# ENVIRONMENTAL COST INFLUENCE AND PERFORMANCE OF LISTED OIL AND GAS COMPANIES IN NIGERIA

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**Abstract:** The study examined the effect of environmental cost on performance of listed oil and gas companies in Nigeria. Performance of companies was measured in terms of operational performance, financial performance, and market performance which were proxied by asset utilization, net profit, and share price of the companies. Ex post facto research design was adopted while secondary data were collected from the annual reports of six (6) oil and gas companies which were judgmentally sampled from the population of 10 listed oil and gas companies on the Nigerian Exchange Group. The study adopted the multiple panel regression in analyzing the data. The findings revealed that environmental cost has no significant effect on asset utilization, net profit, and share price of the listed oil and gas companies on the Nigerian Exchange Group. Thus, it is recommended that, the management of the companies should reduce the activities that have effect on the environment in order to reduce the cost of maintenance of the environment while increasing assets that will enable high productivity but reduce negative environmental impacts. Furthermore, oil and gas companies should use more environmental efficient ways of oil exploration and oil and gas production so as to mitigate the negative impacts the cost of such exploration and production methods have on their profit and the environment. Lastly, the study recommended that, companies should adopt globally recommended best production practices that are environmentally responsive and these methods should be reported. As such, they might attract investment and patronage of their shares from investors that have environmental concerns in the heart of their investment drive.
**Keywords:** financial performance, market performance, oil and gas, operational performance,

## INTRODUCTION

Over the past decade, the performance of companies in Nigeria faces several core challenges, impeding growth and profitability (Shehu, 2014). One key issue is inadequate infrastructure, especially in power and transportation, which increases operational costs and limits productivity. Additionally, inconsistent government policies and regulatory uncertainties, particularly in taxation and foreign exchange management, create an unstable business environment. Inflation and rising costs, worsened by the recent fuel subsidy removal, further strain companies by reducing consumer purchasing power and increasing overhead costs, Soomiyol, Wajir, & Yua (2024). These combined factors hinder the ability of Nigerian companies to thrive in an increasingly competitive global market. Understanding the metrics of performance of companies is akin to deciphering the multifaceted issues affecting companies' performance. Operational, financial, and market performance metrics are the key metrics that make up the performance proxy. To truly appreciate this intricate weave, this study embarked on a course to explore the background of studying these aspects of companies' performance,

shedding light on the motivations, methodologies, and significance behind this critical endeavor as it relates with environmental cost, Soomiyol, Teryima, Yua, H. & Temitope, (2024).

According to Rokhmawati, Sathye and Sathye (2015), operational performance analysis focuses on the internal workings of a company. It delves into the efficiency and effectiveness of processes, resource allocation, and overall productivity. This study specifically looked at asset's utilization of companies as a measure of operational performance which is measured in terms of how the companies utilize the assets available in making revenue. On the other hand, financial performance has been noted as another crucial facet of companies' performance (Rokhmawati, Sathye & Sathye, 2015). In most modern studies like that of Olasupo and Akinselure (2017), companies' profit has been used as a measure of financial performance. Another performance proxy considered in this study is the market performance, which is revolves around stock prices and shareholder value. Malarvizhi and Ranjani (2016) posited that, stock prices reflect all available information, leading to the concept of market efficiency and performance. This hypothesis spurred the development of share price prediction models and algorithms as measures of market movements and assessment of the performance of companies in the eyes of investors. As much as these proxies represent a more holistic view of what performance means, how they interact or are affected by environmental cost of companies is not fully established, Yua, Kazeem & Temitope, (2024).

In recent years, many stakeholders in Nigeria and beyond have become conscious of how companies are managing their environmental challenges in view of the cost associated with such undertaking and how it affects different aspects of performance. While some authors like Ong, Tho, Goh, Thai and Teh (2016), argue that environmental cost has negative impact on performance of companies, Nwaiwu and Oluka (2018) stated otherwise, that one or more of these future impacts of environmental cost will be beneficial. For instance, degradation of the natural environment and finiteness of resources is one of the main threats to the environment in the long term. Kasum (2010) noted that, the environment is at risk due to different forms of economic activities of companies which reduces the productivity of the environment, especially activities engaged by most oil and gas companies in the bid to maximize shareholders value are environmentally unsustainable (Khlif, Guidara & Souissi, 2015). These empirical studies have revealed contrasting views about the relationship between company's performance and environmental cost.

Controversies about the relationship have however been debated since the mid-1970s and still have not resulted in a consensus on how environmental cost affects different aspects of performance. It is a major belief that those profit opportunities forgone by investing in environmental responsibility will reduce the profit of the organization (Samy, Odemilin, & Bampton, 2010). Regardless, author like Stavropoulos, Efthymios and Despina (2011) posited that when environmental cost is incurred in repudiating harmful production practices, it legitimizes the companies' actions in the face of shareholders and investors giving the company a positive image in the market. These prepositions are mixed but they posit the preposition made by Elkington (1998) in the Triple Bottom Line theory. Moreover, the International Financial Reporting Standard encourages companies to incorporate environmental considerations into their risk management processes. By assessing the financial risks associated with environmental factors such as climate change or regulatory changes, companies can better anticipate future costs and strategize accordingly. While some may view environmental initiatives as a drain on profitability, the IFRS perspective paints a different picture. Accordingly, Ngozi and Ike (2019) stated that, by accounting for environmental costs, companies can identify opportunities for efficiency improvements and innovation while sustainable practices can lead to cost savings through resource conservation, enhanced brand

reputation, and access to new markets. This relationship between environmental costs and profitability is not one of opposition, but of symbiosis, Yua, Kazeem & Temitope, (2024).

In view of the aforementioned, this study aims to investigate the effect of environmental cost on performance of oil and gas companies in Nigeria, addressing the critical issue of sustainability in the energy sector. The broad objective of this study is to examine the effect of environmental cost on performance of listed oil and gas companies in Nigeria. Specifically, the study seeks to; assess the effect of environmental cost on operational, financial, and market performance of listed oil and gas companies on the Nigeria Exchange Group.

