Green Accounting and Corporate Performance of Selected Quoted Oil & Gas Firms in Nigeria

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Abstract

The objective of this study is to ascertain the relationship between green accounting and the corporate performance of quoted oil and gas firms in Nigeria. The study specifically evaluates the effect of oil spillage, gas flaring, water pollution and energy consumption disclosures on the corporate performance of quoted oil and gas firms in Nigeria. The study adopted the ex-post facto research design. The population was drawn from the ten quoted oil and gas companies listed on the Nigerian Exchange Group (NGX) as of 1st June 2022. The final sample was delimited to eight firms with annual financial information for the study period. The study relied on secondary sources of data, i.e., from annual financial statements of the oil and gas firms. The data were analysed using descriptive and inferential statistical techniques. The hypotheses were tested using the pooled OLS technique consistent with prior authors on disclosure measurements. The results showed that oil spillage disclosure has a positive non-significant effect on Tobin's Q; there is a positive and significant effect of gas flaring disclosure on Tobin's Q; water pollution disclosure has a negative and significant effect on Tobin's Q; and, there is a positive non-significant effect of energy consumption disclosure on Tobin's Q. Based on the above the study recommended that shareholders should monitor compliance of managers with the numerous laws and strategies used to reduce GHG flaring and the resulting carbon emissions in the company. Managers develop a water pollution system for managing their negative environmental impact on water. Regulators should constantly monitor firms with excessive energy consumption to pay relevant fees and fines which can encourage the move to sustainable energy consumption.

Keywords: *Green Accounting, Oil Spillage, Gas Flaring, Water Pollution and Energy Consumption.*

1.1   Introduction

Green accounting is a system of accounting that provides relevant information on the probable social and environmental costs emanating from production activities on the environment and society in general. Green accounting integrates environmental costs into the financial results of a company (Dhar, Sarkar, & Ayittey, 2022). It is an important device for understanding the role of business firms in the economy toward environmental security and welfare (Gola, Mendiratta, Gupta, & Dharwal, 2022). Green accounting provides a framework to ensure that sustainability is embedded into an organization's day-to-day operations to evaluate the risks and opportunities associated with the implementation of sustainable strategies. Green accounting refers to the institutionalization of ecological programs, which has remained one of the strategic tools used by organizations to engage with wider stakeholders. The development of green accounting "was shaped by external environmental factors" (Sisaye, 2021). Green accounting has currently been receiving growing attention in academia and business literature. This comes as stakeholders and non-governmental organizations are increasingly mounting pressure on corporate boards on corporate social responsibility issues (Sisaye, 2021). Moreso, there have been increasing regulations and sanctions in recent times. Green accounting emerged as a necessity to integrate within the existing business models, a company's environmental and social dimension that allows progress to achieve the principles of sustainability (Novovic Buric, Lalevic Filipovic, & Jaksic Stojanovic, 2022).

The most widely applied framework is the GRI (G.4), which despite being voluntary in nature, has enabled organizations to benefit from continuous organizational improvements over time (GRI, 2021a, b). Green accounting encompasses activities, such as natural resource conservation and emission levels, environmental activities and initiatives, occupational health and safety, and community relations, among others, and their economic impact on the organisation (Hoque & Adams, 2008). Green accounting is the primary mode of communication with the various stakeholders of the business. Green accounting information is believed to make a firm more responsive. Other benefits, identified include, enhancing the reputation of a firm; reducing idiosyncratic risk.

Since the discovery of oil in Nigeria, it has remained the mainstay of the economy and a key aspect of the economic revenue in the country. Gas production in the country is undertaken by the major oil companies (Shell, Chevron, Agip, Texaco, Mobil, Elf, Ashland, and Pan Ocean). However, the sector is bedevilled with challenges, such as the volume of gas flared, pipeline vandalism and insurgency. Therefore, these firms need to respond to social and environmental matters. As a response, the Nigerian Exchange Group (NGX) has demonstrated efforts at integrating sustainability into existing business models, which culminated in the production of the Sustainability Disclosure Guidelines (SDG), covering environmental, social, and governance (ESG) issues. Thus, it would signal management efficiency and be a sign for the capital market to enhance credit ratings.

Corporate investors increasingly incorporate green considerations into their investment decisions (Zhang & Lucey, 2022). However, green accounting is still in its infancy in developing countries (Hasan, Singh, & Kashiramka, 2022; Novovic Buric, Lalevic Filipovic, & Jaksic Stojanovic, 2022). Mainly, the bulk of studies were conducted in the context of American and European countries thus neglecting their developing counterparts (Hasan, Singh,

& Kashiramka, 2022). There is limited empirical evidence on the potential mechanisms which it impacts firm performance in developing countries (Zhang & Lucey, 2022). Prior research documents mixed findings on the relationship between green accounting and corporate performance using global or national datasets (Sekhon & Kathuria, 2019). Charumathi and Ramesh (2017) finds that green accounting had a positive and significant impact on company value after studying a sample of 100 Indian companies between 2010 and 2014. Fatemi, Glaum, and Kaiser (2018) using the Bloomberg ESG score finds that green disclosures increase market valuation. It also leads to long-term financial and stock market outcomes. Studies such as Zhang and Lucey (2022) use a sample of global firms to evaluate the nexus of sustainable behaviors and firm performance. The data were analysed using multiple regression technique and the results revealed that ESG performance has a significant positive effect on firm performance.

