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ENVIRONMENTAL DISCLOSURE AND CORPORATE FINANCIAL PERFORMANCE EVIDENCE FROM LISTED OIL AND GAS COMPANIES IN NIGERIA

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Abstract

The broad objective of this study is to empirically analyze the effect of corporate environmental disclosure on firm financial performance of listed oil and gas companies in Nigeria using a time frame of fourteen (14) years. In this study, we employed ex-post facto and analytical research design on a panel data set sourced from annual financial reports of seven (7) listed oil and gas companies in Nigeria. Robust least square regression analysis was employed to test the formulated hypotheses after fulfilling necessary conditions for obtaining non-spurious least square regression estimates. Specifically, the result reveals mixed evidence which show that emission and energy disclosure has a positive statistically significant effect on financial performance measures of return on asset and return on equity, and biodiversity disclosure has a negative effect on both performance measures during the period under investigation. Based on these empirical outcomes, the study recommends among others that mitigating the negative effect of emission and energy disclosure on financial performance requires that managers must develop strong capabilities to identify and solve diverse managerial problems through innovative channels. However, all such channels can be linked to productive systems which can convert waste into saleable products and thus increase its profit.

Keywords: Emission and Energy Effluent and Waste Biodiversity and water Environmental Protection Expenditure Financial Performance

Introduction

The environmental challenges in Nigeria, particularly those related to the oil and gas industries, have significant implications for the natural environment. Consequently, it is necessary to assess the extent and quality of environmental information disclosed in the annual reports of these companies. This disclosure serves the purpose of raising awareness among stakeholders about the environmental impact of these industries. According to Adekanmi, Adedoyin, and Adewole (2015), the inclusion of environmental information, while not obligatory, is widely recognized as a recommended approach. Nevertheless, straying from established best practices can potentially send negative signals to both society and the market, as it suggests inadequate corporate social responsibility management and a lack of consideration for the firm's influence on the natural environment. Companies that aspire to cultivate a positive reputation must demonstrate their commitment to social responsibility by adhering to best practices. Given the context, this study aims to investigate the relationship between environmental disclosures and corporate financial performance within the context of Nigerian listed companies.

The concept of environmental disclosure pertains to the process of preparing and disseminating information to various stakeholders, including both internal and external parties, regarding the environmental condition and operational effectiveness of a corporation (Jariya, 2015). The activities of oil and gas corporations in Nigeria have resulted in significant alterations to the environmental and biological composition, resulting in ecological harm, emissions, pollution, and the loss of landscapes (Oti & Mbu-Ogar, 2018). The well-being and safety of employees are compromised because of the presence of hazardous substances. Manufacturing businesses' operations have a detrimental impact on the environment, leading to a lack of environmental sustainability. According to Oti and Mbu-Ogar (2018), the lack of development in the host communities where firms conduct their activities has resulted in increased young restiveness and militancy.

Companies are obligated to disclose and report on various aspects of their operations, including their environmental impact, strategies for promoting employee health and safety to prevent work-related accidents, waste management procedures to minimize environmental harm, and efforts to improve the quality of life in the communities where they operate by providing infrastructure and basic amenities. Most manufacturing organizations fail to meet these requirements, leading to an unpredictable and unfavorable business environment that hinders the growth of businesses. These companies are frequently perceived as having a negative impact on the environment, leading to adverse effects on their corporate reputation and financial outcomes.

Nevertheless, it is crucial to acknowledge that the Nigerian context lacks enough research studies that have provided insights into the relationship between environmental disclosures and financial performance. In other words, there is paucity of study that has investigated environmental disclosures and corporate financial performance in Nigeria. Some of the prior studies that investigate environmental disclosures are the work of Awa, Udu and Udu (2022), Onuora, Obiora and Atusiaka (2022), Kurawa and Shuaibu (2022), Ikponmwosa and

Ogbeide (2021), Adebayo and Ezejiofor (2021), Arumona, Lambe and Ogunmakinde (2021), Olowookere, Taiwo and Onifade (2021), Iorun (2021), Nguyen, Tran, Nguyen and Le (2017); Bani-khalid, Kouhy and Hassan, (2017); Soyinka, Sunday and Adedeji, (2017); Ozigi, Said and Daud (2017); Juhmani (2014); Makori and Jagongo, (2013); Naser, Al-Hussaini, Al-Kwari and Nuseibeh (2006). In the study conducted by Awa, Udu, and Udu (2022), an investigation was carried out to analyze the impact of environmental accounting information disclosures on the financial performance of cement manufacturing firms in Nigeria. The study conducted by Onuora, Obiora, and Atusiaka (2022) investigated the correlation between web-based environmental disclosure and the financial performance of publicly traded companies in Nigeria. The study conducted by Ikponmwosa and Ogbeide (2021) examined the impact of environmental disclosure on the financial performance of non-financial companies listed in Nigeria.

