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The Effects of Green Accounting on listed firms in the Oil and Gas Sector of the Nigeria Exchange Group

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ABSTRACT
The goal of this research was to examine how green accounting affects the bottom lines of publicly listed oil and gas firms on the Nigerian Exchange Group. Using an expo-facto research approach, we gathered secondary data on green accounting (green accounting disclosure index, waste and energy disclosures) and a measure of financial success (return on equity) for six (6) publicly traded oil and gas businesses in Nigeria between 2014 and 2021. Analysis of the estimated data included the use of descriptive (mean, median, standard deviation, minimum and maximum values, skewness, kurtosis, and Pearson correlation) and inferential (fixed and random effects) statistics, as well as the variance inflation factor, Breusch-Pagan/Cook-Weisberg test for heteroskedasticity, Cameron and Trivedi's decomposition of the information matrix, and the Hausman specification test. Green accounting was not shown to have a substantial impact on the bottom lines of Nigeria's oil and gas corporations using either a fixed or random effects study. The profits of oil and gas companies listed on the Nigerian Stock Exchange were found to be unaffected by the implementation of green accounting practises. Several suggestions were made based on the study's findings, such as encouraging oil and gas companies in Nigeria to increase their green accounting index scores and more fully adopt green accounting practises within their own organisations' accounting frameworks, and promoting greater green accounting awareness within the accounting and business regulatory framework.
Keywords: green accounting, Nigerian Exchange Group, oil and gas corporations

1. INTRODUCTION

As the modern world becomes increasingly industrialised, more people are paying attention to the problem of environmental pollution and the efforts of various industrial components, most notably oil and gas firms, to dispose of their waste, which is harmful to both the environment and the people who live in it (Chinwe, 2013).

Huge capital investments are typical in the oil and gas industry, but enormous returns are anticipated from these endeavours due to the high demand for oil and gas products. Despite the high cost of capital (which impacts a wide range of stakeholders, including investors), the oil industry consistently outperforms comparable businesses in nations with similar oil reserves in terms of profitability (Effiong, 2010). Despite the enormous revenues earned by the oil firms from activities in the Niger Delta Area, the inhabitants of the Niger Delta live in filth without basic facilities, as Effiong succinctly said. Because of this, many violent acts have been planned and carried out by young people in certain areas (called Militants) in an effort to get the world to notice their predicament. Green accounting, as argued by Malik and Mittal (2015), is vital for emerging nations like Nigeria in order to address issues related to the

environment and economic growth. The effects of climate change can be mitigated with the use of environmental accounting. Companies and businesses in developing nations will benefit from this because of their enhanced efficiency. Preserving the environment and its resources is good for society and its people since environmental preservation is one of the pillars of economic prosperity in every nation.

In response, a slew of environmental protection laws and regulations have been enacted in a number of nations, Nigeria included. The Department of Petroleum Resources enacted laws including the Environmental Impact Assessment Act (1992) and the Environmental Guidelines and Standards for the Petroleum Industry in Nigeria (EGASPIN) (2002). All internal company choices must now, per these statutes and ordinances, take into account the potential effects on the environment.

1.1 Statement of the Problem

The rising effect of oil and gas firm's operations on the environment have continued to pose a challenge to the people especially the riverine areas of the Niger Delta. The firms concerned pay little or no attention to the environmental hazards such as the polluted water caused by oil spillage. In most riverine areas, fishing which is the major occupation of such people is threatened as fishes can- not breed in oil polluted water resulting in scarcity of fishes in the river causing low productivity for the fishermen. Agricultural crops too also adversely affected as farmers continue to reap a low harvest. What about the atmosphere that is filled with black sooth, causing lots of health hazards. This problem is persisting because there is no clear framework such as green accounting standard that would ensure that firms are accountable for their actions in the environment.

An increasing number of people are demanding that businesses implement green accounting practises in order to keep track of their environmental impact and determine whether or not doing so improves their bottom line. This is especially true of oil and gas firms, which are notorious for releasing some of the most toxic substances into the environment through their onshore and offshore operations (Oti & Mbu-Ogar, 2018).

The purpose of this study is to examine the relationship between oil and gas firms' green accounting practises and their financial success in Nigeria.

1.2 Objective of the Study

The research set out to learn how green accounting affects the bottom lines of Nigeria's oil and gas firms. Specifically, we hope to:

1. Examine the connection between green accounting disclosure index and return on equity (ROE) of oil and gas companies in Nigeria.
2. Ascertain the connection between waste disclosure and ROE of oil and gas companies in Nigeria.
3. Determine the connection between energy disclosure and ROE of oil and gas companies in Nigeria.

Hypotheses of the Study

In line with the specific objectives of the study, the following hypotheses of the study were formulated:

Hypothesis I

Ho: There is no substantial link between green accounting disclosure index and ROE of oil and gas companies.

Hypothesis II

Ho: There is no substantial link between waste disclosure and ROE of oil and gas companies.

