



RESEARCH ARTICLE

ENVIRONMENTAL DISCLOSURE AND MARKET VALUE ADDED OF QUOTED OIL AND GAS FIRMS IN NIGERIA.

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ABSTRACT

This study assessed the nexus between environmental disclosure and market value added of quoted oil and gas firms in Nigerian Exchange Group (NGX) for the period of eleven (11) years spanning from 2012 to 2022. Emission Disclosure (EMID), Compliance Disclosure (COMD), Effluent and Waste Disclosure (EFWD) were used to proxy environmental disclosure while Market Value Added (MVA) served as the dependent variable. In line with the objectives of the study, three hypotheses were formulated. Ex-post facto research design was employed. Six (6) out of the eleven (11) quoted oil and gas firms constituted the sample size of this study. Secondary data were extracted from the annual reports and accounts of the sampled firms in accordance with Global Reporting Initiative Fourth Generation (GRIG4) indicators of environmental reporting using content analysis. The study employed inferential statistics using Panel Least Square (PLS) regression analysis to analyse the variables. Findings from the empirical analysis showed that there is a positive and significant relationship between compliance disclosure and effluent and waste disclosure on market value added while emission disclosure revealed negative and significant relationship on market value added. The study recommended inter alia that companies like oil and gas firms should take the issue of environmental disclosures serious, so as to enhance the confidence of the public on their operations which will definitely translate to improved performance.

Keywords: Environmental disclosure, emission, compliance, effluent waste, market value added,

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1.0. INTRODUCTION

Climate change is becoming one of the most important issues of the twenty-first century and it is widely recognised as the most significant environmental issue facing the global economy. Majority of the scientists agreed that carbon emission and waste disposal are the most prominent factors responsible for climate change. Evidence does suggest that the failure of the business to manage these impacts can expose them to considerable risk (Bello and Ogungbenle, 2022).

In order to ensure long-term financial success, businesses need to recognize that they are operating within a larger biophysical and social environment, and respect the limits and processes governing the sustainability of the larger ecosystem as the global economy expands rapidly toward the carrying capacity of the planet. Consequently, firms, especially the large multinational corporations such as oil and gas companies, 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 in different 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 (Ellili and Nobanee, 2022). As a result, the accounting profession is being called upon to expand its traditional role to incorporate environmental and social performance into the financial reporting and management control systems.

Environmental cost is an issue that has captured the attention of national and international, political and business leaders across the globe and the developed world. The creation of wealth



has led to various environmental impacts such as depletion of non-renewable resources, global warming, diminution of land resources, acidification, and reduction of water resources and potential threats to health and safety of employees (Ezeokafor and Amahalu, 2019). Environmental cost is not only used by companies or other organizations internally, but is also made public through disclosure in environmental reports. The disclosure of environmental accounting data as one of the key elements in an environmental report enables those parties utilizing this information to get an understanding of the company's stance on environmental conservation and how it specifically deals with environmental issues. Environmental costs include costs of complying with environmental laws. It includes environmental remediation costs, pollution control equipment costs and non-compliance penalty. Environmental cost could also cover the cost incurred to prevent degradation, cost of re-stating the environment to its original state, cost of restoring depleted environment to its normal position (Mahmud, 2020).

Shareholders expect management to generate value over and above the costs of resources consumed, including the cost of using capital. A company that is destroying value will always struggle to attract further capital to finance expansion since it will be hamstrung by a share price that stands at a discount to the underlying value of its assets and by higher interest rates on debt or bank loans demanded by creditors. Speculators and investors are likewise progressively taking a gander at nature of numbers instead of amount. In order to meet such desires, great administered organizations do embrace practices which improve the estimation of budget reports and incentive to the stakeholders.

Emission is the production and discharge of something, especially gas or radiation. Emission is anything that is been released out into the open. But more often it refers to gases being released into the air, like greenhouse gasses or emissions from power plants and factories. Emissions are basically chemicals in exhaust gases that are harmful to air quality, mainly carbon monoxide



(CO), hydrocarbons (HC), and nitrogen oxides (NO). Carbon emission is the release of carbon into the atmosphere (Ananda and Joni, 2020). Emission is an amount of something, especially a gas that harms the environment that is sent out into the air. Emissions fees is a surcharge on the pollution created while producing goods and services. For example, a carbon tax is a tax on the carbon content of fossil fuels that aims to discourage their use and thereby reduce carbon dioxide emissions. A carbon price is a cost applied to carbon pollution to encourage polluters to reduce the amount of greenhouse gas they emit into the atmosphere.