The current study intends to address the variable gap from prior studies, by looking at the influence of oil spillage, gas flaring, water pollution, and energy consumption on Tobin's Q of quoted oil and gas firms in Nigeria. Studies on oil spillage, gas flaring, water pollution and energy information disclosure are still ad hoc. The focus on the oil and gas sector is timely, as the sector has remained a dominant feature of the Nigerian economy. Stakeholder pressure is intensified following incidents, such as major oil spills, which will affect social and environmental well-being. Studies in the Nigerian context can be divided into two: studies that examine determinants of disclosure practices of green initiatives (Onyali, Okafor, & Egolum, 2014). The second stream of studies is devoted to studying the link between sustainability practices and corporate performance.

They include studies by Asuquo, Dada, and Onyeogaziri (2018) on sustainability reporting; Egbunike and Okoro (2018) on green accounting practices; Nnamani, Onyekwelu, and Ugwu (2017) on sustainability accounting and reporting. These studies have extensively focused on manufacturing firms (either the consumer or industrial goods). Other studies; such as Onyekwelu and Ekwe (2014) on the banking sector; Ijeoma (2015) used primary data; while Udeh and Ezejiofor (2018) focused on telecommunication firms. However, despite the abundance of studies, few studies have specifically examined this in the oil and gas firms in Nigeria. For instance, Ekwe, Odogu, and Mebrim (2017) on two companies, Conoil and Forte; Ajayi and Ovharhe (2016) undertook an exploratory study on LNG; Nze, Okoh, and Ojeogwu (2016) restricted to two firms in the Oil and Gas sector. The main objective of this study is to ascertain the relationship between green accounting and the corporate performance of quoted oil and gas firms in Nigeria. The specific objectives of the study are to:

1. Evaluate the effect of oil spillage on the corporate performance of quoted oil and gas firms in Nigeria.
2. Determine the effect of gas flaring on the corporate performance of quoted oil and gas firms in Nigeria.
3. Examine the effect of water pollution on the corporate performance of quoted oil and gas firms in Nigeria.
4. Ascertain the effect of energy consumption on the corporate performance of quoted oil and gas firms in Nigeria.

2.0   Literature Review

2.1   Green Accounting

Green accounting is the description of corporate activities, especially as it impacts the society and environment. It originated as an offshoot of the sustainability discussion over 30 years ago. Its accounting development occurred, along two lines of thought. The first is the philosophical debate on the relevance and contribution of green accounting to sustainable development. The second is the management perspective associated with varied terms and tools for sustainability. The Brundtland Report's (1987) sustainability definition became a foundational building block for several multilateral organizations (Sisaye, 2021), e.g., World Business Council for Sustainable Development (WBCSD), the International Auditing and Assurance Board (IAASB), the International Labour Organization (ILO), the United Nations Global Compact (UNGC), the International Organization for Standardization (ISO) and the GRI. Green accounting refers to the process of collecting; analysing and communicating sustainability-related information to enable organizations to become more sustainable. Green accounting enables the systematic identification and interlinking of the social, environmental and economic costs and embeds these considerations into organisational decision-making. The interaction between business and production economies is recorded and reported in a company's activities for economic, social and environmental performance. Broadly, green accounting takes into consideration environmental resources and changes in them and integrates the result with the system of national account so as provide a valuable information base for planning and formulating policy for the integrated sustainable development and growth of a nation. Green accounting provides a framework for organizations to identify and account for past, present, and future environmental costs to support managerial decision-making, control, and public disclosure (KPMG & UNEP, 2006).

One of the main sustainability frameworks is the GRI. The GRI identified three broad reporting areas: (1) organizational performance, (2) public policies and implementation measures, and (3) the environmental context/state (see GRI, 2021a, b, and c). The GRI issued the G4 Sustainability Reporting Guidelines in 2013 (GRI, 2021a, b). The G4 is one of the most widely used frameworks by MNCs, governments, small and medium enterprises, NGOs, and industry groups in more than 90 countries.

2.1.1 Oil Spillage and Tobin's Q

An oil spill is the release of a liquid petroleum hydrocarbon into the environment, especially the marine ecosystem, due to human activity, and is a form of pollution. Oil spills may be due to releases of crude oil from tankers, offshore platforms, drilling rigs and wells, as well as spills of refined petroleum products (such as gasoline, and diesel) and their by-products, heavier fuels used by large ships such as bunker fuel, or the spill of any oily refuse or waste oil. Prior studies document mixed findings on the effect of oil spillage on firm performance. For instance, Sekhon and Kathuria (2019) in India, using a sample of the top 137 companies in a panel regression environment finds no significant influence of CSR on financial measures. Dakhli (2021) finds that social investment had a positive influence on Tobin's Q. Using a 34-item CSR scale, Ahmad, Naeem, Hasan, Arif, and Ur Rehman (2019), on a sample of Pakistani Banks finds that CSR positively affected the ROA and ROE of banks.

2.1.2 Gas Flaring and Tobin's Q

Gas flaring is the burning of natural gas associated with oil extraction. The practice has persisted from the beginning of oil production over 160 years ago and takes place due to a range of issues, from the market and economic constraints to a lack of appropriate regulation and political will. Gas flaring contributes to pollution, biodiversity loss, and greenhouse gas emissions, among others (Rahi, Akter, & Johansson, 2022). Prior studies have documented an association between gas flaring and financial performance. Asuquo (2012) on a sample of Oil and Gas companies in the Niger Delta Region of Nigeria revealed that the cost of ensuring environmentally friendly policies as well as firm competitiveness have a significant relationship with the firm's profitability. The environmental concerns include dust and waste during construction of infrastructure, clearance of land, and release of drilling fluids during exploration; spills from leaking pipes and atmospheric emissions from gas flaring during production; tanker spills during transportation; and the release of contaminated wastewater during refining.

