

# **Impact of Environmental Cost on Corporate Performance: Focus on Selected Oil Firms in Nigeria**

**Ibeanu, Ijeoma Rita Ph.D**

*Advanced Space Technology Applications Laboratory (Astal), University of Uyo Main Campus, Nwaniba Road Uyo, AkwaIbomState.Affiliation, Nigeria.*

**Okwo, Ifeoma Mary Ph.D**

*Department Of Accountancy, Enugu State University of Science and Technology, Enugu State, Nigeria.*

**Nkwagu, Louis Chinedu Ph.D**

*Department of Accountancy, Ebonyi State University, Abakaliki Nigeria*

**Nkwagu, Chinasa Gloria**

*Department of Business Management and Entrepreneurship, Ebonyi State University, Abakaliki Nigeria*

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## **ABSTRACT**

*This study seeks to determine the impact of environmental cost on corporate performance of selected oil firms in Nigeria with emphasis on determining the extent to which environmental remediation and pollution control cost, environmental law compliance and penalty cost, and employee health and safety cost affect corporate performance. Use was made of an ex post facto research design and secondary data obtained from the annual reports and accounts of oil and gas firms. The study employed descriptive statistics and multiple regression models in testing three hypotheses formulated. The result of the analysis showed that environmental remediation and pollution control cost have significant and positive effect on return on assets of the sampled oil and gas firms in Nigeria. The findings of the study supported the environmental quality cost management theory. The implication of this finding is that the development and operation of Nigerian oil and gas companies had their return on assets affected negatively by environmental costs proxies. 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 management of oil and gas firms should endeavour to increase the level of awareness of environmental remediation and pollution control costs and comply with environmental laws so as to curtail environmental charges.*

**Keywords:** *Environmental remediation, pollution control, Environmental law compliance, penalty and Employee health and safety costs*

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## **I. INTRODUCTION**

It has been observed that the major challenges confronting most businesses globally and indeed the developing countries is the destruction of the environment, through depletion of natural resources, environmental degradation, and non-sustainable and ecosystem destruction (Enahoro, 2009). Industrial emissions have contributed adversely to the climate change and affluent pollution to land degradation process. As the 21<sup>st</sup> century countries are considered to be the age of progress and prosperity, more and more emphasis is being laid on nature and environment that surrounds us. The main reason of accounting's interest in the environment is that there is increasing need 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. Main environmental expenditures whether Capital (CAPEX) or Operating costs (OPEX) increase dramatically day after day.

There is a worldwide debate on the issue of environmental cost, stemming from a flow of evidence about ecological degradation caused by economic development (Taylor, Sulaiman and Sheaham, 2001). Most environmental degradations and emissions are anthropogenic, an advent traceable to the industrial revolution of late 18<sup>th</sup> century where economic activities in many communities moved from agriculture to manufacturing (Onyali, Okafor and Egolum, 2014). Production shifted from its traditional locations in the home and the small

workshop to factories. The overall amount of goods and services produced expanded dramatically. New groups of investors, business people and managers took financial risks and reaped great rewards (Onyali, et al., 2014). Although, the use of natural resources including energy are indispensable to economic development, and not devoid of environmental consequences as traceable to the environmental degradation and atmospheric pollution experienced in South-South Zone of Nigeria (Adegbulugbe and Akinbami, 1998). An emerging market economy like Nigeria must continue to advance economically and this requires increased exploitation of natural resources.

Industrial revolution has brought economic improvement for most people and firms in industrialized economy. Many enjoyed greater prosperity and improved health. There have been costs; however, industrialization has brought factory pollutants and greater land use which harmed the natural environment (Mastrandrea and Schneider, 2008). It has been observed presently that environment effects on corporate performance are becoming much more urgent economic, social and political challenges. Accountants, auditors, managers, as the custodians and light bearers of economic development can no longer shut their eyes to the effects of environmental accounting and disclosure of environmentally related information on corporate performance. Protection of the environment and the continual sustenance of operation of corporate activities are becoming a common subject of discussion among accountants all over the world today (Eyo, Effiok and Okon, 2013). This implies that there is an increasing interest in environmental protection at all levels.

The world at large has need to evaluate and assess the effect of accounting reporting on raw materials, energy consumption and use of natural resources which have systematically depleted the environment. In the light of the need to increase environmental attention and the fact that the oil and gas sector has profound production impact on the environment, this study will explore the impact of environmental costs accounting on corporate performance of oil firms in Nigeria.

