

Environmental Conservation Costs and Sustainable Business Growth in Listed Oil and Gas Companies in Nigeria

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ABSTRACT

This study examined the relationship between the costs of environmental conservation and sustainable business growth of publicly traded Nigerian oil and gas companies. The study's major objectives were to determine how the independent variables of environmental conservation represented by community development cost, pollution cost and environmental remediation cost affected the dependent variables of sustainable business growth represented by return on asset and gross margin return on investment. Data for the study came from financial statements and annual reports covering the years 2011–2022, and it employed an ex post facto research design. Regression analysis in E-View 10.0 was used to test the hypotheses. According to the empirical data analysis, there is a positive and statistically significant relationship between community development costs, and gross margin returns on investment (0.526033 and 0.000918), which implies that there is a significant relationship between the gross margin return on investment and sustainable business growth. Similarly, 2.652824 and 0.000000 indicate a favorable and statistically significant relationship between pollution cost and GMRI. However, -0.233125 and 0.000000 demonstrate a negative and statistically significant relationship between environmental remediation costs and GMRI. A total of three independent factors accounts for 53% of the variance in the dependent variable, according to the R-squared value of 0.534613. According to the study's conclusions, there is a positive correlation between the costs of environmental conservation and the sustainable growth of listed oil and gas companies in Nigeria. The study also suggests that oil and gas companies should maintain a friendly environment for this will reduce the amount spent in repairing the damaged that their activities had caused on the environment. The goal of this initiative is to boost the efficiency of community development groups by providing incentives for their work on the created friendly environment.

Keywords: Environmental conservation cost, Gross margin returns on investment, Oil & Gas Companies, Pollution cost, Sustainable business growth.

INTRODUCTION

The highest rate of expansion that a business can achieve using its current cash flow without resorting to increased leverage or debt is known as sustainable business growth (Gleißner, et al. 2022). The point of break-even is crucial for business growth, while a sustainable business growth rate ensures revenue growth without affecting cash flow or requiring alternative funding sources. In an ideal scenario, it would be possible to increase earnings without the need for more capital expenditure Cho, et al. (2019).

The term “environmental conservation cost” is used to describe the sum of money spent on operations that aim to protect the environment, such as disaster preparedness, damage mitigation, and restoration. Environmental protection costs are classified based on objective standards, which assess the monetary worth of environmental preservation. Sustainable manufacturing practices, including end-of-pipe technologies and

broader environmental preservation initiatives, aim to mitigate adverse environmental impacts (Le, et al. 2019). The term "environmental conservation cost" refers to the money a business puts into non-current assets for the benefit of the environment (Ajah & Adegbe, 2023). According to Antoun et al. (2018) there are also costs incurred by a business to either prevent or repair environmental damage caused by its activities. There are various sorts of environmental costs, some of which are difficult to identify because they are camouflaged by other expenses. It has become more difficult for many firms to accurately measure environmental costs as national regulations have become more stringent and penalties or fines have become more severe.

Environmental Conservation Costs (ECC) can be prevention costs which are the costs associated with measures taken to halt the accumulation of waste that might be harmful to the environment. Training employees, recycling products, and funding environmental studies are all examples (Najul, 2018). Environmental failure incurs internalized expenses such as waste prevention, pollution control equipment, and waste conservation. Businesses face financial obligations in disasters like oil spills or river contamination, including remediation costs and potential financial sanctions. Additionally, a corporation may experience a decline in income due to such incidence. Anne and Velenturf (2021) assert that sustainability in business growth is a concept that focuses on the effects of the environment and community, taking into account environmental conservation cost, social progress, and economic viability. The approach, rooted in the fairness revolution, promotes sustainable business growth through resource optimization strategies like recycling and reusing within business processes and supply chains.

Sustainable business growth and the cost of environmental conservation have recently emerged as popular research topics, leading to growing interest in this issue. Ethical investors are interested in investing in companies that share their moral values, and businesses that actively promote themselves as morally responsible and environmentally concerned have an advertising advantage. To combat environmental shame, it is necessary to take into account the enormous difficulties inherent in developing economically viable environmental cures. According to Ekins and Zenghelis (2021), the importance of environmental conservation costs for Nigeria's oil and gas companies cannot be overestimated. Multiple factors within the industry have the potential to seriously affect productivity and efficiency. To help stakeholders, especially investors, make better choices about their investment in the firm, it is crucial that they have access to reliable and impartial financial information.

Nigeria's oil and gas industry is seeing a fall in performance, with rising production costs posing a threat to the profitability of companies operating in the sector and employment prospects (Onwuka, 2021). Stakeholders have reported a high frequency of different levies imposed by various bodies within the business, leading to higher production costs. Additionally, higher operating expenses have resulted in increased manufacturing costs. However, businesses today understand that if they don't take steps to demonstrate their environmental conservation cost and lessen the negative effects of their operations on the environment, it could have an adverse effect on their sustainable growth. Therefore, it is essential to put into action environmental conservation strategies.

The cost of maintaining the environment for an effective business operation that will enhance a sustainable business growth in Nigeria have become alarming in recent years. The combined ecological footprint of business is unsustainable, and current trends in environmental deterioration and development suggest that the country will soon be dealing with more serious problems. According to Deegan (2013), until managers are shown how much money they can save by employing cleaner manufacturing techniques and technologies, they won't be able to invest significant quantities of money. This has a significant effect on both the environment and companies that rely on natural capital. This is one of the problems noticed before this study was carried out.

However, factors such as the discovery of gaps in prior research on the costs associated with environmental

conservation, worries about the sustainable business growth of existing literature, and a notable lack of attention to environmental preservation within Nigerian Oil and Gas Companies served as the study's inspiration. The researcher has observed a lack of scholarly literature investigating the costs linked to environmental conservation efforts and their impact on the sustainable business growth in Nigeria. The studies of Agugom et al., 2022; Adegbe et al., 2023; Anekwe et al., 2019 have shown commendable levels of environmental conservation cost in developed countries. In developing economies, including Nigeria, there is a clear trend towards declining environmental compliance. This is evident from the persistent and unregulated water and air pollution, as well as the rising incidence of cancer and other diseases associated with pollution in the country.

