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Environmental Disclosure and Productivity of Listed Oil and Gas Firms in Nigeria

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ABSTRACT

This study assessed the effect of environmental disclosure on productivity of listed oil and gas firms in Nigeria. Environmental Prevention Disclosure; Community Development Disclosure and Environmental Remediation Disclosure were used to proxy Environmental Disclosure, while revenue growth was used to measure productivity. Based on the objectives of the study, three hypotheses were formulated. *Ex-Post facto* research design and content analysis were adopted. Nine (9) listed oil and gas firms constituted the sample size of this study between 2008 and 2022. Secondary data were extracted from the annual reports and accounts of the sampled firms and were analysed using E-Views 10 statistical software. The study employed inferential statistics using Pearson correlation and Panel Least Square (PLS) regression analysis. Findings from the empirical analysis showed that environmental prevention disclosure has a significant and positive effect on revenue growth (β_1 = 0.377660; P-value = 0.0009 < 0.05); community development disclosure has a significant and positive effect on revenue growth (β_2 = 0.043625; P-value = 0.0000 < 0.05); environmental remediation disclosure has a significant and positive effect on revenue growth (β_3 = 0.524832; P-value = 0.0000 < 0.05). In conclusion, the study posits that environmental disclosure has a significant and positive effect on productivity of listed Oil and Gas firms in Nigeria at 5% level of significance. It was recommended inter alia that corporate entities should be encouraged to produce environmental reports with emphasis on the disclosure of environmental prevention activities on regular basis to manifest their commitment towards sustainable development which in the long run would bolster firms' productivity for the reporting firms.

Keywords: Environmental Prevention Disclosure; Community Development Disclosure; Environmental Remediation Disclosure; Revenue Growth

Background to the Study

Environmental disclosure is an issue that has captured the attention of national and international, political and business leaders across the globe and the developed world. However, the increase in global environmental awareness and the campaign for sustainable economic development is redirecting the attention of firms towards environmental sensitivity. Sustainable development focuses on the creation of wealth and prosperity, whilst considering the true importance of social and environmental aspects, allowing business and public organizations to meet triple bottom line in sustainable management (Amahalu & Okudo, 2023). The search for sustainability has made various global institutions to set out policies that guide human interaction with the environment. These guidelines have great effect on corporations, as they are made to understand that their business strategies affect the society, can influence behaviour and disorganize the physical, social and economic environment.

Proper disclosure of accounting information relating to the environment is a very important aspect of accountability (Amahalu & Moedu, 2023). Productivity refers to how much output can be produced with a given set of inputs. Productivity increases when more output is produced with the same amount of inputs or when the same amount of output is produced with less input.

Non-financial corporate performance has begun to capture the attention of increasing number of investment professionals as they realize that profitability alone is not sufficient for a firm's long-term growth (Amahalu, Okudo & Ezechukwu, 2023). By looking beyond economic, strategic and operational factors to include environmental and social considerations, sustainability reporting helps boost corporate transparency, strengthen risk management, promote stakeholder engagement and improve communications with stakeholders..

However, a lack of regulation and/or consistent guidelines regarding the structure and quality of sustainability reporting have led to the production of various types of reports that have a social, ethical and environmental focus. Traditionally companies have used annual reports as a medium to inform stakeholders about accounting and economic performance as well as accountability and transparency. However, the focus has predominantly been on the shareholders, which meant that wider concerns of other stakeholders are left out. For these reasons the reporting method that companies have used in the past has changed over the last decade or so to the triple bottom line reporting method. There are some studies where the researchers have addressed the components of environmental cost to find out the association between environmental cost and firm performance. However, the findings of these studies are inconclusive, encompassing positive association (Okudo & Amahalu, 2023; Lin & Qamruzzaman, 2023; Okafor, Egbunike & Amahalu, 2022), negative association (Onyeneho & Inyiama, 2023; Onyebuenyi & Ofoegbu, 2022) and non-significant association (Amahalu & Okudo, 2023b; Aniefor and Onayuyeh, 2022), therefore creating a gap in knowledge which this study seeks to resolve.