Hypothesis III

Ho: There is no substantial link between energy disclosure and ROE of oil and gas companies.

2.0 LITERATURE REVIEW

2.1 Conceptual Review

Green Accounting

The term "green accounting" refers to the practise of incorporating financial and non-financial information about a company's operations into a single set of reports that can be used by stakeholders in

economic and non-economic decision making. This includes keeping track of the financial and non-financial effects of a company's operations on the environment, society, and the company itself.

Accounting practises that aim to incorporate various environmental costs into reported financial outcomes are known as "green" or "environmental" accounting, and they are a relatively recent development (Rewadika, 2014).It's a way to evaluate the success of any business in terms of their impact on the economy and society. The term "environmental cost accounting" (Nwoji, 2021) refers to the practise of calculating and reporting the costs associated with a given setting. Green accounting is an approach to financial reporting that emphasises the importance of environmental responsibility. Shareholders (owners) and bondholders (bond investors) may only use the purely financial data provided by conventional accounting to make informed decisions. Responsibility towards stakeholders requires disclosure of environmental consequences (Astuti, 2012). The goals of green accounting are to promote long-term economic growth, foster goodwill in the communities where businesses operate, and advance environmentally responsible practises. The best possible means of quantitative measurement in monetary value or physical unit are supported by its disclosure practises, allowing companies to accurately report the cost of environmental conservation as part of their regular business operations.

According to green accounting principles, an organization's land, water, and other natural resources are all assets that contribute to the creation of its outputs (Virola, De Rerio, & Angeles, 2000). It enables accountants to report on the economic effect of these decisions to stakeholders, encouraging them to take preventative action towards implementing procedures that both protect the environment and boost profits.

Lewis and Chopparapu (2017) state that the primary concern of green accounting is the company's impact on the natural world. Costs and advantages of environmental impacts on the financial accounting system are assessed.

Forms of Green Accounting

Green Management Accounting: Green accounting, also known as environmental management accounting, is taking environmental costs into account while making financial choices. Data on environmental expenses and results are used in a company's green management account (GMA). Cost, production, inventory, and waste cost and performance data are gathered for analysis. To improve material efficiency, lessen environmental effect and risk, and lower the cost of environmental protection, "green" or "environmental" accounting combines financial and cost accounting into a unified framework.

Green or environmental cost accounting: In order to achieve complete cost accounting, environmental cost accounting takes into account environmental expenses. Costs can be identified, evaluated, and allocated to processes, goods, activities, or budgets in a number of ways. Green accounting enlightens upper management to the fact that being environmentally responsible has tangible financial rewards in the form of tax breaks, refunds, and reduced expenses (Eilola, 2017).

Waste Disclosure Index

Because of the widespread interest in pollution and the health effects of global warming, effective waste management is a topic of discussion at the highest levels of corporate management. Companies, as energy consumers and polluters themselves, need to improve their environmental management and transparency practises. The Global Reporting Initiative encourages businesses to disclose their sustainability-related activities in accordance with specified guidelines. Subdivision306 requires businesses to report on their discharge volume, water quality, discharge destination, hazardous and nonhazardous waste weight, disposal method, significant charges and their impact, hazardous waste transportation, and water bodies and related habitats that are significantly affected by spills and/or runoff.

Environmental Disclosure (Energy Disclosure)

To examine and incorporate in the firm's annual financial statements issues that bother on environment hazard that are not taken cognizance of in the conventional accounting function so that stakeholders can use them for decision making, as stated by (Crowther 2016). The need of keeping a careful eye on natural resources and the negative impact companies have on the communities in which they operate was highlighted by the disclosure of corporate environmental operations. Waste, toxic emissions, spillages, and degradation are just some of the environmental repercussions produced by business operations,

notably in the oil and had industries (Parmigiani, Klassen, & Russo, 2015). Even when a company says it is reporting on environmental consequences, these direct metrics are rarely seen in the financial report (Atagboro & Ihenyen, 2022; Ogiriki & Atagboro**,** 2022).

Oil and gas industry in Nigeria

Since the Shell company found crude oil in Nigeria in 1956, the country's oil and gas industry has expanded fast. Companies with a long history in Nigeria did not start conducting meaningful market research until the 1990s. About a decade ago, the Nigerian National Petroleum Corporation (NNPC) released the initial set of guidelines on the inclusion of indigenous Nigerian content. After the 2010 adoption of the Nigerian Oil and Gas Industry Content Development (NOGIC) (The Act), which mandated their use, local content development initiatives saw increased involvement. The legislation's stated goal is to improve opportunities for Nigerian businesses and workers to win oil contracts and projects.

The oil and gas sector may be split into upstream and downstream activities. Oil exploration and production are under the purview of the upstream industry. The upstream oil business is the single most significant sector of the Nigerian economy, accounting for more than 90% of exports and approximately 80% of Federal Government revenue. However, the refinery and petrol stations rely on pipelines and storage tanks that are part of the downstream industry. Products like PMS(fuel), diesel, kerosene, cooking gas, etc. are refined from crude oil and gas at the refinery. Refining and selling finished petroleum products are examples of what happen in the downstream industry. Pipelines, coastal boats, road vehicles, rail waggons, etc. are all used in distribution to move refined petroleum products from refineries to storage or selling terminals.