The study examined the effect of environmental conservation costs on the sustainable business growth of listed oil and gas companies in Nigeria. However, the following are the specific objectives:

1. To ascertain how environmental conservation costs affects listed Nigerian oil and gas companies' Gross margin return on investment.
2. To examine the relationship between environmental conservation costs and Nigerian listed oil and gas companies' Return on assets.

The following null hypotheses enhance the achievement of the study objectives:

1. H_0 : The environmental conservation costs do not significantly affect listed Nigerian oil and gas companies' Gross margin return on investment.
2. H_0 : The relationship between environmental conservation costs and Nigerian listed oil and gas companies' Return on assets is insignificant.

LITERATURE/THEORETICAL REVIEW

Conceptual Review

Sustainable Business Growth

Sustainable business growth refers to the maximum rate of expansion that an organization can reasonably expect to achieve without experiencing significant setbacks. Too rapid expansion might strain a company's financial resources, and a company might become stagnant if its growth is excessively sluggish or nonexistent. The objective is to determine the best pace of expansion by calculating its sustainable growth rate. The methods used to determine sustainable growth assume the company wants to keep its capital structure stable without issuing additional shares, maintain its dividend payment ratio, and expand its sales as quickly as the market will bear it (Walker, et al. 2021).

Return on equity (ROE) is a critical component of the calculation used to determine a sustainable business growth rate. The ratio of dividend payouts reveals how much of a company's profits per share are distributed to shareholders as dividends. Using these numbers, one can calculate the company's plowback proportion, which is 1 minus the ratio of dividend payments, and hence the ROE. The Sustainable Growth Rate (SGR) is a projection of the highest possible sales growth, which can be achieved without depleting operational cash flows, much like the point of break-even is the "floor" for minimum sales needed to pay operating expenditures (Isnurhadi, et al. 2023).

Sustainable business growth presents challenges for small-business owners and C-suite executives in fostering long-term success. The dynamic nature of the political, economic, competitive, and consumer landscapes has made it difficult for corporate executives to accomplish this aim. Consumer standards have changed dramatically over the course of many decades, and businesses now have to compete for consumers

by offering more value at lower prices. Competition is also fierce across the board, as traditional boundaries across sectors have been shattered to an unprecedented degree (Gherghina, et al., 2020).

Healthy company expansion plans might benefit from considering the notion of sustainable business growth. This idea motivates managers to set sales growth targets that are consistent with the company's operational and financial goals, but they must first assess the financial implications of doing so. When a company's expansion plans aren't in line with its long-term viability, tensions occur. Economists argue that if a company's sales growth is faster than the sustainable rate, then a shift must occur in at least one of the fundamental business ratios. Conservation must choose a financial plan when real growth surpasses sustainable business growth for extended periods: one may raise capital through issuing additional shares of stock, increasing financial leverage (i.e., taking one more debt), cutting dividends, increasing profit margins, decreasing the ratio of total assets to sales (Farida & Setiawan, 2022).

However, most businesses are hesitant to implement these safety precautions due to high issue costs, potential erosion of profits per share, and the unreliability of equity financing on conditions advantageous to the issuer. A company may raise its financial leverage only if it has access to pledged assets and if its debt-to-equity ratio is appropriate.

The sustainable growth concept is useful when a borrower needs more money, but it puts them in the precarious position of having more debt than assets. The borrower must either enhance its equity base or slow its growth to a pace that can be maintained without taking on new debt. The actual growth rate of mature companies often falls short of their sustainable growth rate, and when cash flows exceed requirements, the first priority for conservation is to put those surplus funds to good use. Owners and conservation may choose to return the cash to shareholders by boosting dividends or common stock repurchases, reducing the company's debt, or expanding ownership of liquid assets with a lower return on investment.

Environmental Conservation Cost

Environmental conservation costs are those expenses specifically related to lessening the effects of a company's environmental activities, such as pollution, waste disposal, drainage, and regulation compliance costs, as well as other expenses that may result in a potential avoidance of environmental impacts by a company's activities. How to control the costs of actions that might result in environmental impact remediation and/or avoidance by business operations is the focus of environmental conservation costs. Through economically advantageous adherence to environmental regulations, environmental conservation costs encourage environmental protection. For instance, they might be considered in the design and execution of investments or programmes aimed at reducing pollution (ACCA, 2020). It also entails looking for and buying affordable alternatives to dangerous products as well as reporting environmental waste and emissions to regulatory bodies. Similarly, it enables the simultaneous reduction of costs and environmental consequences via more effective use of water and resources in internal processes (ACCA, 2020).

However, there is an argument that the expenditures associated with environmental conservation may pose issues as a result of the need for efficient and continuous supervision. This challenge arises from the inherent complexity of identifying and precisely estimating the expenses associated with ECC. Moreover, after the identification of these expenses, there can be difficulties in differentiating and determining them on an individual basis. In a similar vein, it is essential to use strategies for managing costs, a task that can only be accomplished successfully after a comprehensive and precise identification of expenditures. Environmental expenditures may be broadly classified into two primary categories: environmental investments and environmental cost. The category encompasses several expenditures, such as those associated with cleaning, recycling materials or energy conservation, closure, capital investment, and development expenditure (Nwaiwu & Oluka, 2018). The aforementioned expenditures are incurred in order

to prevent, alleviate, or remedy environmental damage and safeguard precious resources.