### **Statement of the Problem**

The oil and gas firms presently have caused a lot of environmental problems in a bid to maximize profit through endless needs, rapidly advancing technological developments and unconscious consumption of natural resources as they execute their operations. The earth environment is a rich heritage but the present civilization has involved us in varied activities. Many of these activities generated waste with potential constituents. The ultimate disposal of the waste led to environmental pollution in many parts of the world, the magnitude of pollution of the environment has already reached an alarming level. Therefore, the adverse environmental effect on economic development has become a matter of great public concern all over the world. Gradually environment is becoming a much more urgent economic, social and political problem.

At first glance, the efforts in order to remove environmental pollution involved additional cost to be incurred by the oil and gas firms both in the short and long term. Despite these challenges, many firms in emerging market economies have been avoiding environmental responsibility with the view that environmental cost exerts great effect on their financial position. Though, there are indicators of environmental accounting practices in corporate organizations in developing countries, yet the practice of environmental accounting is not solid enough, as there are few specialized activities in organizations to apply it and this has made corporate performance below expectation. This unhealthy functioning of environmental accounting has also resulted in failure to meet the needs of business and other stakeholders in relation to the environment.

The fact that most industries are becoming progressively more aware but unconcerned of the environmental and social liabilities pertaining to their operations and products is a constant norm and practice. This if left unattended will create more problems to the firms and the environment at large. Some of the specific issues (problems) regarding environmental accounting and reporting include: identification of environmental cost and expenses, identification of environmental losses, Identification of environmental liabilities, measurement of liabilities and capitalization of cost.

At present, there are no much accounting standard issued for accounting treatment of these specific problems, only regulations and guidelines which are voluntary in nature.

Therefore, the reporting of financial transactions about environmental activities has become a necessity. This reporting process is accomplished through accounting and especially environmental costs which are critically important to form this environmental awareness. A number of researchers in the advanced world have analyzed environmental costs and try to determine whether it exerts significant effects on corporate performances. However, the results from such studies have been inexhaustible and inconsistency. Again, not much attempt have been made here in Nigeria to study the interplay between environmental cost and corporate performance. The basic question which this research is concerned with is whether there exists sufficient evidence to prove that environmental cost exerts an effect on the corporate performance of oil and gas firms in Nigeria and hence the justification for this study.

### **Objectives of the Study**

The broad objective of the study is to assess the impact of Environmental Costs on Corporate Performance of oil firms in Nigeria. To achieve this main objective, the specific objectives of the study are to:

1. Determine the extent to which environmental remediation and pollution control Cost affect corporate Performance among oil firms in Nigeria in Nigeria.
2. Ascertain the extent to which environmental law compliance and penalty cost affect corporate performance among oil firms in Nigeria in Nigeria.
3. Determine the extent to which employee health and safety costs affect corporate Performance among Oil firms in Nigeria in Nigeria.

### **Hypotheses**

The following hypotheses guided the study:

**Ho<sub>1</sub>:** Environmental remediation and pollution control Costs have no significant influence on corporate Performance among Oil firms in Nigeria in Nigeria.

**Ho<sub>2</sub>:** Environmental law compliance and penalty costs have no significant influence on corporate Performance among Oil firms in Nigeria in Nigeria.

**Ho<sub>3</sub>** Employee health and safety costs have no significant influence on corporate Performance among Oil firms in Nigeria in Nigeria.

### **Significance of the Study**

The need for organizations to be conscious in controlling waste discharge into the environment has led many firms around the world to adopt the use of Environmental cost in order to determine the cost of their operation activities in their environment, thereby, determining the environmental responsibilities their organization is owing to its community. This work gives management the knowledge and understanding of environmental costs which will promote more accurate costing and pricing of products in the oil and gas sector. It also help the management to know whether there is need to present their financial statements in break-up basis as the going concern of the entity may be questionable. It will also reveal to the management the need for information disclosure that will enhance users' comparability to other organizations, Support Company's development of strategies on operation of an overall environmental management system.

This work helps investorsto predict how future cash flows of an entity could be distributed among those with a claim against the entity's assets. It would also communicate to the investors on how efficient and effective the managements of oil firms have discharged their social responsibility. It would also be significant in knowing the future growth prospects in share prices of the sampled oil firms. This also helps government on policy formulations, especially in the area of environmental laws and regulations. It also help them to recognize environmental costs as allowable expenses in calculating the government taxes from the operating profit of the oil firm.

Also beneficiaries include Researchers, Students and Body of Academics. This study would serve as a basis for further research by scholars on environmental costs and other related environmental information.

### **Scope of the Study**

This study examines the effect of environmental cost on the performance of oil firms in Nigeria. The study covers only environmental expenditure impact on the performance of sampled oil companies in Nigeria over the time period (2000-2021). The effect of environmental remediation and pollution control cost, environmental law compliance cost and employee health and safety cost on corporate performance were examined, thereby providing an empirical investigations of the environmental cost and corporate performance. The study made conscious effort to address these environmental issues and provide a framework for examining the possibility of the impact of environmental cost on corporate performance of oil firm in Nigeria.