Companies in the oil and gas industry that wish to go public on a stock exchange must disclose their environmental impacts. Most oil and gas firms do not achieve these requirements, which contributes to an unpredictable and unpleasant business environment. Because of the oil and gas industry's negative impact on the environment, consumers see it negatively. Nigeria's Petroleum and Gas Sector

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Financial Performance

The ability of a company to make profits from its principal business activity is one indicator of financial performance. It reveals the health and success of a company overall and its genuine financial standing (Eze, 2021). The term "financial performance" refers to the amount of success an enterprise has over a certain time frame. Profit and loss statements or asset utilisation rates are two metrics that might be used to assess this. According to Iliemena and Okolocha (2019), the motivation for assessing financial performance differs as organisations measure performance to account for management's stewardship of shareholders' funds. The impact of green accounting on performance may be calculated using accounting data like certified financial statements. To achieve this, researchers examine the dynamics at play between certain environmental reporting metrics and the bottom lines of participating businesses. Return on equity is used as an indicator of profitability in this study.

Return On Equity (ROE)

The return on equity is a measure that shows how well a firm is managing the money its shareholders have invested in it. What this metric does is compare the earnings of a company to the value of its equity. A greater return on equity indicates that the company's management is effective at turning its equity investment into profit. Return on equity is also known as return on net worth.

Formulae for return on equity (ROE);

ROE=Net income/shareholder's equity

Green Accounting Disclosure and Financial Performance.

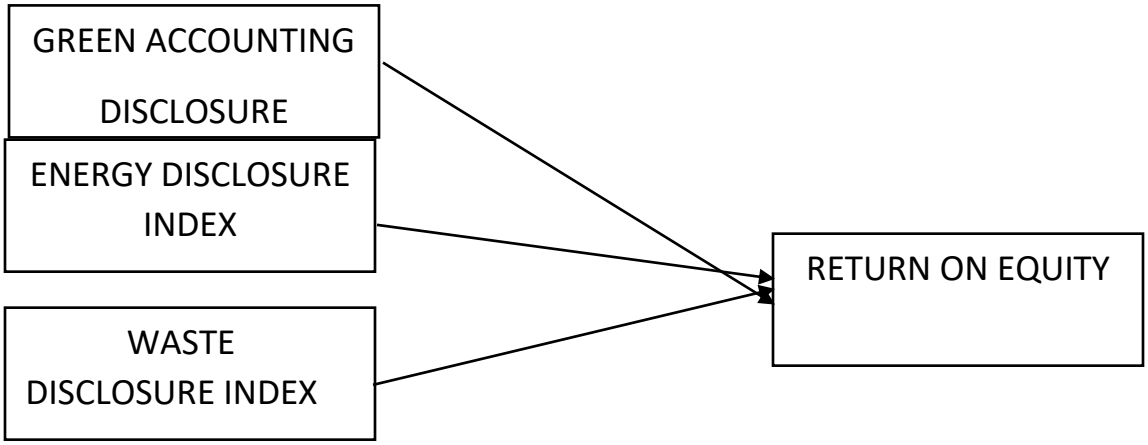
Green accounting disclosure and financial performance refers to whether or not companies whose activities are likely to cause environmental decorations include environmental information in their annual reports, which in turn influences the choices made by stakeholders. The association between the accounting variables return on assets (ROA) and return on equity (ROE) and the reporting was measured by Hai (1998) using a sample of potentially polluting publicly listed corporations in Singapore. The research found that companies who disclosed their environmental impact fared better financially than those that didn't.

Waste disclosure And Financial Performance

During the production of goods or delivery of services, every sector generates some quantity of trash that, in most circumstances, has negative implications. All oil and gas companies that are serious about making a profit prioritize the reduction of waste in their operations. Organisations can boost their profits, public perception, and competitive edge by reducing wasteful practices. This is accomplished through cost savings, increased output per unit of input, or reduced input requirements (Atagboro & Isaiah, 2022).

With oil prices at six-year lows and growing worries about an oil surplus, these qualities would be extremely useful for the oil and gas business. Investment in a management system that guarantees waste reduction and many other benefits for the oil and gas sector will be of major importance as every oil producer faces fewer returns due to the decline in price of oil supply. garbage emissions from oil and gas production operations can include both material (general garbage, paper, glass, empty metals, plastic drums, oil, sludge and chemicals, etc.) and operational wastes that are released to sea under authorization (Atagboro & Isaiah, 2022).

Conceptual framework of model of study



Conceptualized by the researcher, 2023.

2.2 Theoretical Framework

This paper explores two social theories of green accounting: the stakeholder theory and the legitimacy theory.