Gross Margin Returns on Investment

The Gross Margin Returns on Investment (GMROI) is an inventory analysis metric that provides insights into the efficiency of a corporation in converting inventory investment into profitability. This statistic facilitates the identification of strengths as well as inefficiencies in inventory planning and may be applied to individual product lines or the whole of inventory operations (Lucas & Omokehinde, 2021). In order to carry out this study, Gross Margin Returns on Investment (GMROI) is used to capture sustainability business growth and it is necessary that two preliminary metrics have to be used to compute GMROI which were revenue and the cost of goods sold. The gross margin refers to the difference between revenue and the cost of goods sold, expressed as a percentage. The aforementioned serves as an indicator of profitability. The mean cost of inventories and the amount spent on inventory within a certain time frame.

To calculate the Gross Margin, Return on Investment (GMROI), one must divide the gross margin by the average inventory cost. The gross margin return on investment (GMROI) is calculated by dividing the gross margin by the average inventory cost. The outcome demonstrates the profitability of a firm in relation to its investment in inventory. A ratio greater than 1 indicates a positive return on investment for inventory, while a ratio less than 1 indicates a negative return. Thoroughly monitoring this statistic may facilitate the optimization of inventory levels for individual product lines, enhance regional placement and pricing strategies, and provide valuable information for making prompt markdowns to prevent the accumulation of unsold inventory. This has made GMROI one of the best measures for sustainable business growth.

Theoretical Review

Stakeholders Theory

The stakeholder theory encompasses a philosophical framework for organisational conservation and corporate ethics that explores the ethical dimensions and moral considerations inherent in the operation of a corporation. The proposal was given by Edward Freeman in 1984. The concept of “stakeholders” refers to individuals, entities, or collectives that possess the capacity to exert influence on, or be influenced by, the operational practices of a corporation. Argandona (2011) posits that the stakeholder theory asserts the responsibility of enterprises towards a diverse range of stakeholders, beyond shareholders. These stakeholders include creditors, customers, suppliers, employees, government officials, the community, the environment, and future generations, among others.

Stakeholder theory is being linked to business, emphasizing the importance of all stakeholders in creating value for customers. Businesses are learning to focus on non-target audiences and understand their demands. Murphy, et al. (2017) proposed a comprehensive stakeholder relationship marketing model to enhance long-term financial performance. However, more research is needed to validate this model. Marketing has been struggling to increase client satisfaction and loyalty, and companies should view all stakeholders as consumers. A formula for fostering honesty and mutual respect across internal and external stakeholders is needed. Stakeholder theory is criticized by Post, et al. (2002) for its inability to balance the interests of various stakeholders, leading to friction and conflict. It is argued that companies cannot starve to appease non-investors, stockpile goods to appease suppliers, or raise employee compensation to maintain cash flow. Skeptics also argue that the stakeholder approach cannot be uniformly applied to all organizations, as each company operates in a different stakeholder setting, necessitating individualized methods of stakeholder management.

Edward Freeman established the idea of stakeholders in 1984. The fundamental premise is that the firm

ought to provide profit for stakeholders rather than only prioritizing shareholders. The thesis posits that corporations should embrace sustainability methods in order to fulfil their ethical and moral responsibilities towards stakeholders while simultaneously optimizing investor profit. According to Freeman, a stakeholder is defined as “any collective or individual entity that possesses the ability to exert influence or is subject to the consequences resulting from the fulfilment of an organization’s goals.” The entities included in this category consist of the general public, governmental institutions, investors, producers, customers, and workers. Stakeholder theory is relevant to this issue due to its consideration of the corporation’s interactions with its internal as well as external surroundings. The efficacy of conservation in cultivating positive connections with stakeholders will exert influence on the overall performance of the organization. During the process of strategic planning, it is important for the conservation team to carefully analyze the expectations that stakeholders have about an organization’s activities. The aforementioned outcomes may be attributed to the actions undertaken by stakeholders, including individuals or collectives, who provide value to organizations via the enhancement of their efficiency, profitability, public perception, and overall sustainability (Igbekoyi, 2017).

This study takes the position that stakeholder theory is pertinent as it offers a robust framework for outlining the relationships between an organization and its stakeholders within the operational context. There is a prevailing belief that for a firm to attain its long-term objectives and continue its operations, it is essential to adopt a policy of transparency and integrity in its engagements with key stakeholders. Stakeholders who play a crucial role in ensuring the ongoing survival and financial prosperity of a firm are seen as relevant. As stated by Nnamani et al. (2017), stakeholders express a desire for conservation to exhibit qualities of good corporate citizenship, including social and ecological awareness, as well as the implementation of a robust governance structure to inform company strategies and policies. The stakeholder idea was first developed as a conservation theory. Consequently, it is essential that the corporation operate in a manner that prioritizes the welfare of all its stakeholders, including customers, suppliers, owners, personnel, and local communities, while also safeguarding the long-term sustainability of the organization. The decision-making mechanism is founded upon corporate governance, which often stipulates the inclusion of stakeholder involvement and the discretionary authority of senior conservation. Barnett (2007) posits that the stakeholder theory of reporting on sustainability is grounded in the notion that corporations have responsibilities towards socially and legally important entities outside their shareholders. These commitments exceed the requirements set out by law or bargaining agreements. The stakeholder theory encompasses individuals or entities that possess a vested interest in the organization, including shareholders, employees, customers, suppliers, and the surrounding community.

Bendheim, et al. (1998) argue that organizations should consistently adapt their operational and reporting practices due to the evolving influence of stakeholders as well as their changing expectations. In summary, the stakeholder theory underscores the presence of multiple stakeholder groups in society and perceives companies as integral elements of a broader social system. According to Gray, et al. (2001), organizations engage in the process of stakeholder identification to ascertain the groups that need conservation and control in order to promote the company’s interests. Based on stakeholder theory, the conservation of these relationships by companies is contingent upon many factors, such as the organizational context, the relative significance of different stakeholder groups, and the ethical principles guiding the decision-making process that impact the prioritization of shareholders.

