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# DEBT FINANCING AND ENVIRONMENTAL SUSTAINABILITY DISCLOSURE OF LISTED OIL AND GAS FIRMS IN NIGERIA

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## ABSTRACT

*This study examined the effect of debt financing on environmental sustainability disclosure of listed oil and gas firms in Nigeria for a period of eleven (11) years covering from 2012-2022. Specifically, this study ascertained the effect of debt-to-equity ratio, debt to asset ratio, debt to capital ratio, short term debt ratio and long-term debt ratio on environmental remediation disclosure. Panel data were used in this study, which were obtained from the annual reports and accounts of nine (9) sampled listed oil and gas firms for the periods 2012-2022. Ex-Post Facto research design was employed. Inferential statistics using Pearson correlation coefficient and Panel Least Square (PLS) regression analysis were applied to test the hypotheses of the study. This study revealed that Debt to equity ratio has a significant but negative effect on environmental remediation disclosure (β1 = -0.028870; p-value = 0.0000); debt to asset ratio has a significant but negative effect on environmental remediation disclosure ($\beta_1$ = -0.028870; p-value = 0.0000); debt to capital ratio has a significant but negative effect on environmental remediation disclosure ($\beta_1$ = -0.028870; p-value = 0.0000); Short term debt ratio has a significant and positive effect on environmental remediation disclosure ($\beta_1$ = 0.135819; p-value = 0.0097); long term debt ratio has a significant and positive effect on environmental remediation disclosure ($\beta_1$ = 0.471796; p-value = 0.009017).In conclusion, the study upholds that debt finance significantly affects environmental sustainability disclosure of listed Oil and Gas firms in Nigeria at 5% level of significance. It was recommended amongst others that firms should lever on the amount of debt they undertake to finance their undertakings, as it enhances firms' bottom line. Also, that firms should operate with a capital structure mix that would minimize the cost of capital and reducing the reputational risks associated with the company's operations.*

**Keywords:** Debt financing, Environmental Sustainability Disclosure, Oil and Gas firms

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## Introduction

Firms, especially the large multinational corporations, are being challenged to behave in an environmentally sustainable and socially responsive manner while maintaining and improving shareholder value. Stakeholders are soliciting information on the environmental and social impacts of business operations as well as on measures to benchmark corporate social and environmental performance indifferent industrial contexts, while investors demand disclosure of material environmental risks and related compliance costs and liabilities. Firm managers continually seek information to improve the triple bottom line performance and to make informed trade-offs among often-conflicting financial, environmental, and social objectives.

Debt financing refers to the act of borrowing funds from companies and investors through the use of bonds, banks, or financial institutions with refund obligation, in order to support a business's operations. The lender of such fund is repaid the total amount borrowed, plus the interest accumulated on it, at a later point in time (Abuamsha & Shumali, 2022). At the onset, many businesses do not have sufficient funds to operate, let alone sustain their operations. Hence, they decide to borrow, either from personal sources such as family and friends, as is common to small and medium scale enterprises (SMEs), or impersonal sources such as banks and other financial institutions, as is common with large firms. Several means of external financing exist; however, certain reasons exist which compel business owners to opt for debt financing. Funding through debts proves to be critical to business success as it ensures that the business owner is constantly conscious of running the business well so as to be able to pay back such debts. Also, it can be less costly as interest paid on money borrowed for business activities are tax deductible (Onyema, 2022). Debt financing instruments like bonds ease the pressure on bank lending, particularly longer-term lending, and allow a wider range of corporate credits to access investment markets and seek more finance than the banks or government agencies could provide. Debt financing takes many forms. The essence of debt is that the borrower must repay the funds along with agreed-upon service charges such as interest and loan origination fees.

Nigeria has undergone rapid socio-economic and physical development since independence. The country therefore faces numerous challenges to achieve development that is economically and environmentally sustainable. Development achieved so far cannot be described as sustainable because the various development processes have misused or over exploited the natural resources and, in the process, affected the environment negatively as well. The ecosystem of the country has been disturbed as a result of rapid population growth with great pressure

on the natural resources (Okafor, 2013). However, the increase in global environmental awareness and the campaign for sustainable economic development is redirecting the attention of firms towards environmental sensitivity. Environmental sustainability requires enterprises to invest more in human, material and financial resources. Internal funds are usually used for daily business turnover, and most companies may not be financially capable to be responsibly involved in environmental sustainability activities if they only rely on internal funds, so the environmental sustainability activities of enterprises mainly rely on external funds. Among the external funds, debt financing is the most important source, an indication that the level of debt financing might likely have a great impact on environmental sustainability. Providing sustainability can be costly and those costs are primarily incurred by the companies' shareholders. Unless there are tangible benefits associated with such reporting, in the absence of regulation, the motivation for the shareholders to continue allow companies to provide sustainability reports remain questionable. Therefore, this study investigated the effect of debt financing on environmental sustainability disclosure of listed Oil and Gas firms in Nigeria.