Therefore, none of the existing studies have investigated the correlation between environmental disclosures and corporate financial performance in Nigerian listed firms, with a specific emphasis on variables like effluents and waste, emissions, energy, and financial performance. This situation highlights a knowledge gap in the economic literature regarding the impact of carbon monoxide emissions and energy on the financial performance of listed companies in Nigeria. There is a lack of consensus regarding the connection between effluents, waste, emissions, energy, and financial performance in Nigerian listed companies. This study aims to investigate the relationship between environmental disclosures and corporate financial performance among Nigerian listed companies. This study will examine the variables of Emission and Energy, Effluent and Waste, Biodiversity, and Water and Environmental Protection.

Literature Review

Conceptual Clarifications

Financial Performance

Financial performance of a company could be described as an economic category that reveals the aptitude of companies in utilizing human and material resources to accomplish the goals and objectives of an organization (Nguyen, Nguyen, Nguyen & Do, 2021). Corporate financial performance explains the association among the output outcomes and input resources utilized in the course of company operations of organization (Nguyen, Nguyen, Nguyen & Do, 2021). Dodoo, Donkor and Appiah (2021) described financial performance as an essential prerequisite for long-term corporate survival and victory. Usman (2019) opined that financial performance is employed to evaluate company's financial health generally over a specified period of time and may also be employed to evaluate similar companies across the same sector or to evaluate sectors or industries in aggregation. The concept of financial performance lacks a precise and universally agreed-upon definition. The observed occurrence possesses unique characteristics that can be subjectively evaluated and quantitatively assessed. Users with diverse perspectives can assess the situation from multiple aspects and viewpoints (Olaoye, Olaoye & Adebayo, 2019). From a perspective of profitability and growth, a financial analyst possesses the ability to assess performance. In addition to the efficient allocation of resources, an economic planner may also prioritize the equitable distribution of gains and wealth. A

welfare economist's primary focus lies in ensuring the equitable distribution of profits and wealth, in addition to promoting efficient utilization (Olaoye, Olaoye & Adebayo, 2019). The evaluation of financial performance pertains to the achievement of a company's economic objectives, encompassing diverse subjective indicators of the company's ability to effectively utilize its allocated resources in its major business activities to generate profits (Joshua, Efiong, & Imong, 2019).

Environmental Disclosure

It is anticipated that corporations will provide yearly reports that reveal both qualitative and quantitative data regarding their activities and achievements, encompassing economic, financial, social, and other aspects. These reports are intended to be presented to corporate stakeholders, including owners or shareholders, government entities, employees, and others. Stakeholders require diverse information, leading firms to provide not only financial performance disclosures but also additional reports such as environmental accounting reports, sustainability reports, human resources accounting reports, and good corporate governance reports (Jerry, Teru & Musa, 2015). Beredugo and Mefor (2012) define environmental accounting as a comprehensive field within the domain of accounting. The system provides reports for both internal and external use. These reports provide environmental information that assists in managerial decision-making regarding pricing, overhead control, and capital budgeting. Externally, the reports disclose environmental information that is of interest to the public and the financial community. The primary objective of corporate environmental disclosure is to fulfill the responsibility of being accountable to all pertinent stakeholder groups that could potentially be impacted by the operations of the firm, regardless of their level of influence (Uwuigbe & Olamide, 2012).

Theory and Hypotheses Development

The stakeholder theory is a prominent framework utilized in the realms of social, environmental, and managerial research. Academic scholars depict stakeholders as those who possess the ability to exert influence or be influenced by the trade-related activities. Alternatively, stakeholders are defined as individuals who rely on the firm to achieve their personal ambitions, while the firm itself depends on them for its sustenance. The concept of stakeholder theory gained considerable traction in the field of organizational and management study after the release of Edward Freeman's seminal work, "Strategic Management: A Stakeholder Approach," in 1984. The theory pertains to the optimal functioning of corporate operations and its potential for improvement. The subject matter pertains to the concept of value creation, the principles of trade, and the efficient management of business operations. According to Freeman (1984), the stakeholder theory posits that organizations bear a moral responsibility to acknowledge and effectively address the concerns and interests of all stakeholders involved.

In accordance with Hill and Jones (2012), prosperous enterprises prioritize safeguarding the interests of diverse stakeholder groups, including shareholders, creditors, employees, suppliers, customers, communities, and the public. The stakeholder theory has emerged as a basic framework for corporations to establish and maintain their relationships with

stakeholders by means of green accounting reporting. Green reporting is widely recognized as a strategic technique employed by corporations to facilitate stakeholder engagement and mitigate information asymmetry. Research conducted by Masud et al. (2017) has established that firms that consider the needs and expectations of stakeholders tend to exhibit superior performance compared to those that neglect this aspect. This theory is relevant to the field of study as it pertains to green reporting, which involves the integration of environmental, social, and economic factors into an organization's reporting and communication practices. The purpose of this is to disseminate important information to a broader range of stakeholders associated with the organization (Cheng; Ioannou & Serafein, 2014).