## 2. LITERATURE REVIEW

### 2.1 Conceptual Framework

The conceptual diagram for this study is shown in the diagram below:
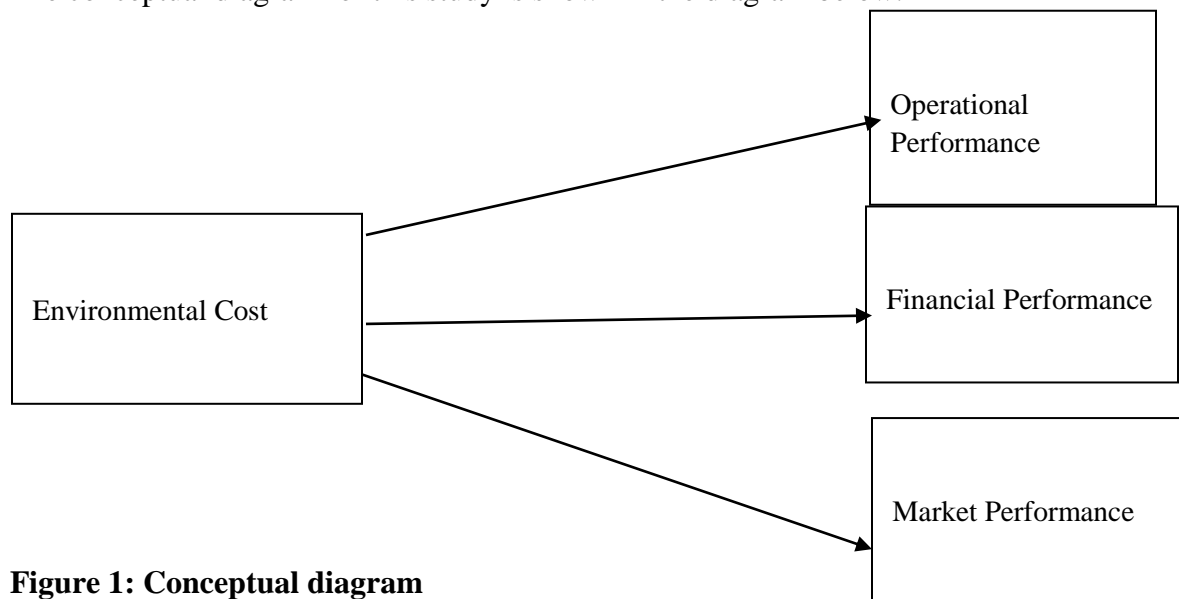


**Figure 1: Conceptual diagram**
**Source: Author's compilation, 2024.**

### 2.1.1 Concept of environmental cost

Environmental cost of companies refers to the wide-ranging ecological impact of business activities, from resource extraction to production, distribution, and disposal of products (Toms, 2002). It encompasses both direct and indirect environmental consequences, which are often externalized, meaning that they are not fully accounted for in a company's financial statements. Understanding the environmental cost is paramount because it reflects the genuine sustainability of a business. Traditional financial reports seldom consider the long-term ecological repercussions of corporate actions (Mohammad, Fakhrul & Rezaur, 2016; Yua, Akume, Ityavyar, & James 2024). Failing to account for these costs results in a skewed perception of company performance. Moreover, the environmental cost is a crucial factor in assessing a company's social responsibility and ethical practices (Karambu & Joseph, 2016). To Hu and Karbharl (2015), companies that neglect their environmental impact risk damage to their reputation and may face legal and regulatory challenges as governments increasingly focus on environmental sustainability.

### a) Disclosure of environmental activities and cost

Ariani (2005) states that the information provided by the corporation is so general and it cannot fully meet the needs of the party's requiring information. Suwardjono (2005) argues that disclosure is related to explanation of

informative matters that are considered important and useful to the user other than what can be stated through the main financial statement. In general, the purpose of disclosure is to provide information that is deemed necessary to achieve the objectives of financial reporting and serve various parties who have different interests. According to Hendriksen and Breda (1992), there are three concepts of disclosure: (1) Adequate, is minimal disclosure that must be done so there will be no misleading corporation information; (2) Fair, is normal disclosure so will give same treatment for the user of corporation's information; (3) Full, is complete disclosure that show all of relevant information.

On the other hand, there are two characteristics of disclosure, these are (1) mandatory disclosure, that is public corporations have obligation to deliver annual report that loads of important financial information, commissioners board report, director report, profile, director responsibility to the report & audited financial statement; and (2) voluntary disclosure, every kind of report that does not regulated in regulation or law. Corporations are willing to make voluntary disclosures, even they should add cost to meet the public's wishes or improve the corporation's image.

**b) Quantitative approach to environmental disclosure measurement**

According to Neuman (2011) quantitative approach to environmental disclosure is the use of objective and systematic counting and recording procedures to produce description of the content in text. Ong et al. (2016), stated that the quantity of environmental disclosure can be measured using content analysis which is considered to be the famous technique employed by previous studies. It can be measured using words count, sentences count and pages count. Annual reports of firms contain both financial and non-financial information, this financial information is easily interpreted using financial ratios while non-financial information can be interpreted using a research tool known as content analysis (Adams & Busola 2017).

**c) Qualitative approach to environmental disclosure measurement**

The quality of environmental disclosure is often difficult to measure, and remains an area of interest and controversy in academic literature (Adams and Busola, 2017). There is no generally accepted measurement of disclosure quality, however several academic literatures have measured environmental disclosure quality on the basis of how the researchers deem fit and the purpose of the study. Saddique (2015) defined qualitative environmental disclosure as the quality attributes as given by the most used environmental and accounting regulating framework and guidelines. Qualitative approach is also known as the scoring measure. Researchers quantify the provided environmental information when using this measurement tool by identifying specific items, and then analyze using a scoring system (Elshabasy, 2017).