2.1.3 Water Pollution and Tobin's Q

Water pollution is the contamination of water sources by substances which make the water unusable for drinking, cooking, cleaning, swimming, and other activities. Pollutants include chemicals, trash, bacteria, and parasites. All forms of pollution eventually make their way to water, for instance, oil is also naturally released from under the ocean floor through fractures known as seeps (Denchak, 2023). Water pollution degrades water quality and renders it toxic to humans or the environment (Denchak, 2023). This information is crucial to investors in making investment decisions. From a shareholder perspective, water pollution would have an impact on firm performance. The study by Cai, Jo and Pan (2012) find sustainability to preceding firm value. However, using data from India, Farooq (2015), finds that ESG disclosure is negatively associated with firm performance. Their panel data regression model using data which spanned from 2005 to 2010 showed a positive association between earnings per share and firm performance proxied using returns. Buallay, Kukreja, Aldhaen, Al Mubarak, and Hamdan (2020) find a negative association between CSRD with operational and market performance in Mediterranean countries.

2.1.4 Energy Consumption and Tobin's Q

This information is important in today's business environment, which is highly competitive and volatile in nature due to frequent changes and rapid advancements in technology. The global financial crisis alongside several financial improprieties by large firms, e.g., Enron, WorldCom, and Parmalat have increased the interests of stakeholders on the issue of resource utilisation in organizations. Prior studies have documented an association between energy consumption and firm performance across several contexts. The study by Ruggiero and Lehkonen (2017), showed that 66 large electric utility companies had better business performance after adopting renewable energy. However, other studies also document a negative relationship between energy consumption and firm performance. Using a sample of 668 firms from the energy sector, Wasiuzzaman, Ibrahim, and Kawi (2022) finds that Environmental, Social and Governance (ESG) disclosure negatively affected the firm performance of energy sector firms globally. The study utilised secondary data which spanned from 2009 to 2016 analysed using the instrumental regression technique.

2.1.5   Corporate Performance

The word 'performance' is derived from the word 'parfourmen', which means 'to do', 'to carry out', or 'to render'. Performance is a difficult concept, in terms of definition and measurement. It has been defined as the result of an activity, and the appropriate measure depends on the type of organization to be evaluated and the objectives to be achieved through that evaluation (Jat, 2006). The concept of organizational performance is based on the idea that an organization is the voluntary association of productive assets, including human, physical, and capital resources, to achieve a shared purpose. Tobin's Q is one of the most commonly used industry indices to indicate firm performance. The Q ratio, also known as Tobin's Q, equals the market value of a company divided by its assets' replacement cost. Prior literature has shown mixed findings on the relationship between green accounting and financial performance (Alareeni & Hamdan, 2020, Omaliko & Okpala, 2023). Friede, Busch, and Bassen (2015) conclude that most studies found positive relationships between ESG and financial performance. The positive effect may be attributed to the influence of ESG on corporate reputation and consumer trust (Alsayegh, Abdul Rahman, & Homayoun, 2020; Buallay, 2019). Other authors suggest that ESG decrease financial and operating costs and may lower the costs of debt financing. In the study by Broadstock, Chan, Cheng, and Wang (2020), ESG is often seen as a signal by shareholders of future stock price movement.

Figure 1:   Schematic representation of the relationship between the variables
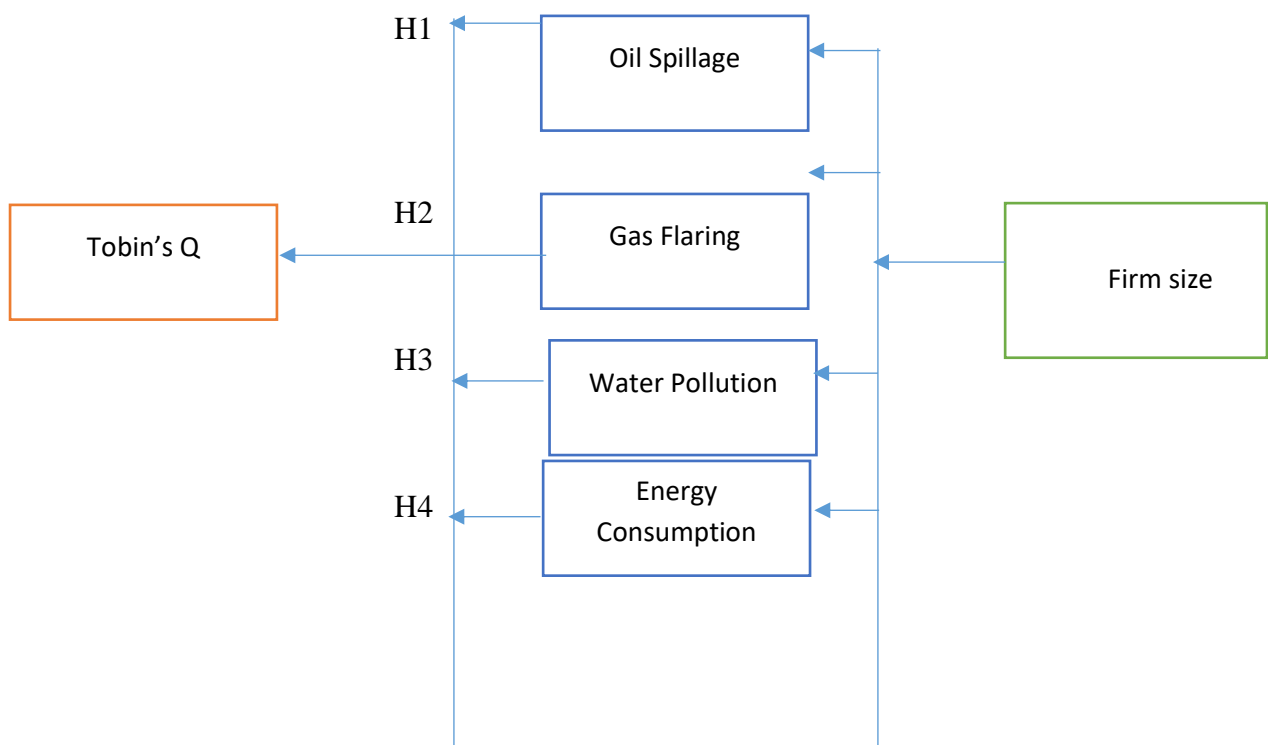
Source: Author's Conceptualisation (2023)