Compliance cost refers to all the expenses that a firm incurs in order to adhere to industry regulations. Compliance costs include salaries of people working in compliance department, time and money spent on reporting, new systems required to meet retention and so on. These costs typically increase as the regulation around an industry increases (Elmagrhi, Ntim, Elamer and Zhang, 2019). Compliance costs can be incurred as a result of local, national and international regulations, and they generally increase as a company operates in more jurisdictions. Global companies that have operations in jurisdictions all over the world with varying regulatory regimes naturally face much higher compliance costs than a company operating solely in one location (Ekweozor, Ogbodo and Amahalu, 2022). Compliance cost is the total cost incurred by a firm to comply with applicable regulations. These regulations may cover such areas as tax reporting, environmental topics, transport, and finances. Compliance costs can include the following:

- i. Cost of the systems needed to collect information for compliance reporting.
- ii. Cost of the personnel needed to construct and monitor the compliance systems.
- iii. Cost to compile and issue reports.

Effluent is sewage that has been treated in a septic tank or sewage treatment plant. It is also referred to as trade effluent or waste water. Effluent is waste other than waste from kitchens or



toilets, surface water or domestic sewage. It can be produced and discharged by any industrial or commercial premises. Effluent is an outflow of water or gas to a natural body of water, from a structure such as a sewage treatment plant, sewer pipe, industrial wastewater treatment plant or industrial outfall. It is produced and discharged by any industrial or commercial premises, such as a food processing factory or manufacturing business. Effluents are harmful when they enter the environment, especially in freshwater, because of their polluting chemical composition. According to Hossain, Islam and Andrew (2016) effluent and waste disclosure can enhance the financial performance of any organization.

The market value added (MVA) is a performance measurement tool that computes for the increase in the value of the company's stock price. The MVA is derived by comparing the total market value of the firm and the book value of the invested capital (Jasperson, 2021). Market value added (MVA) is a calculation that shows the difference between the market value of a company and the capital contributed by all investors, both bondholders and shareholders. In other words, it is the market value of debt and equity minus all capital claims held against the company. It is calculated as:

$$MVA = V - K$$

where MVA is the market value added of the firm, V is the market value of the firm, including the value of the firm's equity and debt (its enterprise value), and K is the total amount of capital invested in the firm.

$$MVA = \text{Market Value of Stocks} - \text{Book Value of Stockholders' Equity}$$

The market value (MV) of stocks is computed by multiplying the number of outstanding shares by the market price per share (Jasperson, 2021).



A company's MVA is an indication of its capacity to increase shareholder value over time. A high MVA is evidence of effective management and strong operational capabilities. A low MVA can mean the value of management's actions and investments is less than the value of the capital contributed by shareholders. A negative MVA means the management's actions and investments have diminished and reversed the value of capital contributed by shareholders.

The state of the environment is a major concern today. The environment is faced with serious challenge of environmental changes such as global warming, health care and poverty. This situation is similar to what Fromont, Vo and Lux (2022) described as tangible environmental crises. As human population continues to grow, material consumption intensifies and production technology further expands, there is a steady decline in the quantity and quality of environmental resources. There is continuing concern about nature fragmentation and loss of biodiversity, shortages in freshwater availability, over-fishing of the seas, global warming, extreme weather events, gas flaring, air pollution, water pollution, environmental noise and utter neglect and disregard for the protection of the immediate environment, much more the future environment. This type of environmental unsustainability associated with continuously rising demand and a shrinking resource base now spills over into social and economic instability.

The production of every barrel of crude oil, refining and transportation of petroleum products to the customer, due to the high pressure; high temperature conditions of underground reservoirs, and the use of a variety of chemicals to safely drill and produce hydrocarbons in the industry that causes contamination and pollution. The challenges of sustainable development in the oil and gas sector can be categorized as: flaring and venting; decommissioning of oil and gas installations; oil storage tank disposal; managing drill cuttings; produced water disposal/treatment; managing drilling muds and fluids; estimating and validating greenhouse gas



emissions; and so on. Each of these challenges has created many environmental concerns and occasionally environmental crises in the past. Some major oil companies have made decisions about each of these challenges, and billions of naira has been spent annually on improving methods and technologies, and dealing with indigenous communities around oil and gas facilities.