**Statement Of the Problem**

Finance is a crucial ingredient for environmental sustainability. Firms face several significant challenge towards being environmental friendly which include: shortage of lending; currency volatility; fears over the sustainability of supply chains; downward pressure on prices; globalization and expansion into new markets; low-cost country sourcing; pursuit of growth through innovation; product proliferation; service competition; going green; the war for talent; mergers, acquisitions, and divestitures; enterprise risk management, and compliance requirements (Wang, Shang, Li & Li, 2023). Beating the competition and driving profitable growth to exceed investor expectations in this context is a daunting task. Sustainability reporting includes a wide range of information about a company's economic, social, environmental and governance performance and impacts. When viewed over time, they assist in placing annual positive and/or negative information about a company, in addition to demonstrating the long-term commitment of the company. The key challenge of sustainability reporting is deciding who the audience is. The challenge is to think about how to use the reporting information gathered more flexibly, in order to meet the specific interests of different stakeholder groups in other to create value. In practice, however, and in the absence of a universally accepted approach to categorizing all the components of the sustainability accounting, reporting organizations do not necessarily follow a particular reporting standard in relation to sustainability reporting. They see confusion that results in the receipt of multiple requests for information about the same

subject matter from multiple sources. This leads to duplication of effort, increased administrative burdens and uncertainty about what should be reported, how and to whom.

Debt financing and its effect on financial performance have emerged as key areas for research in recent years. Various research studies have been performed over the last decade for examining this relationship. In the light of the foregoing, it is crystal clear that there exists a gap in knowledge, which this study sought to close. In an attempt to closing the variable gap in knowledge, this present study concentrated on environmental sustainability against prior studies that predominantly focused on financial performance (to the best knowledge of the researcher). Unlike traditional content analysis methods, this study adopted a newly developed Global Reporting Initiatives-based reporting index (G4) that identifies companies with good sustainability performance by aligning companies' disclosures to their sustainability performance thereby closing the measurement gap (to the best knowledge of the researcher). Again, periodic gap in literature was equally bridged by extending the fiscal year to 2022, opposite to past studies with a time scope that ended in 2021.

**Objectives Of the Study**

The main objective of the study is to examine the effect of debt financing on environmental sustainability disclosure of listed oil and gas firms in Nigeria. The specific objectives of this study are to determine the effect of debt-to-equity ratio, debt to asset ratio, debt to capital ratio, short term debt ratio and long-term debt ratio on environmental remediation disclosure of listed oil and gas firms in Nigeria.

**Literature Review**

**Conceptual Review**

**Debt Financing**

Debt means the amount of money which needs to be repaid and financing means providing funds to be used in business activities. An important feature in debt financing is the fact that you are not losing ownership in the company. Debt financing is a time-bound activity where the borrower needs to repay the loan along with interest at the end of the agreed period. The payments could be made monthly, half yearly, or towards the end of the loan tenure. Debt Financing means when a firm raises money for working capital or capital expenditures by selling bonds, bills, or notes to individual and/or institutional investors. In return for lending the money, the individuals or institutions become creditors and receive a promise to repay principal and interest on the debt.

Debt financing occurs when a firm raises money for working capital or capital expenditures by selling debt instruments to individuals and/or institutional investors. In return for lending the money, the individuals or institutions become creditors

and receive a promise that the principal and interest on the debt will be repaid. The other way to raise capital in the debt markets is to issue shares of stock in a public offering; this is called equity financing (Coleman, 2020). When a company needs money through financing, it can take three routes to obtain financing: equity, debt, or some hybrid of the two. Equity represents an ownership stake in the company. It gives the shareholder a claim on future earnings, but it does not need to be paid back. If the company goes bankrupt, equity holders are the last in line to receive money. The other route is debt financing where a company raises capital by issuing debt (Veenam, 2020).