Emission, Energy and Corporate Financial Performance

Hayami et al. (2005) empirically supported the positive correlation between waste generation and corporate financial performance. Philip and Shi (2016) suggest that corporate management teams can improve financial returns by using state-dependent hedge ratios to manage carbon emissions portfolio risks in the financial market. Cucchiella et al. (2012) utilized an econometric framework to analyze the effect of emissions control on the profitability of Italian companies in their study. The analysis findings suggest that implementing an Environmental Management System (EMS) and improving emissions control measures can lead to higher profitability for firms. The positive impact is due to an increase in demand and enhanced productivity. Lucas and Noordewier (2016) utilized a multilevel hypothesis testing approach to examine data from 941 publicly traded manufacturing firms in the United States. The study found that the introduction of pollution control measures has a beneficial impact on the financial performance of companies in industries that are harmful to the environment, as well as those that are not proactive in environmental matters. The impact was more pronounced in industries with higher levels of pollution compared to those with lower levels of pollution and proactive corporate environments. Hence, we state our hypotheses as:

$H0_1$: ***Emission and Energy disclosure has no significant effect on financial performance of Nigerian listed oil and gas companies.***

Effluents, Waste and Corporate Financial Performance

Several studies conducted in recent years have placed significant emphasis on the examination of effluents and waste in relation to corporate performance strategy. According to Rogers and Tibben-Lembke (2002), a primary obstacle to waste reduction is the lack of prioritization inside the organization. Another obstacle that can impede progress is the company policies that may be driven by concerns over the potential financial burden of waste expenditures. Rogers and Tibben-Lembke (2002) conducted a study to highlight the importance of effluents and waste in relation to performance. Their research primarily focused on quantitative implications, revealing that effluents and waste constitute around four percent of the overall logistical expenses in the publishing sector. Within the manufacturing sectors, it has been approximated that waste reduction constitutes approximately 5-6 percent of the overall logistical expenditures. According to Zhu et al. (2008), the Resource Based View perspective suggests that effluents and waste management can be considered a strategic resource that has the potential to reduce production costs. This can be achieved through various means, such as

reducing waste management fees and hazardous material management fees, streamlining reporting processes to save time and costs, and realizing savings from conserving energy, water, fuel, and other resources. These cost reductions are expected to have a positive impact on overall performance. Hence, we state our hypotheses as:

$H0_2$: ***Effluent and Waste disclosure has no significant effect on financial performance of Nigerian listed oil and gas companies.***

Biodiversity, Water and Corporate Financial Performance

When there are changes in ecosystem services, there are corresponding modifications in the possibility for direct utilization of resources. As a result, this could have implications for the business's internal operations and even influence overall corporate performance. Both direct and indirect impacts play a crucial role in influencing biodiversity and the ecosystem services that are essential for human well-being. Consequently, stakeholders anticipate that enterprises possess an understanding of how their actions influence biodiversity and subsequently affect the overall performance of the firm (GRI, 2007). The viewpoints of businesses regarding biodiversity are contingent upon the specific sector in which they operate and the corresponding level of engagement with biodiversity. According to KPMG (2012), businesses that exhibit a higher degree of reliance on natural resources and ecosystem services are more susceptible to risks and are therefore more inclined to prioritize the establishment of safeguards to ensure the continuity of their operations in the future. Therefore, the examination of corporations' interest in biodiversity can be handled from two distinct perspectives. The essay delineates the hazards associated with the direct and indirect reliance of businesses on (sensitive) ecosystems. Conversely, it is possible to highlight the potential advantages that enterprises might derive from biodiversity (TEEB, 2010). Hence, we state our hypotheses as:

$H0_3$: ***Biodiversity and Water disclosure has no significant effect on financial performance of Nigerian listed oil and gas companies.***

Environmental Protection Expenditure and Corporate Financial Performance

Some studies suggest an inverse correlation between governmental environmental regulations and the financial performance of firms, but others allude to the potential for a positive correlation. Sueyoshi and Goto (2009) conducted a study which revealed that the financial performance of electric utility corporations in the United States is negatively impacted by expenditure on environmental protection measures. In contrast, Porter and van der Linde (1995) posited that the perceived trade-off between government environmental regulation and enterprises' commercial performance may be attributed to a limited perspective on the issue. The authors additionally propose that by employing a dynamic framework that incorporates the potential for promoting innovation, the organization may be able to decrease its production expenses. In a study conducted by Al-Tuwaijri et al. (2004), it was suggested that there exists a strong relationship between favorable environmental performance and positive economic performance. Additionally, Brolund and Lundmark (2017) discovered that the implementation of regulations pertaining to environmental pollutants can lead to enhancements in a firm's productivity. Ashford and Hall (2011) proposed that the achievement of sustainable

development necessitates the promotion of transformative technology advancements through the implementation of legislation pertaining to environmental, health, safety, economic, and labor market factors. Hence, we state our hypotheses as:

$H0_4$: ***Protection Expenditure disclosure has no significant effect on financial performance of Nigerian listed oil and gas companies.***

Review of Empirical Studies

Awa, Udu, and Udu (2022) investigated the impact of environmental accounting information disclosures on the financial performance of cement manufacturing firms in Nigeria. The study utilized an ex-post facto research design and the data were sourced from the company's annual reports. The panel data was analyzed using multiple regression techniques with the assistance of E-view 9.0 econometric software to test the hypotheses. Descriptive statistical methods were employed to evaluate the presence of collinearity among the variables in the study. Further, the researchers utilized statistical tests, including the F-statistic and Hausman test, to evaluate the overall significance of the regression equation. The study observed a significant impact on returns from corporate social responsibility disclosure, specifically in the areas of health and safety, remediation, and pollution control. The statistical analysis revealed that the disclosure of environmental fines and penalties did not have a significant impact on the return on assets.

Onuora, Obiora, and Atusiaka (2022) examined the relationship between web-based environmental disclosure and the financial performance of Nigerian listed companies. The study used the Kinder Lydenberg Domini (KLD) social environmental performance rating system as a proxy to measure web-based environmental disclosure. The study utilized net assets per share (NAPS) as an indicator of financial performance. Data was collected from the annual reports and financial statements of consumer products companies in Nigeria from 2016 to 2022. The study utilized an Ex Post Facto research design and employed the ordinary least squares (OLS) regression model for statistical analysis. The study's findings indicate a significant association between web-based environmental disclosure (WED) and the financial performance (NAPS) of publicly traded companies in Nigeria.

Olowookere, Taiwo, and Onifade (2021) examined the impact of environmental accounting disclosure on the financial performance of Nigerian cement companies. The study employed an ex post facto research design. The study utilized data from the annual report and accounts of three cement firms listed on the Nigerian Stock Exchange. The data covered the period from 2011 to 2019. The study employed descriptive statistics and estimated panel regression analysis. The research findings suggest that the disclosure of environmental accounting positively affects the financial performance of cement companies listed in Nigeria.

Falope, Offor, and Ofurum (2019) examined the influence of environmental disclosure on the performance of listed Nigerian construction companies. This study seeks to assess the impact of pollution control costs on return on assets. Additionally, it aims to determine the relationship between environmental protection costs and the return on assets. Lastly, it aims to examine the influence of environmental recycling disclosure on the return on assets of construction firms listed in Nigeria. This study utilized an Ex Post Facto research design. The hypotheses were formulated to align with the research objectives and were tested using linear

regression analysis with SPSS Version 20.0. The study discovered a significant correlation between the expenses related to preventing environmental pollution, protecting the environment, and disclosing environmental recycling, and the return on assets of construction companies listed on the Nigerian Exchange Group.

Hidayat (2017) investigates the relationship between size, profitability, leverage, and corporate social responsibility (CSR) disclosure. This study employs a dataset comprising data from 20 manufacturing firms listed on the Indonesian Stock Exchange (BEI) between 2011 and 2015. This study utilized multiple linear regression analysis in SPSS version 20 to assess the influence of the independent variables on the dependent variables. The study's findings suggest that company size has a positive significant impact on corporate social responsibility (CSR) disclosure. Moreover, the relationship between profitability and CSR disclosure is found to be negative and statistically significant. The study revealed that leverage has a partially insignificant impact on the disclosure of corporate social responsibility (CSR).

Methodology

This study utilizes an ex-post facto research design. The population comprises oil and gas companies listed on the Nigerian Exchange Group from 2007 to 2021. As of December 31, 2021, there were a total of thirteen (13) listed oil and gas companies. This study utilizes purposive sampling to include firms that meet specific conditions. To ensure a homogeneous sample, five oil and gas firms were excluded from the study based on two criteria: they were listed after the study period (2015) and they lacked the necessary information for this study. Therefore, the study's sample size comprises 7 oil and gas firms in Nigeria. To assess the impact of environmental sustainability disclosure on the financial performance of oil and gas companies listed in Nigeria, we conducted regression diagnostic analysis. This analysis involved descriptive statistics, correlation analyses, and an assessment of the normality of residuals. Gujarati (2003) proposed several essential post-regression diagnostic tests that are necessary for validating the least square regression estimates. The tests include multicollinearity, misspecification, omitted variable bias, heteroskedasticity, and influential variable analysis. All these were done to improve the credibility of the resulting estimates. In this study, we employ Robust Regression Analysis to test the hypotheses if the diagnostic test reveals that the model exhibited the presence of heteroscedasticity. Specifically, the researcher modified the models of Laskar (2020), He, Tang and Wang (2016), Hardivansah & Agustini (2020) and Ermawati (2020) to specify the model as:

roa = $\pi_0 + \pi_1$e&e+ π_2e&w + π_3b&w + $\pi_4$proexp + $\pi_5$firmsize+ $\pi_6$firmage …… (1)

tobinq = $\pi_0 + \pi_1$e&e+ π_2e&w + π_3b&w + $\pi_4$proexp + $\pi_5$firmsize+ $\pi_6$firmage …… (2)

roe = $\pi_0 + \pi_1$e&e+ π_2e&w + π_3b&w + $\pi_4$proexp + $\pi_5$firmsize+ $\pi_6$firmage …… (3)

Where:

Roa	=	Return on Asset
Tobinq	=	Tobin Q Ratio
roe	=	Return on Equity
E&E	=	Emission and Energy
E&W	=	Effluent and Waste

B&W = Biodiversity and water
proexp = Protection expenditure and investment

Results and Discussion

We utilized environmental disclosure measures, including Energy and Emission, Effluent and Waste, Biodiversity, and Water, as well as the variable of Protection Expenditure, based on the Global Reporting Initiative (GRI) Standard 2020, which is a leading environmental reporting standard worldwide. Additionally, we address the potential impact of variations in firm sizes and financial structures (specifically, leverage) by incorporating two control variables: firm size and firm leverage. The data set covers the years 2007 to 2020. To assess the impact of environmental disclosure on the financial performance of oil and gas companies in Nigeria, we initially performed descriptive statistics, correlation analysis, residual normality testing, and panel least square regression analysis. The tables below present descriptive statistics that offer valuable insights into the characteristics of the chosen Nigerian listed oil and gas companies used in this study.

Table 1 Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
roa	89	2.201236	22.01981	-71.36	176.27
roe	89	13.53708	108.2926	-393.97	872.2
tobinq	89	1.337416	1.033481	.5	6.29
ee	89	.0786517	.2707195	0	1
ew	89	.1123596	.3175976	0	1
bw	89	.1011236	.3032005	0	1
pro_exp	89	.1235955	.3309842	0	1
firmsize	89	7.785281	.4895617	6.52	9.03
leverage	89	76.21764	25.11955	50.17	247.85

Authors' Computation

The table 1 shows the descriptive statistics for this study. From the table 1, it is observed that the average value of return on asset for the sample firms was 2.20 with a standard deviation of 22.20. We also find that return on equity has a mean of 13.54 with a standard deviation of 108.29. Tobin Q has a mean of 1.34 with a standard deviation of 1.03. In the case of the independent variables, the table shows that emission and energy disclosure have a mean of 0.08 with a standard deviation of 0.27. Effluents and waste have a mean of 0.11 with a standard deviation of 0.32. Biodiversity disclosure has a mean of 0.10 with a standard deviation of 0.30. Protection expenditure has a mean of 0.12 with a standard deviation of 0.33. For the control variable, we find that firm size has a mean of 7.79 with a standard deviation of 0.49 while leverage has a mean of 76.22 with a standard deviation of 25.12.

Correlation Analysis

This study employs the Spearman Rank Correlation analysis technique to conduct the possible association between the variables of interest.

Table 2 Spearman Rank Correlation Analysis

	roa	roe	tobinq	ee	ew	bw	pro_exp	firmsize	leverage
roa	1.0000								
roe	0.8688	1.0000							
tobinq	0.0026	0.0568	1.0000						
ee	-0.2621	-0.0585	0.0702	1.0000					
ew	0.0135	-0.0150	-0.0985	0.0282	1.0000				
bw	0.0217	0.0055	0.0806	-0.0980	-0.1193	1.0000			
pro_exp	0.0093	-0.0094	-0.0060	0.2707	-0.1336	-0.1260	1.0000		
firmsize	-0.0356	-0.1599	-0.2151	-0.1506	-0.3276	0.1365	0.1088	1.0000	
leverage	-0.2076	0.0051	0.2883	0.1393	-0.1615	-0.0435	-0.0716	0.0141	1.0000

Authors' Computation

Specifically, the analysis from the spearman rank correlation showed that emission and energy as well as biodiversity and water are positively correlated with firm performance during the period under review. But we find that the variable of effluents and water, and protection expenditure are negatively correlated with firm performance measure of return on asset However, both associations are seen to be weak hence there is no room to suspect the presence of multicollinearity in the estimated model.

Regression Analyses

Due to the presence of heteroskedasticity observed in both Tobin Q and Return on Equity models, we proceed to employ the Huber Robust Estimator which has been proved very useful (Fernholz, 1983).