**d) Biodiversity component of environmental cost**

The term biodiversity has been introduced by Walter Rosen in 1986. Biological diversity or Biodiversity is defined as the variety and variability among the living organisms and the ecological complexes in which they occur (Walter, 1986). Biodiversity could be seen as the variabilities among species of plants, animals and microorganisms; ecosystems; ecosystem including terrestrial, aerial, marine and other aquatic system and ecological complexes of which they are part. In simpler terms, biodiversity is the assemblage of different life forms that reflects the number of different organisms and their relative frequencies in an ecological system (Yahaya & Lamidi, 2015).

**e) Environmental pollution component of environmental cost**

Pollution is the introduction of contaminants into the natural environment that cause adverse change. Pollution can take the form of chemical substances or energy, such as noise, heat or light. Pollutants, the components of

pollution, can be either foreign substances/energies or naturally occurring contaminants. Pollution is often classed as point source or nonpoint source pollution. The emergence of great factories and consumption of immense quantities of coal gave rise to unprecedented air pollution and the large volume of industrial chemical discharges added to the growing load of untreated human waste. Environmental pollution according to Anuradha (2015) is the build-up and concentration of toxic levels of chemicals in the air, water, and land, which reduces the ability of the affected area to support life. He maintained that pollutants may be gaseous-ozone, carbon monoxide, liquid-discharge from industrial plants and sewage systems or solid land-fills or junkyards which in response causes global warning.

**f) Waste Control/Management component of environmental cost**

Waste is defined by Gobbi (2008) as unnecessary work or holding stocks as a result of errors, poor organization or communication. Contributing to the same, Li and Olorunniwo (2008) focused on the disastrous implication of having wastes in the form of repairs, recalls and image control. On their part, Elmas and Erdogmus (2011) summarize the importance of waste reduction as positive environmental impact, legal compliance, competitiveness advancement and improved customer service. A number of researches in the recent past also focused on barriers of adoption of waste reduction strategy. Rogers and Tibben-Lembke (2002), identify the main barrier for waste reduction being it not receiving priority within the company.

**2.1.2 Performance**

In the ever-evolving landscape of business, the concept of company performance is both a compass and a barometer, guiding companies toward success while providing a critical measure of their vitality (Garg, 2015). To Ftouhi, Ayed and Zemzem (2014) company performance is the heartbeat of any company, resonating through its financial health, operational efficiency, and strategic market effectiveness. It encapsulates a company's ability to achieve its objectives and deliver value to its stakeholders, whether they are shareholders, employees, customers, or the broader community. The performance of a company is often assessed through a combination of quantitative and qualitative metrics. Key financial indicators, such as net profit and return on investment, provide a snapshot of a company's fiscal health. Meanwhile, qualitative assessments may include customer satisfaction, employee engagement, and market reputation (Ejoh, Duke & Acquah, 2014). Together, these metrics form a comprehensive picture of how well a company is faring in the competitive business arena. Numerous factors can sway a company's performance, making it a complex and ever-shifting concept. Among these, leadership and strategy take center stage. Effective leadership sets the tone for a company, fostering a culture of innovation, accountability, and adaptability. Meanwhile, a well-crafted strategy is the roadmap that guides a company toward its goals, ensuring alignment and focus across all levels of the company.

**a) Operational performance**

Asset utilization is a critical metric in assessing the operational performance of companies (Campbell, Shrives & Saager, 2001; Yua, Yua, Ogbonna, 2021). It reflects how efficiently a company is using its assets to generate revenue and profits. Essentially, it measures how well a company is making the most of its resources to drive its business forward. In a competitive business landscape, optimizing asset utilization is paramount. Companies invest heavily in assets like machinery, equipment, and facilities, and they need these investments to pay off. A high level of asset utilization indicates that a company is effectively deploying its resources to meet customer demand, while a low level suggests inefficiency and potential waste (Binh, 2012).

**b) financial performance**

Financial Performance has been defined by various authors in extant literature. According to Verma (2019) financial performance in broader sense refers to the degree to which financial objectives has been accomplished. It measures results of a firm's policy and operations in monetary term, and overall financial health over a period of time. It can also be used to compare similar firms across the same industry or sectors. Kenton (2018) defined financial performance as a subjective measure of how well a firm can use assets from its primary mode of business and generate revenues. This term is also used as a general measure of a firm's financial health over a given period of time, and can be used for comparison across industries. Kenedy and Macmilan (2017) viewed financial performance as an evaluation of profitability and financial strength of any business concern. Financial performance is measuring the results of a firm's policies and operations in monetary terms, these results are reflected in the firm's return on investment, assets etc. Wuave, Yua, and Yua, (2020), (Okafor 2018).

**c) Market performance**

Market performance of companies is a multifaceted concept that reflects the financial health, competitiveness, and overall success of businesses in the dynamic world of finance. At its core, market performance measures how well a company is doing in the eyes of investors, analysts, and the broader market. It encompasses stock price movements, which is pivotal in evaluating a company's ability to generate profits, innovate, and adapt to changing market conditions (Adekunle & Taiwo, 2013). A company's market performance also plays a pivotal role in attracting investment. A strong market performance can boost investor confidence and attract capital for expansion and research and development. Conversely, poor performance can lead to a loss of investor trust and financial instability.

**2.2 Theoretical Review**

**2.2.1 Triple bottom line theory**

**2.2.1 The Stakeholder Theory**

Stakeholder theory was developed by Freeman (1984). Freeman and Reed (1983) have recognized stakeholders as the groups who have an interest in the actions of the corporation. In a follow up study, Freeman (1984) revisited stakeholder theory and redefined stakeholders as any person or group who have an interest in the company due to the fact that he (or she) can affect or is affected by the firms' activities: employees, environmentalists near the company's plants, vendors, governmental agencies, and more. Freeman's theory suggests that a company's real success lies in satisfying all its stakeholders, not just those who might profit from its stock.

