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ENVIRONMENTAL ACCOUNTING EXPENDITURE AND FINANCIAL PERFORMANCE OF LISTED OIL AND GAS COMPANIES IN NIGERIA

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ABSTRACT

The study examined environmental accounting expenditure and financial performance of listed oil and gas companies in Nigeria. The objectives of the study among others are to investigate the relationship between communities' reclamation cost and return on equity of listed oil and gas companies in Nigeria. Determine the relationship between pollution management cost and return on equity of listed oil and gas companies in Nigeria. The study adopted correlational research design. The population and sample size for the study is ten (10) listed oil and gas companies in Nigeria stock exchange. The instrument for this study was secondary data. The research questions were analyzed using mean and standard deviation in the descriptive statistics tables. The formulated hypotheses were tested using the simple regression analysis. The findings of the study among others were that there is no significant relationship between communities' reclamation cost (CRC) and return on equity (ROE) of listed oil and gas companies in Nigeria. Also there is no significant relationship between pollution management cost (PMC) and return on equity (ROE) of listed oil and gas companies in Nigeria. Based on the synopsis of the findings, the study advances the following recommendations among others: Oil and gas companies should seriously embark on restoring host communities that have suffered from the firm's environmental activities by revegetation or land reclaiming for displaced persons. Oil and gas industry should improve on their pollution control strategies, by applying green accounting and provide reduce hazardous mechanisms as it will raise the market value and financial performance.

Keywords: environmental accounting expenditure, financial performance, communities' reclamation cost, pollution management cost, return on equity

INTRODUCTION

As environmental degradation has become a more important concern across the world, the challenges related with accounting for the environment have grown crucial to firmes. Industrialization, which necessitates the use of natural resources such as energy, resulted in manufacturing pollution and increased land usage, both of which wreaked havoc on the natural environment (Mastrandrea & Schneider, 2018). This is reflected in the global environmental deterioration and pollution, notably in Nigeria today. On a national and international level, actions are being done to promote the environment and to limit, avoid, and mitigate pollution's effects. Environmental policies in Nigeria have been seen to be frequently viewed as an opportunity cost of economic expansion. The increased emphasis on environmental sustainability of cooperative organisations by host communities, government, and non-governmental organisations (NGOs) cannot be overstated, and has oriented enterprises, particularly oil companies in Nigeria, towards environmental awareness.

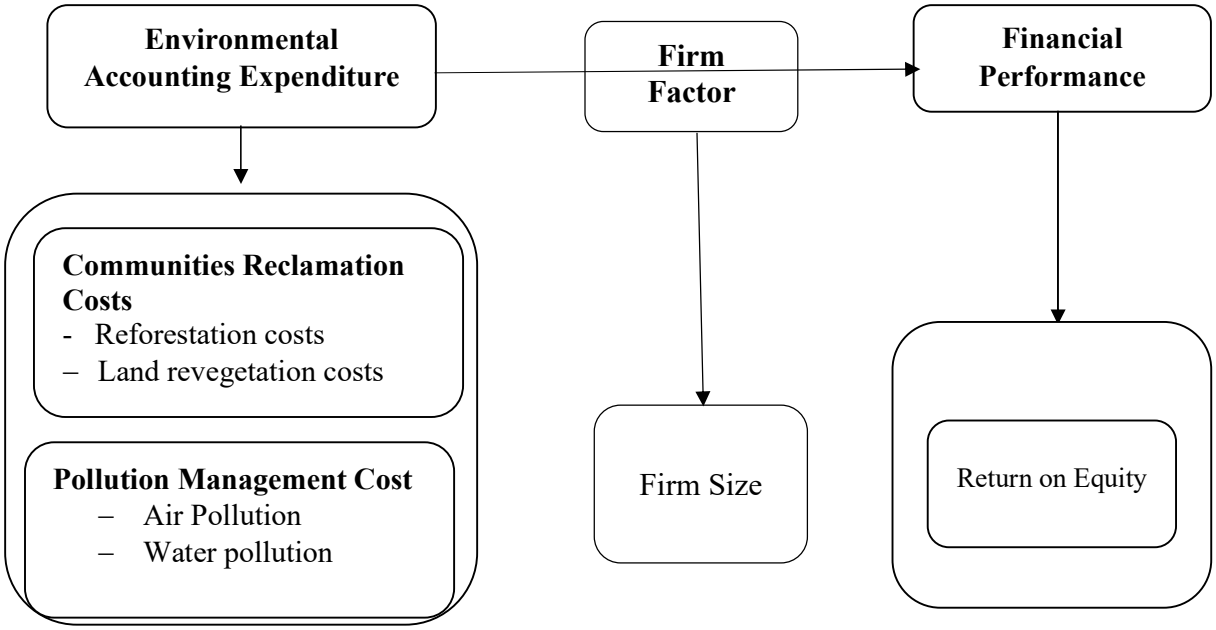
Oil is one of the world's most traded commodities. Oil exploration, production, and development, on the other hand, have two sides to the story. The discovery of oil, particularly in Nigeria, heralds a plethora of opportunities in terms of revenue, industrialisation, technology development, employment, and entrepreneurial growth on one hand. On the other hand, oil extraction has paved the way for social vices, communal strife, and increased corruption, not to mention the

deterioration of the environment. As a result, Nigeria is not immune to environmental issues such as oil pollution, spills, gas flaring, and indiscriminate waste disposal, with worrying oil degradation records among oil-producing countries (Eze, et al, 2016). Recent accountants and corporate strategists have been under a lot of strain because of the rising cost of the environment and its impact on public health, image, and financial performance. As a result, environmental accounting expenses are a component of the oil and gas industry's fundamental costs.