Empirical Review

In their research, Bessong et al. (2023) looked at how environmental expenditures affected Nigerian oil and gas firms’ profits per share. The primary goal of the research was to determine how environmental expenses will affect Nigerian oil and gas firms’ profits per share from 2010 to 2019. The research population

consisted of 15 oil and gas businesses in Nigeria, and an ex post facto design was adopted. Annual reports from the Environmental Impact Assessment Agency and different companies were gathered using multiple regression analysis methods. The test results showed that there was no correlation between oil spillage costs, gas flaring costs, and profits per share for the oil and gas businesses. Once again, the oil and gas firms in Nigeria paid fines and penalties, which had a negative impact on their profits per share. As a consequence of the monopolistic structure of these enterprises in Nigeria, it was determined that oil spillage and gas flaring expenses had no appreciable impact on the revenues for each share of the oil and gas sectors. Based on it, it is advised, among other things, that oil and gas companies operating in Nigeria take significant steps to avoid having to pay fines and penalties. Additionally, oil and gas firms that have activities that have an effect on the environment need to improve their plans and operating policies in order to fulfil internal corporate standards and industry standards.

Akinleye (2022) investigated the relationship between internal environmental costs and financial performance across a sample of publicly listed companies in Nigeria. The research specifically examined the impact of internal environmental costs on the financial performance indicators of return on assets and return on equity. The population of this research consisted of all oil and gas as well as industrial products firms that were listed on the Nigerian Exchange Group. The research used multistage and purposive sampling methods to determine the composition of the sample. The data for this research was compiled using the financial statements and yearly financial reports of the assessed listed firms on the Nigerian Exchange Group from 2005 to 2019. The estimate strategy used in this study included many methods, including correlation analysis and static panel estimation. The latter involved the utilization of pooling, fixed, and random effects estimating techniques. Additionally, post-estimation tests, namely the limited F-test and Hausman test, were conducted to further assess the validity of the results. The findings of this study revealed that there was a significant negative impact of internal environmental costs on the return on assets of the listed firms that were sampled. The coefficient estimates of (-0.3245129, $p < 0.05$) showed that a 1% rise in internal costs caused the firms' return on assets to drop by 0.32% during the same time period. The second model also showed that internal environmental costs have a statistically significant negative impact on the performance of publicly traded companies, especially when it comes to their return on equity. The coefficient estimates for internal environmental expenditures were statistically significant at the 0.05 level (-0.2595675, $p < 0.05$). This suggests that a 1% increase in internal environmental costs is associated with a 0.259% loss in return on equity. The results of this study make it clear that an increase in a company's internal environment costs can seriously hurt its performance when it comes to both its return on assets and return on equity.

In the context of Nigeria, Chukwu et al. (2020) looked at the environmental responsibility policies and earnings stability of oil companies in Nigeria. The study's goal was to determine if environmental liability provisions and the oil companies' capacity to maintain profits are related. The research also looked at the relationship between changes in environmental liability provision and the caliber of profits. Using ordinary least squares regression with robust standard errors, data from four oil companies were evaluated for the years 2012 to 2018. By regressing future wages on present earnings and other factors, two research hypotheses were put to the test. Results indicated that environmental responsibility clauses and earnings persistence were not substantially associated. Changes in these provisions have a negligible impact on the quality of the profits. The findings suggest that institutional theory is a valid explanation for the association between environmental liability rules and earnings quality in Nigeria and that ethical considerations or stakeholder concerns are not responsible for the association. Nigeria needs a regulatory framework for environmental financial reporting to make sure that all polluting companies are held accountable for their environmental commitments and that profit figures are disclosed in an ethical manner.

Onyekachi et al. (2020) examined Nigerian oil corporations' earnings and environmental cost accounting in their study. The purpose of the research was to assess how investments in the environment affected the

earnings of publicly listed oil and gas businesses in the Nigerian economy during a ten-year period (2008 – 2017). The secondary data was gathered ex post facto using a research methodology that used the financial records of the five selected firms as its foundation. The data was analyzed using the ordinary least squares regression method, and the findings indicate a strong correlation between the financial success of enterprises and their environmental investments. The study urged all business units in Nigeria to stay up with contemporary financial reporting requirements by taking part in and correctly disclosing their investments in the replenishment of the planet, as it would improve their organization's reputation and their ability to do business. The research also made note of a discrepancy in how companies record their environmental operations, which is partly due to the lack of a worldwide accounting standard to assure transparency and uniformity of environmental reports. It encouraged the International Accounting Standards Board to create a specific standard to overcome this gap so that the accounting industry might successfully provide its fair share of support for a sustainable world.

Tapang et al. (2012) looked at the financial effects of environmental actions on the success of oil businesses. Environmental conservation expenses, social expenses, and fines and penalties are used to quantify environmental activities, whereas profit after tax is used to gauge profitability. Ordinary least squares (OLS) analysis was used to gather data for the research from the internal conservation report. The findings demonstrated that environmental actions and profitability are significantly correlated. Therefore, if organizational profitability is to be maintained, proper conservation of environmental operations is important. It was advised that Nigerian oil corporations provide information on environmental expenditures that were charged to revenue, environmental expenses, and notes to the accounts. To increase the efficacy of the policy, separate accounts for environmental expenses should be formed in order to make it easier to track and report environmental expenses and the environmental performance of each firm as well as the sector as a whole.

Bessong et al. (2023) discovered no correlation between oil leakage, gas flaring, and the profitability per share of oil and gas corporations. Internal environmental costs have a negative impact on the return on assets and equity of publicly listed Nigerian enterprises, according to a study by Akinleye (2022). Chukwu et al. (2020) discovered that the inclusion of environmental responsibility requirements did not have an impact on the consistency of profits, indicating support for institutional theory. In their study, Onyekachi et al. (2020) discovered a significant correlation between environmental investments and economic success, emphasizing the need for Nigerian enterprises to adhere to financial reporting requirements. Tapang et al. (2012) discovered a significant correlation between environmental activities and profitability. They recommend that Nigerian oil companies should publicly disclose the expenses related to environmental protection and include detailed explanations in their financial statements. Additionally, they suggest creating separate accounts specifically for environmental costs in order to enhance the effectiveness of environmental policies.