**Debt to Equity Ratio**

The Debt to Equity ratio (also called the debt-equity ratio, risk ratio, or gearing), is a **leverage ratio** that calculates the weight of total debt and financial liabilities against total **shareholders' equity**. Unlike the debt-assets ratio which uses total assets as a denominator, the D/E Ratio uses total equity. This ratio highlights how a company's **capital structure** is tilted either toward debt or equity financing (Fernando, 2023). The Debt/Equity Ratio is a ratio of ordinary shareholders' equity and the stake of creditors in a company. In other words, it is a measure of a company's financial leverage (Manson, 2023). The debt-to-equity ratio (D/E ratio) shows how much debt a company has compared to its assets. It is found by dividing a company's total debt by total shareholder equity. A higher D/E ratio means the company may have a harder time covering its liabilities (Boyle, 2023). Debt-to-equity (D/E) ratio is used to evaluate a company's financial leverage and is calculated by dividing a company's total liabilities by its shareholder equity. D/E ratio is an important metric in corporate finance. It is a measure of the degree to which a company is financing its operations with debt rather than its own resources. Debt-to-equity ratio is a particular type of gearing ratio (Rathburn, 2023).

$$\text{Debt/Equity} = \frac{\text{Total Liabilities}}{\text{Total Shareholders' Equity}}$$

**Debt to Asset Ratio**

Debt-to-assets is a **leverage ratio** that defines how much debt a company owns compared to its **assets**. Debt-to-assets information can reflect how financially stable a company is. The higher the ratio, the higher the degree of leverage (DoL) and, consequently, the higher the risk of investing in that company (Blakely, 2023).

The debt-to-total-assets ratio shows how much of a business is owned by creditors (people it has borrowed money from) compared with how much of the company's assets are owned by shareholders (Hayes, 2023). The debt to asset ratio is a financial metric used to help understand the degree to which a company's operations are funded by debt. It is one of many leverage ratios that may be used to understand a company's capital structure (Lip, 2023). The debt to asset ratio is calculated by using a

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company's funded debt, sometimes called interest bearing liabilities. This refers to actual credit provided by direct lenders for which there are interest obligations (like bonds, term loans from a commercial bank, or subordinated debt) (Peterdy, 2023).

$$\text{Debt to Assets Ratio} = \frac{\text{Short-Term Debt} + \text{Long-Term Debt}}{\text{Total Assets}}$$

**Debt to Capital Ratio**

The debt-to-capital ratio (D/C ratio) measures the financial leverage of a company by comparing its total liabilities to total capital. The debt-to-capital ratio formula measures the proportion of debt that a business uses to fund its ongoing operations as compared with capital (Hargrave, 2021). The debt-to-capital ratio is a measurement of a company's financial leverage. The debt-to-capital ratio is calculated by taking the company's interest-bearing debt, both short- and long-term liabilities and dividing it by the total capital. Total capital is all interest-bearing debt plus shareholders' equity, which may include items such as common stock, preferred stock, and minority interest (Tamplin, 2023).The debt-to-capital ratio is a measurement of a business's total debt against total **capital**. This can be used to determine how much **leverage** a business has. It is simply the total amount of a company's debt divided by its total capital (Brock, 2022). Debt pertains to all of a business's short-term and long-term debts. Capital pertains to all of the business's capital which includes common stock, **preferred stock**, and retained earnings (kindness, 2021).

$$\text{Debt-To-Capital Ratio} = \frac{\text{Debt}}{\text{Debt} + \text{Shareholders' Equity}}$$

**Short Term Debt Ratio**

Short-term debt, also called current liabilities, is a firm's financial obligations that are expected to be paid off within a year (Fernando, 2022). Short-term debt describes liabilities that are due to be paid within one year. A short-term debt ratio indicates the likelihood that a company will be able to deliver payments on its outstanding short-term liabilities. Short-term debts include liabilities with a repayment time frame of less than one year from initial issue (such as commercial paper) rather than the sum of all debt payments (final and interim) due within a coming 12-month period (Ahern, 2020). Short-term debt, also called current liabilities, is a firm's financial obligations that are expected to be paid off within a year. It is listed under the current liabilities portion of the total liabilities section of a company's statement of financial position (Mansa, 2022). If the current liabilities are higher than the cash and cash equivalents, this tells us that the company might be in poor financial health, and is in danger of not being able to meet its obligations and pay off all of its debts (Rathburn, 2022).

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Short Term Debt Ratio = Short Term Debt / Total Assets

**Long Term Debt Ratio**

Long term debt ratio is the financial leverage ratios measuring the proportion of long-term debt used to finance the assets of a business. This ratio represents the position of the financial leverage the company's take. With this ratio, analysts can estimate the capability of the corporation to meet its long-term outstanding loans (Smith, 2020). Long term debt ratio is a coverage or solvency ratio used to calculate the amount of a company's leverage. The ratio result shows the percentage of a company's assets it would have to liquidate to repay its long-term debt. It is the ratio that represents the financial position of the company and the company's ability to meet all its financial requirements. It shows the percentage of a company's assets that are financed with loans and other financial obligations that last over a year. As this ratio is calculated yearly, decrease in the ratio would denote that the company is fairing well, and is less dependent on debts for their business needs (Harvey, 2020).