Statement of the problem

In poor countries like Nigeria, there have been concerns and counter-complaints about environmental accounting, reporting, standards, and policies. For long-term development, more than 80% of firms (from small firmes to multinational organisations) do not obey environmental rules and regulations (Ironkwe & Success, 2017). Take the Ogoni clean-up, for example, which has remained unimplemented despite years of approval and which even the current federal government has dabbled in or been duped by politics. The concerns of Nembe and Nigeria Agip Oil Company in Bayelsa State are also discussed. Others include the Eket people and the Exxon Mobil Producing Company in Akwa Ibom state, which has sparked rising protests in Nigeria's Niger Delta over environmental concerns. As a result, both developed and developing countries have called for the use of environmental accounting expense as a key movement (Donwa, 2012). The oil and gas sector must consider the long-term environmental implications of their operations for future generations. In light of these concerns, numerous studies have been published, the majority of which focus on sustainable accounting, corporate social responsibility accounting, and firm performance. Environmental accounting expense dimensionalizing to a company's reclamation cost, on the other hand, is more frequent in developed countries and has a small presence in Nigerian literature. As a result, the goal of this study is to fill a gap in the literature. As a result, the study introduced community reclamation costs, pollution management costs, and waste management as dimensions of environmental accounting expenditure, as well as return on equity and return on assets as financial performance measures for publicly traded oil and gas companies in Nigeria.

Conceptual Framework Model



Sources: Nnamani, et al. (2017), Pramanil, Shil and Das (2012); Ironkwe and Success, (2017); and researcher's conceptualization (2022).

Aim and objectives of the Study

The main aim of this study is to find out the relationship between environmental accounting expenditure and financial performance of listed oil and gas companies in Nigeria. The other objectives are to:

1. Investigate the relationship between communities' reclamation cost and return on equity of listed oil and gas companies in Nigeria.
2. Determine the relationship between pollution management cost and return on equity of listed oil and gas companies in Nigeria.
3. Determine the influence of firm size in the relationship between environmental accounting expenditure and financial performance of listed oil and gas companies in Nigeria.

Research Hypotheses

Seven null hypotheses and tested at 0.05 level of significant guided the study

Ho_1: There is no significant relationship between communities' reclamation cost and return on equity of listed oil and gas companies in Nigeria.

Ho_2: There is no significant relationship between pollution management cost and return on equity of listed

Ho_3: Firm size has no significant influence in the relationship between environmental accounting expenditure and financial performance of listed oil and gas companies in Nigeria.

Conceptual Review

Environmental Accounting Expenditure

Environmental accounting expense is the process of identifying, analysing, measuring, allocating, and integrating environmental spending into a firm for the benefit of shareholders (Daniel, And Ambrose, 2013). Environmental accounting, according to experts, aids in the provision of information for transparency reasons, pollution reduction, cost savings via increased efficiency, reduced compliance costs, and affect firm value, attracting more investors owing to regulatory compliance, and profitability (Konar & Cohen 2012; Egbunike & Okoro, 2018). Environmental accounting (EA) evaluates waste treatment and removal costs, pollution/spill control costs, environmental compensation costs, non-productive uses, monetary fines, and environmental litigation costs (Corporate environmental index record,2012; Pramanik et al, 2009). Environmental investments are beneficial because they address society needs like as pollution management and public health, rather than reducing total profitability through non-productive usage. In the face of strong public demand and financial performance requirement, accountants are nonetheless concerned about the developing role of cost in environment accounting. Environmental accounting may be used to explain a company's financial performance (Daniel. & Ambrose, 2013).

Concerns about resource depletion, scarcity, and environmental degradation, as well as the ozone layer depletion, have heightened awareness between companies and the environment in which they operate in Africa and other developing countries. This enlightenment has been heightened by concerns about resource depletion, scarcity, and environmental degradation, which is causing an imbalance in the ecological system. With the advent of environmental accounting expenditure practises (of waste management costs, pollution management costs, expenditure towards corporate social costs, costs on human development and empowerment, community development costs, and so on) due to firm's industrial activities, accountants are expected to take a proactive role in the environmental sustainability process, which should be internalised in corporate accounts. That is why, in today's world, environmental accounting spending and reporting are critical.