2.2   Theoretical Framework

2.2.1   Stakeholder Theory

The stakeholder theory was propounded by Freeman (1984). The theory draws from the strategic management literature, systems theory, and corporate social responsibility to challenge the long-standing assumption "that the sole objective of firms is to maximize shareholders' wealth" (Laplume, Sonpar, & Litz, 2008). Stakeholders refer to individuals or groups who are affected by, or whose actions can directly, or sometimes indirectly, affect the firm's operation (Omaliko & Ajuonu, 2022). The broadest definition of the concept is found in the work of Freeman (1984) where a "stakeholder is by definition any individual or group of individuals that can influence or are influenced by the achievement of the organization's objectives." The theory proposes that companies produce externalities that affect several parties, both internal and external to the firm. This study is anchored on the "stakeholder theory" because stakeholders are also interested in other information concerning corporate activities, which includes the social, environmental, economic, and governance information of the firm. In line with this, green accounting can promote the meeting of stakeholders' interests as they may have an impact on the organizations, such that without their support or explicit support an organization will cease to exist.

2.3   Empirical Review

Javed (2023) conducted a study titled 'Environmental management accounting and corporate performance: The mediating role of corporate environmental ethics: evidence from the manufacturing sector'. The study adopted a quantitative design and relied on primary data from the India manufacturing sector. The sample comprised 384 participants which were analysed using CFA and SEM. The results showed that EMA adoption was positively associated with firms' financials, environmental, and social performance; which was significant and positive. Simultaneously, the mediation of corporate environment ethics is also significant and positive. Wang, Bao, and Wang (2023) examined the "Impact of environmental information disclosure on corporate performance in the building material industry". The sample comprised Chinese A-share listed companies in the building materials industry from 2015 to 2019. The data were analysed using multiple regression technique. The results showed that environmental information disclosure significantly positively correlated with corporate performance at the 1% level.

Zhang and Lucey (2022) conducted a study titled 'Sustainable behaviors and firm performance: The role of financial constraints' alleviation'. The sample comprised 215,110 firm-year observations from global, publicly-traded firms during the period 2016-2020. The data were analysed using the multiple regression technique and the results revealed that ESG performance has a significant and positive effect on firm performance. Second, ESG performance improves firm performance by alleviating financial constraints. Third, ESG performance improves external financing, including long-term and short-term debt. Rahi, Akter, and Johansson (2022) conducted a study titled 'Do sustainability practices influence financial performance? Evidence from the Nordic financial industry'. They adopted a quantitative design. The sample comprised 39 financial firms in the Nordic region, i.e., Sweden, Denmark, Finland and Norway. The study relied on secondary data obtained from the Thomson Reuters Eikon database from 2015 to 2019. The data were analysed using the fixed

effects model and generalised method of moments. The empirical results revealed that ESG is negatively related to financial performance, i.e., return on invested capital, return on equity and EPS.

Hasan, Singh, and Kashiramka (2022) conducted a study titled 'Does corporate social responsibility disclosure impact firm performance? An industry-wise analysis of Indian firms'. The sample comprised 287 Indian firms. The study relied on secondary data from the financial year 2014 to 2019. The data were analysed using the pooled ordinary least squares (OLS), fixed and random effects models. In consumer goods, consumer services and heavy engineering, ESG was positively associated with financial performance; while, in the healthcare, energy and utility firms, the relationship between ESG and financial performance was negative. Buallay (2021) conducted a study titled 'Sustainability reporting and agriculture industries' performance: worldwide evidence'. The sample comprised 1426 observations from 31 countries over ten years, i.e., from 2008 to 2017. The secondary data were analysed using multiple regression techniques and the dependent variables were: ROA, ROE and Tobin's Q. The results showed that ESG had no significant relationship with ROA, ROE and Tobin's Q.