Long Term Debt Ratio = Long Term Debt / Total Assets

**Environmental Sustainability Disclosure**

Environmental sustainability disclosure is the communication of environmental performance information by an organization to its stakeholders. Information on environmental performance includes among others: impacts on the environment; performance in managing those impacts; and contribution to ecological and sustainable development (Okafor, Onyali & Egolum, 2014; Wang, Shang, Li & Li, 2023).Environmental reporting is the process by which management reports to the public about environmental impacts of business activities and environmental initiatives undertaken to mitigate them by disclosing the environmental information related to those activities (Hassani & Bahini, 2022). Environmental disclosure is the generation, analysis, and use of financial and non-financial information in order to optimize corporate, environmental and economic performance, achieving a sustainable business (Onyali, Okafor & Onodi, 2015).

**Environmental Remediation Disclosure**

Environmental remediation disclosure means reporting all costs and expenses of actions or activities to cleaning up or removal of hazardous materials from the environment; preventing or minimizing the further movement, leaching or migration of hazardous materials in the environment; preventing, minimizing, or mitigating the release or threatened release of hazardous materials into the environment, or injury or

damage from such release, and comply with the requirements of any environmental laws. Environmental remediation costs include, without limitation, costs and expenses payable in connection with the foregoing for legal, engineering or other consultant services, for investigation, testing, sampling, and monitoring, for boring, excavation, and construction, for removal, modification or replacement of equipment or facilities, for labor and material, and for proper storage, treatment, and disposal of hazardous materials (Cheng, Wang, Keung, & Bai, 2017). Remediation cost means all costs associated with performing work to remediate contamination of real property or groundwater, including engineering and other professional fees and expenses, costs to remove, transport and dispose of contaminated soil, costs to "cap" or otherwise contain contaminated soil, and costs to pump and treat water and monitor water quality (Blankespoor, De-Haan & Marinovic, 2020).

**Debt to Equity Ratio and Environmental Sustainability Disclosure**

Debt structure decisions are among the most important finance decisions firms encounter. The debate still remains until the present day whether such decisions influence costs of capital and firm values. According to Jabbouri and Kijkasiwat (2023) debt financing decision refers to the financial framework of debt levels maintained by an entity. It is vital to managers by reason of the fact that it constitutes the basis for making financing decisions in any firm. Basically, the choice of debt structure a firm adopts is both financial and marketing problem and it depends on the risk and return characteristics of such firm and/or its management. Realistically, it is difficult to determine a firm's debt structure because the exact optimal debt mix can hardly be determined. For this reason, the firm must issue different securities in a countless mixture to produce the combination that maximizes its overall value, and increase performance. Optimal debt structure means a combination of funds which minimizes the weighted average cost of capital (WACC) and increases firm value (Almustafa & Kalash, 2022).

**Debt to Asset Ratio and Environmental Sustainability Disclosure**

Over time researchers have sought to determine the capital structure or financing decisions and financial performance of enterprises. Enterprises finance part of their assets with equity capital and the other part with other resources like long-term debts and short-term debts. Enterprises can choose their capital structures from many alternatives of capital structures that include arranging lease financing, use of warrants, issue bonds or trade bond swaps. Enterprises also issue distinct capital structures in countless combinations that affect their overall market value (Mazanec, 2023).

**Debt to Capital Ratio and Environmental Sustainability Disclosure**

Corporations finance their activities with internally generated funds or may require external funding. The external funding may come from debt and equity ((Amin & Cek, 2023). When corporations decide on a capital structure, they can either decrease their debt and equity levels or raise them (Akingunola, Olawale & Olaniyan, 2018). Long-term competitiveness is influenced by a strong capital structure. For any company to compete favorably in this era, it must be well focused on three decisions areas; dividend policy decision, an investment decision, and a financing decision (Maina, Olweny & Wanjau, 2018). There is a strong connection among the three types of decisions. An appropriate mix of equity and debt must be used to structure capital. Financial performance and the long-term survival of a company are inextricably linked to an optimal capital structure (Ahmed & Afza, 2019).