Dimensions on Environmental Accounting

Communities Reclamation Cost

Reclamation refers to the actions done to recondition or restore land or water that has been harmed by exploration or mineral development, mining or onsite processing activities, or waste disposal in methods that avoid or manage onsite and offsite environmental degradation. On oil and gas sites, the primary goal of reclamation is to restore damaged areas to their original or former use, such as agricultural farming or animal habitat. The establishment of a self-sustaining native plant community that fulfils density and forage production standards, as well as the re-contouring of all disturbed surface areas to match or blend with the original landform, are typically the criteria for successful reclamation (Smith, 1993). According to Richard (2010), in current environmentally friendly field upgrades, an operator's authorization to drill commonly incorporates a limit on the total surface area that can be disturbed at one time. As a result of this limitation, interim reclamation is performed during the construction, drilling, and well production stages of oil and gas development to ensure that surface disturbance is kept within the drilling permit's restrictions. During interim reclamation, land on a well site that is not being utilised for production but has been disturbed should be recovered by re-contouring, topsoil replacement, and revegetation.

Pollution management cost

Environmental pollution is defined as any activity by organizations or individuals that jeopardizes others' health and/or environment in a confined region, where a causal relationship can be established. In the environment, there are seven different forms of pollution. Pollution management costs are all about reducing emissions and effluents into the environment. It comprises the use of materials, procedures, or behaviours to reduce, diminish, or eliminate pollution or waste creation. Methods for preserving poisonous or hazardous chemicals, energy, water, and/or other resources are included (Ousama & Fatima, 2010).

According to Pramanil et al (2012), pollution management costs are expenditures incurred to regulate harmful emissions and effluents into the environment. The sum of direct and indirect expenses related with pollution control operations is referred to as pollution management costs. Direct expenses include materials, consumable stores, spares, personnel, equipment usage, utilities, testing & certification resources, and other identified resources used in waste processing, disposal, remediation, and other activities. The cost of resources is something that many people face. Pollution control expenses activities, for example, are an example of an indirect cost. Expenses associated with registration and other comparable matters.

According to Pramanil, et al., internal pollution control costs should be accounted for when incurred and quantified at the historical cost of resources utilised. Future cleanup or disposal costs Based on the quantity of pollution created, expected to be incurred and reported.

The expense of future cleanup or disposal is unknown. For example, future disposal costs of solid waste created during the present period should be assessed on a "per tonne" basis. Expenses for pollution control are incurred as a result of activities done by outside contractors. Expenses such as social and external costs, for example, cannot be forecast with sufficient precision. They are not included in the overall purpose of the expenditure statement.

Types of Pollution:

- Soil pollution is defined as the presence of any soil contaminants in the soil that are detrimental to living organisms when their concentration level exceeds a certain threshold.
- Water pollution is defined as any contamination of water, alteration of sewage or trade effluent, or introduction of any other liquid, gaseous, or solid substance into water that may cause a nuisance or render the water harmful or injurious to public health or safety,

or to domestic, commercial, industrial, agricultural, or other legitimate uses, or to the life and health of animals, plants, or aquatic organisms.

- Air pollution is defined as any solid, liquid, or gaseous pollutant existing in the atmosphere that is hazardous to humans, other living creatures, plants, property, or the environment.

Firm Size

In today's environment, a company's size is important to its success due to the phenomena of economies of scale. Modern firmes strive to increase in scale in order to get a competitive advantage over their rivals by cutting production costs and increasing market share. Larger firmes may create goods at a lower cost than smaller firmes (Olawale, Ilo & Lawal 2016). Shaheen and Malik (2012) describe firm size as the number and variety of production capacity and potential a firm possesses, or the quantity and diversity of services a firm can make available to its clients at the same time. The size of a firm is essential in determining the kind of interactions it has both inside and outside of its working environment.

Financial performance

Financial performance primarily shows firm sector outcomes and results that demonstrate the sector's overall financial health over time. It shows how well a company uses its resources to maximise shareholder value and profits. Financial ratios are the most common performance measurement used in the field of finance and statistical inference. Although a complete evaluation of a firm's financial performance takes into account many other different kinds of measures, financial ratios are the most common performance measurement used in the field of finance and statistical inference (Achim et al., 2016). Firm performance is a gauge of what a company has accomplished over a period of time when operating under favourable conditions. The goal of evaluating success is to collect meaningful information about the flow of money, how they are used, and how successful and efficient they are. Furthermore, the knowledge might drive managers to make the best judgments possible (Amal et al., 2012). Financial performance refers to a company's financial position throughout time, as assessed by many measures such as capital adequacy ratio, liquidity, leverage, solvency, and profitability. The capacity of a corporation to manage and control its resources is referred to as financial performance (IAI, 2016).

Return on Equity (ROE)

The return on equity ratio (ROE) is a profitability statistic that evaluates a company's ability to generate profits from its shareholders' investments. In other words, the return on equity ratio shows how much profit each dollar of common stockholders' equity generates. A return on equity means that one dollar of net income is created for every dollar of common stockholders' equity. This is an essential indicator for potential investors since it determines how successfully a firm will use their money to create net income.

ROE also assesses management's capacity to employ equity capital to support operations and expand the company.

Formula

The return on equity ratio formula is calculated by dividing net income by shareholder’s equity.

$$\text{Return on Equity Radio} = \frac{\text{Net Income}}{\text{Shareholder's Equity}}$$

Most of the time, ROE is computed for common shareholders. In this case, preferred dividends are not included in the calculation because these profits are not available to common stockholders. Preferred dividends are then taken out of net income for the calculation.