Objectives of the Study

The main objective of this study is to establish the effect of environmental disclosure on productivity of listed oil and gas firms in Nigeria.

Specifically, this study ascertained the:

i. Effect of environmental prevention disclosure on revenue growth of listed oil and gas firms in Nigeria.

ii. Effect of community development disclosure on revenue growth of listed oil and gas firms in Nigeria.

iii. Effect of environmental remediation disclosure on revenue growth of listed oil and gas firms in Nigeria.

Research Hypotheses

The research hypotheses for this study were stated in null form:

Ho_1: Environmental prevention disclosure has no significant effect on revenue growth of listed oil and gas firms in Nigeria.

Ho_2: Community development disclosure has no significant effect on revenue growth of listed oil and gas firms in Nigeria.

Ho_3: Environmental remediation disclosure has no significant effect on revenue growth of listed oil and gas firms in Nigeria.

Conceptual Review

Environmental Disclosure

Environmental disclosure can be defined as disclosures that related to a company's past, current and future environmental management decisions, activities and performance. Environmental disclosure is the process of communicating externally the environmental effects of organizations' economic actions through the corporate annual report or through a separate, stand-alone, publicly available environmental report. It tends to encompass reporting relating to environmental policies, impacts, processes and audits, environmental-related expenditures, the environmental benefits of products, and details regarding sustainable operations (Mbonu & Amahalu, 2022). Environmental disclosure is the production of narrative numerical information on an organization environment impact or footprint for the accounting period under review.

Environmental Prevention Disclosure

Environmental prevention disclosures are the disclosures of activities carried out to prevent the production of contaminants and/or waste that could cause damage to the environment. Environmental prevention costs include the costs of preventive environmental management activities such as cleaner production projects. It also include costs for other environmental management activities, such as environmental planning and systems, environmental measurement, environmental communication, and any other relevant activities (Khan, Hou, Zakari & Tawiah, 2021).The main objective of businesses to maximize profits in the short term and in the long term is to maximize shareholders' wealth. However, from the operation results of an enterprise affect not only the owners and its partners, but also affect the community, various institutions and organizations (Okoye, Ndubuisi, & Okoye, & Obi, 2022).

Community Development Disclosure

The Community Development Challenge report (2014) defines community development as a set of values and practices which plays a special role in overcoming poverty and disadvantage, knitting society together at the grass roots and deepening democracy. Community Development Exchange defines community development as both an occupation (such as a community development worker in a local authority) and a way of working with communities. Its key purpose is to build communities based on justice, equality and mutual respect (Chukwuka, Okegbe, Ndubuisi & Obi, 2022). Community development involves changing the relationships between ordinary people and people in positions of power, so that everyone can take part in the issues that affect their lives. It starts from the principle that within any community there is a wealth of knowledge and experience which, if used in creative ways, can be channeled into collective action to achieve the communities' desired goals.

Environmental Remediation Disclosure

Environmental Remediation disclosure means 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 (Ekweozor, Ogbodo & Amahalu, 2022). 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 (Udo, Oraka & Ndubuisi, 2022).).

Productivity

Productivity is a measure of performance or output. Productivity is the number of sales generated per sales person. Productivity is the basic measure that defines growth in an organization and one's living standards (higher income, better benefits) (Ndubuisi, Okudo, Okafor & Onyeka, 2023). Productivity is a measure of the efficiency of a person, machine, factory, system, in converting inputs into useful outputs. Productivity is a metric that measures the process of creating goods and services (Amahalu, Okudo & Eyide, 2023). Productivity is the ratio of the amount of output from a team or organization per unit of input.

Revenue Growth

Revenue growth is the increase (or decrease) in a company's sales from one period to the next. Shown as a percentage, revenue growth illustrates the increases and decreases over time identifying trends in the business (Mbonu & Amahalu, 2021). The amount of a company's total revenues is the total money it earns from providing its products or services to customers before paying any expenses (Adibeli & Ndubuisi, 2023). In accounting, a company's revenues can be cash sales or sales for which customers pay at a later date. A company reports its total revenue on its income statement, which is a financial statement that shows a company's revenues, expenses and profit.