**Short Term Debt Ratio and Environmental Sustainability Disclosure**

Short-term assets and liabilities management are critical because they lay bare the financial stability of the firm and the market (Gao, Takuji, & Tsusaka, 2023). Short term debt has been observed by various scholars and researchers to have influence on profitability. Tran, Hoang, & Tran (2018) found that firms can make use of short-term financing which may influence profitability of the firm depending on the cost of the source of financing to that particular firm. Gombola, Liu and Chou (2019) observed that firms may have a certain ration of short-term liabilities in its financing structure which they feel are optimum in enhancing performance and profitability. Numerous studies examine the relationship between debt financing and firm performance, with mixed and divergent results. Kleimeier and Viehs (2018) found that debt-taking negatively affects businesses' profitability. Okudo, Mbonu and Amahalu (2022) found a positive relationship between debt and profitability.

**Long Term Debt Ratio and Environmental Sustainability Disclosure**

Excess indebtedness often triggers a debt crisis, currency crisis and financial distress on the one hand; the bailouts of government on the financial sector during the crisis and the expanding expenditures of the government for enhancing the aggregate demand after the crisis increase the public debt level on the other hand. Therefore, a sustainable debt level is a key factor for preventing financial distress and promoting stable economic growth (La Rosa, Liberatore, Mazzi & Terzani, 2018). Long term debts are the most preferred sources of debt financing among well-established corporate institutions mostly by their asset base, and collateral is a requirement that many of deposits-taking financial institutions (Amahalu & Okudo, 2023

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## Theoretical Framework

Stakeholder Theory

Stakeholder theory was first described by Dr. F. Edward Freeman in 1984, a professor at the University of Virginia, in his landmark book, "Strategic Management: A Stakeholder Approach." It suggests that shareholders are merely one of many stakeholders in a company. Stakeholder theory suggests that a business must seek to maximize value for its stakeholders. It emphasizes the interconnections between business and all those who have a stake in it, namely customers, employees, suppliers, investors and the community. Stakeholder theory states that the purpose of a business is to create value for stakeholders not just shareholders. Business needs to consider customers, suppliers, employees, communities and shareholders

Anchored Theory

This study is anchored on Stakeholder theory because stakeholders are instrumental in ensuring that an organization acts in the public interest. Again, the business case for sustainability reporting is often premised on the need for a business to prepare sustainability reports for the purpose of financial stakeholders. On the other hand, sustainability reporting as an accountability mechanism implies organizations' readiness to report true and fair information on sustainability performance cutting across economic, environmental, social and governance aspects. Also, an accountability approach to sustainability reporting implies that an organization identifies the stakeholders in its internal and external business environment who are all pivotal to its success and continuity. Such awareness could foster greater co-operation and engagement between company managers and stakeholders, thereby, resulting in feedback from corporate stakeholders.

## Empirical Review

Bewley and Li (2000) examined the determinants of environmental information by Canadian manufacturing companies. Five (5) company characteristics were employed to establish the determinants, return on assets, auditor quality, and logarithm of total assets, pollution propensity based on records in the NPRI database and pollution propensity based on standard industry classification. Sample of 188 firms listed on the Canadian stock exchange from 1993 annual report. Seventy (70) firms disclosed both financial and non-financial information, while the residual companies representing 118 did not have any mandatory or voluntary disclosures. Logic analysis and ordinary least square were used, the study revealed that firms with a greater media coverage and a higher pollution propensity had the likelihood of disclosing information pertaining to the environment.

Ane (2012) investigated the effect of environmental information disclosure on profitability of corporations in China. A sample of 110 firms was drawn from multiple subsectors such as electricity,

steel, cement, oil chemicals, mining, timber products, coal metallurgy, pharmaceuticals and paper merchants during the year 2007 to 2009. Each item was scored 0 for non-disclosure, 1 for partial disclosure and 2 for full disclosure. Correlation analysis, multivariate regression and hausman test was used to analyze the data. The scoring system is informed by its intensity. Secondary sources of data which comprised of the annual reports and accounts of the selected companies were used as the main sources of data. The study revealed that there was no significant relationship between environmental disclosure and net profit margin.

Okoye and Omorogbe (2014) investigated the influence of company size on environmental disclosure in Nigerian manufacturing sector. The sample consists of 15 manufacturing companies from the year 2008 to 2013. Correlation and ordinary least square regression analysis were used to analyse the data collected. The study showed that sales and the number of employees had a significant influence on the environmental accounting disclosure of manufacturing companies in Nigeria.