The basic proposition of the stakeholder's theory is that the firm's success is dependent upon the successful management of all the relationships that a firm has with its stakeholders, a term originally introduced by Stanford research institute to refer to those groups without whose support the organization would cease to exist, (Freeman 1983). Freeman's stakeholders' theory asserts that, managers must satisfy a variety of constituents (employees, customers, suppliers, local community and so on) who can influence the firm's outcomes. According to this view, it is not sufficient for managers to focus exclusively on the needs of shareholders, or the owners of the business. This implies that it can be beneficial for the firm to engage in certain environmental activities that non-financial stakeholders perceive important, because without this, these groups might withdraw their support from the business.

**2.2.2 Capital need theory**

Companies aim to attract external finance to increase their capital, either by debt or equity. The capital need theory suggests that voluntary disclosure helps in achieving a company's need to raise capital at a low cost

(Choi, 1973). In 2001, according to the Improved Business Reporting: Insights into Enhancing Voluntary Disclosure, which is published by the Financial Accounting Standards Board as part of their broader Business Reporting Research Project, the competition for capital leads to increased voluntary disclosure. The rationale beyond this is the fact that "a company's cost of capital is believed to include a premium for investors' uncertainty about the adequacy and accuracy of the information available about the company." Therefore, reduction in a company's cost of capital is achieved when investors are able to interpret the company's economic prospects through voluntary disclosure (Financial Accounting Standards Board, 2001). The relationship between voluntary disclosure and cost of capital was thought to be a positive relationship; the higher the information disclosures, the lower the cost of capital. However, as Botosan (2006: 3) highlighted that another "stream of research indicates that certain types of disclosure might have the opposite effect.

## 2.3    Review of Related Empirical Studies

Lawrence and Bernard (2023) The study examined the relationship between environmental costs and financial performance of Nigerian industrial goods firms from 2011 to 2020. The research used a moderated regression analysis approach, focusing on waste management costs and community development costs. Results showed that waste management and community development costs positively impacted net profit margin, while firm size negatively affected these costs.

Nwanwu (2022) evaluated the environmental management expenses and financial performance of Nigerian oil and gas firms for the period of nine (9) years from 2011 to 2018, both years inclusive. The explanatory research design of secondary data was used for the study. The linear regression model and e-views statistical software were also adopted for the study. The environmental management cost is an independent variable proxied by pollution cost (PC), while financial performance is a dependent variable proxied by net profit (NEP). The regression result indicated that pollution costs have a positive and significant impact on the net profit of Nigerian oil and gas firms

Ekpose and Enidiok (2021) The study examined the impact of environmental costs on the financial performance of Nigerian oil and gas firms from 2009 to 2019, using panel data, purposive sampling, and a linear regression model. Results showed that health-related costs significantly influenced profit margin, while infrastructural development and education program costs had a positive but insignificant effect.

Oraka (2021) studied the environmental costs and financial performance of Nigerian oil and gas businesses. Environmental remediation expenses and compliance costs were used to measure the independent variable, environmental costs, while Tobin's Q was used to assess the dependent variable, financial performance. The financial statements of eleven (11) businesses were gathered for a period of twelve (12) years, from 2008 to 2019, both years included, using the ex-post facto research design. Statistical software called E-Views 9.0 was used to implement the regression analysis. The outcome demonstrates that environmental remediation costs and compliance costs have a considerable impact on the Tobin's Q of oil and gas businesses in Nigeria.

Chiamogu and Okoye (2020) The study examines the impact of environmental costs on the financial performance of Nigerian oil and gas companies from 2008 to 2018, using purposive sampling and E-views version 9.0 statistic software. Results show that community development and remediation costs positively and significantly affect Tobin's Q of listed companies in Nigeria.

Ngozi and Ike (2019) examined the effect of environmental and social costs on performance of manufacturing companies in Nigeria. The objectives of this study are to examine the relationship between environmental and social costs and performance of manufacturing companies in Nigeria. The data for the study were collected

from annual reports and accounts of fourteen (14) randomly selected manufacturing companies in Nigeria. The data were analyzed using multiple regression models. The key findings of the study shows that there is significant negative relationship between Environmental and social costs and Return on Capital Employed (ROCE) and Earnings per share (EPS) and a significant positive relationship between environmental and social costs and Net Profit Margin (NPM) and Dividend per Share (DPS).

Oyedokun, Egberioyinemi and Tonademukaila (2019) The study analyzed the impact of environmental accounting on the firm value of Nigerian listed industrial goods companies from 2007-2016. Results showed that non-financial indicators positively impacted firm value, while performance indicators had a negative effect. Financial indicators had no significant effect. The study suggests corporate entities should improve environmental responsibility practices.

Umaren, Akpan and Okafor (2018) The study investigated the relationship between environmental accounting and oil companies' performance in Nigeria. Eleven oil companies were selected from the Nigerian Stock Exchange and their performance was measured using return on capital employed, net profit margin, divided per share, and earnings per share. The results showed insignificant relationships between environmental accounting reporting and performance variables. The study suggests further research for longer periods and no theory to underpin the findings.

Nwaiwu and Oluka (2018) examined the effect of environmental cost and financial performance measures of quoted oil and gas companies in Nigeria. Time series data were collected from annual financial reporting and economic review of Central Bank of Nigeria. Pearson product moment coefficient of correlation and multiple linear regression analysis with the aid of special package for social sciences (SPSS) version 22. The econometric results reviewed adequate disclosure on environmental cost, compliance to corporate environmental regulations have positive significant effect on financial performance measures.

Lyndon and Sunday (2018) The study found a significant positive relationship between environmental responsibility reporting and financial performance of 13 Nigerian oil and gas companies from 2012-2017, using the ordinary least square regression method. However, the research suggests that environmental responsibility reporting in Nigeria is still developing, with organizations reporting minimal environmental impact information.