Meanwhile, the major limitation of this study is dearth of required data. The use of sampled companies was as a result of incomplete data from some oil firms that make up the population. So the results from the sampled oil firms were used to generalize the effect of environmental cost on corporate performance. However, this limitation identified did may not have significantly affected the result of this research.

## **II. REVIEW OF RELATED LITERATURE**

### **Environmental Costs**

The Environmental Protection Agency (1996) define Environmental cost as those cost that have a direct financial impact on a company (internal cost) and cost to individual society and the environment for which the company are not accountable (external cost). Environmental cost comprises both internal and external cost and relates to all cost occurred in relation to environmental damage and protection. Internal cost, include cost for prevention waste disposal, planning material purchase value of non-product output control, shifting action and damage repairs that can occur at companies and affect governance or people. While external cost are

the cost of environmental damage external to the firm. These cost include contaminated site, fine and penalties, cost of regulatory compliance, legal cost, damage to corporate image and environmental liabilities

Gary (2005) also opines that environmental cost is the cost of making sure that a company's activities do not damage the environment or that any such damage is put right. There are many types of environmental costs and these are often difficult to identify as they are hidden in overheads. Measuring environmental cost is now an important issue for many companies, as national regulations become more stringent and penalties or fines more severe. Many environmental costs can be significantly reduced or eliminated as a result of business decisions, ranging from operational and housekeeping changes, to investment in cleaner production, to redesign of processes/products. Accounting for environmental costs and performance can support an organization's development and operation of an overall Environmental Management System (EMS) and ISO 14000 accreditation.

### **Classification of Environmental Cost**

Makori and Jagongo (2013) have advocated that an environmental cost report should be produced at regular interval based on the concept of a cost of quality report to indicate the total environmental cost to the organisation associated with the creation, detection, remedy and prevention of environmental degradation.

It is useful to classify environmental costs into four categories

1. **Environmental prevention cost:** being cost of processes involved to avoid the waste in production which could bring about pollution of the environment. The cost that may be involved include certification for meeting international and national standard, staff training, designs and plans to minimize pollution product regarding.
2. **Environmental Evaluation Costs:** These are the cost associated with ensuring that companies' product function and goods comply with the law and local regulations and procedures. The associated costs include verification of goods and production function to determine compliance with rules environmental audits and carrying out of pollution tests.
3. **Environmental Internal Failure Cost:** These are costs of carrying out production function that have been finalized but are yet to be released to the environment especially those that involves the elimination or reduction of waste to the extent of meeting up with the standard. Example includes the cost of having scraps reworked and disposal of acidic items that are injurious to human health.
4. **Environmental External Failure Costs:** These are cost of functions carried out after polluting the environment with waste. Examples include the cost of reducing degradation of the soil ensuring the reduction of the spread of oil-spillages, fumigations to reduce bacteria effect with the effective classification of cost. Environmental cost report should be framed in such a manner that all classes of costs is denoted as a function of turnover (operation costs) in order to ensure that comparison with past period, other companies and subsidiaries of the same company are made possible.

### **Environmental Remediation and Pollution Control Cost**

Remediation tends to be expensive and can include excavation, drilling, construction, pumping, soil and water treatment, and monitoring, and can include the response costs incurred by regulatory authorities (Kevin, Tony, Beate and Tom, 2015). Remediation costs also can include the provision of alternate drinking water supplies for affected community residents, remediation cost for cleaning up pollution posing a risk to human health and, in some circumstances, purchase of properties and relocation expenses. Technical studies and the expenditure of management, professional, and legal resources add to the cost of remediation.

The remediation obligation is distinctive because an organization may face remediation obligations due to contamination at inactive sites that are otherwise unregulated; at property formerly but not currently owned or used; at property it never owned or used, but to which its wastes were sent; and, at property it acquired but did not contaminate, as large expenditures will be needed in the short-term to remediate existing environmental contamination, particularly at inactive and abandoned sites, these liabilities often dominate and can distort a firm's assessment of its environmental liabilities. Therefore, it is helpful to distinguish between remediation obligations for existing contamination and potential remediation obligations for future contamination because managers can have more impact on ongoing and future activities and releases - whether accidental or not - that may trigger future remediation obligations.

### **Concept of Environmental Law Compliance and Penalty Cost**

Organizations that are not in compliance with applicable requirements may be subject to civil or criminal fines or penalties for non-compliance and/or expenses for projects agreed to as part of a settlement for non-compliance. Such payments fulfill punitive and deterrent functions and are in addition to the costs of coming into compliance. Fines and penalties (and related outlays for supplemental environmental projects) can

range from modest amounts to a few million dollars per violation. Generally, a civil penalty is assessed that is at least equal to the costs a company saved through non-compliance, thus removing any financial incentive to ignore a law. The costs of compliance can range from modest outlays required to conform to administrative requirements (e.g., record keeping, reporting, labeling, training and all that) to more substantial outlays, including capital expenditures (e.g., to pre-treat wastes prior to land disposal or release to surface waters, to contain spills, to treat air emissions). Regulations also impose "exit costs" (e.g., to properly close waste disposal sites and provide for post-closure care).