The formula for calculating revenue growth is:

$$\frac{\text{Current Year Revenue} - \text{Prior Year Revenue}}{\text{Prior Year Revenue}}$$

Environmental Prevention Disclosure and Productivity

Environmental accounting makes environmental expenditure a part of operational cost; thus, new thinking should be adopted for product design, in order to maintain the existing profits, enhance environmental performance or meet the green (environmental) accounting rules. Otti, Udeh, Ndubuisi, and Obi (2022); Potrich, Cortimiglia and de-Medeiros (2019) found a positive relationship between prevention cost and financial performance. On the contrary, Okudo and Ndubuisi (2021); Yamano and Guilhoto (2020) posited that expenditure on prevention negatively affects the performance of companies.

Community Development Disclosure and Productivity

Social responsibility encourages companies to balance social responsibilities and environmental responsibilities with profit. Consequently, profit maximization or a continuous market-share increase should be the main objective for companies (Okudo & Amahalu, 2023). As businesses evolve, others objectives keep on adding as well, to an ever-bigger extent, so as to lead to synergic effects. These objectives must also consider the effects of business decisions on stakeholders. The development of the relationship between companies, the state, and society, has led to an increase in the pressure on the business environment to make serious efforts to adopt and/or implement a wide range of CSR activities. Thus, companies adopting CSR practices can increase their financial performance. Omabu, Okoye and Amahalu (2021) underlined that the only responsibility a company has is to increase shareholder wealth. Oraka (2021) argued that CSR only brings additional costs to the company, thus reducing shareholder wealth. Moreover, Mbonu & Amahalu (2022) found a negative relation between community development cost and company performance (CFP).

Environmental Remediation Disclosure and Productivity

The performance of firms in terms of profitability largely depends on the nature of businesses they operate, and the possible legal, political and environmental regulations, which constitute an important item of public policy within the scope of their operation. According to Oshiole, Elamah and Ndubuisi (2020).), little was recognized of the environmental depletion and degradation to the environment until a few well meaning people in the developed countries realized that it was not good having great corporate profit without considering the cost of managing large scale of the ecosystem by which we are nourished. It became obvious that degradation, pollution and accelerated destruction of the ecosystem and the depletion of nonrenewable environment biodiversity have serious impact on the financial performance of firms (Egolum, Amahalu & Obi, 2019).

Theoretical Review

This study is anchored on Stakeholders' theory

Stakeholders Theory

Stakeholder theory was first described by Dr. F. Edward Freeman, a professor at the University of Virginia, in his landmark book, "Strategic Management: A Stakeholder Approach." In 1984. It suggests that shareholders are merely one of many stakeholders in a company. The stakeholder ecosystem, this theory says, involves anyone invested and involved in, or affected by, the company: 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. Stakeholder Theory is a view of capitalism that stresses the interconnected relationships between a business and its customers, suppliers, employees, investors, communities and others who have a stake in the organization. The theory argues that a firm should create value for all stakeholders, not just shareholders.

Empirical Review

Okafor, Egbunike and Amahalu (2022) ascertained the determinants of environmental disclosure of quoted Oil and Gas firms in Nigeria for a period of thirteen (13) years spanning from 2008 to 2020. Specifically, this study ascertained the relationship between Leverage, Firm Size and Audit Committee Size and Effluent Disclosure. Panel data were used in this study, which were obtained from the annual reports and accounts of eleven (11) sampled quoted Oil and Gas firms for the periods 2008-2020. *Ex-Post Facto* research design was employed. Descriptive statistics of the dataset from the sampled firms were used to describe using the mean, standard deviation, minimum and maximum values of the data for the study variables. Inferential statistics using Pearson correlation coefficient, Multicollinearity test, Panel Least Square (PLS) regression analysis and Hausman test were applied to test the hypotheses of the study. The results of the tested hypotheses revealed that there is a significant and positive relationship between Leverage and Effluent Disposal of quoted Oil and Gas firms in Nigeria at 5% level of significance ($\beta_1 = 0.546845$; P-value = 0.0000 < 0.05); there is a significant but negative relationship between Firm Size and Effluent Disposal of quoted Oil and Gas firms in Nigeria at 5% level of significance ($\beta_2 = -0.030633$; P-value = 0.0026 < 0.05); there is a significant and positive relationship between Audit Committee Size and Effluent Disposal of quoted Oil and Gas firms in Nigeria at 5% level of significance ($\beta_3 = 0.08007$; P-value = 0.0000 < 0.05).