Onipe (2018) The study investigated the impact of environmental disclosure practices on the financial performance of Nigerian environmentally-sensitive firms. The results showed a positive and significant relationship between environmental reporting practices and financial performance, with a green reporting index indicating a positive effect on environmental reporting quality and quantity. This suggests that environmental disclosure practices are crucial for determining corporate financial performance.

Emeka-Nwokeji (2018) The study examined the impact of environmental disclosure challenges on the market value of Nigerian oil and gas firms. Results showed that disclosure of pollution control and abatement costs positively impacted firm value, while environmental litigation costs had a significant negative effect.

Utile, Tarbo and Ikya, (2017) The study examines the impact of environmental reporting on the financial performance of Nigerian listed manufacturing companies. It found that erosion control and air pollution reporting significantly impacted firm financial performance, while waste management reporting had a negative but significant effect. The study concludes that environmental reporting significantly impacts firm financial performance.

Olasupo and Akinselure (2017) The study examines the impact of environmental accounting on the financial performance of Nigerian oil and gas companies. Data was collected through questionnaires and annual reports.

Linear regression analysis revealed a significant relationship between environmental disclosure and return on equity, indicating that the alternate hypothesis should be accepted.

Charles, John and Umeoduagu (2017) The study examined the relationship between environmental disclosures and financial performance of Nigerian food and beverage companies. It found a significant relationship between environmental disclosures and return on equity, but also a negative relationship between environmental disclosures and return on capital employed and net profit margin. The study did not specify the population and sample size.

Worae and Ngwakwe (2017) The study analyzed the relationship between environmental responsibility and financial performance of Johannesburg Stock Exchange's socially responsible manufacturing and mining firms from 2008-2014. It found a unidirectional causal relationship between environmental responsibility and equity returns, and a bidirectional causal relationship between emissions intensity and market value of equity. However, the study did not provide a general recommendation due to mixed findings.

Nnamani, Onyekwelu and Ugwu (2017) The study found that sustainability accounting positively impacts the financial performance of Nigerian listed manufacturing firms, particularly in the brewery sector. It recommends investing in sustainability activities, creating specific accounting templates, and making sustainability reporting compulsory. The Financial Reporting Council of Nigeria should also enforce sanctions on defaulting organizations. The study, published in 2017, is relatively outdated.

Ahmad, Simon and Mohammed (2017) The study examines the impact of environmental disclosure on the performance of nine Nigerian cement and breweries companies. Data was collected from annual reports from 2011-2015. The results show that environmental disclosure quantitative has a positive insignificant impact on Return on Asset (ROA) and EPS, while qualitative has a positive significant impact on ROA and EPS. Firm size also has a positive impact on EPS.

Karambu and Joseph (2016) The study examined the impact of corporate environmental disclosure on the financial performance of listed firms at the Nairobi Securities Exchange. It used longitudinal secondary data from annual reports and financial statements. A checklist of environmental disclosure items and categories was developed, and indices were computed. The casual research design was employed, with a sample size of 32 listed companies. The results showed a significant positive relationship between environmental disclosure and financial performance.

Gatimba and Wabwire (2016) The study examined the impact of corporate environmental disclosure on the financial performance of listed firms at the Nairobi Securities Exchange. It used longitudinal secondary data from annual reports and financial statements. The research involved content analysis, content analysis, and a checklist of environmental disclosure items. The study found that environmental disclosure significantly impacted financial performance, explaining 47.7% of changes. Firm size and leverage did not affect environmental disclosure.

Malarvizhi and Ranjanni (2016) A study on the relationship between Corporate Environmental Disclosure (CED) and firm performance of Indian companies on the Bombay Stock Exchange found no significant relationship. The research used content analysis methodology and a regression model, but the primary data used could be subject to errors and bias, necessitating a subsequent study without primary data.

Mohammad, Fakhrul and Rezaur (2016) The study examines the correlation between company profitability and environmental accounting disclosures in annual reports of quoted manufacturing companies in DSE. An Environmental Accounting Reporting Disclosure Index (EARDI) was developed, revealing a significant

positive relationship between profitability and EARDI. However, a larger sample size may not provide a more accurate conclusion.

Magara, Aming and Momanyi (2015) The study investigated the impact of environmental accounting on the financial performance of corporate organizations in Kisii County. It involved 144 accountants and auditors from 16 corporations, using a stratified sampling design. Data was collected through questionnaires and secondary data analysis. Results showed that the perceived financial performance of the organizations was generally good, with improved revenue generation, cash flows, and profitability. The Environmental Disclosure application, including environmental information, environmental evaluation, compliance with laws, and tracking of environmental cost savings, was found to be positively related to this performance.

Shehu (2014) examines the effect of environmental expenditure on the performance of quoted

Nigerian oil companies, within a period of twelve years (1999-2010) using selected firm financial statement of all quoted oil companies listed in the Nigerian Stock Exchange. The data was analysed using multiple regression, employing ROA and three independent variables; Cost of Environmental Remediation and Pollution Control (ERPC), Cost of Environmental Laws Compliance and Penalty (ELCP), Donations and CharitableContributions (DCC). The result reveals that environmental expenditure has significant effect on the performance of quoted oil companies in Nigeria.

Aggarwal (2013) The study analyzed the impact of sustainability performance on financial performance of 20 non-finance companies in India from 2010/11 to 2011/12. The results showed that sustainability performance did not significantly influence financial performance. The study suggests that the two-year period could be extended for more comprehensive analysis and conclusions.

Nyirenda, Ngwakwe and Ambe (2013) The study examined the impact of environmental management practices on financial performance in South Africa, using a Johannesburg Stock Exchange listed mining company as a case study. Results showed no significant relationship between environmental management practices and financial performance, suggesting the company adopted these practices to comply with regulations and mitigate climate change impacts.