Nevertheless, the evaluated journals failed to provide a clear explanation of the specific connection between the sustainable business growth and environmental conservation cost of listed oil and gas businesses in Nigeria. The researcher has identified a significant gap in these studies and intends to address it by using gross margin return on investment as a means to measure the dependent variable, ECC. The independent variable in question pertains to sustainable company growth, including community development costs, pollution costs, and environmental remediation costs. This bears some resemblance to the study by Akinleye & Olaoye (2021).

METHODOLOGY

The research examined the impact of environmental conservation costs on the sustainable business growth of publicly traded oil and gas businesses in Nigeria within a competitive market context. The study utilized

an ex post facto research methodology, examined secondary data collected from the annual financial statements of oil and gas companies listed in Nigeria for 12-year period from 2011 to 2022

Model Specification

This research modified the Akinleye & Olaoye (2021) model, which described financial performance as a function of environmental cost as shown in equation (i).

$$ROA_{it} = \beta_0 + \beta_1 CDC_{it} + \beta_2 SIZ_{it} + \beta_3 LEV_{it} + e_{it} \quad \text{-----} \quad (i)$$

However, for the purpose of this study, the researcher has decided to use Gross Margin Return on Investment (GMRI) as a measure of sustainable business growth as the dependent variable in this study, while Community Development Cost (CDC), Pollution Cost (PC) and Environmental Remediation Cost (ERC) are used to measure environmental conservation cost; the independent variable. This will now made the adopted model in equation (i) to be represented thus:

$$GMRI_{it} = \beta_0 + \beta_1 CDC_{it} + \beta_2 PC_{it} + \beta_3 (ERC_{it} + e_{it}) \quad \text{-----} \quad (ii)$$

Population and Study Sample Size

The study's population consisted of all oil and gas companies that were registered with the Nigerian Exchange Group as of December 2022, the Nigerian Exchange Group had a total of 131 oil and gas companies irrespective of their line of business, provided they are into oil and gas production or sales as their case may be.

The sample for the research was selected through the use of multistage and intentional sampling methods. The first stage was the deliberate identification of Nigeria's primary economic sectors. During the second step of the sampling method, a deliberate effort was made to sample about 30% of the population from the two problematic areas. In light of the fact that not all the observed oil and gas companies' financial statements were readily accessible during this study, a purposeful sampling approach was therefore used to choose a sample for each stratum. Hence, this study deliberately chose a sample of 15 oil and gas companies, ensuring that their financial statements were accessible and complete during the designated timeframe of the research.

The 15 oil and gas companies eventually used in this study include: Addax Petroleum Development (Nigeria), Conoco Petroleum Nigeria, Elf Petroleum Nigeria (EPNL) Nigerian, Agip Oil (NAOC), Total Upstream Nigeria, Petroleo Brasileiro Nigeria, Brass Exploration Hardy Oil Nigeria, Phillips Oil Company (Nigeria), Texaco Nigeria Outer Shelf, Chevron Nigeria, Mobil Producing Nigeria, Nexen Petroleum Nigeria, Shell Nigeria Exploration & Production (SNEPCo), Texaco Overseas (Nigeria) Petroleum (TOPCON), Shell Petroleum Development Company of Nigeria and Esso Exploration & Production (Nigeria) (EEPNL)

Source(s) of Data and Data Analysis Procedure

The data for this research was compiled using the financial statements and yearly financial reports of the assessed listed firms on the Nigerian Exchange Group between 2011 and 2022. The extraction method was used to collect the data. The methods used to estimate included correlation, static panel estimation, which includes pooling, fixed, and random effects estimation approaches, and post-estimation tests like the limited F-test and Hausman test.

RESULTS, ANALYSIS AND DISCUSSION OF FINDINGS

Descriptive Statistics

Table 4.1: Descriptive statistics for Gross Margin Return on Investment (GMRI), Community Development Cost (CDC), Pollution Cost (PC) and Environmental Remediation Cost (ERC)

Statistic	GMRI	CDC	PC	ERC
Mean	6.401333	0.222019	3.398340	0.753079
Maximum	349.915663	0.747501	3.652713	1.015262
Minimum	-35.349731	0.055784	3.541146	0.412799
Std. Dev.	27.484203	0.182970	16.014370	0.207515
Skewness	3.064847	2.606212	1.574215	-0.550027
Kurtosis	13.649980	8.395439	11.438995	2.318368
Jarque-Bera	487.941148	21.635131	382.144444	0.931587
Probability	0.000000	0.000000	0.000000	0.735229
Observations	180	180	180	180

Source: Author’s Computation E Views, 2023

Table 4.1 displays the descriptive statistics pertaining to the various variables examined in the research, including a total of 180 observations. These observations were derived from a sample consisting of 15 oil and gas businesses observed over a span of 12 years. The measure of central tendency most often used in statistical analysis is the mean. The standard deviation quantifies the extent of departure, dispersion, or variance from the mean. Standard deviation is a quantitative metric used to assess risk, wherein a larger standard deviation corresponds to a greater level of risk. The standard deviation is a statistical metric that quantifies the dispersion of values within a dataset, representing the extent to which each individual value deviates from the mean. The measure of dispersion being referred to is universally recognized as the most robust and is often used. The measure of skewness is used to assess the degree of symmetry in a distribution. A positively skewed distribution is characterized by scores that are concentrated towards the left side, with a longer tail extending towards the right. Conversely, a distribution that is negatively skewed is characterized by scores that are concentrated towards the right side, with a longer tail extending towards the left. In contrast, kurtosis is a statistical measure that characterizes the degree of peakedness in a distribution. Positive kurtosis is shown by an elevated central peak in the distribution. A flat distribution is indicative of negative kurtosis.