Relationship between Environmental accounting expenditure and financial performance

Customers, workers, suppliers, and community groups, particularly those that track and report on firm donations, all benefit from environmental accounting spending. According to CEOs, corporate charity increases respect and community goodwill while also enhancing brand positioning (Kotler & Lee, 2015). It has been discovered that companies that are socially responsible have a better market share and profits. When firmes are socially responsible, their reputations are enhanced, and their products and brands perform better in the marketplace (McCabe, 2015). Companies that are socially responsible are better able to form stronger bonds with government agencies and communities, increasing their sales volume and making it simpler for them to expand into new markets. In a 2016 Harvard Firm Review essay, Michael Porter and Mark Kramer claimed that charitable efforts may (and should) go beyond generating goodwill. They presented examples of how charitable initiatives may aid a company's productivity (e.g., Exxon Mobil making substantial contributions to improving roads in developing countries where it operates, thereby winning the hearts and souls of communities and enjoying tremendous customer patronage). Actions of philanthropy can aid in the development of the market (e.g., Apple Computers donating computers to schools, thereby increasing the usage and appeal of their systems to the public). Projects may be utilised to generate a strong future workforce, including environmental accounting expense. For example, American Express provides funding for students interested in working in the travel industry (Porter and Kramer, 2016).

Firm size influence in the Relationship between Environment cost accounting and financial performance

In addition, there is a growing societal awareness that puts more pressure on corporations to consider their environmental obligations when doing firm. As a consequence, many firms are responsible for both environmental and economic problems, and one reason for this is that enterprises are reacting to rising environmental protection needs from diverse stakeholders. The environmental stewardship of these firmes is documented in their annual reports, which are published on a regular basis. According to Gray (2015), environmental accounting has become a must since the traditional accounting system, which classifies most environmental expenditures as overhead, is insufficient in providing managers with the data they need to make strategic choices. This is because a company's performance is assessed by the amount of profit it creates and the market value of its shares under traditional accounting, while significant environmental problems are ignored.

Theoretical Framework

Theory of Stakeholders

Stakeholder theory is a firm ethics and organisational management theory that deals with the ideas and values that go into operating a company (Freeman & Phillips, 2003). According to this perspective, stakeholders are a collection of individuals who are interested in the company's activities (Freeman, 2017). Stakeholders, as described by Edward Freeman, are "any group or person who may affect or is impacted by the attainment of the organization's goals" (1984). "Those groups that are crucial to the corporation's existence and success," according to Freeman (2014). The WBCSD defined stakeholders as representatives from labour organisations, universities, religions, indigenous peoples, human rights organisations, government and NGOs, shareholders, workers, customers/consumers, suppliers, communities, and legislators (1999). Freeman refers to customers, workers, local communities, suppliers and distributors, as well as shareholders, as stakeholders (2006). Stakeholders include the media, the general public, firm partners, future generations, past generations (organisation founders), academics, competitors, NGOs or activists, stakeholder representatives such as trade unions or trade associations of

suppliers or distributors, financiers other than stockholders (debt holders, bondholders, and creditors), and financiers other than stockholders (debt holders, bondholders, and creditors).
The company's principal purpose, according to stakeholder theory, is to balance all stakeholders' expectations via its activities (Ansoff 1965). Because it offers a normative framework for socially responsible companies, stakeholder theory is also a corporate social responsibility theory (Mele 2008). "The stakeholder notion may have been presented and applied in a variety of ways that are quite distinctive and involve very various methodologies, forms of evidence, and evaluation criteria," Donaldson and Preston (1995) write.

Stakeholder Theory was chosen for a variety of reasons.
In general, the concept relates to what the company should be and how it should be envisioned. According to Popa, et al. (2009), stakeholder theory is based on the idea that the better a company's connections with other interested parties are, the simpler it will be to achieve its commercial goals. Stakeholder theory expands on the notion of corporate social responsibility by presenting additional commercial arguments for why companies should strive for long-term success. According to Perrini & Tencati (2006), a company's corporate social responsibility is established by the corporate social responsibility of its stakeholder ties. A corporation must examine and involve not just shareholders, workers, and customers, but also suppliers, governmental authorities, local community and civil society in general, and financial partners in order to maintain corporate growth, profit, market share, and market value.