### **Concept Employee Health and Safety Cost**

Under common law and some state and federal statutes, companies may be obligated to pay for compensation of "damages" suffered by individuals, their property, and businesses due to use or release of toxic substances or other pollutants. These liabilities may occur even if a company is in compliance with all applicable environmental standards. Distinct subcategories of compensation liability include personal injury (e.g., "wrongful death," bodily injury, medical monitoring, pain and suffering), property damage (e.g., diminished value of real estate, buildings, or automobiles; loss of crops), and economic loss (e.g., lost profits, cost of renting substitute premises or equipment). Compensation costs can be fairly minor or quite substantial, depending on the number of claimants and the nature of their claims. Oftentimes, legal defense costs (potentially including technical, scientific, economic, and medical studies) can be substantial in handling such claims, even when the claims are ultimately determined to be without merit. Moreover, responding to compensation claims can consume management time and require expenditures in order to control damage to corporate image.

Compensation liabilities may involve costs for remediation of contaminated property as well as provision of alternate water supplies, thus somewhat overlapping the remediation category. Because of workers' compensation and employer liability laws, payments to compensate employees for occupational exposure and injury from hazardous or toxic substances are not generally determined through litigation against the employer or considered environmental liabilities. However, occupational claims sometimes may be brought against another party who is not the employer; for example, workers responding to a train wreck have sued the shipper of hazardous wastes released at the scene of the wreck; for the shipper, these claims can be viewed as environmental liabilities. Managers will want to understand the potential costs of occupational exposure and injuries, because actions taken to prevent or reduce environmental liabilities may also eliminate or reduce occupational liabilities.

### **Return on Assets (ROA)**

The return on assets ratio, often called the ratio on total assets, is a profitability ratio that measures the net income produced by its total assets during a period, by comparing net income to the average total assets. In other words, return on assets ratio or ROA measures how efficiently a firm can manage its assets to produce profits during a period. It illustrates how well management employed the firm's total assets to make profit. The higher the return, the more efficient management is utilizing its asset base. Since firm's assets sole purpose is to generate revenue and produce profits. This ratio helps both management and investors see how well oil and gas firms can convert its investments in assets into profits. One can look at ROA as a return on investment for the firm, since capital assets are often the biggest investment for most oil and gas firms. In this case, oil and gas firms invest money into capital asset and the return is measured in profits. The return on assets ratio formular is calculated by dividing net income by average total assets.

$$\text{Return on Assets (ROA)} = \frac{\text{Net income}}{\text{Average Total Asset}}$$

The return on assets ratio measures how effectively a firm can earn a return on its investment assets. A positive ROA ratio indicates an upward profit trend as well as greater value to the firm (Burritt, Italu and Schatteger (2004).

### **Theoretical Framework**

#### **Environmental Quality Cost Management Theory**

The theory was postulated by Hecht in 1999, and is formulated on the basis of environmental cost reduction model. The basic assumption of this theory is that the lowest environmental costs will be attained at the point of zero-damage to the environment. It is considered that before environmental costs information can be provided, environmental costs must be defined. Environmental quality model is the ideal state of zero-damage to the environment, which is analogous to environmental quality management (EQM), a zero-defect state of total quality management. This is certainly compatible with the concept of eco-efficiency.

Environmental costs incurred are costs arising because poor environmental quality exists or may exist and these have to be prevented, reduced or remedied. Various theories such as the Stakeholder's theory, the Political economy theory and the corporate social responsibility theory have been found relevant to this work.

Also in the environmental theory postulated by O’Riordan (1997), Pepper (1986) and Dobson (1990) as cited by Acti et al (2013), emphasizes the need for environmentally friendly products and clean technology and stresses the need for business to produce a balanced report that includes reporting the impact of business activities on the environment.

Environmental Quality Cost Management theory concerns itself on how management provide environmental cost information and help to reduce its damage to the environment. It also indirectly help improve firm performance, since profit may not be attainable if the environment in which the business operates is neglected. This study thus adopts the Environmental Quantity Cost Management theory because the corporate performance of oil firms in Nigeria will not improve if the environment where they operate is not protected or taken care of.