Omaliko, Onyeogubalu and Akwuobi (2021) examined the effect of Carbon Emission Disclosures on Sustainability of Oil and Gas Firms in Nigeria. The study used some key proxy variables namely; Leverage and Firms Size as a measurement for sustainability while Carbon Emission Disclosures was measured using the GRI G4 Disclosure Index. Two hypotheses were formulated to guide the investigation and the statistical test of parameter estimates was conducted using OLS Regression Model. The research design used is Ex Post Facto design and data for the study were obtained from the NSE Factbook, Annual Reports & Accounts and Sustainability Reports of oil and gas firms in Nigeria spanning from 2015-2020. The findings of the study generally indicate that Carbon Emission Disclosures have significant and positive effect on Firms Sustainability in Nigeria at 1% level of significance. Sen and Mallick (2021) conducted a study titled 'Linkage between corporate social responsibility practices and firm's financial performance: Evidence from select Indian IT companies'. The study employed a quantitative approach and secondary data from 2014 to 2019 was used. The data were analysed using the panel logit regression technique. The results showed that CSR spending positively affected firm performance proxied using ROE.

Oladele, Aribaba, Afolabi, Adele, Ahmodu, Babatunde, and Tuoyo (2021) assessed the 'Triple bottom line reporting and corporate performance of listed manufacturing firms in Nigeria'. They disaggregated their triple bottom line element into four: environmental reporting, board compositions, employee relations and community relations. The study employed the ex-post-facto research design and secondary data from annual reports obtained from the period 2012 to 2019. The sample comprised ten manufacturing companies listed on the Nigeria Stock Exchange. Ten (10) manufacturing companies were chosen. The results revealed that environmental reporting and employee relations had a positive significant effect on ROA; while the board composition and community relations had a negative non-significant effect on ROA. Zhang and Du (2020) undertook a study titled 'How China "Going green" impacts corporate performance?'. The study employed an experimental research methodology. The sample comprised over 3,000,000 observations from 1998 to 2012. The secondary data were analyzed using a difference-in-difference-in-differences (DDD) model to solve the endogeneity problem. The results of the analysis revealed that China's environmental

regulation policies negatively affect corporate total factor productivity and ROA in the short term.

Shahbaz, Karaman, Kilic, and Uyar (2020) conducted a study titled 'Board attributes, CSR engagement, and corporate performance: What is the nexus in the energy sector?' the sample comprised global energy firms. The secondary data spanned the period from 2011 to 2018 obtained from Thomson Reuters. The multiple regression results showed that a high CSR performance does not guarantee higher financial performance-proxied using market and accounting measures. However, board diligence and CSR committees were contributors to CSR performance, proxied using the composite environmental, social, and governance (ESG). The variable board independence affected the aggregate ESG score and the governance indicator, while board gender diversity affected the environmental and governance indicators. Buallay, Kukreja, Aldhaen, Al Mubarak, and Hamdan (2020) conducted a study titled 'Corporate social responsibility disclosure and firms' performance in Mediterranean countries: A stakeholders' perspective'. The quantitative study relied on secondary data from 203 firms listed in six Mediterranean countries for a period of 10 years, i.e., 2008 to 2017. The results showed that CSR disclosure negatively affects operational and market performance but had no effect on the financial performance proxy.

Alareeni and Hamdan (2020) conducted a study titled 'ESG impact on performance of US S&P 500-listed firms'. The quantitative study employed a sample of the US S&P 500-listed companies. The study utilised secondary data from the period 2009 to 2018 analysed using the panel regression technique. The results showed a positive association between ESG disclosure and firm performance. However, the environmental and corporate social responsibility dimensions are negatively associated with ROA and ROE. These variables are positively related to Tobin's Q. The corporate governance disclosure is positively related to ROA and Tobin's Q, and negatively related to ROE. More importantly, ESG, CSR, EVN and CG tend to be higher with firms that have high assets and high financial leverage. Furthermore, the higher level of ESG, EVN, CSR and CG disclosure, the higher the ROA and ROE.

3.0   Methodology

The study adopted the use of an *ex-post facto* research design. Ex post facto research design is a systematic empirical inquiry, in which the observer has no direct control of independent variables because their manifestations have already occurred or because they are inherently not manipulated. The area of the study is Nigeria, as the study focuses on quoted oil and gas companies listed on the Nigerian Exchange Group (NGX) as of 1st June 2022. Nigeria is one of the major oil producers in sub-Saharan Africa and therefore a varied number of oil firms are operational in the country. The population of the study comprise ten quoted oil and gas companies listed on the Nigerian Exchange Group (NGX) as of 1st June 2022. The study adopts a purposive sampling technique and employed regression model as a statistical test tool with the aid of E-View 11. Hence, the scope of the study restricted the focus to companies classified under the oil and gas sector, of the Nigerian Stock Exchange. Also, content analysis was used to measure the varying aspects of green accounting; this is similar to the procedure used in prior studies. It involves the construction of a classification scheme and developing a set of rules about "what" and "how" to code, measure, and record the data to be classified. The study measures disclosure, by assigning "1" if an item is present in the annual report, otherwise zero.