Numerous studies have tried to establish the importance of environmental disclosures to enhanced firm performance, but there has been no consensus on the influence of environmental disclosures on firm performance. Findings from extant literature have been mixed and inconclusive, ranging from significant positive relationship to negative relationship and non-significant relationship thereby creating a gap in knowledge which this study tends to fill. For instance, Westin, Hallencreutz and Parmler, (2022), and Olayinka (2022) are of the view that environmental disclosures provide positive performance benefits to organizations. Some other studies found non-significant influence of environmental disclosures on firms' financial performance like Costa and Fonseca (2022), and Carroll (2022) while Nogueira, Gomes and Lopes (2022) found a negative relationship. In resolving the gap in literature, this study adopted market value added which is a contemporary financial performance measure as against prior studies that utilized conventional/traditional financial performance measure such as return on assets, return on equity, return on capital employed, thereby resolving the variable gap. Again, the currency and periodic gap was bridged by considering 2022 as part of the financial period, as against prior studies that the scope of its financial period ended in 2021, hence, the need for this study.

2.1. Objectives of the Study



The main objective of this study was to examine the relationship between environmental disclosure and market value added of quoted oil and gas firms in Nigeria.

Specifically, the study determined the relationship between:

1. emission disclosure and market value added of quoted oil and gas firms in Nigeria.
2. compliance disclosure and market value added of quoted oil and gas firms in Nigeria.
3. effluent and waste disclosure and market value added of quoted oil and gas firms in Nigeria.

2.2. Research Hypotheses

To accomplish the objectives of the study, the following null hypotheses were formulated and tested at 0.05 level of significance.

H₀₁: There is no significant relationship between emission disclosure and market value added of quoted oil and gas firms in Nigeria.

H₀₂: Compliance Disclosure has no significant effect on the market value added of quoted oil and gas firms in Nigeria.

H₀₃: There is no significant relationship between effluent and waste disclosure and market value added of quoted oil and gas firms in Nigeria.

3.0. METHODOLOGY

Design of the Study

The design used for the study was ex-post facto research design. This is appropriate because ex-post facto research aims at measuring and establishing the relationship between one variable and another or the effect of one variable on another in which the variables involved are not manipulated by the researcher (Kothari and Garg, 2014).



Population of the Study

The population of this study consisted of all the eleven (11) oil and gas companies listed on the Nigerian Exchange Group (NGX) as at 31st December, 2022. They include: Anino International Plc; Capital Oil Plc; Conoil Plc; Eterna Plc; Ardova Plc; Japaul Oil & Maritime Services; MRS Oil Nigeria Plc; Oando Plc; Rak Unity Petroleum Company Plc; Seplat Petroleum Development Company Plc and Total Nigeria Plc.

Sample Size and Sampling Technique

The sample size of this study comprised of six (6) listed oil and gas firms in the Nigeria Exchange Group (NGX) from 2012 to 2022. Purposive sampling technique was adopted to select oil and gas companies that consistently filed their annual reports with the Nigerian Exchange Group (NGX) for the study period. The sampled firms are: Conoil Plc; Eterna Oil Plc, MRS Oil Nigeria Plc; Oando Plc; Rak Unity Petroleum Plc and Total Nigeria Plc.

Source of Data Collection

Secondary data were basically sourced online and collected from the annual reports and financial statements of the selected listed oil and gas firms in Nigeria. Based on the annual reports, chairman statement, directors reports and corporate social responsibility (CRS) reports made in connection with environmental impact are scored based on the GRIG4 standard guideline for environmental reporting using Wiseman (1982) rating scale as adopted by Okafor, Egbunike and Amahalu (2021). Annual reports are the most acceptable and commonly used medium for social



disclosure as well as to communicate information to stakeholders all over the world including Nigeria.

Operationalisation of Variables

Table 1: Variable Description

Variable Type	Indicators	Variable Symbols	Definition and Measurement
Independent Variable (Environmental Disclosure)			
	Emission Disclosure	EMID	Total emission score disclosed
	Compliance Disclosure	COMD	Total compliance score disclosed
	Effluent and Waste Disclosure	EFWD	Total effluent and waste score disclosed
Dependent Variable			
	Market Value Added	MVA	Market value of shares - Book value of stockholders' equity

Model Specification

In order to determine the relationship between environmental disclosure and market value added of oil and gas firms listed on the Nigerian Exchange (NGX) Group. This study adapted the model of Okafor, Egbunike and Amahalu (2021):

$$ROA = \beta_0 + \beta_1 EMID + \beta_2 EWD + \beta_3 ENVR + \varepsilon \dots\dots\dots (1)$$

Where:

ROA = Return on Assets

ENVR = Environmental Remediation

ε = error term



To test for hypotheses 1, 2, and 3, this study estimated the following regression equations based on the formulated hypotheses:

$$MVA_{it} = \beta_0 + \beta_1 EMID_{it} + \mu_{it} \quad - \quad - \quad 1$$

$$MVA_{it} = \beta_0 + \beta_1 COMD_{it} + \mu_{it} \quad - \quad - \quad 2$$

$$MVA_{it} = \beta_0 + \beta_1 EFWD_{it} + \mu_{it} \quad - \quad - \quad 3$$

Considering the utilization of the adapted model, the following model was thus formulated:

$$MVA_{it} = \beta_0 + \beta_1 EMID_{it} + \beta_2 COMD_{it} + \beta_3 EFWD_{it} + \mu_{it}$$

Where:

β_0 is the intercept of the regression.