Empirical Review
Environmental management accounting (EMA) has affected sustainable development in Nigeria, particularly the Niger Delta. The study used quasi experimental research design to explore social amenities, poverty eradication, health care, natural disasters, and pollution for sustainable development. The study used Chi-square and Spearman's coefficient correlation to analyse primary data collected via questionnaires. In Nigeria, there is a link between Environmental accounting, Sustainable development, and economic stability. The report recommends that all enterprises operating in the Niger Delta area adopt Environmental management accounting as part of their operational standard.
Between 2012 and 2016, Tafadzwa and Fortune (2018), studied the impact of sustainability reporting on the financial performance of selected quoted Nigerian enterprises. The study used secondary data from ten companies' financial reports to examine panel least square. According to the findings of the study, expenditure on economic activities (costs incurred in production, distribution, exchange, consumption, and trade of goods and services) positively impacted financial performance (measured by price-earnings ratio) of selected firms in Nigeria. Between 2012 and 2016, sustainability reporting standards positively impacted the financial performance of selected Nigerian traded companies. The study concluded that there is a need for standardised reporting standards and procedures in Nigeria. Sustainability reporting in Nigeria should be regulated by regulatory agencies like the CAC and the legislative branch of government.
Reddy and Gordon (2010), looked into the impact of sustainability reporting on company financials. Companies voluntarily release sustainability reports to inform stakeholders about their environmental and social impacts. Design/Methodology/Approach: This empirical study examines current sustainability reporting models for overlaps, gaps, restrictions, and errors. Using the event study approach to estimate anomalous returns for a 31-day event window for a sample of 68 listed firmes (17 NZX and 51 ASX) (ASX). Findings: The empirical analysis found that sustainability reporting explains abnormal profits for Australian corporations. The cross-sectional results of the pooled dataset for both nations support the hypothesis that industrial environment influences abnormal returns of reporting enterprises. In this regard, the study identifies various contextual elements that may effect the link, such as industry and sustainability report type. Only the CSR

report type explained the abnormal return of New Zealand corporations. To demonstrate the theory's practical application, the model illustrates how sustainability reporting affects financial performance for enterprises in environmentally sensitive industries. The simple model may have many further uses in firm and social sciences.

Rashid and Radiah (2012) studied the relationship between sustainability and financial performance of multinational organisations. This paper's fundamental hypothesis is that companies who adhere to superior sustainability practises outperform those that do not. The study's target audience is the top 100 sustainable global corporations in 2008, chosen from a pool of 3,000 organisations from developed and emerging economies. Over the 2006–2010 period, the sample firms' mean sales growth, return on assets, profit before tax, and operating cash flows outperform the control companies. Our data also suggest that sustainable organisations' financial performance has improved over time. Despite sample limitations, this paper's findings imply a bi-directional relationship between corporate social responsibility and financial performance.

Najul et al. (2017) examined the relationship between corporate sustainability and financial performance in Japan and India using secondary data from annual reports and CS reports of 28 and 35 listed non-financial enterprises from 2009 to 2014. The GRI approach uses content analysis (binary coding) to determine the sustainability disclosure score. The M/B ratio measures the financial performance. The panel data and logit regression models are utilised to assess the impact of CS performance on financial performance. The survey found that Japanese corporations disclose more than Indian firms. The analysis demonstrates a favourable and significant relationship of CS performance on financial performance for both nations. However, in Japan, CS performance has a greater impact than in India. The study also shows that environmental factors have a greater impact on financial performance in Japan. In India, however, the social factor surpasses the financial.

Priyanka (2013) reviewed the literature on the influence of sustainability reporting on corporate financial performance. Various studies have been done on this association throughout the last decade. They range from a positive to a negative to a statistically insignificant association depending on the sustainability reporting metric, financial performance measure, sample composition, time period and control variables. We found that most studies show a positive association. For better and more consistent outcomes, this study analyses existing researches. More stringent and required sustainability reporting laws, regulations, and standards are expected in the near future. Corporate sustainability reporting is essential to avoid future regulatory measures. Another key issue is the credibility of sustainability reporting. To tackle this issue, organisations should have their sustainability reports externally guaranteed by trustworthy assurance providers like KPMG, EY, etc. Firm cannot exist without stakeholder credibility and confidence.

Annisa and Burhan (2012), investigated the link between sustainability reporting and firm performance. It comprises 32 firms listed on the Indonesian stock exchange between 2006 and 2009. The independent variables are sustainability, economic, environmental, and social performance. The disclosure index measures these variables. The index score is calculated using GRI's Sustainability Reporting Guidelines. The dependent variable is Return on Asset (ROA). A secondary data source is the Indonesian stock exchange. So, sustainability reporting affects firm performance. Only social performance disclosure influences company performance partially.

METHODOLOGY

This study adopted correlational research design. The target population and sample size of the study is ten (10) listed oil and gas companies operating in the Nigerian economy. They are; Ardova Plc, Capital Oil Plc, Conoil Plc, Eternal Plc, Japaul Gold & Ventures Plc, MRS Oil Nigeria Plc, Oando Plc Total Nig. Plc, Rak Unity Pet. Comp. Plc, Seplat Petroleum Development Company and Total Energies (source; Nigeria stock exchange, January, 2022). The instrument for this study was

secondary data of the ten (10) oil and gas company's financial statements and Nigeria Stock Exchange (NSE) from the period of 2012 - 2021. The research questions were analyzed using mean and standard deviation in the distributive statistics tables. The formulated hypotheses were tested using the simple bivariate regression analysis with model summary explaining the relationship and determinant percentage of the relationship by the R and R-square respectively. The significance of the hypotheses acceptation and rejection at 0.05 levels of significant using Coefficients table with the aid of the Eview Version 10 platform.