The stakeholder perspective: The core tenet of the stakeholder theory is that a company's fortunes rise and fall with how it handles the many ties it maintains with its various constituencies. There are two main types of stakeholders for every given business: internal and external. Shareholders, creditors, consumers, investors, communities, government agencies, and the environment are all examples of external stakeholders (Johnson-Rokusu & Olarenwanju, 2016).

Green or environmental accounting is primarily concerned with the appraisal and disclosure of environmental costs to stakeholders. Stakeholder theory is a framework for understanding corporate social responsibility (CSR) from an organisational perspective. It emphasises the importance of the company's responsibility and the openness of its operations, as well as the accountability of all actors involved. Corporate social responsibility (CSR) and sustainability are inextricably linked to stakeholder theory. Because of this, earnings alone are not sufficient to measure a company's performance, and money is not the only thing that matters when it comes to producing value for consumers.

Legitimacy Theory

According to legitimacy theory, institutions should make consistent efforts to comply within accepted social norms and regulations (Deegan et al., 2002). Organisational legitimacy may be maintained by careful management of stakeholders' views of what is required to achieve it.

Legitimacy theory is a framework for helping businesses gain public trust and respect by making voluntary social and environmental disclosures, as required by the social compact that helps them achieve their goals and thrive in a volatile and uncertain world. What the public thinks about the organization's actions is compared to what the public expects the organisation to do. When an organization's actions violate societal norms, it faces strong backlash from the public. Those restrictions might spell the end for the company. An organisation can only continue to exist if it engages in economically and socially responsible practises that do not endanger the communities in which it operates or the planet itself.

2.3 Empirical Review

Saman (2019) examines the relationship between environmental accounting and the bottom lines of Nigeria's oil and gas firms. In order to get first-hand accounts from businesses that manufactured eco-friendly goods, the researchers used questionnaires for their study. A lack of environmental reporting and disclosure standards was shown to have a major impact on the consistency with which environmental information is reported and disclosed in financial statements, annual reports, and accounts. Businesses with a strong commitment to environmental sustainability and transparency in their environmental practices have a significant competitive advantage. This research found that in order to effectively deal with additional environmental challenges, further research into financial performance, management accounting, external and internal audits, tax and financial accounting is required.

Chiamogu and Okeye (2020) investigated the connection between the environmental implications of oil and gas companies and their financial performance. Tobin funded a study that analysed how environmental expenses affected the profitability of oil and gas companies in Nigeria. After the incident, it was discovered that community development costs and environmental remediation charges positively affected Tobin's. To further promote community growth and improve business outcomes, the report suggests that the government provide tax credits to organisations that engage in and contribute to community development.

Nwafor, Asuquo, and Inyang (2021) looked at how green accounting affected the bottom lines of Nigerian oil and gas companies. The study employed a quantitative approach and an Ex post facto research design. The statistical analysis was done using E-view q.o. Information for the years 2010 through 2020 was culled from firms' annual reports. The findings demonstrated that environmental cost accounting significantly affects the bottom lines of oil and gas firms. The research concluded that if Nigerian oil and gas corporations were to improve their operating environment and bottom line,

management would do well to pay more attention to environmental cost accounting. The government should mandate environmental reporting in yearly reports and enact legislation to include environmental concerns into policymakers' long-term planning.

Sustainability accounting and the financial performance of a sample of Nigerian oil and gas firms between 2012 and 2017 was studied by Ordu, Promise, and Cletus (2021). Using secondary sources, an explanatory and rectificational framework was developed. We used a technique called regression analysis. Their research revealed that Nigeria's oil and gas firms' ROAs had no discernible connection to environmental accounting practises. The study concludes that oil and gas company management should prioritise environmental accounting disclosure as a means of gaining the confidence of their stakeholders and demonstrating their commitment to openness.

Bogdan et al. (2022) investigated how both internal and external factors influenced the correlation between waste management statistics and profits. Throughout the examined time period, the results show a low score for the waste management information disclosure index; nevertheless, an upswing in confidence indicates that things will change by the end of 2021.

3.0 METHODOLOGY

This study focuses on the quantitative research paragon which is closely related to positivism. Since the study discusses the connection between the dependent variable and the independent factors after the fact, it employs an Ex post facto research design. The ability to test hypothesized correlations between and among variables and to generate predictions about these interactions is a key feature of this sort of design.

Thirty-six (36) NGX oil and gas businesses make up the study's population. Ten (10) of these companies. This was determined with the use of Taro Yamme Model. But most of the companies do not have the required financial report that cover the period of study. The companies selected include; Conoil Plc, Total Nigeria Plc,, Forte Oil, Mrs Oil, Oando plc,Eterna Oil and Gas plc.