### **Empirical Review**

Samuel, Aruna&Amahalu (2020) focused on the relationship between environmental cost and profitability of oil and gas firms listed on Nigeria Stock Exchange. The proxies for environmental cost disclosures include waste management cost disclosure, employee Health and Safety cost disclosure and environmental remediation cost, while net profit margin was employed as profitability measure. Content Analysis via STATA 13 statistical software were used to test the hypotheses of the study. The result of this study showed that waste management, employee Health and Safety, and environmental remedial costs have a significant positive effect on net profit margin at 5% level of significance respectively.

Iliemena&Ijeoma (2019) examined the effect of sustainability reporting on financial performance of manufacturing firms quoted on Nigerian Stock Exchange, using secondary data from annual reports and accounts of 24 sampled quoted manufacturing companies. The study period ranged from 2012 to 2018 which represents IFRS reporting period in Nigeria. The three hypotheses formulated were tested using regression analyses at 5% level of significance. Findings reveal among others that there is no significant effect of environmental disclosures on ROCE.

Okafor (2018) focused on firms within the Nigeria oil sector and used returns on assets (ROA) as the indices for performance of firms’. The study employed the regression analytical techniques and found that environmental cost incurred by firms within the oil and gas sector have significant and positive influence on their performance.

Chiamogu&Janefrances (2015) examined the extent environmental cost affects financial performance in Nigeria. The specific objectives were to determine the effect of community development cost and environmental remedial cost on Tobin’s on oil and gas companies in Nigeria. Data were obtained from annual reports and accounts for the period 2011 to 2018. The hypotheses were tested using regression analysis with the aid of e-view 9.0. The results of the empirical data analysis revealed that community development and environmental remedial cost has positive significant effect on Tobin’s on oil and gas companies in Nigeria.

Adeiran and Alade (2013) researched on the impact of environmental and social accounting on corporate performance in Nigeria. It used fourteen (14) randomly selected quoted companies in Nigeria. Data were collected from annual report analysed using regression analysis. They discovered that there is negative relationship between Environmental Accounting and Return on Capital Employed and Earning per share and a significant relationship between Accounting and Return on Capital Employed and Earning per share and a significant relationship between Environmental Accounting and Net profit margin cum divided per share.

Daniel (2013) carried out similar study on the effect of Environmental regulations on financial performance of manufacturing companies in Tanzania. The study used regression analysis with a sample of five (5) selected listed manufacturing companies. The findings indicated that Environmental compliance has no significant effect on the financial performance of listed financial companies in Tanzania. Also, Odatayo, Adeyemi and Sajuyigbe (2014) carried out a study on impact of corporate social responsibility on profitability of Nigerian banks. The study is an empirical investigation which sampled six (6) banks in Nigeria from 2003 – 2012 using annual report and with the use of simple regression analysis reviewed that there is a significant relationship between expenditure on social responsibility and profitability of banks in Nigeria.

In a study conducted by Osemene, Kasum and Asaolu (2012) on the impact of SMEs activities on human health and environment in Oyo state Nigeria, they discovered that environmental problem lead to inhalation of harmful smokes, emissions, noise pollution, etc. They added that the quest for rapid industrialisation (not yet visible) and development pushed environmental management to the background. Meanwhile, EI Serafy and Lutz (1996) noted earlier that consumers willingly pay more for product of companies that preserve and clean the environment.

Enyi (2012) studied environmental and social accounting as an alternative approach to conflict resolution in a volatile and e-business environment, it state that through profit and improvement in word social welfare are the main reason for industrialisation, as government and business owners strive to solve one social problem or another, these same solution processes scoop up of other problem along the line which inadvertently

breed conflict and confrontations between host communities and owners and operators of the organisations attempting solutions. It was found that a lot could be done to douse the resulting conflagrations and pacify those directly affected by applying palliative and preventive remedies using the process of environmental and social accounting as aspect of corporate social responsibility (CSR) polices as a tool.

Beredugo and Mefor (2012) highlighted that Nigeria as a developing country must continue to advance economically and thus required increase exploitation of natural resources. They buttresses further that there exist a polarity between Nigeria GDP and energy consumption as they are highly correlated. They emphasised that most of the natural resources consumed are non-renewable and are under threat of depletion and a persistence consumption of most valued natural resources in present day would compromise the ability of future generation to meet their own needs. Oil exploitation and government activities may have reduced the quality and usefulness of life through gas flaring, industrial pollution, oil spillage, deforestation and other related problems. In the same vein, Uwaigbe, (2012) conducted a research on corporate environmental disclosures in Nigeria Manufacturing industry. He adopted the use of content analysis of manufacturing industry concerning the extent of disclosure. However, the paper discovered among other things that the level of environmental disclosure practices in Nigeria is still low. It concentrated much on cement manufacturing firms and fails to analyse the cost components of the firms.

Rikhardson 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.