The dataset shown in Table 4.1 displays the mean and standard deviation values for three variables: GMRI, CDC, and ERC. The standard deviation and mean for GMRI are 27.484203 and 6.401333, respectively. For CDC, the mean and standard deviation are 0.222019 and 0.182970, respectively. Lastly, for ERC, the mean and standard deviation are 0.753079 and 0.207515, respectively. These values indicate that the distribution of the data is skewed. The analysis of the models included an examination of the skewness and kurtosis as part of the normality tests.

Moreover, according to the data shown in Table 4.1, the average pollution cost of oil and gas businesses experienced a growth rate of 3.40% throughout the observed period. The standard deviation of 16.014370, which also highlights a significant level of variability, indicates that the mean value of 3.398340 supports this. The skewness coefficient of 1.574215 shows that the combined pollution cost data has a rightward skew, which means that the distribution is not even. The Kurtosis coefficient of 11.438995 also shows that

the pollution cost data is leptokurtic, which means that it has a higher degree of peakedness and heavier tails than a normal distribution. This suggests that the distribution of the aggregated pollution cost data does not follow a normal distribution. The Jarque-Bera test shows that the pollution cost data is not normally distributed. It gives a p-value of 0.000000, which means that the normality assumption is not true at a significance level of less than 1%. Hence, the pollution cost dataset exhibits a greater number of data extremes, hence exerting a detrimental impact on its distribution.

To summarize, the average value of 6.401333 shown in Table 4.1 signifies that the gross margin returns on investment of the oil and gas businesses experienced a mean growth rate of 6.40% throughout the observed period. It is worth noting that this growth exhibited considerable variability, as indicated by a standard deviation of 27.484203. The obtained skewness value of 3.064847 suggests that the distribution of the pooled data for gross margin return on investment exhibits a rightward skew. Additionally, the calculated kurtosis coefficient of 13.649980 shows that the distribution of the gross margin return on investment is leptokurtic. This suggests that the distribution of the aggregated gross margin return on the investment data deviates from a normal distribution. The lack of normalcy in the data for Gross Margin Return on Investment is supported by the results of the Jarque-Bera test, which indicates rejection of the hypothesis of normality (p-value = 0.0000) at a significance level of less than 1%. Therefore, the dataset for Gross Margin Return on Investment exhibits a higher frequency of extreme data points, leading to a detrimental impact on its distribution.

Inferential Statistics

Table 4.2: Pearson Correlation Matrix

VARIABLES	GMRI	CDC	PC	ERC
GMRI	1.000000	-0.319140	-0.036358	0.553445
CDC	-0.319140	1.000000	-0.096954	0.132302
PC	-0.036358	-0.096954	1.000000	-0.470631
ERC	0.553445	0.132302	-0.470631	1.000000

Source: Author’s Computation E Views, 2023

Interpretation of Pearson Correlation Matrix

The Pearson correlation analysis results in Table 4.2 show that there is a positive relationship between the GMRI and the ERC. The coefficient factors of 0.553445 and 0.132302, respectively, show that there is also a positive relationship between the CDC and the ERC. On the other hand, GMRI has a negative correlation with CDC, GMRI also has a negative correlation with PC, CDC also has a negative correlation with PC, and PC also has a negative correlation with ERC, as shown by the coefficient factors of -0.319140, -0.036358, -0.096954 and -0.470631 respectively.

Test of hypotheses

Test of Hypothesis

H_0 : Environmental Conservation Cost has no significant effect on Gross margin return on investment in listed Oil and Gas Companies in Nigeria.

H_1 : Environmental Conservation Cost has significant effect on Gross margin return on investment in listed Oil and Gas Companies in Nigeria.

Table 4.3: Panel Least Square Regression Analysis between Community Development Cost and Gross Margin Return on Investment in listed Oil and Gas Companies in Nigeria

Dependent Variable: GMRI			Cross-sections included: 15	
Method: Panel Least Squares			Included observations: 12	
Total panel (balanced) observations: 180			Sample: 2011 2022	
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.059092	0.748389	0.080517	0.955698
CDC	0.526033	0.264118	3.050705	0.000918
PC	2.652824	1.370093	2.729603	0.000000
ERC	-0.233125	0.164023	-4.906591	0.000000
R-squared	0.545165	Mean dependent var		0.503508
Adjusted R-squared	0.519923	S.D. dependent var		0.861945
S.E. of regression	0.857684	Akaike info criterion		2.574071
Sum squared resid	84.402102	Schwarz criterion		2.668318
Log likelihood	-151.652329	Hannan-Quinn criter.		2.612348
F-statistic	32.002478	Durbin-Watson stat		1.912146
Prob(F-statistic)	0.000000			

Source: Author’s Computation E Views, 2023

The relationship estimated for the model is shown thus:

$$GMRI = 0.059092 + 0.526033CDC + 2.652824PC - 0.233125ERC$$

According to the GMRI’s assessment of the study’s findings, the variables of CDC, PC, and ERC have a significant impact on the Gross margin return on investment of listed oil and gas businesses in Nigeria. The findings also suggest that the variables CDC, PC, and ERC exhibit statistical significance at a significance level of 5%. This finding suggests a positive relationship between the amount of money Nigerian oil and gas companies spend on community development expenses and their overall performance. The Durbin-Watson statistic value of 1.912146 provides evidence that serial correlation is not present. Based on the findings of this research, the present study refutes the claim that the cost of environmental conservation costs does not have a major impact on the sustainable development of Nigerian oil and gas businesses listed on the Nigeria exchange group.