Table 3.1: Descriptive of Variables

Type	Indicators	Variable Symbols	Variables Explanation
Independent Variable (Green Accounting)			
	Green Accounting Disclosure Index	GADI	0 for coy with green impact; 1 if otherwise
	Waste Disclosure	WD	0 for coy with waste disclosure; 1 if otherwise
	Energy Disclosure	ED	0 for coy with energy disclosure; 1 if otherwise
Dependent Variable (Financial Performance			
	Return on Equity	ROE	Net profit after tax divided by Equity Share

Source: Researchers' Compilation (2023)

Method of Data Analysis

Descriptive, post-estimation and inferential statistics was used in analysing the data collected for the study as follows.

(a) Summary Statistics

Mean and standard deviation, as well as a test for skewness and kurtosis, would make up the summary statistics. Determining if the average and standard deviation will aid in spotting the degree of variation is why the mean is calculated. The normality results would be used to test for normal distribution of data and hence adjust to avoid spurious results and this would be done via the skewness and kurtosis tests.

Furthermore, summary statistics such as the minimum and maximum values and median would be used to ascertain the minimum and maximum value for the measures of green accounting (GADI, ED and WD) and financial performance (ROE). While the median would be used to evaluate the variables' midway across the selected Nigerian oil and gas firms. The Pearson correlation was also utilised to assess the

relationship's significance, strength, and direction. The correlation between items was calculated using Pearson correlation in this study. Therefore, multicollinearity was defined as a value of inter-item correlation or bivariate association more than 0.9.

(b) Post-estimation Statistics

(i) Multicollinearity: The Variance Inflation Factor (VIF) method was employed to check for multicollinearity. As a rule of thumb, multicollinearity among the pairs of independent variables is present if the mean VIF is larger than 10, and absent if the VIF is less than 10.

(ii) Heteroscedasticity Test: The Breusch-Pagan test, developed by Trevor Breusch and Adrian Pagan in 1979, was used to examine the linear regression model for heteroskedasticity. It tests if the estimated variance of the residuals from the regression changes when the values of the independent variables change. According to the Breusch-Pagan test decision rule, heteroscedasticity does not exist if both the F-statistic and the observed R-square value are bigger than the critical values at the 5% level. Both the F-statistic and the observed R-square value point to the presence of heteroscedasticity if they fall below the 5% threshold.

(iii) Cameron and Trivedi's Decomposition of Information Matrix (IM) Test: The Cameron and Trivedi's decomposition of information matrix (IM) test was carried out to ensure that the empirical models of the study are not violating any of the assumptions of panel data regression model so as to make good inferences about the dataset of the study. The decision rule is that Hi is accepted when p-value is less than or not close to 0.05 and if otherwise, reject the Ho.

(c) Inferential Statistics

(i) **Fixed Effect**: The fixed effect model was used to assess the unobserved time-invariant individual effect of the independent variable on the dependent variable.

(ii) **Random Effect**: The "random" in "random effect model" refers to the fact that the sample was selected at random from a broader population of samples and so assesses the difference between firm I and time average scores.

(iii) Hausman Specification Test (Post Estimation): The majority of the Hausman test was run using a random effect model. An essential consideration is that the Hausman test can't be performed without first having the test approximated in a random fashion. This statistic has a chi-squared distribution with degrees of freedom proportional to the rank of metrics under the null hypothesis. Furthermore, data collected were analyzed via the computer software known as STATA 13.0 version.

Model Specification

This present study builds on existing models of Egbunike and Okoro (2018); and Krivacic and Jankovic (2017). In these studies, green accounting was measured using waste, energy and compliance disclosures; however, this study adapts these models by introducing another measure of green accounting such as green accounting disclosure index in its empirical model. In view of the above, regression model was set up to investigate the hypothesized relationship between the explained factor (ROE) and the explanatory factor (green accounting disclosure index, waste disclosure and energy disclosure) of the selected oil and gas companies in Nigeria. The econometric form of the regression model is given as:

$Yit = \delta 0 + \delta 1xit + \delta 2xit + \delta 3xit + \mu it$ eq. 1

Where: $\delta 0$ = Constant (intercept); $\delta 1 - \delta 3$ = Coefficients of the independent variable; Y = Dependent variable; x = Independent variable; μ = Stochastic error term.

Furthermore, to validate the individual hypothesis of the study (hypothesis 1-3), the following regression models were estimated as follows:

$ROEit = \delta 0 + \delta 1GADIit + \mu it$ eq.2

$ROEit = \delta 0 + \delta 2WDit + \mu it$ eq.3

$ROEit = \delta 0 + \delta 3EDit + \mu it$ eq.4

Equations 2-4 are the explicit regression models of the study; however, expressed as a simple regression. In equation 4, we estimated the multiple regression model of the study as follows:

$ROEit = \delta 0 + \delta 1GADIit + \delta 2WDit + \delta 3EDit + \mu it$ eq.5

Where: ROE = Return on equity; GADI = Green accounting disclosure index; WD = Waste disclosure; ED = Energy disclosure. The data were obtained from the annual reports and accounts of the six (6) selected oil and gas companies from 2014-2021.