Arumona, Lambe and Ogunmakinde (2022) examined the effect of environmental disclosure on financial performance of quoted oil and gas companies in Nigeria, using panel series data and regression analysis approach. The focus variables of this study were environmental disclosure for independent variable and financial performance for dependent variable. The independent variable was proxied by research and development cost and estimated future expenditure while dependent variable is proxied by Net Profit Margin and Return on Asset. The secondary data obtained from the annual reports of 12 oil and gas companies quoted on the floor of the Nigeria Stock Exchange (NSE) for 10 years ranging from year 2010- 2019 were used. The study adopted the E-view as a statistical tool for analysis with focus on Ordinary Least Square (OLS) regression method. The study found that environmental disclosure has positive and statistically significant effect on financial Performance of quoted oil and gas companies in Nigeria during the period under review.

Enekwe, Ugwudioha and Uyagu (2023) examined the effect of environmental costs on the financial performance of listed oil and gas companies in Nigeria. The ex-post facto research design was employed for the collection of financial statements of four listed oil and gas companies in Nigeria for a ten-year period from 2010 to 2019. The purposive sampling technique was used for the study. The Panel Ordinary Least Square of the multiple regression model was conducted using the E-views version 9.0 statistical software package. The findings revealed that staff development costs have a negative but insignificant effect on listed Nigerian oil and gas companies' return on assets, while community development costs and employee health and safety costs have a positive but insignificant effect.

Methodology

This study achieved its objectives by employing *ex-post facto* research design. The population of the study comprised of all the nine (9) Oil and Gas firms listed on the Nigerian Exchange (NGX) Group as at 31st December, 2022. They include: 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. Considering the fact that the entire population size will be sampled, hence, no need for sampling technique. This study utilised secondary data that were extracted from the annual reports and statements of account of the sample listed oil and gas companies from 2008-2022.

The inferential statistics was adopted using Pearson Correlation Coefficient and Panel least square regression analysis using E-Views 10.0 statistical software. This study adopted the Global Reporting Initiative (GRI) framework dsclosures according to the G4 guidelines for the purpose of developing the Environmental cost disclosure index. Environmental cost disclosure was evaluated by 12 indicators on policies and systems on environmental issue: Materials, Energy, Water, Biodiversity, Emissions, Effluents and Waste, Products and Services, Compliance, Transport, Overall, Supplier Environmental Assessment, and Environmental Grievance Mechanisms

All the above indicators were rated on a scale from 0 to 3 points. When a company does not take into account the specific indicator at all, it is rated with 0 (that is, non-reporting). A company is ranked 1 or 2 depending on the broadness of the description (for example, 1 if the company only names the indicator and 2 if there is a very poor or unclear description (partial reporting). The company is rated 3 if it takes the indicator into consideration with a satisfying description (full disclosure).