Field (2002) studied environmental economics effect on firms performance. The study used ordinary least square. It explained the pertinent aspect of environmental degradation and costs as those including emission into air, water, and land. Also aspect of untreated domestic waste outflows into rivers and coastal ocean, quantities of solid waste that must then be disposed of, perhaps through land spreading or incineration. Pollution include airborne Sulfur dioxide emission from power plants by stack-gas scrubbing which leaves a highly concentrated sludge and degradation which incorporates midnight dumping, illegal dumping along the sides of roads or in remote areas. The study asserts that environmental cost exerts a significant and positive effect on companies' performance.

Eyo, Effiok, and Okon (2013) examined the impact of Environmental Accounting and Reporting on Organizational Performance. The study used multiple regression 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 have a high degree of influence on performance of firms. Hassel(2005) investigated the effect of environmental information on the market value of listed companies in Sweden using a residual income valuation model. The results show that environmental responsibility as disclosed by sampled companies has value relevance, since it is expected to affect the future earnings of the listed companies. Their findings have implications for companies that pollute the environment – their future solvency may be eroded with gradual depletion in earnings.

Wayman (2008) in examined 500 companies in Europe and America between September 2006 and December 2007, and found 68 percent (335) issuing environmental reports. Of these 335 reports, 87 percent address climate change, with 78 percent publishing Quantitative Green House Gas (GHG) emissions data; 65 percent include a specific climate change section, and 41 percent address climate change in the chairperson introduction. However, only 16% percent assign management responsibility for addressing climate change. He emphasized that a look at their operations shows that organizations with increased report on environmental issues and global warming are receiving increased patronage from stakeholders.

Banerjee (2005) posits that since oil and gas resources are natural assets and non-renewable and it is generally accepted that the environmental impact from the sector is significant, so economic valuation, accounting and reporting of these resources and their environmental impacts are very important to ensure sustainable development.

From the foregoing literature description, it is obvious that a number of studies both local and international laid emphasis on environmental disclosure and performance of firms but did not take into consideration the effect of environmental cost accounting on corporate performance of oil and gas firms. Following this submission is the need and gap the researcher intends to cover in this work.

### **III. METHODOLOGY**

The study adopted an *ex post facto* design since it relies on published data. The data for the study were obtained from the published annual reports of the sampled oil and gas firms in Nigeria for a period of eighteen years (2000 – 2021). The firms were Texaco Nigeria Plc, Mobil Oil and Gas Nigeria Plc and AGIP Nigeria Plc. The availability of the relevant data required for the analysis for the period under review was the consideration

for the inclusion of each oil and gas firm selected for the study. The study employed Multiple Regression Analysis to evaluate the effect of environmental cost on corporate performance of selected oil and gas firms in Nigeria.

The justification for adopting this was based on the following premise; the least square estimate is assumed to be the best linear unbiased estimator (Gujarati, 1995); it has minimum variance (Onwumere, 2006).

**Model Validity and Justification**

The study adopted multiple regression model as represented below:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon_t$$

- Where, Y = dependent variable
- X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub> = explanatory variables
- β<sub>0</sub> = intercept of Y
- β<sub>1</sub>, β<sub>2</sub>, β<sub>3</sub> = slopes of coefficients
- ε = error terms.

This is modified as presented below;

$$ROA = \beta_0 + \beta_1 ERPC + \beta_2 ELPC + \beta_3 EHSC + \epsilon_t$$

Where,

- ROA = Return on Asset
- ERPC = Environmental Remediation and Pollution Control Costs
- ELPC = Environmental Law Compliance and Penalty Costs
- EHSC = Employees Health and Safety Costs
- ε<sub>t</sub> = error terms