Akinlo and Iredele (2014) ascertained the impact of environmental information disclosures on Market Value of fifty quoted companies in Nigeria spanned 2003-2011. The aggregate and individual impact of Corporate Environmental Disclosure (CED) was regressed on market value (Tobin‟s Q) while firm size was factored in as an extraneous variable. The study showed that Corporate Environmental Disclosure (CED) had a significant positive impact on Market Value when considered in aggregate. In turn, considering the impact of each of the variables, Energy policy (ENP), Impact on Biodiversity (BIO), Award Received for installing Environmental Management System (AWR) had an insignificant positive impact on Market Value with the exception of Environmental Research and Development cost (ERD). Also, Environmental pollution and control policy (EPC), Waste Management Cost (WSM), and Cost of compliance with environmental Laws (CEL) had a negative impact on Market Value. The study recommended that businesses should take caution in areas where environmental activities impact negatively on the Value of the firm and also invest in areas that enhance value for the company.

Ndukwe and John (2015) examined the determinants of environmental disclosures on performance of oil and gas companies in Nigeria. The performance indicators were firm size, Profit, Leverage and Audit firm type on environmental disclosures. Cross-sectional research design was utilized in carrying out the study for a period of 2008-2013 while Binary regression technique was used as the data analysis method. The outcome showed that there was a significant correlation between company size and environmental disclosures. Also, there was no significant correlation between profit and corporate social responsibility

disclosures. The study also found out that there was no significant correlation between Leverage and corporate environmental disclosures and there was also no significant relationship between audit firm type and corporate environmental disclosures. The study suggested that incentives be put in place to motivate disclosures.

Ezeagba, John- Akamelu and Umeoduagu (2017) examined environmental accounting disclosures and financial performance from 2006 to 2015. A sample of 14 food and beverage companies from the Nigeria context was utilized. A disclosure index comprising 20 items of information was used. Multiple regression and Pearson correlation statistical technique was used and the study revealed that, there was a negative relationship between environmental accounting disclosures (EAD) and net profit margin of Nigerian food and beverage companies.

Uyagu, Okpanachi, Nyor and Muhammad (2017) examined the effect of firm characteristics on environmental reporting practices of listed manufacturing firms in Nigeria for a period of 2000-2015. The population of the study comprises of sixty-one (61) manufacturing firms with a sample size of 29 firms drawn using judgmental sampling technique. Data were gathered using annual reports and accounts of the sampled firms through content analysis and analysed using multiple regression technique. The study found that the firm characteristics of firm size, leverage, return on assets and firm age have significant and positive effect on environmental reporting practices of listed manufacturing firms in Nigeria.

Erhirhie and Ekwueme (2019) examined corporate social sustainability reporting and financial performance of Oil and Gas Industry in Nigeria from 2011-2017. The study assessed the effect of corporate social sustainability reporting on Return on Assets, Return on Equity, and Return on Capital Employed of oil and gas companies listed on the Nigeria Stock Exchange. Ten oil and gas companies were sampled for the study. The study utilized secondary data collected via financial ratios and accounts of the individual companies and content analysis. The findings showed that social sustainability reporting exerts negative effect on all three performance proxies, howbeit only its effect on return on equity was statistically significant.

Emeka-Nwokeji and Osisioma (2019) investigated how overall sustainability disclosures and it's disaggregated dimensions of environment, social and governance affect market value of firms in Nigeria as an emerging economy using company's' specific disclosures. Tobins Q was used to proxy firm market value. The study selected 93 out of 120 non-financial firms listed on the Nigerian Stock Exchange as at 2015. *Ex Post Facto research design* was adopted and the secondary data were collected from annual reports of sampled firms from 2006 to 2015 through content

analysis. The data were analysed with descriptive statistics, correlation analysis, principal component analysis while pooled ordinary least squares regression was employed to test formulated hypotheses. The analysis showed that overall sustainability disclosures have significant positive effects on firm value. When treated individually, environmental sustainability disclosures and corporate governance disclosures have a significant positive effect on market value of firm. The study also revealed that social sustainability disclosures have negative and insignificant effect on market value of firm. Based on these findings, the study recommended among other that companies should foster greater sustainability and long-term value creation by integrating sustainability metrics into their reporting model and strategy. Firms in Nigeria should adopt and disclose environmentally friendly policies since it portrays their commitment towards achieving the goal of sustainable development.

Muhammad and Muhammad (2022) examined the effect of board characteristics on corporate social responsibility disclosure of listed food and beverage firms in Nigeria over the period 2005-2020. The study made use of secondary data generated from Annual Reports and Accounts of the sampled firms and the Nigerian Stock Exchange Fact book. The data were analyzed by means of descriptive statistics, correlation and regression analysis using STATA (version 12) package. The study revealed that managerial ownership has a significant negative effect on corporate social responsibility disclosure.