$\beta_1, \beta_2, \beta_3$ are the coefficients of the regression

MVA_{it} = Market value added of firm i in period t

$EMID_{it}$ = Emission disclosure of firm i in period t

$COMD_{it}$ = Compliance disclosure of firm i in period t

$EFWD_{it}$ = Effluent and waste disclosure of firm i in period t

i = individual firms (1, 2, 3... 6)

t = time periods (2012, 2013, 2014 ... 2022)

μ_{it} = Error term

Method of Data Analysis

The method adopted for data analysis in this study was the content analysis using the Global Reporting Initiative (GRI) on environmental reporting guidelines and standard disclosures. The content of the annual reports and statements of the sampled firms from 2012 to 2022 was evaluated based on the study variables. The weighting scale used by Wiseman scored the three environmental reporting indicators used for the study 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 specific and detailed information with some numerical support; and rarely a score of 3 when a report provided extensive numerical support with data on goals achieved or fully accomplished.

Panel Least Square regression analysis was employed to determine the value of a variable based on the value of the other variables using E-View 10.0.

Decision Rule

Reject H_0 and accept the alternative hypothesis, if the P-value of the test is less than 0.05.

4.0. FINDINGS / RESULTS

4.1. Results

The data collected on the variables of the study were extracted from the annual reports and statements of account of the sampled listed oil and gas companies in Nigeria and GRIG4 guideline. The variables are environmental disclosure as independent variable which was proxy with emission disclosure, compliance disclosure, effluent and waste disclosure and market value added as the dependent variable of the study.

Table 2: Raw data of the study

See raw data of the study in Appendix 1

Table 3: Panel Least Square Regression analysis testing the relationship between EMID, COMD, EFWD and MVA

Dependent Variable: MVA

Method: Panel Least Squares

Date: 06/15/23 Time: 15:48

Sample: 2012 2022



Periods included: 11

Cross-sections included: 11

Total panel (balanced) observations: 121

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.491984	0.095860	15.56428	0.0000
EMID	-0.352722	0.032120	-10.98137	0.0000
COMD	0.132804	0.048666	2.728890	0.0069
EFWD	0.799450	0.054411	14.69289	0.0000
R-squared	0.632716	Mean dependent var		0.147143
Adjusted R-squared	0.626977	S.D. dependent var		0.072139
S.E. of regression	0.044060	Akaike info criterion		-3.386349
Sum squared resid	0.372720	Schwarz criterion		-3.319449
Log likelihood	335.8622	Hannan-Quinn criter.		-3.359265
F-statistic	110.2521	Durbin-Watson stat		1.970274
Prob (F-statistic)	0.000000			

Source: E-Views 10 Regression Output, 2023

Interpretation of Regression Output

Table 3 shows the regression output of the relationship between environmental disclosure and market value added, the result of the model is written as:

$$MVA_{it} = 1.491984 - 0.352722EMID_{it} + 0.132804COMD_{it} + 0.799450EFWD_{it} + \mu_{it}$$



The implication of the model infers that 1 unit increase in EMID will cause MVA to reduce by 0.3527, while a unit increase in COMD and EFWD will respectively exert 0.1328 and 0.7995 increase on MVA.

Test of Hypotheses.

Based on the results of panel least square regression estimations were used to make decisions by testing the formulated hypotheses in this study.

Hypothesis 1 (H₀₁): There is no significant relationship between emission disclosure and market value added of quoted oil and gas firms in Nigeria.

The result of the test for this hypothesis is presented on table 3. The result reveals that the EMID with a coefficient of -0.352722 and p-value is 0.0000 indicates a significant negative relationship with MVA. With this result therefore, the null hypothesis which states that emission disclosure has no significant relationship on MVA is rejected while the associated alternate hypothesis is accepted.

H₀₂: Compliance disclosure has no significant effect on the market value added of quoted oil and gas firms in Nigeria.

There is no significant relationship between emission disclosure and market value added of quoted oil and gas firms in Nigeria.