**IV. DATA PRESENTATION AND ANALYSIS**

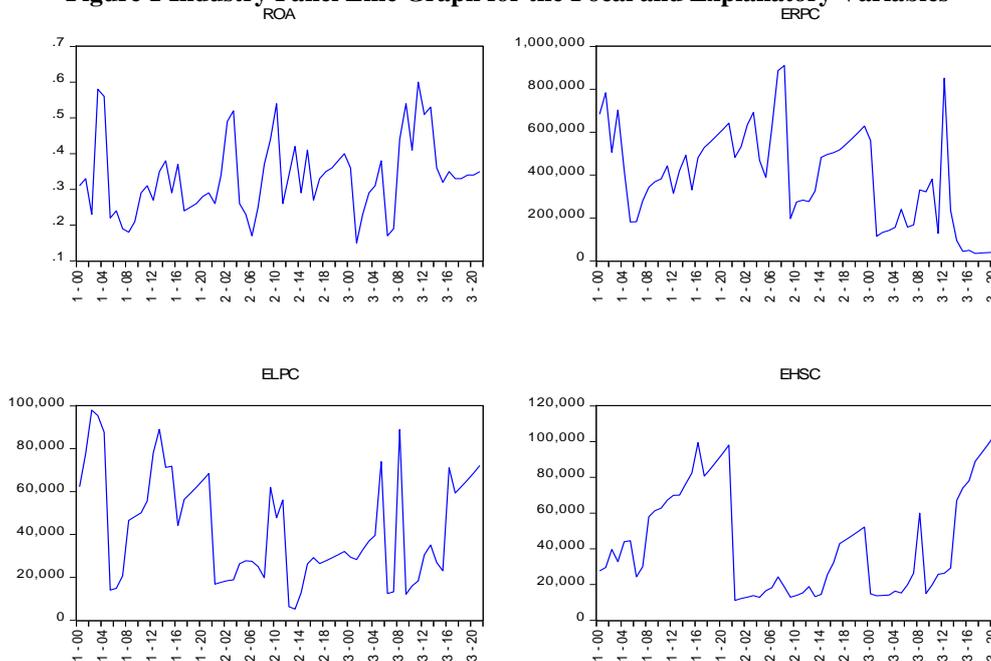
**Table 2: Descriptive Statistics of the Variables – Panel Data**

	ROA	ERPC	ELPC	EHSC
Mean	0.335455	391769.8	43098.14	44107.05
Median	0.330000	385940.0	33960.50	31126.00
Maximum	0.600000	910700.0	98016.00	108099.0
Minimum	0.150000	34660.00	5238.000	11077.00
Std. Dev.	0.106946	228592.5	24957.05	30176.53
Skewness	0.637288	0.177883	0.447365	0.615074
Kurtosis	2.916329	2.283966	2.040450	1.967061
Jarque-Bera	4.486749	1.758006	4.733519	7.095617
Probability	0.106100	0.415197	0.093784	0.028788
Sum	22.14000	25856810	2844477.	2911065.
Sum Sq. Dev.	0.743436	3.404312	4.053410	5.925710
Observations	66	66	66	66

**Source:** Author's E-views 10 Output, 2023.

Table 2 above reveals the variable description of the 66 observations of the time series data for the sampled oil and gas companies. The industry maximum value for return on assets in our sample was ₦0.60m with a minimum value of ₦0.15m approximately. Also, the maximum value for Environmental Remediation and Pollution Control Cost (ERPC), Environmental Law Compliance and Penalty Cost (ELPC) and Employees Health and Safety Cost (EHSC) stood at 910,700.00, 98,016.00, and 108,099.00 respectively with minimum values of 34,660.00, 5,238.00, and 11,077.00. The standard deviations of 0.106946, 228592.5, 24957.05 and 30176.53 for the variables implied that those individual observations did not deviate so much from their respective mean of 0.335455, 391769.8, 43098.14 and 44107.05 respective. The skewness estimate was used to capture how the variables for the sampled oil and gas firms lean to one side of the distribution. Hence, it was observed that all the variables were positively skewed. This indicated that probability distribution of the variables means has fatter tails to the right of the distribution. It can also be observed that the relative skewness of the variables lied closer to zero which implied that the probability distribution was evenly distributed around their respective mean which guaranteed an approximate normal distribution.

**Figure 1 Industry Panel Line Graph for the Focal and Explanatory Variables**



Source: Computed by Researcher Using Eviews 10.0 Statistical Software, 2023.

The Figure above showed at a glance the industry trends for the variables under review from 2000 to 2021. The pattern of these movements required further analysis to unfold the connections between the focal and explanatory variables.

**Table 3: Result of Panel Unit Root Tests**

Variables	ADF P-value at levels	Decision	ADF P-value at 1 <sup>st</sup> Diff.	Decision	ADF P-value at 2 <sup>nd</sup> Diff.	Decision	Order of Integration
D(ROA)	0.0117	Reject Ho	-	-	-	-	1 (0)
D(ERPC)	0.0600	Do not Reject	0.0000	Reject Ho	-	-	1 (1)
D(ELPC)	0.0453	Do not Reject	0.0000	Reject Ho	-	-	1 (1)
D(EHSC)	0.9951	Do not Reject	0.0002	Reject Ho	-	-	1 (1)

Source: empirical analysis, 2023.

Table 3 above depicts the stationarity test of the variables used in this study. This test is significant in order to determine if any of the variables (focal and explanatory) has a unit root or to know if the variable is non-stationary. The result above shows that ERPC, ELPC and EHSC are integrated at the order of one (1) while ROA is attained stationarity at level.

**Table 4: Presentation and Analysis of Regression Result**

Dependent Variable: DROA				
Method: Panel Least Squares				
Date: 05/19/23 Time: 02:56				
Sample (adjusted): 2001 2022				
Periods included: 21				
Cross-sections included: 3				
Total panel (balanced) observations: 63				
Variable	Coefficient	Std. Error	t-Statistic	Prob.