Okoli and Okafor (2023) examined the relationship between corporate social responsibility and value creation of quoted oil and gas firms in Nigeria for a period of fourteen (14) years spanning from 2008 to 2021. Specifically, the study examined the relationship between occupational health and safety responsibility, emissions responsibility, employment responsibility and cash value added. Data were used in this study, which were obtained from the annual reports and accounts of the ten (10) sampled firms. Ex-Post Facto research design was employed. Descriptive statistics of the dataset from the sampled firms was employed to summarily describe the mean, standard deviation, minimum and maximum values of the data for the study variables. Inferential statistics using Pearson correlation coefficient and Panel least square regression analysis were employed to test the hypotheses of the study. The results showed that there is a significant and positive relationship between occupational health and safety responsibility and cash value added ($\beta1$=1.930842; p-value = 0.0006); a significant and positive relationship between emissions responsibility and cash value added ($\beta2$=0.575137; p-value = 0.0116); a significant and positive relationship between employment responsibility and cash value added ($\beta3$=.0.075661; p-value = 0.0000) of quoted

oil and gas firms in Nigeria at 5% level of significance respectively.

**Research Method**

The study will be conducted in the Oil and Gas sector using nine (9) Oil and Gas firms listed on the Nigerian Exchange (NGX) Group as at 31st December, 2022. These nine (9) Oil and Gas firms will form the population form the population for the study. These Oil and Gas firms are Ardova Plc, Conoil Plc, Eterna Plc, Japaul Gold and Venture Plc, MRS Oil Nigeria Plc, Oando Plc, Seplat Energy Plc, Total Nigeria Plc, and Capital Oil Plc. On this note, the research will adopt *ex-post facto* research design since it relied on historical data. No sample size since the entire population was studied. The data to be used in this study were collected mainly from secondary source. These data were obtained from eleven (11) year's annual reports and account from 2012-2023 of the sample Oil and Gas firms. This study made use of panel data from secondary sources through the sampled firms annual reports and accounts. Descriptive statistics was utilized to describe the mean, median, standard deviation, kurtosis, skewness, maximum and minimum values of the study variables via E-Views 10 statistical software. Inferential statistics of this study was carried out using Pearson Correlation Analysis and Panel Least Square (PLS) regression analysis.

Moreover, content analysis was adopted in this study. A content analysis was performed on the sample environmental reports to study how organizational boundaries are set for the whole report and how operational boundaries are set for specific environmental indicators. Any data using fair standard meanings for a specific group of people can be subjected to content analysis (Baker & Schaltegger, 2015). This study adopted the Global Reporting Initiative (GRI) framework disclosures according to the G4 guidelines for the purpose of developing the environmental sustainability disclosure indices. Environmental sustainability disclosure was evaluated by 21 indicators (refer to appendix A).

For each of these sustainability reports, all the 21 indicators were scored as follows:

- a score of 0 for an item not referred to in a report;
- a score of 1 when the report only briefly mentioned something pertinent to the item or provided only qualitative statements;
- a score of 2 when the report provided detailed information with some numerical support; and rarely
- a score of 3 was given when a report provided extensive numerical support with data on goals achieved or fully accomplished.

So, a total score for environmental disclosure could reach the maximum score of 63 (21 x 3 = 63).

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Therefore, ESDI =TDP/MP

Where: ESDI = Environmental Sustainability Disclosure Index
TDP = Total Disclosure Points of a Firm
MP = Maximum Points for a Firm

*This study adapted and modified the model of* Uyagu, Okpanachi, Nyor and Muhammad (2017):

$ED = \beta o + \beta_1 DER_{it} + \beta_2 PROF_{it} + + \mu_{it}$ - - - - *eq (i)*

*Where: ED = Emission Disclosure*
*DER = Debt to Equity Ratio*
*PROF = Profitability*

*Consequent upon the adapted model, the following regression equation was constructed:*

$ERD_{it} = \beta o + \beta_1 DER_{it} + \mu_{it}$ - - *eq (ii)*
$ERD_{it} = \beta o + \beta_1 DAR_{it} + \mu_{it}$ - - *eq (iii)*
$ERD_{it} = \beta o + \beta_1 DCR_{it} + \mu_{it}$ - - *eq (iv)*
$ERD_{it} = \beta o + \beta_1 STDR_{it} + \mu_{it}$ - - *eq (v)*
$ERD_{it} = \beta o + \beta_1 LTDR_{it} + \mu_{it}$ - - *eq (vi)*