Table 3 Return on Asset

Variables	Emission & Energy	Effluents & Waste	Biodiversity & Water	Protection Expenditure	Firm Size	Leverage
Panel Least Square Model						
Coefficient	-23.232	-1.138	0.787	5.862	-3.790	-10.256
t_ Statistics	(-2.53)	(-0.14)	(2.69)	(0.78)	(-0.74)	(-0.95)
Probability_t	{0.013} **	{0.887}	{0.018}	{0.440}	{0.463}	{0.347}
F_ Stat = 7.78, Prob_ F = 0.0000, R^2 = 0.3987, Het = 0.905, Model Spec = 0.151, Func. Form = 0.228 VIF = 1.14, OVB = 0.6342						

Source: Author's Computation (2023)

The table presents a concise summary of the results obtained from a panel least squares regression model. The study utilizes the provided model to offer interpretation and policy recommendations. The diagnostic tests conducted indicate that the least square assumption is not violated, as indicated in the table. The Fisher statistics (7.78) and the corresponding probability value (0.0000) indicate a statistically significant level of 1%, suggesting that the model is a good fit and can be used for interpretation and policy implications. Additionally, the

model aligns with the assumption of homoscedasticity and multicollinearity, as indicated by the probability value of 0.905 for Heteroscedasticity and a mean VIF of 1.14, respectively. Both the assumption of an appropriate functional form and the specification of a well-defined model were adequately addressed. The table above shows that the values for Func. Form and Model Spec are 0.228 and 0.151, respectively. The study found a probability value of OVB = 0.6342, indicating that the model is not affected by omitted variable bias. The regression analysis indicates that the R2 value is 0.3987, suggesting that approximately 40% of the variability in the dependent variable can be accounted for by the independent variables in the model.

Table 4 Tobin Q Model

Variables	Emission & Energy	Effluents & Waste	Biodiversity & Water	Protection Expenditure	Firm Size	Leverage
Panel Least Square Model						
Coefficient **t_ Statistics** **Probability_t**	-0.081 (-0.49) {0.623}	0.195 (1.36) {0.177}	-0.089 (-0.63) {0.531}	-0.90 (-0.66) {0.510}	0.219 (2.37) {0.020} **	-0.906 (-4.65) {0.000} ***
F_ Stat = 5.33, Prob_ F = 0.0001, R^2 = 0.2806, Het = 0.000, Model Spec = 0.111, Func. Form = 0.444 VIF = 1.14, OVB = 0.0678						
Robust Regression Model						
Coefficient **t_ Statistics** **Probability_t**	-0.064 (-0.36) {0.720}	0.234 (1.52) {0.134}	-0.100 (-0.66) {0.510}	-0.061 (-0.42) {0.676}	0.212 (2.13) {0.036}**	-0.926 (-4.41) {0.000}***
F_ Stat = 4.84, Prob_ F = 0.0003						

Note: t & z -statistics and respective probabilities are represented in () and {}
Where: ** represents 5% & * represent 1% level of significance**

The market performance model shown in table 4.5 above summarizes the result obtained from the panel least square regression and Huber Robust Estimator. The panel least square model goodness of fit as captured by the Fisher statistics (5.33) and the corresponding probability value (0.0001) shows a 5% statistically significant level suggesting that the entire model is best fit. However, the model is consistent with the assumption of no multicollinearity evidenced from the probability value (Mean VIF = 1.14). The assumption of appropriate functional form with accurate model specification were equally taken care off. These can be seen from the table above as Func. Form = 0.444 and Model Spec = 0.111 respectively. We obtained a probability value of OVB = 0.0678 which shows that the model is free from the consequences of omitted variable bias. The Tobin Q regression result above reveal an R2 value of 0.2806 indicating that about 28% of the variation in the dependent variable has been explained by all the independent variables in the model. Specifically, we provide interpretation and make policy recommendation with the Huber Robust Estimator model after correcting the least square estimator which violated the assumption of homoscedasticity.

Table 5 Return on Equity Model

Variables	Emission & Energy	Effluents & Waste	Biodiversity & Water	Protection Expenditure	Firm Size	Leverage
Panel Least Square Model						
Coefficient **t_ Statistics** **Probability_t**	-39.251 (-0.85) {0.400}	-22.556 (-0.56) {0.579}	7.665 (0.19) {0.848}	11.527 (0.30) {0.764}	-45.563 (-1.75) {0.084}	13.467 (0.25) {0.807}
F_ Stat = 0.56, Prob_ F = 0.7575, R^2 = 0.0397, Het = 0.001, Model Spec = 0.516, Func. Form = 0.810, VIF = 1.14, OVB = 0.8104						
Robust Regression Model						
Coefficient **t_ Statistics** **Probability_t**	-18.740 (-2.36) {0.021}	-0.986 (-0.14) {0.887}	1.752 (0.26) {0.797}	1.169 (0.18) {0.859}	-8.896 (-2.00) {0.049} **	65.338 (6.95) {0.000} ***
F_ Stat = 9.18, Prob_ F = 0.0000						