Adediran and Alade (2013) investigate if there is any significant relationship between environmental accounting and corporate performance in Nigeria. The data for the study were collected from annual report and accounts of fourteen randomly selected quoted companies in Nigeria. The data were analysed using multiple regression analysis. The findings of the result show that there is significant negative relationship between environmental accounting and Return on Capital Employed (ROCE) and Earnings Per Share (EPS) and a significant positive relationship between Environmental Accounting and Net Profit Margin and Dividend Per Share.

## 3. METHODOLOGY

### 3.1 Model specification for the Study

Present study examined effect of environmental cost on firm performance of listed oil and gas in Nigeria, in order to find out the relationship between different variables, the data were then analyzed using multiple panel regression analysis through the use of econometric model. The model is specified below:

$AUT_{it} = Þ_0 + Þ_{21}EVC_{it} + FSZ_{it} + \mu_{it}$ .......... Model 1

$NPT_{it} = Þ_0 + Þ_{21}EVC_{it} + FSZ_{it} + \mu_{it}$ ........... Model 2

$SHP_{it} = Þ_0 + Þ_{21}EVC_{it} + FSZ_{it} + \mu_{it}$ ........... Model 3

Where;

Þ$_0$ = constant

AUT= asset utilisation

NPT= net profit

SHP= share price

EVC= environmental cost

FSZ= firm size

 I= company

t= time

U= error term

Þ$_{1=}$ coefficients of the independent variables

## 3.1 Techniques of Data Analysis

The technique of data analysis used in this study is panel regression analysis. To avoid spurious regression, the test of multicollinearity is conducted to ascertain the fitness of the data set for regression analysis.

Multicollinearity is a test that proves that the independent variables are significantly different from each other and can independently affect the dependent variable. Multiple regression analysis is used because it is known as one of the unbiased and efficient estimators of relationship between variables and it also minimizes the error term with a view of finding the model or regression equation that explains the data.

In evaluating the panel regression results, the Hausman specification test is used to select between fixed effect and random effect. The individual statistical significance test (T-test) and overall statistical significance test (F-test) is used in making inferential decisions. Importantly, the regression variation fit of the model is ascertained using the coefficient of determination ($R^2$). The panel analysis is done after descriptive statistics, normality test, correlation analysis, variance inflation test (test for multicollinearity) and Test for Heteroscedasticity. All analyses are conducted at 5% level of significance using STATA 12.1 software.

Normality Test, in this case, the Skewness statistic test determines if the data series are normally distributed by evaluating the disparity of the skewness of the series compared with those from the normal distribution. While the multicollinearity test is done using the correlation matrix and VIF statistics.

**Decision Rule:** To accept the null hypothesis if the calculated probability value is higher than 0.05 acceptance region.

## 4.0                 RESULTS AND DISCUSSION

## 4.1 Data Presentation

This section presents the data used for the study. The data used for this analysis is placed in appendix 1 at the end of the study for perusal.

## 4.2 Data Analysis

## 4.2.1 Descriptive statistics

Table 3 presents the results of descriptive statistics of variables used in the analyses. The minimum, maximum, mean, and standard deviation values are recorded. The number of observations for the study is 60 (6 oil and gas companies for 10 years each).

**Table 3: Descriptive Statistics**

| Variable | | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|---|
| EVC | | 60 | 405984.1 | 481907.7 | 5114 | 1590759 |
| AUT | | 60 | 1.677277 | 1.543654 | .0031872 | 2.098671 |

| | | | | | |
|---|---|---|---|---|---|
| NPT | 60 | 3105820 | 7026003 | -8733042 | 4.07e+07 |
| SHP | 60 | 29.56933 | 47.78077 | .2 | 225.3 |
| FSZ | 60 | 5.48e+07 | 5.31e+07 | 515716 | 3.08e+08 |

**Source: Author's computation from Stata**

For the independent variable, Environmental Cost (EVC) data reveal a minimum value of N5,114,000 and a maximum value of N1,590,759,000. EVC further reveal a mean value of N405,984,100 with a standard deviation of N481,907,700. The value of deviation shown to be above the sector average mean depicts that, bigger companies in the sector spend a considerable about on environmental cost which is above the smaller companies and the sector average.

In respect to the dependent variables, the Assets Utilization (AUT) data, which measures the level of the companies' operational performance reveal a minimum ratio of 0.0031872 and a maximum ratio of 2.098671. AUT further reveal a mean value of 1.677277 with a standard deviation of 1.543654. Net Profit (NPT) data as a measure of the companies' financial performance reveal a minimum value of -N8,733,042 and a maximum value of N40.7 billion. NPT further reveal a mean value of N3,105,820,000 with a standard deviation of N7,026,003,000. Accordingly, Share Price (SHP) data which measures the market performance of the companies' reveal a minimum value of 20 kobo and a maximum value of N225.3. SHP further reveal a mean value of N29.56 with a standard deviation of N47.78. The dispersion of the companies' performance means and deviations shows the level of variation in the individual performance of the companies in the oil and gas sector.

Finally, the companies Firm Size (FSZ) data as a control variable which measures their respective amount of total asset reveal a minimum value of N515,716,000 and a maximum value of N308 billion. FSZ further reveal a mean value of N54.8 billion with a standard deviation of N53.1 billion. The deviation shown to be below the sector average mean depicts that, the oil and gas sector assets is not too skewed for a big or small company to exert too much or less influence in the sector that may cause inference bias in the study analysis.

**4.2.2 Stationarity test**

**Table 4: Combined Skewness and Kurtosis Test**

| | EVC | AUT | NPT | SHP | FSZ |
|---|---|---|---|---|---|
| Skw/Kur (Prob) | 0.0124 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

**Source: Author's computation from Stata**

To ensure stationarity and standardization for all the variables, the combined Skewness and Kurtosis probability values of all the data are computed using Stata 12.1 As shown in table 4 below, data for EVC, AUT, NPT, SHP and FSZ have probability value that are less than 0.05 (shown to be normally distributed).