Model Specification:
The following panel data econometric model is estimated:
$Y_{it} = X_{it} \beta + c_i + u_{it}$,   t= 2012,…,2021.   (1)
        Where i indexes firms, t indexes time periods, X is a 1 x K vector of observed variables that may change across i or/and t, β is a vector of corresponding coefficients, c_i is the unobserved component, u_{it} is idiosyncratic disturbances/errors because they change across t as well as across i. The following model from the study of Oladele *et al.* (2021) was adapted for the study. The model is specified as follows:

ROA = $\beta_0 + \beta_1 ENV_t + \beta_2 BC_t + \beta_3 EMR_t + \beta_4 CR_t + \Sigma_{it}$………. (2)

The modified model is shown below as follows:
TOBQ $_{it}$ = $\beta_0 + \beta_1 OSD_{it} + \beta_2 GFD_{it} + \beta_3 WPD_{it} + \beta_4 ECD_{it} + \beta_5 FS_{it} + \mu_i$…… (3)

Where:
TOBQ = Tobin's Q
OSD   = Oil Spillage Disclosure
GFD   = Gas Flaring Disclosure
WPD   = Water Pollution Disclosure
ECD   = Energy Consumption Disclosure
FS   = Firm size
μ_i = Error term

4.0   Data Analysis
Table 1: Descriptive statistics of the model variables

	TOBINQ	OSD	GFD	WPD	ECD	FS
Mean	1.021600	0.087500	0.450000	0.787500	0.550000	1.44E+08
Median	1.023765	0.000000	0.000000	1.000000	1.000000	58191446
Maximum	2.762669	1.000000	1.000000	1.000000	1.000000	1.48E+09
Minimum	0.286426	0.000000	0.000000	0.000000	0.000000	47150.00
Std. Dev.	0.235201	0.284349	0.500633	0.411658	0.500633	2.76E+08
Skewness	4.647009	2.919668	0.201008	-1.405604	-0.201008	3.238566
Kurtosis	40.14957	9.524462	1.040404	2.975724	1.040404	13.44271
Jarque-Bera	4888.230	255.5548	13.33877	26.34495	13.33877	503.3448
Probability	0.000000	0.000000	0.001269	0.000002	0.001269	0.000000
Sum	81.72802	7.000000	36.00000	63.00000	44.00000	1.15E+10
Sum Sq. Dev.	4.370223	6.387500	19.80000	13.38750	19.80000	6.01E+18
Observations	80	80	80	80	80	80

Source: E-Views 11

Table 1 reveals the summary statistics for the variables used in the empirical research. We noticed that WPD had the highest mean value, whereas OSD showed the lowest mean value. The mean of TOBQ of the sampled companies was 1.022, i.e., approximately. This suggests that on average the firm's current market value is higher than its total asset value. The median value was 1.024; while the maximum value was 2.763 and the minimum 0.286. This, therefore, means that companies with higher or equal to the average TOBQ are highly valued firms while

companies with a value below the average TOBQ are low-valued firms. In the case of OSD which is a proxy of Oil Spillage Disclosure, the mean value of the sampled companies was 0.088 which suggests that on average less than 10% of firms had a disclosure of this item by the sampled firms. The mean value of GFD was 0.450 which suggests that on average 45% of firms disclosed this GRI measure. The mean value of WPD was 0.788 which suggests that on average 78% of firms disclosed this GRI measure. The average value of ECD is 0.550 which suggests that on average 55% of firms disclosed this GRI measure. The average value of firm size was one hundred forty-four billion (i.e., figure scaled in '000). The median value was fifty-eight billion one hundred ninety-one million four hundred forty-six thousand; while the maximum value was one trillion four hundred eighty billion and the minimum forty-seven million one hundred fifty thousand.

Table 2: Correlation analysis of the dependent and independent variables

	TOBINQ	OSD	GFD	WPD	ECD	FS
TOBINQ	1	0.047652	-0.00156	0.010851	-0.04897	0.026418
OSD	0.047652	1	0.342344	0.160858	0.2801	-0.00983
GFD	-0.00156	0.342344	1	0.469871	0.313131	-0.26723
WPD	0.010851	0.160858	0.469871	1	0.574287	0.104775
ECD	-0.04897	0.2801	0.313131	0.574287	1	-0.38483
FS	0.026418	-0.00983	-0.26723	0.104775	-0.38483	1

Source: E-Views 11

According to the correlation matrix in Table 2, which was used to test for collinearity among the independent variables, the correlation results demonstrate that there is no strong correlation between any two independent variables. This is because all of the correlation coefficients were less than 0.80. This suggests that there are no issues with the multicollinearity between them.

4.1   Test of Hypotheses

To test the hypotheses a multiple regression analysis was conducted since correlation analysis does not imply a cause-effect relationship. This model focuses on estimating the effect of green accounting on Tobin's Q of quoted oil and gas firms.

Table 3: OLS test for model explanatory variables

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.026909	0.007550	136.0182	0.0000
OSD	0.021422	0.012135	1.765328	0.0816
GFD	0.031970	0.009973	3.205722	0.0020
WPD	-0.027864	0.013723	-2.030441	0.0459
ECD	0.000837	0.008230	0.101664	0.9193
FS	3.17E-11	2.30E-11	1.376610	0.1728
	Weighted Statistics			
R-squared	0.170993	Mean dependent var		5.304093
Adjusted R-squared	0.114979	S.D. dependent var		2.968696
S.E. of regression	0.209218	Sum squared resid		3.239135
F-statistic	3.052685	Durbin-Watson stat		1.647264

Prob(F-statistic)	0.014674

Source: E-Views 11

The F-statistic value of 3.052685 and its associated P-value of 0.014674 show that the regression model overall is statistically significant at a 5% level, this means that the regression model is valid and can be used for statistical inference. In the table above, the regression R-squared value of 0.171 shows that about 17.1% of the systematic variations in TOBQ were jointly explained by all the independent variables. The Adjusted R-squared is often preferred to account for sample size adjustments, the figure showed a value of 0.115 which can be attributed to the exclusion of other independent variables that can impact TOBQ. , other specific findungs are shown below as thus:

Ho$_1$:   Oil spillage has no significant effect on Tobin's Q of quoted oil and gas firms in Nigeria.