Where: $\beta_o$ = Constant term (intercept)
$\beta_{it}$= Coefficients of Debt Financing estimated for firm í in period t
$\mu_{it}$ = Error term/unexplained variable(s) of firm í in period t
$ERD_{it}$ = Environmental Remediation Disclosure of firm í in period t
$DER_{it}$ = Debt to Equity Ratio of firm í in period t
$DAR_{it}$ = Debt to Asset Ratio of firm í in period t
$DCR_{it}$ = Debt to Capital Ratio of firm í in period t
$STDR_{it}$ = Short Term Debt Ratio of firm í in period t
$LTDR_{it}$ = Long Term Debt Ratio of firm í in period t

Decision Rule: Accept the null hypothesis ($H_o$) if the p-value of the test is greater than 0.05, otherwise reject and accept the alternate hypothesis ($H_1$).

**Summary, Conclusion and Recommendation**

**Summary**

Based on the analysis of this study, the following findings were deduced:

1. Debt to equity ratio has significant but negative effect on environmental

remediation disclosure of listed oil and gas firms in Nigeria (β1 = -0.028870; p-value = 0.0000).

2. Debt to asset ratio has significant but negative effect on environmental remediation disclosure of listed oil and gas firms in Nigeria at 5% level of significance at 5% level of significance ($\beta_1$ = -0.028870; p-value = 0.0000).
3. Debt to capital ratio has significant but negative effect on environmental remediation disclosure of listed oil and gas firms in Nigeria at 5% level of significance ($\beta_1$ = -0.028870; p-value = 0.0000).
4. Short term debt ratio has a significant and positive effect on environmental remediation disclosure of listed oil and gas firms in Nigeria at 5% level of significance ($\beta_1$ = 0.135819; p-value = 0.0097).
5. Long term debt ratio has a significant and positive effect on environmental remediation disclosure of listed oil and gas firms in Nigeria at 5% level of significance ($\beta_1$ = 0.471796; p-value = 0.009017).

## Conclusion

This study examined the effect of debt financing on environmental sustainability disclosure of listed oil and gas firms in Nigeria. This study obtained panel data from annual reports and account and publications of the listed oil and gas firms that operated during 2012-2022. In addition, the study specifically examined the effect of debt-to-equity ratio, debt to asset ratio, debt to capital ratio, short term debt ratio and long-term debt ratio on environmental sustainability disclosure. To determine the relationship that exists amongst the study variables and the effect thereof, Pearson correlation coefficient and Panel least square regression estimate were employed. This study revealed that Debt to equity ratio has a significant but negative effect on environmental remediation disclosure (β1 = -0.028870; p-value = 0.0000); debt to asset ratio has a significant but negative effect on environmental remediation disclosure ($\beta_1$ = -0.028870; p-value = 0.0000); debt to capital ratio has a significant but negative effect on environmental remediation disclosure ($\beta_1$ = -0.028870; p-value = 0.0000); Short term debt ratio has a significant and positive effect on environmental remediation disclosure ($\beta_1$ = 0.135819; p-value = 0.0097); long term debt ratio has a significant and positive effect on environmental remediation disclosure ($\beta_1$ = 0.471796; p-value = 0.009017).Conclusively, this present study holds that debt financing has a significant effect on environmental sustainability disclosure of listed oil and gas firms in Nigeria.

## Recommendations

In line with the conclusion of this study, the following suggestions were offered:

1. Based on the negative relationship between debt-to-equity ratio and environmental sustainability disclosure, this study recommends that, firms should lever on the amount

of debt they undertake to finance their undertakings, as it enhances firms' bottom line. Also, that firms should operate with a capital structure mix that would minimize the cost of capital and reducing the reputational risks associated with the company's operations.

2. In order to revert the negative relationship between debt to asset ratio and environmental sustainability disclosure, this study suggests that firms should judiciously maintain optimize debt to asset ratio in financing operations so as to improve and sustain their environmental performance.
3. Sequel to the negative but significant relationship that exists between debt to capital ratio and environmental remediation disclosure, firms should always use the debt to capital ratio to track a firm's improvement over time as it acquires properties. The debt-to-capital proportion can be used by shareholders to determine if a company seems to have enough income to finance its financial commitments and whether it can expect to be paid rates of return.
4. In order to sustain the positive relationship between long-term debt and environmental sustainability disclosure, this study suggests that firms should continue with the usage of long-term debt in financing operations so as to improve and sustain their financial performance.
5. Government and/or lending institutions should design long term financing options suitable for firms such as credit and equity guarantee as well as industry-based credit facilities that will make long term credit not only available but also affordable in order to enable firms link improvements in social and environmental issues with financial opportunities.

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