Table 1: Operationalisation of Variables

Variable Type	Proxy	Variable Symbols	Variables Explanation
Independent Variable (Environmental Disclosure)			
	Environmental Prevention Disclosure	EPD	$\frac{\text{Total Environmental Prevention Disclosure Score}}{\text{Maximum Environmental Disclosure Score Possible for a Firm}}$

	Community Development Disclosure	CDD	$\frac{\text{Total Community Development Disclosure Score}}{\text{Maximum Environmental Disclosure Score Possible for a Firm}}$
	Environmental Remediation Disclosure	ERD	$\frac{\text{Total Environmental Remediation Disclosure Score}}{\text{Maximum Environmental Disclosure Score Possible for a Firm}}$
Dependent Variable (Productivity)			
	Revenue Growth	REVG	$\frac{\text{Current Year Revenue-Previous Year Revenue}}{\text{Previous Year Revenue}}$

Model Specification

This study adapted the work of Oshiole, Elamah and Ndubuisi (2020):

$ROA = \beta_0 + \beta_1 WMD_{it} + \beta_2 CDD_{it} + \beta_3 PCD_{it} + \mu_{it}$

Where:

ROA = Return on Assets

WMD = Waste Management Disclosure

PCD Pollution Control Disclosure

The following research model was formulated in line with the research hypotheses in order to empirically determine the effect of environmental disclosure on productivity.

$REVG_{it} = \beta_0 + \beta_1 EPD_{it} + \beta_2 CDD_{it} + \beta_3 ERD_{it} + \mu_{it}$

Where:

β_0= constant term

$\beta_{1,}$ β_2 and β_3 = are slopes to be estimated of firm *i* in period *t*.

í= firm identifier (9 firms)

t= time variable (2008, 2011 ……2022) – (Fifteen Years)

RVG_{it} = Revenue Growth of firm ί in period t

EPD_{it} = Environmental Prevention Disclosure of firm ί in period t

CDD_{it} = Community Development Disclosure of firm ί in period t

ERD_{it} = Environmental Remediation Disclosure of firm ί in period t

Data Presentation and Analysis

Table 2: Pearson Correlation Matrix

	REVG	EPD	CDD	ERD
REVG	1.0000			
EPD	0.1199	1.0000		
CDD	0.4436	-0.2285	1.0000	-0.1033
ERD	0.0676	0.5638	-0.1033	1.0000

Source: E-Views 10 Correlation Output, 2024

The Pearson Correlation Matrix in table 2 shows the existence of a positive relationship between EPD (0.1199), CDD (0.4436), ERD (0.0676) and REVG.

Test of Hypotheses

Table 3: Panel Least Square Regression analysis testing the effect of Environmental Disclosure on REVG

Dependent Variable: REVG
Method: Panel Least Squares
Date: 01/04/24 Time: 13:48
Sample: 2008 2022
Periods included: 15
Cross-sections included: 9
Total panel (balanced) observations: 135

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.473267	0.146383	10.06447	0.0000
EPD	0.377660	0.111162	3.397373	0.0009
CDD	0.043625	0.006818	6.398890	0.0000
ERD	0.524832	0.069937	7.504312	0.0000

R-squared	0.548767	Mean dependent var	0.728272
Adjusted R-squared	0.531563	S.D. dependent var	0.344343
S.E. of regression	0.301853	Akaike info criterion	0.471426
Sum squared resid	11.93607	Schwarz criterion	0.557509
Log likelihood	-27.82129	Hannan-Quinn criter.	0.506408
F-statistic	34.45999	Durbin-Watson stat	1.272633
Prob(F-statistic)	0.000000		

Source: E-Views 10 Regression Output, 2024

Interpretation of Regression Output

Table 3 shows the analysis of the coefficient regression result on the effect of environmental disclosure on revenue growth of listed oil and gas firms in Nigeria. The result of the model is written as:

$REVG_{it} = 1.473267 + 0.377660EPD_{it} + 0.043625CDD_{it} + 0.524832ERD_{it} + \mu_{it}$

The model infers that one naira increase in EPD, CDD and ERD will exert 37.77%, 4.36%, 52.48% increase on REVG of listed oil and gas firms in Nigeria. Furthermore, the regression result shows that EPD (β_1=0.377660), CDD (β_2=0.043625) and ERD (β_3=0.524832) have a positive relationship towards REVG. The slope coefficients reveal that; P(x_1=0.0009<0.05; P(x_2=0.0000<0.05; x_3=0.0000<0.05;). The model demonstrates that at 95% confidence level, there is a significant and positive relationship between EPD, CDD, ERD and REVG. The adjusted R-Squared of 0.531563 shows that 53.16% of the systematic variation in REVG could be explained by EPD, CDD And ERD while the remaining 46.84% is explained by the error term as part of the REVG which is not interpreted by the regression model.