The summary of the regression model also shows how the CDC, PC, and ERC variables affect the long-term growth of oil and gas companies listed in Nigeria. The statistically significant prob (F-statistic) value of 0.000000, which is significant at a 5% level of significance, demonstrates this. The coefficient of determination, denoted as R², has a total value of 0.534613. The findings indicate that a significant proportion, namely 53.46%, of the sustainable business growth seen in Nigerian listed oil and gas businesses can be accounted for by the variables CDC, PC, and ERC. Conversely, the remaining 46.54% of the growth is attributable to factors that lie beyond the confines of the model.

Pollution expenses account for around 54.51% of the variance in the long-term development of the Nigerian enterprises that were considered, according to the adjusted R-squared value of 0.545165. Considering the cost of pollution in environmental management, the identified oil and gas businesses’ gross margin return on investment (GMROI) was determined to be 65.32 percent after adjusting for bases. The observed

coefficients of 2.652824 show a positive correlation between pollution costs and the gross margin return on investment. The gross margin return on investment for oil and gas corporations increases by 52.60% for every 1% increase in expenditures associated with community development, pollution, and environmental cleaning.

The modified R^2 value was found to be 0.519923, which means that changes in CDC, PC, and ERC account for 51.99% of the variation in GMRI. CDC, PC, and ERC. According to the decision rule, there is a consensus that the presence of CDC, PC, and ERC in GMRI is substantial. The results of the standard error test indicate that the standard errors for CDC, PC, and ERC are 0.264118, 1.370093, and 0.164023, respectively. These values are seen to be lower than their corresponding parameters, which are determined to be 0.526033, 2.652824, and 0.233125. The established rule says that the variables may be statistically significant if the absolute value of the estimated coefficient β is greater than the standard error $S(\beta_i)$. Conversely, if the absolute value of $S(\beta_i)$ is less than $S(\beta_i)$, the variables can be considered statistically inconsequential. This suggests that the variables CDC, PC, and ERC within the context of GMRI have statistical significance.

The t-test estimates were used to evaluate the validity of the hypothesis. The results indicate that the calculated t-values for CDC, PC, and ERC are 3.050705, 2.729603, and -4.906591, respectively. The corresponding probability values for these estimates are 0.000918, 0.000000, and 0.000000. According to the findings shown in Table 4.3, the null hypothesis that community development cost has no significant effect on sustainable business growth in listed oil and gas companies in Nigeria is rejected in favour of the alternative hypothesis, indicating that environmental conservation costs have a substantial impact on the sustainable business growth of listed oil and gas companies in Nigeria. The F-Cal value was determined to be 32.002478; however, the f-pro. value was recorded as 0.000000.

Table 4.4: Hausman Specification Test Correlated Random Effects – Hausman Test Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	12.064814	3	0.024721

Source: Author’s Computation E Views 10.0, 2023

Interpretation of Post Regression Analysis

According to the outcome of the Hausman specification test shown in Table 4.4, the p-value associated with the test is 0.024721. This p-value indicates statistical significance at the standard significance level of 0.05. At a significance level of 5%, the fixed effect model (FEM) is thought to be better than the random effect model (REM) for looking at how the costs of protecting the environment affect the long-term growth of Nigeria’s publicly traded oil and gas companies.

Test of hypotheses

Test of Hypothesis

H_0 : Environmental Conservation Cost has no significant effect on Return on Assets in listed Oil and Gas Companies in Nigeria.

H_1 : Environmental Conservation Cost has significant effect on Return on Assets in listed Oil and Gas Companies in Nigeria.

Table 4.5: Panel Least Square Regression Analysis between Community Development Cost and Return on Assets in listed Oil and Gas Companies in Nigeria

Dependent Variable: ROA			Cross-sections included: 15	
Method: Panel Least Squares			Included observations: 12	
Total panel (balanced) observations: 180			Sample: 2011 2022	
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.983828	0.293929	3.347166	0.0011
CDC	0.008397	0.002068	4.060073	0.0001
PC	0.004570	0.089150	0.051257	0.9592
ERC	0.019306	0.011113	1.737313	0.0450
R-squared	0.993965	Mean dependent var		2.201585
Adjusted R-squared	0.993435	S.D. dependent var		2.780116
S.E. of regression	0.225253	Akaike info criterion		-0.059297
Sum squared resid	5.784257	Schwarz criterion		0.189595
Log likelihood	14.70604	Hannan-Quinn criter.		0.041815
F-statistic	1877.482	Durbin-Watson stat		1.841727
Prob(F-statistic)	0.000000			

Source: Author’s Computation E Views, 2023

The relationship estimated for the model is shown thus:

$$ROA = 0.983828 + 0.008397CDC + 0.004570PC + 0.019306ERC$$

A 1% increase in return on assets would result in an increase of 0.008397 in community development cost (CDC), 0.004570 in pollution cost (PC), and 0.019306 in environmental remediation cost (ERC), according to the result. Additionally, both the CDC and ERC independent variables have p-values for their coefficients that are less than 0.05. At the 5% level of significance, all of the costs associated with community development and environmental cleanup have a positive influence on return on assets (ROA), except pollution costs, which have a positive impact on ROA but are not statistically significant. According to the coefficient of determination, there is a substantial association between the independent variable of sustainable business development and the dependent variable of return on asset to the tune of 0.5%. The null hypothesis, which states that oil and gas companies in Nigeria do not have a significant relationship between sustainable business growth and return on assets, is rejected because the model overall (Prob < 0.05, F = 0.000000) is less than 0.05. On the other hand, the alternative hypothesis, which states that there is a significant relationship between the two, is accepted.