4.0 RESULTS AND DISCUSSION

Using an ex-post facto research approach, we analysed the correlation between green accounting and financial success at six (6) publicly traded oil and gas businesses in Nigeria between 2014 and 2022 (see appendix I for a full list of the companies we looked at). Descriptive statistics (means, medians, standard deviations, minimums, maximums, skewness, kurtosis, and the correlation matrix) were covered, as were post-estimation statistics (variance inflation factor, heteroscedasticity, and the Cameron and Trivedi decomposition of information matrix (IM) test), and inferential statistics (panel least square (PLS) regression, fixed and random effects regression, and the Hausman specification test). The return on equity is one metric of interest, while the green accounting disclosure index, waste disclosures, and energy disclosures are others.

4.1 Descriptive Statistics

Table 4.1: Summary of Descriptive Statistics

stats	roe	gadi	ewd	ed
mean	.7333958	.25	.3333333	.3191489
p50	.772	0	0	0
sd	.710981	.437595	.4763931	.4711864
min	-.244	0	0	0
max	2.957	1	1	1
skewness	.8431732	1.154701	.7071068	.7759403
kurtosis	3.687609	2.333333	1.5	1.602083
N	48	48	48	47

Source: Researcher's Computation via STATA 13.0

The average and standard deviation for each variable across the tested Nigerian oil and gas firms from 2014 to 2022 were shown in Table 4.1. This data shed light on the environmental practises (green accounting disclosure index, waste and energy disclosures) and financial health (return on equity) of a subset of Nigeria's oil and gas firms. In terms of performance indicators, return on equity (ROE) had the highest average value of 0.7334, followed by waste disclosure (EWD), energy disclosure (ED), and green accounting disclosure index (GADI).

ROE showed the highest dispersion with a standard deviation value of 0.7109 while GADI showed the least dispersion with a standard deviation of 0.4375; the standard deviation shows that the sampled oil and gas companies' disclosure of green accounting in Nigeria are similar; an indication of relative change in disclosure of green accounting and financial performance indicator (ROE). Also, EWD and ED recorded averages of 0.3333 and 0.3191 respectively. The low mean values for EWD and ED are clear indications that there is a 33 per cent of the oil and gas companies that disclosed waste while 32 per cent disclosed energy

Remarkably, the minimum value for GADI, EWD and ED are zero (0); suggesting among other things that some of the sampled oil and gas companies failed to make disclosures on green accounting while the maximum value of one (1) showed that some of the sampled oil and gas companies had disclosure on green accounting, particularly waste and energy. Second, the skewness values for GADI, EWD and ED were positive; indicating that they moved in the same direction with ROE. The kurtosis values for GADI,

EWD, and ED are < 3 (mesokurtic – a standard normal distribution), implying that GADI, EWD and ED would result in increased tremendous positive events (financial performance).

Table 4.2: Pearson Correlation Matrix

	roe	gadi	ewd	ed
roe	1.0000			
gadi	0.1010	1.0000		
ewd	0.1798	0.8150	1.0000	
ed	0.1199	0.8552	0.8567	1.0000

Source: Researcher's Computation via STATA 13.0

Table 4.2 showed the results of the Pearson correlation matrix for dependent and independent variables for the sampled oil and gas companies in Nigeria and it was shown that GADI, EWD and ED are positively correlated with ROE. This points to a good correlation between environmentally friendly bookkeeping and bottom line results. Oil and gas firms in Nigeria would benefit financially by being more transparent about their waste and energy management practises, two areas where green accounting has been shown to have a beneficial impact. Furthermore, the Pearson correlation coefficients for the pairs of green accounting measures did not reach 0.9, indicating that there was no perfect pairwise relationship between the measures. Thus, there is no suspected case(s) of multicollinearity problems in the empirical models of the study; however, this was confirmed by the post-estimation results (variance inflation factor).

4.2 Post-Estimation Statistics

Table 4.3: Variance Inflation Factor

Variable	VIF	1/VIF
ed	5.19	0.192675
ewd	4.15	0.240843
gadi	4.11	0.243069
Mean VIF	4.49	

Source: Researcher's Computation via STATA 13.0

Table 4.3 showed the multicollinearity results for the aggregate panel data of the sampled oil and gas companies in Nigeria. The mean VIF is = 4.49 and is not greater than the accepted mean VIF level of 10, indicating that there is the nonexistence of multicollinearity problems in the empirical model of green accounting and financial performance in Nigeria. Thus, the panel dataset is exceptionally reliable for conducting statistical inferences.