The result of the test for this hypothesis is presented on table 3. The result reveals that the COMD with a coefficient of 0.132804 and p-value is 0.0069 shows a significant positive relationship with MVA. With this result therefore, the null hypothesis which states that compliance disclosure has no significant relationship on MVA is rejected while the associated alternate hypothesis is accepted.

H₀₃: There is no significant relationship between effluent & waste disclosure and market value added of quoted oil and gas firms in Nigeria.



There is no significant relationship between emission disclosure and market value added of quoted oil and gas firms in Nigeria.

The result of the test for this hypothesis is presented on table 3. The result reveals that the EFWD with a coefficient of 0.799450 and p-value is 0.0000 revealed a significant positive relationship with MVA. With this result therefore, the null hypothesis which states that effluent and waste disclosure has no significant relationship on MVA is rejected while the associated alternate hypothesis is accepted.

Statistically, the model delineate that at 95% confidence level, there is a significant relationship between EMID, COMD, EFWD and MVA. The Durbin-Watson Value of 1.970274 buttressed the fact that the model does not contain auto-correlation, since the value is less than approximately, thereby making the regression fit for prediction purpose. The adjusted R-Squared of 0.626977 shows that 62.70% of the systematic variation in MVA could be explained by EMID, COMD and EFWD while the remaining 37.30% is explained by the error term as part of the MVA which is not interpreted by the regression model.

4.2. Discussion of Findings

The environmental disclosures were proxy with emission, compliance, effluent and waste while market value added is the dependent variable. Estimation of the model is via the Panel Least Square Regression by the application of the software for empirical econometric analysis E-Views 10.0.

The findings of environmental disclosure on market value added reveals as follows;

The outcome of the regression result on hypothesis one (H_{01}) on EMID showed a coefficient value of -0.352722 and p-value of 0.0000 which is less than 0.05 significant level. The result revealed that negative and significant relationship with MVA exists. The study result is in



consistent with the results of Olayinka (2022) and Jung and Heejin (2022) who found emission disclosure negative and significant on MVA but debunked the findings of Costa and Fonseca (2022) and Carroll (2022) whose results contradicts with the present study of EMID and MVA. This means that EMID affects MVA of quoted oil and gas firms in Nigeria.

The outcome of the regression results on hypothesis two (H_{02}) on COMD and MVA showed a coefficient value of 0.132804 and p-value of 0.0069 which is less than 0.05 significant level. The result indicates that a positive and significant relationship exists. The finding of this study corroborates with the results of Mohammad, Alhassan and Mohammad (2022); Okeke, Ifurueze and Nwadiaro (2021) but negates with the assertions of Odugbemi and Igbekoyi (2022); Omaliko and Ogbuagu (2018) whose results have negative and insignificant relationship with studies used variables. This means that COMD affect MVA of quoted oil and gas firms in Nigeria.

The outcome of the regression results on hypothesis three (H_{03}) on EFWD and MVA showed a coefficient value of 0.799450 and p-value of 0.0000 which is less than 0.05 significant level. The finding indicates that positive and significant relationship exists between EFWD and MVA of quoted oil and gas firms in Nigeria. The result of this study is in consonance with Ofoegbu and Onyebuenyi (2022); Julansa, Zuraidda and Diantimala (2020) whose results found that EFWD have significant relationship with the studies used variables but contradicts with the works of Odugbemi and Igbekoyi (2022) who found insignificant relationship. This means that EFWD affect MVA of quoted oil and gas firms in Nigeria.



5.0. CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

The thrust of this study is to ascertain the relationship between environmental disclosure and market value added of quoted oil and gas firms in Nigeria for a period of eleven (11) years spanning from 2012 to 2022. The proxies used to measure environmental disclosure are Emission Disclosure, Compliance Disclosure, and Effluent and Waste Disclosure while market value added served as the dependent variable. Data were obtained from annual reports and accounts of the sampled oil and gas firms for the study period using a sample of six (6) quoted oil and gas firms. Panel Least Square Regression analysis was employed via E-Views 10.0. Based on the findings, the study concludes that three indicators emission, compliance and effluent & waste disclosure has significantly affected market value added of selected quoted oil and gas firms in Nigeria during the period under review.

5.2. Recommendations

The following recommendations were made in line with the findings and conclusion of this study:

- i. Companies like oil and gas firms should take the issue of environmental disclosures serious, so as to enhance the confidence of the public on their operations.
- ii. Regulatory agencies in Nigeria should strengthen their monitoring and oversight function on the compliance level of organizations towards environmental frameworks.
- iii. Significant penalties should be placed on any firm that will violate the stipulated laws of the environment on the course of its operations.

Competing Interest

The authors have declared that no conflicting interest exist in this paper.



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