OSD as an independent variable to TOBIN Q appears to have a positive (i.e., 0.021422) and non-significant effect on TOBIN Q at a 5% level of significance. This, therefore, implies that an increase in OSD will cause an increase in TOBIN Q. This evidence, therefore, leads to a rejection of the alternate hypothesis and acceptance of the null; thus, 'oil spillage has no significant effect on Tobin's Q of quoted oil and gas firms in Nigeria'.

Ho$_2$:   There is no significant effect of gas flaring on Tobin's Q of quoted oil and gas firms   in Nigeria.

GFD as an independent variable to TOBIN Q appears to have a positive (i.e., 0.031970) and significant effect on TOBIN Q at a 5% level of significance. This, therefore, implies that an increase in GFD will cause an increase in TOBIN Q. This evidence, therefore, leads to a rejection of the null hypothesis and acceptance of the alternate; thus, 'there is no significant effect of gas flaring on Tobin's Q of quoted oil and gas firms in Nigeria'.

Ho$_3$:   Water pollution has no significant effect on Tobin's Q of quoted oil and gas firms in Nigeria.

WPD as an independent variable to TOBIN Q appears to have a negative (i.e., -0.027864) and significant effect on TOBIN Q at a 5% level of significance. This, therefore, implies that an increase in WPD will cause a decrease in TOBIN Q. This evidence, therefore, leads to a rejection of the null hypothesis and acceptance of the alternate; thus, 'water pollution has no significant effect on Tobin's Q of quoted oil and gas firms in Nigeria'.

Ho$_4$:   There is no significant effect of energy consumption on Tobin's Q of quoted oil and gas firms in Nigeria.

ECD as an independent variable to TOBIN Q appears to have a positive (i.e., 0.000837) and non-significant effect on TOBIN Q at a 5% level of significance. This, therefore, implies that an increase in ECD will cause an increase in TOBIN Q. This evidence, therefore, leads to a rejection of the alternate hypothesis and acceptance of the null; thus, 'there is no significant effect of energy consumption on Tobin's Q of quoted oil and gas firms in Nigeria'.

4.2   Discussion of Findings

4.2.1   Discussion of Hypothesis One

OSD as an independent variable to TOBIN Q appears to have a positive (i.e., 0.021422) and non-significant effect on TOBIN Q at a 5% level of significance. This is supported in the study by Zhang and Lucey (2022), using a sample of global, publicly-traded firms from 2016 to 2020 analysed using the multiple regression technique finds that ESG performance has a significant and positive effect on firm performance. Dakhli (2021) on a sample of 200 French firms analysed using the panel regression technique. The results showed that ESG positively affected firm financial performance measured using the ROA, ROE and Tobin's Q. Sen and Mallick (2021) using evidence from Indian IT companies analysed using the panel logit regression technique showed that CSR spending positively affected firm performance proxied using ROE.

Likewise in Nigeria, the study by Oladele, Aribaba, Afolabi, Adele, Ahmodu, Babatunde, and Tuoyo (2021) employed the ex-post-facto research design and secondary data from annual reports obtained from the period 2012 to 2019. The sample comprised ten manufacturing companies listed on the Nigeria Stock Exchange. The results revealed that environmental reporting and employee relations had a positive significant effect on ROA. In the US, Alareeni and Hamdan (2020) on a sample of S&P 500-listed firms from the period 2009 to 2018 analysed using the panel regression technique. The results showed a positive association between ESG disclosure and Tobin's Q.

4.2.2   Discussion of Hypothesis Two

GFD as an independent variable to TOBIN Q appears to have a positive (i.e., 0.031970) and significant effect on TOBIN Q at a 5% level of significance. Using global data Zhang and Lucey (2022) revealed that ESG performance has a significant and positive effect on firm performance. Second, ESG performance improves firm performance by alleviating financial constraints. Third, ESG performance improves external financing, including long-term and short-term debt. In the study by Dakhli (2021) on the impact of corporate social responsibility on firm financial performance in France and secondary obtained from annual financial reports from 2007 to 2018 analysed using the panel regression technique showed that ESG positively affected firm financial performance measured using the ROA, ROE and Tobin's Q.

Oladele, Aribaba, Afolabi, Adele, Ahmodu, Babatunde, and Tuoyo (2021) assessed the triple bottom line reporting and corporate performance of 10 manufacturing firms in Nigeria using an ex-post-facto research design and secondary data from annual reports obtained from the period 2012 to 2019. The results revealed that environmental reporting and employee relations had a positive significant effect on ROA; while the board composition and community relations had a negative non-significant effect on ROA. Likewise, the study by Alareeni and Hamdan (2020) in the US employed a sample of S&P 500-listed companies. The panel regression results showed a positive association between ESG disclosure and Tobin's Q. Similarly, the study by Buallay, Fadel, Al-Ajmi, and Saudagaran (2020) on a sample of 59 banks in the Middle East and North Africa (MENA) region using data from annual financial reports from 2008 to 2017 showed a significant positive effect of ESG on firm performance, i.e., proxied using ROA and Tobin's Q.