Table 4.4: Heteroscedasticity Test

```
Ho: Constant variance
Variables: fitted values of roe

chi2(1)      =     0.02
Prob > chi2  =   0.8989
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Source: Researcher's Computation via STATA 13.0

The Breusch-Pagan/Cook-Weisberg test for heteroskedasticity was presented for the combined panel data from the sample of Nigerian oil and gas firms in Table 4.4. Heteroskedasticity according to Gujarati (2003) is a situation where the variance of the residuals is unequal over an array of measured variables. The Breusch-Pagan/Cook Weisberg chi2(1) is = 0.02, Prob. chi2 is = 0.8989 and is greater than 0.05% indicating the nonexistence of heteroskedasticity problem in the variables of the study. Thus, the result implies that the sample used in the panel data regression does not contain unequal variance and as such, there is evidence that the results are valid.

Table 4.5: Cameron & Trivedi's Decomposition of IM-Test

Source	chi2	df	p
Heteroskedasticity	1.28	4	0.8645
Skewness	2.96	3	0.3976
Kurtosis	0.77	1	0.3810
Total	5.01	8	0.7565

Source: Researcher's Computation via STATA 13.0

To ensure that the empirical models of green accounting and financial performance adhere to the standards of panel data regression, we applied the decomposition of information matrix (IM) test devised by Cameron and Trivedi. The empirical models of green accounting and financial performance pass the heteroskedasticity test with flying colours (Chi2 = 5.01; p-value = 0.7565 > 0.05). Surprisingly, the dataset passes tests for normality, multicollinearity, heteroscedasticity, and information decomposition, all of which are prerequisites for doing panel data regression and are advocated by Gujarati (2003).

4.3 Inferential Statistics

Table 4.6: PLS Regression for Green Accounting and Financial Performance

Source	SS	df	MS	Number of obs =	47
				F(3, 43) =	0.59
Model	.934754517	3	.311584839	Prob > F =	0.6268
Residual	22.8227404	43	.530761404	R-squared =	0.0393
				Adj R-squared =	-0.0277
Total	23.7574949	46	.51646728	Root MSE =	.72853

roe	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
gadi	-.1701803	.494321	-0.34	0.732	-1.167074	.826713
ewd	.483041	.4569728	1.06	0.296	-.4385325	1.404615
ed	-.1016394	.5193565	-0.20	0.846	-1.149022	.9457429
_cons	.6442787	.1319167	4.88	0.000	.3782433	.9103141

Source: Researcher's Computation via STATA 13.0

Table 4.6 displays the results of a panel least square (PLS) regression analysis between oil and gas firms in Nigeria and their green accounting and financial performance. R-squared and adjusted R-squared were calculated to be (0.0393%) and (-0.0277%), respectively. That is to say, the independent variables (GADI, EWD, and ED) accounted for around 3.9% of the variation in the dependent variable (ROE). The high number of confounding factors driving the ROE that were left out of the analysis was one possible interpretation of the low R2 value. Green accounting has a negligible effect on return on equity (ROE), as measured by the F-statistics (df=3, 43, f-ratio=0.59), with a p-value of 0.6268.

4.4 Test of Research Hypotheses

The results in Table 4.7 were used to validate the hypotheses of the study as follows:

Ho1: There is no substantial link between green accounting disclosure index and ROE of oil and gas companies.

Ho2: There is no substantial link between waste disclosure and ROE of oil and gas companies.

Ho3: There is no substantial link between energy disclosure and ROE of oil and gas companies.

Table 4.7: Fixed and Random Effects Panel Data Regression for Green Accounting and Financial Performance

Dependent Variable: Return on Assets (ROE)				
Estimator(s)	***Fixed Effect (FE)***		***Random Effect (RE)***	
Variable(s)	***Coefficient***	***Probability***	***Coefficient***	***Probability***
GADI	0.0000 (-0.000)	N/A	0.1701 (0.34)	0.731
EWD	0.4615 (0.70)	0.487	0.4830 (1.06)	0.290
ED	0.116 (0.19)	0.853	0.1016 (0.20)	0.845
_cons.	0.6127 (1.92)	0.062	0.6442 (4.88)	0.000
F-value	(3, 37) = 0.26			
F-Probability	0.7697			
R-Sq (within)	0.0141		0.0140	
R-Sq (between)	0.2728		0.3079	
R-Sq (overall)	0.0354		0.0393	
Wald Ch2(3)			1.76	
Prob. Ch2			0.6234	
Hausman Test	Chi2(2) = 0.000		Prob>Chi2= 0.9989	

Source: Researcher's Computation via STATA 13.0;

** significant at 0.05% level*; *Items in parentheses are t-values for FE; Z-scores are in parentheses for RE,*

In Table 4.7, we can see how the panel regression for green accounting and financial performance of the selected Nigerian oil and gas businesses affected both fixed and random factors. Based on the findings of the RE, the coefficients are 0.1701 (GADI), 0.4830 (EWD), and 0.1016 (ED), which indicates that the tested oil and gas businesses in Nigeria will see an increase or decrease in ROE of around 17%, 48%, and 10.2%, respectively, as a result of their disclosure on green accounting.

Besides, all the green accounting variables (GADI, EWD, and ED) and financial performance measure of ROE were insignificant for both FE (F, 3, 37=0.26; F-Prob. = 0.7697> 0.05), and RE (Wald Ch2(3) = 1.76; Prob.Ch2 = 0.6234 > 0.05) at 5% significance level and the result is similar to the panel least square (PLS) results in Table 4.6

Nevertheless, overall R^2 is 0.0393 for RE, which is higher than the overall R_2 for FE (0.0354); impliedly, the green accounting measures (GADI, EWD and ED) jointly explained about 0.35 per cent variation in ROE. The Hausman test was also employed to separate the FE and RE models. If the probability value of the Hausman test is less than 0.05, the null hypothesis is rejected (RE), and if it is more than 0.05, the