Note: t & z -statistics and respective probabilities are represented in () and {}
Where: ** represents 5% & * represent 10% level of significance, * represents 1%**

The market performance model of return on equity shown in table 4.6 above summarizes the result obtained from the panel least square regression and Huber Robust Estimator. The panel least square model goodness of fit as captured by the Fisher statistics (0.56) and the corresponding probability value (0.7575) shows statistically insignificant level suggesting that the entire model is not fit but the model is consistent with the assumption of no multicollinearity evidenced from the probability value (Mean VIF = 1.14) The assumption of appropriate functional form with accurate model specification were equally taken care off. These can be seen from the table above as Func. Form = 0.810 and Model Spec = 0.516 respectively. We obtained a probability value of OVB = 0.8104 which shows that the model is free from the consequences of omitted variable bias. The return on asset regression results above reveals an R^2 value of 0.0397 indicating that about 4% of the variation in the dependent variable has been explained by all the independent variables in the model. Specifically, we provide interpretation and make policy recommendation with the Huber Robust Estimator model after correcting the least square estimator which violated the assumption of homoscedasticity.

Discussion of Findings

The regression results obtained from the financial performance models revealed that the variable of emission and energy disclosure has no significant effect on firm financial performance when proxied by Tobin Q. However, we find that emission and energy have a significant effect on financial performance when proxied by return on asset and return on equity during the period under investigation. This finding is revealed as: Return on Asset (Coef. = -23.232, t = 2.53 and P -value = 0.013), Tobin Q (Coef. = -0.081, t = -0.49 and P -value = 0.623) and Return on Equity (Coef. = -18.740, t = -2.36 and P -value = 0.021), Following the results above, it is revealed that the effect of emission and energy on firm performance of quoted oil and gas companies in Nigeria is statistically significant. This finding is inconsistent with our

stated null hypothesis which leads us to reject the null hypotheses that emission and waste disclosure has no significance effect on financial performance of quoted oil and gas firms in Nigeria. We also find that variable of effluent and waste disclosure has no significant effect on firm financial performance during the period under investigation. This finding is consistent across all three different measures of financial performance as follows: Return on Asset (Coef. = -1.138, t = -0.14 and P -value = 0.887), Tobin Q (Coef. = 0.234, t = 1.52 and P -value = 0.134) and Return on Equity (Coef. = -0.986, t = -0.14 and P -value = 0.887), Following the results above, it is revealed that the effect of effluent and waste disclosure on firm performance of quoted oil and gas companies in Nigeria is not statistically significant. This finding is consistent with our stated null hypothesis which allows us to accept the null hypotheses that emission and waste disclosure has no significance effect on financial performance of quoted oil and gas firms in Nigeria. We show that biodiversity and water disclosure have a statistically significant effect on firm financial performance during the period under investigation. This finding is evident as follows: Return on Asset (Coef. = 0.787, t = 2.69 and P -value = 0.018). A closer look at the result above also reveal that the effect is positive and very statistically significant at 5%. However, on firm financial performance measure of Tobin q and Return on Equity we find that the variable of biodiversity and water has no statistically significant effect shown as follows: Tobin Q (Coef. = -0.100, t = -0.66 and P -value = 0.510) and Return on Equity (Coef. = 1.752, t = 0.26 and P -value = 0.797). Hence, following the results above, it is revealed that the effect of biodiversity and waste disclosure on firm performance of quoted oil and gas companies in Nigeria is statistically significant. This finding is inconsistent with our stated null hypothesis which allows us to reject the null hypotheses that biodiversity and waste disclosure has no significance effect on financial performance of quoted oil and gas firms in Nigeria. Finally, the variable of protection expenditure disclosure has no significant effect on firm financial performance during the period under investigation. This finding is consistent across all three different measures of financial performance as follows: Return on Asset (Coef. = 5.862, t = 0.78 and P -value = 0.440), Tobin Q (Coef. = -0.061, t = -0.42 and P -value = 0.676) and Return on Equity (Coef. = 1.169, t = 0.18 and P -value = 0.859), Following the results above, it is revealed that the effect of effluent and waste disclosure on firm performance of quoted oil and gas companies in Nigeria is not statistically significant. This finding is consistent with our stated null hypothesis which allows us to accept the null hypotheses that emission and waste disclosure has no significance effect on financial performance of quoted oil and gas firms in Nigeria.