**4.2.3 Regression Analysis**

This section shows the result for the regression analysis, as well as data diagnostic test that enables validity of the study regression result.

**a) Diagnostic tests for the regression**

This sub-section contains discussions about the diagnostic tests carried out to ensure the validity of the regression result presented. Table 5 in this sub-section contains result for Hausman test and multicollinearity test.

**Table 5: Hausman and multi-collinearity test table**

| | Hausman | Method | W/F.Prob | Lag-test | VIF |
|---|---|---|---|---|---|
| **Model 1 (AUT)** | 0.0043 | Fixed | 0.0191 | Nil | 1.20 |

| | | | | | |
|---|---|---|---|---|---|
| **Model 2 (NPT)** | 0.6766 | Random | 0.0034 | 0.0084 | 1.20 |
| **Model 3 (SHP)** | 0.1041 | Pooled | 0.0000 | 0.0709 | 1.20 |

**Source: Author's computation from Stata**

The Hausman test result is discussed side by side the VIF and fitness test for each model in this sub-section. This is to ensure the validity of each model before final analysis of the model result. The outcomes are discussed below:

For model 1 which test the effect of environmental cost on assets utilization controlled by firm size, the Hausman test reveal a probability statistic of $0.0043<0.05$. This informs the study decision to choose the fixed effect model in analyzing the model 1 outcome. The average VIF of $1.20<10$ for the model, shows that the model is free from multicollinearity issues. While the probability of Fisher statistics of $0.0191<0.05$, reveals that, the model is fit. This then means that, result from fixed effect model is valid for analysis in respect to model 1.

For model 2 which test the effect of environmental cost on net profit controlled by firm size, the Hausman test reveal a probability statistic of $0.6766>0.05$. This informs the study decision to choose the random effect model in analyzing the model 2 outcome. To validate between the random effect model and the pooled model, the study carried out a Lagrangian test which reveal a value of $0.0084<0.05$; this specifies that, the random effect model is must suited for the analysis. The average VIF of $1.20<10$ for the model, shows that the model is free from multicollinearity issues. While the probability of Wald statistics of $0.0034<0.05$, reveals that, the model is fit. This then means that, result from the random effect model is valid for analysis in respect to model 2.

Lastly, for model 3 which test the effect of environmental cost on share price controlled by firm size, the Hausman test reveal a probability statistic of $0.1041>0.05$. This informs the study decision to choose the random effect model. To validate between the random effect model and the pooled model, the study carried out a Lagrangian test which reveal a value of $0.0709>0.05$; this specifies that, the pooled effect model is must suited for the analysis. The average VIF of $1.20<10$ for the model, shows that the model is free from multicollinearity issues. While the probability of Fisher statistics of $0.0000<0.05$, reveals that, the model is fit. This then means that, result from the pooled effect model is valid for analysis in respect to model 3.

**b) Regression of the estimated model**

**Table 6: Regression result for the three models**

| **Model** | **AUT** | **NPT** | **SHP** |
|---|---|---|---|
| **$R^2$ overall** | 0.1345 | 0.4359 | 0.4922 |
| | Fixed | Random | Pooled |
| **Constant** | 14.08867 | 1.578831 | 432.6573 |
| **EVC (coe)** | -0.1924479 | -0.0956207 | 6.687746 |
| **FSZ (coe)** | -1.528882 | 0.682858 | -58.51709 |

**Source: Extracted from Stata output**

The panel regression results for the 3 models are presented in table 6 below. The outcomes are discussed as follows:

For model 1, which tested the effect of EVC on AUT controlled by FSZ, the overall $R^2$ value of 0.1345 shows that, the EVC cause the AUT to change by 13.45%, while the remaining 86.55% is caused by other factors not incorporated in the study. The other factors could be corporate governance decisions. Furthermore, the constant value of 14.08867 shows that, given intercept only model, the AUT value increases by 14.08867 units without

considering environmental cost. But a unit variation in EVC controlled by FSZ in the model will lead to a 19.2% decrease in asset utilization of the oil and gas companies.

For model 2, which tested the effect of EVC on NPT controlled by FSZ, the overall $R^2$ value of 0.4359 shows that, the EVC cause the NPT to change by 43.59%, while the remaining 56.41% is caused by other factors not incorporated in the study. The other factors could be corporate governance decisions. Furthermore, the constant value of 1.578831 shows that, given intercept only model, the NPT value increases by 1.578831 units without considering environmental cost. But a unit variation in EVC controlled by FSZ in the model will lead to a 9.5% decrease in net profit of the oil and gas companies.

Finally, for model 3, which tested the effect of EVC on SHP controlled by FSZ, the overall $R^2$ value of 0.4922 shows that, the EVC cause the SHP to change by 49.22%, while the remaining 50.78% is caused by other factors not incorporated in the study. The other factors could be corporate governance decisions. Furthermore, the constant value of 432.6573 shows that, given intercept only model, the SHP value increases by 432.6573 units without considering environmental cost. But a unit variation in EVC controlled by FSZ in the model will lead to a 6.687746 unit increase in share price of the oil and gas companies.

**4.3 Test of Hypotheses**

**Table 7: Hypotheses results for the three models**

| Model | AUT | NPT | SHP |
|-------|-----|-----|-----|
| EVC | 0.660 | 0.490 | 0.253 |

The decision rule is: Reject HO if the calculated P-value of t-statistic is $</=0.05$. Otherwise, do not reject HO.

**Source: Extracted from Stata output**

Result from Table 7 is used to test the study hypotheses earlier stated in section three of the study. The test is shown as follows:

**Ho1: Environmental cost has no significant effect on asset utilization of listed oil and gas companies in Nigeria.**

From table 7, the P value for EVC against AUT in model 1 revealed a calculated p-value of 0.660>0.05. As a result, the study accepts the null hypothesis. Thus, environmental cost has no significant effect on assets utilization of listed oil and gas companies in Nigeria.