alternative hypothesis is accepted (RE). The Hausman efficiency test indicates that RE is superior to FE (Prob>Chi2= 9989 > 0.05). Therefore, RE demonstrated that the patients from which the measurements were taken were picked at random, and that disparities between oil and gas corporations in Nigeria are of no importance.

Decision Wald Ch2 of RE is = 1.76 (p-value=0.6234 > 0.05) and is insignificant, providing evidence to reject the alternate hypothesis and an acceptance of the null hypothesis. This result supports the proposition that there is no substantial correlation between green accounting disclosure index, waste disclosure and energy disclosure and return on equity of the oil and gas companies in Nigeria. Thus, green accounting insignificantly affects financial performance of oil and gas companies in Nigeria.

4.6 List of Findings

The following are the list of findings:

i. There is no substantial link between green accounting disclosure index and ROE of oil and gas companies.
ii. There is no substantial link between waste disclosure and ROE of oil and gas companies.
iii. There is no substantial link between energy disclosure and ROE of oil and gas companies.

5.0 SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

Oil and gas businesses trading on the NGX were analysed to see how green accounting affected their bottom line. Six (6) NGX-listed oil and gas firms were randomly picked from the whole population of NGX-listed oil and gas enterprises. The present study builds on existing models of Egbunike and Okoro (2018); Krivacic and Jankovic (2017) and secondary data on green accounting (proxied by green accounting disclosure index, waste disclosure and energy disclosure) were obtained from 2014-2021.

Furthermore, data obtained were analyzed via descriptive, post-estimation and inferential statistics. In specific, the inferential statistical results (fixed and random effects) revealed the following:

1. There is no substantial link between green accounting disclosure index and ROE of oil and gas companies.
2. There is no substantial link between waste disclosure and ROE of oil and gas companies.
3. There is no substantial link between energy disclosure and ROE of oil and gas companies.

5.2 Conclusion

However, whether this is the case among publicly traded oil and gas businesses in Nigeria has been a matter of discussion, driven by contradictory findings, since previous research in developed nations have demonstrated that green accounting plays a substantial influence in enhancing financial performance. The goal of this research was to examine the financial performance of publicly listed oil and gas companies in Nigeria from 2014 to 2021 in connection to their adoption of environmentally friendly accounting practises. Green accounting did not have any appreciable effect on the financial success of Nigeria's oil and gas enterprises, according to both the fixed and random effects analyses. Thus, it was concluded that green accounting practises had no impact on the bottom lines of oil and gas corporations listed on the NGX.

5.3 Recommendations

Following analysis of the data, the following suggestions were made:

1. The regulatory framework of accounting and business should gear efforts towards creating more awareness on green accounting practices among firms in Nigeria; this would further enable management of companies embrace and fully implement green accounting practices in their accounting systems or frameworks as well as aiding green accounting index of publicly quoted companies in Nigeria.
2. The financial performance of oil and gas companies in Nigeria was found to not be significantly affected by a number of green accounting indicators (such as the green accounting disclosure index and waste and energy disclosures). Nevertheless, it is still important to keep an eye on how these businesses handle waste and energy.

3. Management of oil and gas companies in Nigeria should translate into reality, 'green' accounting/management by proactively engaging in green-accounting audit for publicly quoted oil and gas companies and thereby making the next millennium a green millennium.

5.4 Contributions to Knowledge

The following fields of study have benefited from this investigation:

1. Prior research has not made extensive use of three (3) important green accounting indicators used in this study, such as the green accounting disclosure index, the waste and energy disclosures impact, and the financial performance of companies.
2. This study established that green accounting insignificantly influenced the financial performance of publicly quoted oil and gas companies on the floor of the Nigerian Exchange Group.
3. This research forged a new path in the field of accounting and provided important insights into the ways in which green accounting affects the bottom line of oil and gas firms in emerging markets like Nigeria.

5.5 Suggestions for Further Study

1. This study only examined the publicly quoted oil and gas companies on the floor of the Nigerian Exchange Group from 2014-2021. Hence, future researchers may consider using other subsectors like construction and real estate, conglomerate, healthcare, consumer, banking and insurance companies among others in their investigation.
2. This study only employed three (3) green accounting indicators (green accounting disclosure index, waste and energy disclosures) and one (1) financial performance indicator (return on equity). Thus, future researchers should use other financial performance indicators like ROA, ROCE, EPS, book value per share, Tobin's Q alongside other green accounting indicators like material, biodiversity, emission and effluent accounting.

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