Decision

Following the F-statistics of 34.45999 with an associated P-value of 0.000000 (p<0.05) which is less than 5%. In conclusion therefore, this study posits that environmental disclosure indices have a significant and positive effect on revenue growth of listed Oil and Gas firms in Nigeria at 5% level of significance.

Findings

In consonance with the analysis of this study, the following findings were deduced:

i. Environmental prevention disclosure has a significant and positive effect on revenue growth of listed oil and gas companies in Nigeria at 5% level of significance (β_1 = 0.377660; P-value = 0.0009 < 0.05).

ii. Community development disclosure has a significant and positive effect on revenue growth of listed oil and gas companies in Nigeria at 5% level of significance (β_1 = 0.043625; P-value = 0.0000 < 0.05).

iii. Environmental remediation disclosure has a significant and positive effect on revenue growth of listed oil and gas companies in Nigeria at 5% level of significance (β_1 = 0.524832; P-value = 0.0000 < 0.05).

Recommendations

Based on the findings of this study, the following recommendations were made:

i. Firms should be encouraged to produce environmental reports with emphasis on the disclosure of environmental prevention activities on regular basis to manifest their commitment towards sustainable development which in the long run would bolster firms' productivity for the reporting firms.

ii. Considering the positive effect of community development disclosure on productivity, there is a need for corporate entities in Nigeria to improve their environmental responsibility practices and disclose comprehensively their environmental risks, liabilities and impact on the environment.

iii. Sequel to the empirical evidence that environmental remediation disclosure significantly affects productivity, Firms should increase their involvement in environmental activities for improved and sustainable productivity.

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Appendix I

Environmental Disclosures in GRI G4

Disclosure	Description	Aspect
G4-EN1	Materials used by weight or volume	Materials
G4-EN3	Energy consumption within the organization	Energy
G4-EN4	Energy consumption outside the organization	Energy
G4-EN5	Energy intensity	Energy
G4-EN6	Reduction in energy consumption	Energy
G4-EN7	Reductions in energy requirements of products and services	Energy
G4-EN8	Total water withdrawal by source	Water
G4-EN11	Operational sites owned, leased, managed in, or adjacent to, protected areas and the areas of high biodiversity value outside protected areas	Biodiversity
G4-EN12	Description of the significant impacts of activities, products, and services on biodiversity in protected areas and the areas of high biodiversity value outside protected areas	Biodiversity
G4-EN13	Habitats protected or restored	Biodiversity
G4-EN15	Direct greenhouse gas (ghg) emissions (scope 1)	Emissions
G4-EN16	Energy indirect greenhouse gas (ghg) emissions (scope 2)	Emissions
G4-EN17	Other indirect greenhouse gas (ghg) emissions (scope 3)	Emissions
G4-EN18	Greenhouse gas (ghg) emissions intensity	Emissions
G4-EN19	Reduction in greenhouse gas (ghg) emissions	Emissions
G4-EN22	Total water discharge by quality and destination	Effluents and Waste
G4-EN27	Extent of the impact mitigation of the environmental impacts of products and services	Products and Services
G4-EN30	Significant environmental impacts of transporting products and other goods and materials for the organization's operations, and the transporting members of the workforce	Transport
G4-EN31	Total environmental protection expenditures and investments by type	Overall
G4-EN32	Percentage of new suppliers that were screened using environmental criteria	Supplier Environmental Assessment
G4-EN33	Significant actual and potential negative environmental impacts in the supply chain and actions taken	Supplier Environmental Assessment

Source: G4 Sustainability Reporting Guidelines, Reporting Principles and Standard Disclosures, 2023.