Model Specifications

According to Nmesirionye et al. (2019), regression analysis is concerned with the study of how one or more variables affect changes in another variable. Thus, on the basis of the theoretical framework, the study adopted the regression formula with some modifications. The model is specified as:

$Y = f(ao + bX_1) + Et$.....3.1

Where; Environmental accounting expenditure (ECA) components in the study are [communities' reclamation cost (CRC) and Pollution Management Cost (PMC) defined as three components used in the study; whereas the Financial Performance (FIP) measures are return on equity (ROE) and return on assets (ROA). This modification helps us examined the impact of environmental accounting expenditure and financial performance of listed oil and gas companies in Nigeria.

FIP $= f(ao + ECA_1 + Et)$ 3.2

Thus:

HO_1: ROE $= \beta o + \beta CRC + \upsilon$.....3.3

HO_2: ROE $= \beta o + \beta PMC + \upsilon$.....3.4

Where;

β_0 = Constant Term (y intercept)

β = Coefficient of the independent variable

υ = Error term (causes of market share or profitability not explained by variables in the model)

To make the data uniform and easy to regress and analyses, Data were converted to natural logarithm (log) form as follows:

$NLROE_{it} = \beta o + \beta_1(NLCRC)_t + + \upsilon\ (.05)$ 3.5

$NLROE_{it} = \beta o + \beta_1(NLPMC)_t + \upsilon\ (.05)$ 3.6

Where;

*NL*CRC =Natural log of Communities' Reclamation Cost

*NL*PMC = Natural log of Pollution Management Cost

*NL*WMC = Natural log of Waste Management costs

NLROE = Natural log of Return on Equity

NLROA = Natural log of Return on Assets

Gillette and Robert (1992), suggested that in a linear regression equation where both the explained variable and the explanatory variables are in natural logs. Elasticity is a popular tool among empiricists because it is independent of units and thus simplifies data analysis.

Data Analyses and Results Interpretations

Table 4.1 Descriptive Analysis

	CRC	PMC	ROE	FRMSIZE
Mean	3.00E+09	3.21E+09	0.823483	2.34E+09
Median	1.03E+09	1.26E+09	0.678700	1.45E+09
Maximum	7.78E+08	7.16E+08	1.639000	2.91E+09
Minimum	1.23E+09	1.57E+09	0.492000	1.63E+09

Std. Dev.	1.75E+08	3.41E+08	0.433227	5.08E+08
Skewness	1.630836	1.636192	1.250362	2.331698
Kurtosis	2.658808	3.624851	3.177599	1.594451
Jarque-Bera	0.466817	0.585783	1.571291	0.603916
Probability	0.791830	0.746103	0.455825	0.739369
Sum	6.01E+09	7.23E+09	4.940900	1.41E+10
Sum Sq. Dev.	1.52E+17	5.80E+17	0.938427	1.29E+18
Observations	10	10	10	10

Source: Author's calculations using E-view 12.0

The dimensions of the predictor variable [community' reclamation cost (CRC), pollution management cost (PMC), and the goal variable measure of return on equity (ROE) in the study are shown in the descriptive statistics table above.

CRC and PMC had mean values of 3.00E+09 and 3.21E+09, respectively. CRC and PMC maximum and minimum values were 7.78E+08 and 1.23E+09, 7.16E+08 and 1.57E+09, respectively. The standard deviation values of 1.75E+08 and 3.41E+08, on the other hand, show that the data deviates from the three study dimensions' mean values, meaning that the data has a significant dispersion from the mean since the standard deviation is closest to the mean.

Skewness and Kurtosis calculated mean values for the three study dimensions CRC and PMC suggest positive skewness values (1.630836 and 1.636192, respectively), which is a measure of a distribution's divergence from symmetry. This indicates that the two research dimensions are evenly distributed. Because their kurtosis coefficients (2.658808, 3.624851, and 2.594253) are greater than 3, the Kurtosis result, which measures the extent of flatness or peakedness of a distribution in comparison to a normal distribution, confirms that CRC and PMC are normal and not platykurtic (not having negative values / flattened curved). Also, the p-value for the three research dimensions [(JB (PValue > 0.05) = Accept Ho (Normal Distribution) and JB (P Value 0.05) = Reject Ho (Non-Normal Distribution)] for Jarque-Bera statistics [(JB (PValue > 0.05) = Accept Ho (Normal Distribution) and JB (P Value 0.05) = Reject Ho (Non-Normal Distribution)]. As a consequence, the statistical probabilities for Jarque-CRC, Beta's PMC, and WMC were authorised at 0.791830, 0.746103, and 0.791830, respectively. The discovery strengthens the normality test for normally distributed variables.

The table also shows that the study's [return on equity (ROE)] outcome measures have a mean value of 0.823483, with maximum and minimum values of 1.639000 and 0.492000, respectively. The standard deviation of 0.433227, on the other hand, indicates that the data deviates from the research measure's mean value, implying that there is a dispersion of the data from the averages since the standard deviation is near to the mean.