**Ho2: Environmental cost has no significant effect on net profit of listed oil and gas companies in Nigeria.**

From table 7, the P value for EVC against NPT in model 2 revealed a calculated p-value of 0.490>0.05. As a result, the study accepts the null hypothesis. Thus, environmental cost has no significant effect on net profit of listed oil and gas companies in Nigeria.

**Ho3: Environmental cost has no significant effect on share price of listed oil and gas companies in Nigeria.**

From table 7, the P value for EVC against SHP in model 3 revealed a calculated p-value of 0.253>0.05. As a result, the study accepts the null hypothesis. Thus, environmental cost has no significant effect on share price of listed oil and gas companies in Nigeria.

**4.4      Discussion of Results**

The following discussions are made in respect to each finding revealed from the test of hypotheses made.

**4.4.1 Effect of environmental cost on asset utilization of listed oil and gas companies on the Nigeria Exchange Group.**

From the first hypothesis tested, the result revealed that environmental cost has no significant effect on asset utilization of listed oil and gas companies in Nigeria. This study evidence underscores the complex interplay between environmental efforts and operational performance in the oil and gas sector, shedding light on the need for a more comprehensive evaluation of sustainability strategies in line with the TBL theory. The Triple Bottom Line (TBL) theory, also known as the 3P approach (People, Planet, Profit), is a framework that encourages businesses to consider not only their financial performance but also their social and environmental impacts. When studying the effect of environmental costs on asset utilization within the context of oil and gas companies, it's crucial to explore whether these companies are effectively implementing the principles of the TBL theory. The current study examining the relationship between environmental costs and asset utilization in the oil and gas industry has revealed intriguing insights. It is conceivable that the traditional economic perspective, which often prioritizes profit above all else, could lead to the belief that environmental costs have an insignificant effect on asset utilization. This perspective argues that stringent environmental regulations and investments in sustainability initiatives might hinder profitability. However, a comprehensive TBL analysis would consider the broader implications of such a stance. In practice, oil and gas companies are increasingly recognizing the importance of sustainable practices due to growing public awareness and regulatory pressures. Neglecting environmental concerns could lead to reputational damage and legal consequences, potentially impacting long-term asset utilization.

## 4.4.2 Effect of environmental cost on net profit of listed oil and gas companies on the Nigeria Exchange Group.

The second hypothesis tested revealed that, environmental cost has no significant effect on net profit of listed oil and gas companies in Nigeria. This result is consistent with the study of Ekpose and Enidiok (2021) who examined the influence of environmental costs on the financial performance of quoted Nigerian oil and gas firms for the period of eleven (11) years from 2009 to 2019. They used a linear regression model to analyze the data from the study. They found that environmental cost has a positive but insignificant influence on the profit margin (PM) of quoted Nigerian oil and gas firms.

On the other hand, the study findings contradict that of Umaren, Akpan and Okarfor (2018) and Shehu (2014). They found that environmental cost significantly affects financial performance of companies. The reason for the contradiction is owing to the difference in sectors studied by the previous authors and the current study.

## 4.4.3 Effect of environmental cost on share price of listed oil and gas companies on the Nigeria Exchange Group.

From the third hypothesis tested, the result revealed that environmental cost has no significant effect on share price of listed oil and gas companies in Nigeria. The Triple Bottom Line (TBL) theory, encompassing economic, social, and environmental dimensions, has gained prominence in corporate sustainability discussions. Within this framework, there has been growing interest in understanding the relationship between environmental costs and the share prices of oil and gas companies. Recent research examining the impact of environmental costs on the share prices of oil and gas companies yielded unexpected results. Contrary to expectations, the study found that the environmental costs incurred by these companies had only a marginal and statistically insignificant effect on their share prices. This finding raises critical questions about the practical applicability of the TBL theory to this industry. The study's results suggest that investors may not be significantly penalizing oil and gas companies for their environmental costs, potentially reflecting a broader market sentiment or limited awareness of the TBL framework. The study's findings challenge conventional

wisdom regarding the TBL theory's application to the oil and gas sector. Further research and dialogue among stakeholders are needed to determine whether these results hold in the long term and to identify strategies for aligning environmental sustainability with shareholder value in this industry.

## 5.0       SUMMARY, CONCLUSION AND RECOMMENDATION

### 5.1     Summary of findings

i. It was found that a unit variation in EVC controlled by FSZ in the model will lead to a 19.2% decrease in asset utilization of the oil and gas companies. But the decrease was statistically insignificant.

ii. It was further found that, a unit variation in EVC controlled by FSZ in the model will lead to a 9.5% decrease in net profit of the oil and gas companies. But the decrease was statistically insignificant.

ii. Lastly, it was found that, and a unit variation in EVC controlled by FSZ in the model will lead to a 6.687746 unit increase in share price of the oil and gas companies. This change may be considered as a weak change because the coefficient of determination is not up to 50%. This connotes that environmental cost does not strongly affect the shareholders measurement of performance.

### 5.2     Conclusion

The conclusion of the study is drawn from the result of the analysis. It is concluded that environmental cost has insignificant effect on performance indicators of oil and gas companies in Nigeria.

### 5.3     Recommendations

i.   The management of the firms investigated should reduce the activities that have effect on the environment in order to reduce the cost of maintenance of the environment while increasing assets that will enable high productivity but reduce negative environmental impacts.

ii.  It has further recommended that oil and gas companies should use more environmental efficient ways of oil exploration and oil and gas production so as to mitigate the negative impacts the cost of such exploration and production methods have on their profit and the environment.

iii. Lastly, the study recommends that, companies should adopt globally recommended best production practices that are environmentally responsive and these methods should be reported. As such, they may attract investment and patronage of their shares from investors that have environmental concerns in the heart of their investment drive.

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