4.2.3   Discussion of Hypothesis Three

WPD as an independent variable to TOBIN Q appears to have a negative (i.e., -0.027864) and significant effect on TOBIN Q at a 5% level of significance. This is consistent with the study by Rahi, Akter, and Johansson (2022) on a sample of 39 financial firms in the Nordic region, i.e., Sweden, Denmark, Finland and Norway. The data analysed using the fixed effects model and generalised method of moments revealed that ESG is negatively related to financial performance, i.e., return on invested capital, return on equity and EPS. Also, Hasan, Singh, and Kashiramka (2022) on a sample of 287 Indian firms analysed using the pooled ordinary least squares (OLS), fixed and random effects models showed that firms in the healthcare, energy and utility, had a negative relationship between ESG and financial performance. The study by Zhang and Du (2020) employed an experimental research methodology on a sample of over 3,000,000 observations from 1998 to 2012 analyzed using a difference-in-difference-in-differences (DDD) model revealed that China's environmental regulation policies negatively affect corporate total factor productivity and ROA in the short term. More so, Shahbaz, Karaman, Kilic, and Uyar (2020) using global energy firms and data from 2011 to 2018 obtained from Thomson Reuters showed that a high CSR performance does not guarantee higher financial performance.

4.2.4   Discussion of Hypothesis Four

ECD as an independent variable to TOBIN Q appears to have a positive (i.e., 0.000837) and non-significant effect on TOBIN Q at a 5% level of significance. The study by Buallay (2021) using a sample of 1,426 observations from 31 countries from 2008 to 2017 and the dependent variables of ROA, ROE and Tobin's Q showed that ESG had no significant relationship with ROA, ROE and Tobin's Q. Similarly, Dakhli (2021) confirms a positive relationship between ESG and financial performance measured using the ROA, ROE and Tobin's Q on a sample of 200 French firms. In Nigeria, Oladele, Aribaba, Afolabi, Adele, Ahmodu, Babatunde, and Tuoyo (2021) using an ex-post-facto research design and secondary data from the period from 2012 to 2019 revealed that environmental reporting and employee relations had a positive significant effect on ROA. In the MENA region, Buallay, Fadel, Al-Ajmi, and Saudagaran (2020) conducted a study using a sample of 59 banks. The study relied on secondary data from annual financial reports from 2008 to 2017. The results showed a significant positive effect of ESG on firm performance, i.e., proxied using ROA and Tobin's Q. This is also supported by Riyadh, Sukoharsono, and Alfaiza (2019) using a sample of the top 250 global energy firms globally from 2016 to 2018. The study adopts a quantitative design and analysed the secondary data using smart partial least squares (PLS). The results showed no significant positive impact of corporate social responsibility disclosure on corporate performance.

5.0   Conclusion and Recommendations

This study concludes that there is a relationship between green accounting and the corporate performance of quoted oil and gas firms in Nigeria. There has been growing attention in the corporate world on the impact of corporate activities on the environment. This issue has driven several global bodies, to develop measurement indexes for corporate organisations to assess their environmental impact. This study analyses green accounting measures from the perspective of stakeholder and legitimacy theories. The former advocates the role of the firm in meeting the interests of several stakeholders while the latter advocates the instinct of organisations seeking

rationalisation for their operations by implementing green initiatives. The study employed secondary data from oil and gas firms from 2012 to 2021 to specifically analyse the effect of oil spillage, gas flaring, water pollution and energy consumption disclosure on Tobin's Q. The data were analysed using descriptive and inferential statistical techniques with corrections for panel cross-section dependence. The study found that oil spillage, gas flaring, and energy consumption positively affect Tobin's Q; while water pollution negatively affects Tobin's Q of quoted oil and gas firms in Nigeria. The study draws recommendations from the findings of the empirical data analysis. The study makes the following recommendations for managers and shareholders of oil and gas firms in the Nigerian context as follows:

1. Improved Oil Spillage Disclosure: Even though oil spillage disclosure has no significant effect on the Tobin's Q of oil and gas companies operating in the country, these companies still need to do more to improve on their disclosure of such negative environmental impact consistent with relevant international regulations such as the GRI G.4, etc., particularly in the areas of the environmental clean-up of affected areas which was the cause of the uprising in the Niger Delta region, amongst others. Oil spillage disclosure can enable the management of a company to meet the information needs of stakeholders and create a platform for communication with its shareholders.
2. Gas Flaring Disclosure is important to maintain firm value: The flaring of GHG is still the common practice amongst major oil and gas companies operating in the Nigerian upstream sector. Shareholders should monitor the compliance of managers with the numerous laws and strategies used to reduce GHG flaring and the resulting carbon emissions in the company. Moreover, the government should develop further enforcement strategies to ensure effective compliance.
3. Effective water pollution management: Managers should develop a water pollution system for managing their negative environmental impact on water which causes pollution as it may reduce firm valuation methods. Thus, as long as pollution is a sign of economic inefficiency, firms may be indirectly affected by the market valuation of their corporate performance. This is because water pollution causes significant ecological harm to the environment, leading to direct expenses from sanctions, and reputational harm to the listed companies. Thus, oil and gas firms that wish to sustain Tobin's Q should adopt water pollution management in line with international best practices.
4. Improved energy consumption disclosure: Thus, with growing concerns about environmental problems, managers and shareholders who do not want a negative market reaction should continually disclose such information in line with best practices. Regulators should constantly monitor firms with excessive energy consumption to pay relevant fees and fines which can encourage the move to sustainable energy consumption. Shareholders are also advised to pressure managers to look for alternative solutions to avoid loss of firm value.

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