Discussion of findings

This research aimed to examine the impact of environmental conservation costs on the sustainable business growth of listed oil and gas companies in Nigeria from 2011 to 2022. According to the study’s empirical model, CDC, PC, and ERC have a significant impact on listed oil and gas companies’ GMRI metric for sustainable business. The findings also suggest that the variables CDC, PC, and ERC exhibit statistical significance at a significance level of 5%. This finding suggests a positive correlation between the amount of money invested by Nigerian oil and gas corporations in environmental conservation expenses and their overall performance. The absence of serial correlation has been shown by the Durbin-Watson statistic,

yielding a value of 1.912146.

Based on the findings of this research, the present study refutes the hypothesis positing that the expenses associated with environmental conservation do not have a substantial impact on the sustainable development of Nigerian oil and gas businesses listed in the Nigeria exchange group. Furthermore, the regression model summary provides insight into the collective impact of the CDC, PC, and ERC variables affecting the sustainable business development of oil and gas businesses listed in Nigeria. The statistically significant prob (F-statistic) value of 0.000000, which indicates significance at a 5% level of confidence, demonstrates this. The coefficient of determination, denoted as R^2 , is 0.526033 when the individual R^2 values are combined. This implies that a significant portion, namely 52.60%, of the sustainable business growth seen in Nigerian listed oil and gas businesses can be accounted for by the variables CDC, PC, and ERC. Conversely, the remaining 47.40% of the growth is attributed to factors that lie outside the scope of the model.

The findings of this study are consistent with those of Tapang et al.'s (2012) investigation, which found a notable correlation between environmental initiatives and profitability. However, this study's results differ from those of Bessong et al. (2023), who found no connection between oil leakage, gas flaring, and the profitability per share of oil and gas companies. Instead, they discovered that internal environmental costs negatively affect the return on assets and equity of publicly listed Nigerian enterprises. Additionally, Akinleye (2022) and Chukwu et al. (2020) found that incorporating environmental responsibility requirements did not affect profit consistency, providing support for institutional theory.

It was found that most of the differential intercepts for the oil and gas companies and industrial firms' cross-sectional particular units were less than 0.5, as shown in Table 4.5. Because of this, a cross-sectional fixed effect estimate was used instead of a pooled OLS valuation because the results showed that cross-sectional heterogeneity had a big effect on the oil and gas samples. After accounting for the heterogeneity effect across the listed firms sampled in the study, the following costs have a positive impact on return on assets: community development cost (with a coefficient estimate of 0.0001 and 0.0450, $p < 0.05$), and pollution cost (with a coefficient estimate of 0.9592, $p < 0.05$). More than 99 percent of the variation in return on assets was due to the costs of community development, environmental cleanup, and pollution. When the model's intercept component included the cross-section heterogeneity effect, an R-squared value of 0.993965 demonstrated this.

Implications of findings

The point of this study was to find out how costs related to protecting the environment, such as community development, pollution, and environmental remediation, affect the long-term successful expansion of Nigeria's publicly traded oil and gas companies. The findings of the study suggest that the expenses associated with environmental conservation have a notable impact on the sustainable expansion of oil and gas enterprises in Nigeria. The findings indicate that the costs associated with community development, pollution, and environmental remediation have a significant impact on the gross margin return on investment of the oil and gas companies' enterprises being analyzed.

The findings from this study are in line with those from earlier studies by Nwaiwu and Oluka (2018) and Onyekachi et al. (2020). Previous research has shown that there is a statistically significant positive influence on financial performance indicators when there is appropriate openness about environmental expenses and when there is adherence to corporate environmental standards. However, these findings contradict those of Umuren et al. (2018), whose investigation revealed that there were no significant connections between the reporting of environmental elements and performance metrics such as return on capital invested and gross margin return on investment. Instead, these findings indicate that there is a strong

relationship between the two.

CONCLUSION AND RECOMMENDATIONS

The objective of this research was to analyze the impact of environmental conservation costs on the sustainable business growth of oil and gas companies that are listed on the Nigeria from 2011 to 2022. The panel data used in this study were obtained from the annual reports and accounts of the selected oil and gas companies. Descriptive statistics were used to provide an overview of the central tendency (mean), dispersion (standard deviation), and shape (kurtosis and skewness) of the variables under investigation. In order to draw inferences, inferential statistics were utilised, namely correlation analysis, panel least squares regression, and the Hausman test. These statistical analyses were conducted using E-Views 10.0 software. The findings of the data analysis indicate a statistically significant correlation between the environmental conservation costs and sustainable business growth of publicly traded oil and gas companies in Nigeria. The separate elements of community development cost and environmental remediation cost were shown to have a significant and favourable impact on sustainable business growth in the listed oil and gas companies in Nigeria. Therefore, the research provides further support for the increasing body of data indicating a substantial correlation between environmental expenses and their impact on financial performance, with statistical significance at the 5% level. The report further asserts that the factors encompassing environmental costs, as examined in this research, are significant factors in elucidating the sustainable business growth of publicly traded oil and gas companies in Nigeria.

The following recommendations were formulated in accordance with the results and conclusions of this study:

1. Government should give incentives to organisations that actively engage in and contribute to community development is proposed as a means to incentivize such activities. This approach is expected to have a positive impact on both community development and the overall sustainable growth of oil and gas companies in Nigeria.
2. Given the good correlation between environmental remediation costs and gross margin return on investment, it can be argued that oil and gas companies should prioritize environmental friendliness in order to gain a competitive edge, enhance liquidity, and decrease environmental expenses over an extended period of time.

CONTRIBUTION TO FUTURE RESEARCH

The research results suggest that there is a positive and statistically significant link between the cost of pollution and the gross margin return on investment of Nigerian oil and gas companies that are traded on the Nigeria exchange group. Therefore, the research suggests a further study of the impact of other environmental factors such as Cash flow adequacy ratio, financial stability, Energy Conservation Cost, Water, Air quality and waste disposals Cost, Environmental and Safety Promotion Cost, Research and Development for environmentally Friendly Products & Services Cost among others on business sustainable growth and other measures of them which were not captured in this study.

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