On the other hand, the estimated mean values of Skewness and Kurtosis, which is a measure of a distribution's deviation from symmetry, reveal a positive skewness value larger than 1 for the measure of ROE. This means that the results of the single research are regularly distributed. Furthermore, the Kurtosis result, which measures the extent of a distribution's flatness or peakedness in comparison to a normal distribution, confirms that profit after ROE is normally distributed and not platykurtic (not having a negative value / flattened curved), as its kurtosis coefficient is greater than 3. Also, for Jarque-Bera statistics, the p-value for the research measure [(JB (PValue > 0.05) = Accept Ho (Normal Distribution) and JB (P Value 0.05) = Reject Ho (Non-Normal Distribution)]. As a result, the ROE of Jarque-Beta and its statistical probability of 0.455825 and 0.716831 were accepted. The finding improves the normality test of normally distributed variable.

Data Diagnostic and Robustness Tests

Stationary (Unit Root) Test

Stationary of the dimensions of the independent variables and the measures of the dependent variable for the 1st and 2nd models were tested using Augmented Dickey Fuller (ADF) test. Table 4.2 depicts the results which indicate the rejection of the unit root null hypothesis of the stationary of LNCRC, LNPMC, LNFIRMSIZE at the first difference

Table 4.2 Summary Stationary Test Result

Variables	ADF Statistics	Test critical values at		Prob Value	Order of Co-integration
LNCRC	-8.158471	1%	-2.982813	0.0007	1(1)
		5%	-5.119808		
		10%	-3.519595		
LNPMC	-9.883996	1%	-2.898418	0.0000	1(1)
		5%	-5.119808		
		10%	-3.519595		
LNFIRMSIZE	-7.413146	1%	-2.898418	0.0025	1(1)
		5%	-5.604618		
		10%	-3.694851		

Source: Author's calculations using E-view 12.0

The ADF test was performed in in level and first difference and individual intercept. The result of the ADF test in the above tables indicated all the variables have unit root at constant without trend and at constant. Consequently, the first difference test was performed. See Results appendix b

Multicollinearity Test

Table 4.3

Variance Inflation Factors
Date: 11/11/21 Time: 16:55
Sample: 2012 2022
Included observations: 10

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	4514.170	14.80136	NA
LNCRC	6.77E-08	13.49537	1.408018
LNSPMC	4.76E-08	9.016982	3.961908

Source: Author's calculations using E-view 12.0

Table 4.4

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	LNCRC	.710	1.408
	LNPMC	.252	3.962
	LNWMC	.247	4.054

SPSS v.24 Result on Multicollinearity test

The tolerance value estimates for communities' reclamation cost (LNCRC) and pollution management cost (LNPMC) are 0.710 and 0.252, respectively, from table 4.3 and 4.4, and these values are more than 0.2, implying that the correlation is not multi-collinear. This implies that the

data might be used to estimate the criteria variable's value. The variance inflation factor (VIF), which is the reciprocal of the tolerance value (TV), was estimated at 1.408 and 3.962 for the communities' reclamation cost (LNCRC) and pollution management cost (LNPMC), respectively, to corroborate this result. This indicates that there is no multi-collinearity because the VIF is less than 10. When the value of VIF is larger than 10, it demonstrates multi-collinearity (Tobachnick and Fidell, 1996).

The First Model: The first hypothesis test model; the relation between return on equity and communities' reclamation cost: $ROE_{it} = a_0 + b_1(CRC)_{it}, + e$ *(.05).....(1)*

Table 4.5: Model 1

Dependent Variable: ROE
Method: Least Squares
Date: 11/03/21 Time: 10:42
Sample: 2012 2022
Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CRC	-0.005416	0.000270	-20.06170	0.0910
C	1257701.	489363.2	2.570077	0.0146

R-squared	0.536328	Mean dependent var	57.12377
Adjusted R-squared	0.510871	S.D. dependent var	67.65977
S.E. of regression	1778942.	Akaike info criterion	31.71785
Sum squared resid	1.11E+14	Schwarz criterion	31.88847
Log likelihood	-614.4981	Hannan-Quinn criter.	31.77907
F-statistic	171.5647	Durbin-Watson stat	2.138475
Prob(F-statistic)	0.000000		

Source: Author's calculations using E-view 12.0

The coefficient of CRC and ROE is -0.005416, as seen in the table above. This figure indicates that CRC has a minor influence on ROE. The T-statistics are less than 1, indicating statistical insignificance at the 1% T-stat confidence level. CRC has a Prob value of 0.0910, indicating that the link between CRC and ROE is statistically insignificant at the 5% level.

The R2, which assesses the goodness of fit, was found to be 0.536328, indicating that the dimension of the independent variables can explain 93 percent of the variation in the return on equity. The results show that the model is appropriate for the research. The results of F-statistics and probability of F-statistics of 171.5647 and 0.000000, respectively, validate the model's goodness of fit and appropriateness. The absence of serial autocorrelation is further indicated by the Durbin-Watson statistics of 0.698475.