Due to growing public concern for the environment, the government mandates that businesses assume greater responsibility in addressing environmental issues. Government pressure on firms to increase environmental expenditure can have a significant impact on corporations. The disclosure of emissions and energy usage may lead to substantial increases in production costs, including expenses related to materials and electricity. Consequently, this can have a detrimental effect on the profitability of the corporation. This finding supports the results of several studies conducted by Chen and Cheng (2017), Cao, You, and Liu (2017), Chong, Qin, and Ye (2017), Yang, Liu, Sun, and Zhang (2017), Dechezleprêtre and Sato (2017), and Chong, Qin, and Ye (2016). Environmental expenditure encompasses all costs associated with activities aimed at protecting the environment, including measures to prevent, mitigate,

and manage environmental aspects, impacts, and hazards. This includes expenses related to waste disposal, treatment, sanitation, and remediation. By increasing its environmental expenditure, the firm can enhance its ability to comply with government regulations and meet public expectations. However, as previously stated, the issue lies in the fact that an increase in environmental spending may negatively impact the firm's profitability, as evidenced by this study. Multiple explanations exist for this adverse outcome. If the firm chooses to incorporate the costs of environmental expenditure into its product price within a competitive market, it is likely to experience a decrease in both sales and profit. Additionally, if a company prioritizes environmental expenditures over investments in innovation and efficiency improvement, it diminishes its profit-earning potential. The findings of this study align with those of Eiadat et al. (2008), who suggested that the increasing pressure on companies to prioritize environmental protection may lead to higher capital and labor expenses, distract management, and reduce investments in productive activities. Additionally, our findings are consistent with McGuire's (1982) research, which demonstrates that excessive spending on environmental initiatives can hinder a firm's investment in innovation and ultimately decrease its efficiency significantly. Therefore, the question arises as to whether the firm can effectively address the trade-off between its environmental expenditure and profitability. Furthermore, we argue that the voluntary adoption of regulatory authorities' guidelines for environmental disclosure in Nigeria also demonstrates a neutral relationship between emissions, energy, and firm financial performance during the investigated period. There is currently a lack of enforcement or mandatory regulations regarding the disclosure of content. Executives in Nigeria's oil and gas firms engage in selective disclosure to maximize their interests, resulting in varying levels of environmental disclosure. This study's findings align with previous research conducted by Dhaliwal, Li, Tsang, and Yang (2013), Griffin and Sun (2011), Clarkson, Fang, Li, and Richardson (2013), and Matsumura, Prakash, and Vera-Munoz (2014).

This study aligns with the stakeholder theory, which suggests that companies with numerous stakeholders tend to have a greater impact on the company's activities. There are two types of stakeholders: internal and external. Like shareholders, stakeholders can make demands of the company. Companies often encounter criticism from non-shareholders, such as the Niger Delta Militants in Nigeria. This criticism can have a detrimental impact on the company's shareholding value, as these individuals can exert pressure through means like boycotts and lawsuits. Our findings are consistent with those of Brouwers et al. (2014), who emphasized the importance of meeting the demands of multiple stakeholders to achieve social and environmental performance. Meeting stakeholder demands is a necessary expense for businesses, but it should be managed within a specific limit. This supports Jensen's (2001) argument that companies should consider stakeholder interests while pursuing value maximization. The company should prioritize both economic and environmental objectives. The argument aligns with the Resource-Based View (RBV) theory, which asserts that adopting environmental responsibility can lead to competitive advantage and improved firm performance.

Conclusion and Recommendations

The primary focus of most corporations revolves around generating income and allocating it to shareholders in the form of dividends, often at the expense of other stakeholders. Nevertheless, the influence of civil society pressure groups, non-governmental organizations, government regulations, corporate governance codes, green consumer pressure, and other comparable groups necessitates that corporate entities prioritize corporate environmental disclosure in order to ensure their survival and generate wealth, while also addressing the diverse needs of stakeholders. Based on the findings of this study, it is evident that among the four variables of environmental disclosures examined, namely biodiversity and water disclosures, emission and energy disclosure, effluents and waste disclosure, and protection expenditure disclosure, only the first two variables, namely biodiversity and water disclosures, as well as emission and energy disclosure, exhibit a significant impact on the financial performance of oil and gas firms in Nigeria. Based on the empirical evidence documented in this study, we strongly recommend that managers enhance their ability to identify and address various managerial challenges through innovative approaches to effectively address the adverse association between emission and energy disclosure and financial performance. The aptitude is not limited solely to environmental factors, but rather encompasses a wide-ranging ability to innovate, which is strongly intertwined with the total research and development capacity of the organization. Additionally, the organization has the potential to devise novel approaches to reduce pollution emissions while maintaining productivity levels. The study reveals a lack of comprehensive disclosure on environmental issues. To rectify this, it is recommended that environmental regulatory agencies, in conjunction with government bodies, establish standardized protocols for disclosing environmental information. The imposition of required compliance across all enterprises is vital, as the provision of standardized environmental disclosures serves as valuable information for all stakeholders involved in the decision-making process. The 2017 criteria for environmental assessment should be revised to enforce the inclusion of environmental disclosure by firms.

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