D(ERPC)	1.271207	7.370108	1.723609	0.0400
D(ELPC)	1.452306	6.623207	2.196632	0.0320
D(EHSC)	-1.673406	1.421306	-1.176665	0.2441
C	0.006540	0.014897	0.439026	0.6622
R-squared	0.821949	Mean dependent var		0.001746
Adjusted R-squared	0.777303	S.D. dependent var		0.117426
S.E. of regression	0.112796	Akaike info criterion		-1.465086
Sum squared resid	0.750652	Schwarz criterion		-1.329014
Log likelihood	50.15021	Hannan-Quinn criter.		-1.411568
F-statistic	12.731435	Durbin-Watson stat		1.679975
Prob(F-statistic)	0.001774			

**Source:** *Author's Eviews 10.0 Statistical Output, 2023.*

Table 4 indicates that a single change in Environmental Remediation and Pollution Control Cost, Environmental Law Compliance and Penalty Cost and Employees Health and Safety Cost affects return on assets of the sampled oil firms by 1.271207, 1.452306 and 1.673406 respectively. In summary, return on assets is influenced positively by ERPC and ELPC while it is affected negatively by EHSC. The extent of effect of ERPC and ELPC on ROA is both positive and significant while EHSC exerts a negative and insignificant effect on ROA.

The Durbin-Watson statistic is 1.679975 which is also not substantially lower than 2. In this case as well, the Durbin Watson statistic is also closer to 2 than 0 which indicates the absence of autocorrelation in the time series panel data.

The Adjusted R-squared is 0.777303. The adjusted R<sup>2</sup> reveals that about 78% of the variations in Return on Assets (ROA) could be explained by ERPC, ELPC and EHSC while about 22% are explained by other factors capable of affecting return on assets and the error term. The adjusted R<sup>2</sup> coefficient is quite significant. This is supported by the high F-Statistic of about 12.731435 which confirms the statistical significance of the model and p-Value of 0.001774 which shows that the effect of the explanatory variables (ERPC, ELPC and EHSC) on the dependent variable (ROA) is unlikely to have occurred by chance.

The table reveals that the effect of ERPC on ROA of the sampled oil firms in Nigeria is positive and significant. This is the same scenario in ELPC on ROA while EHSC exerts a non-significant and negative influence.

## V. SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

### Summary of Findings

Findings arising from this research were summarized as follows:

1. Findings from the regression result indicate that return on assets was influenced by environmental remediation and pollution control Cost (ERPC). The extent of the influence exerted on return on assets by Environmental remediation and pollution control Cost (ERPC) is significant and positive. This implies that a unit increase in Environmental remediation and pollution control Cost (ERPC) will have a corresponding increase in return on assets of the sampled oil and gas firms in Nigeria.
2. Findings from hypothesis two shows that return on assets were influenced by environmental law compliance and penalty costs. The extent of the influence exerted on return on assets by environmental law compliance and penalty costs is significant and positive. This implies that a unit increase in environmental law compliance and penalty cost will exert a corresponding increase in return on assets of the sampled oil and gas firms in Nigeria.
3. Findings from hypothesis three reveals that return on assets was influenced by employee health and safety costs. The extent of the influence exerted on return on assets by employee health and safety costs is insignificant and negative. This implies that a unit increase in employee health and safety costs will exert a corresponding decrease in return on assets of the sampled oil and gas firms in Nigeria.

### Conclusion

The study appraises the impact of environmental costs on corporate performance of quoted oil firms in Nigeria. Environmental costs cover all cost; incurred concerning environmental protection such as emissions treatment as well as wasted material, capital and labour which so called 'non product output' as a result of inefficiency production activities. Different firms may consider different elements into environmental costs but

it is important that all significant and relevant costs are incorporated for sound decision making purpose. 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 and Agip Petroleum Company have their return on assets affected by environmental remediation and pollution control cost, environmental law compliance and penalty cost and employee health and safety cost. Specifically this study has revealed that these aforementioned explanatory variables exert either positive or negative effects on corporate performance of selected oil and gas firms in Nigeria. However, one common observation across the classifications of the sample companies is that environmental remediation and pollution control costs and environmental law compliance and penalty costs are found to be the most influencing variables on the return on assets of the sampled oil and gas firms.

### **Recommendations**

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

1. The level of awareness of environmental remediation and pollution control cost should be increased. This can be achieved by the ministry of environment liaising with the relevant accounting bodies calling for training and retraining of accounting staff on environmental issues and how to track externality cost.
2. Corporate oil firms on their parts 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
3. Management of oil firms should review and enhance employees' health and safety costs to boost corporate performance.

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