The Second Model: The second hypothesis test model; the relation between return on equity and pollution management cost: $ROE_{it} = a_0 + b_1(PMC)_{it}, + e$ *(.05).....(2)*

Table 4.5: Model 2

Dependent Variable: ROE
Method: Least Squares
Date: 11/03/21 Time: 08:03
Sample: 1 6
Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PMC	5.81E-10	1.21E-09	1.481671	0.0612
C	1.405775	1.224089	1.148425	0.3148
R-squared	0.574822	Mean dependent var		0.823483
Adjusted R-squared	0.541473	S.D. dependent var		0.433227
S.E. of regression	0.470898	Akaike info criterion		1.592852
Sum squared resid	0.886981	Schwarz criterion		1.523439
Log likelihood	-2.778556	Hannan-Quinn criter.		1.314984
F-statistic	0.232017	Durbin-Watson stat		2.518817
Prob(F-statistic)	0.000007			

Source: Author's calculations using E-view 12.0

The coefficient of PMC and ROE is 5.81E-10, as seen in the table above. This figure indicates that PMC has a significant influence on ROE. The T-statistics are greater than 1, indicating statistical significance at the 1% T-stat confidence level. PMC has a Prob value of 0.0612, indicating that the link between PMC and ROE is statistically insignificant at the 5% level.

The R2, which assesses the goodness of fit, was found to be 0.574822, indicating that the dimension of the independent variables can explain 57 percent of the variation in the return on equity. The results show that the model is appropriate for the research. The results of F-statistics and probability of F-statistics of 0.232017 and 0.000007, respectively, validate the model's goodness of fit and appropriateness. The absence of serial autocorrelation is further indicated by the Durbin-Watson statistics of 2.518817.

Analysis on the Moderating Variable

$H0_3$: Firm size has no moderate influence on the relationship between environmental accounting expenditure and financial performance of listed oil and gas companies in Nigeria.

Partial Correlations Matrix

Table 4.6

Correlations

Control Variables			ECA	FINP
FSIZ	ECA	Correlation	1.000	.881
		Significance (2-tailed)	.	.618
		df	0	5
	FIP	Correlation	.881	1.000
		Significance (2-tailed)	.618	.
		df	5	0

Source: Author's calculations using SPSS V.23

Firm size has a considerable impact on the link between environmental accounting expense and financial performance, according to the partial correlation's output. The correlation coefficient of 0.881 indicates that firm size has a positive impact on the interaction of environmental accounting expenditure and financial performance, as evidenced by the probability level of 0.618, which is higher than the chosen alpha level of 0.05, resulting in the null hypothesis being rejected and the

alternative hypothesis being accepted. As a result, firm size has a considerable impact on the link between environmental accounting expense and financial success of Nigerian listed oil and gas firms.

Summary Results Findings

Table 4.7 Summary Computation of Hypotheses Results

Hypotheses	Coefficient	Std. Error	T-Stat	P-Value 0.05	Statistical Decision	Result
$H0_1$	-0.005416	0.000270	-20.06170	0.0910	Not significant	Accepted $H0_1$
$H0_2$	5.81E-10	1.21E-09	1.481671	0.0612	Not significant	Accepted $H0_2$
$H0_7$				0.618	Significant	Rejected $H0_7$

The findings of the study's hypotheses were provided in accordance with the statistical decision rule: "if the probability value (PV) is less than 0.05 alpha level, we reject the null hypotheses and accept significant associations," as shown in the summary of hypotheses table above. Meanwhile, we accept the null hypothesis and accept an insignificant association if the probability value (PV) is larger than the 0.05 alpha threshold. Hence:

$H0_1$: There is no significant relationship between communities' reclamation cost (CRC) and return on equity (ROE) of listed oil and gas companies in Nigeria.

$H0_2$: There is no significant relationship between pollution management cost (PMC) and return on equity (ROE) of listed oil and gas companies in Nigeria.

$H0_3$ There is significant influence of firm size in the relationship between environmental accounting expenditure and financial performance of listed oil and gas companies in Nigeria.

CONCLUSION

While attempting to maximise the firm's worth, they are supposed to minimise the negative impact on the environment and society through environmental accounting expense. Despite the Nigerian government's focus on environmental accounting expenditure, which includes self-regulation policies, adherence to rules and regulations, ethical standards, environmental responsibility and sustainability, as well as the benefits to communities and stakeholders, most firmes have yet to fully appreciate or recognise the importance of environmental accounting expenditure.

There is no substantial association between community reclamation cost (CRC) and return on equity (ROE) of listed oil and gas firms in Nigeria, as hypothesis one found. In Nigeria, there is no correlation between pollution management costs (PMC) and return on equity (ROE) of publicly traded oil and gas firmes. The link between environmental accounting expense and financial performance of listed oil and gas firms in Nigeria is significantly influenced by firm size.

RECOMMENDATIONS

The research makes the following suggestions based on the overview of the findings and conclusion:

1. Oil and gas firms should carefully consider revegetating or recovering land for displaced people in host communities that have been harmed by the company's environmental activities.
2. The oil and gas firm should enhance their pollution management techniques by using green accounting and implementing less dangerous processes, since this would increase market value and financial performance.
3. The regulator of the Nigerian oil and gas industry should make every effort to ensure that all listed companies, regardless of size, participate in some form of environmental sustainability activities and upgrade to green accounting, as it has been statistically proven that firm size has a significant impact on the relationship between environmental expenditure and financial

performance of Nigerian listed oil and gas companies.

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