



## Environmental accounting information disclosure and shareholders' investment decisions in listed oil and gas firms in Nigeria

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### ABSTRACT

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K32; Q56; L1.

This study examines the effect of environmental accounting information disclosure (EAID) on the investment decisions of shareholders of listed oil and gas firms in Nigeria. Expost facto research design was adopted, utilizing secondary data extracted from the annual reports of eight sampled firms for a period of eighteen years from 2005–2022. The study explored panel regression analysis using Random Effect Model with Driscoll-Kraay Standard Errors for Models 1 and 2. The statutory auditors of the sampled firms certified the financial statements, thereby establishing the validity and reliability of the study's data. The findings revealed that environmental accounting information disclosure exerted a significant effect on market share value in model 1 as well as on market capitalization in model 2. As a result, the study concludes that environmental accounting information disclosure has a significant impact on the investment decisions of shareholders of listed oil and gas firms in Nigeria. In line with the findings, the study recommends that policymakers should ensure enforcement and strict compliance of existing environmental policies and greenhouse and ecological preservation disclosures in oil and gas firms listed in Nigeria.

**Contribution/Originality:** The research expands the frontiers of empirical evidence on the determining factors of shareholders' investment decisions, a relatively underexplored area, especially in the context of an emerging economy such as Nigeria. The study therefore contributes to empirics and accounting practice.

## 1. INTRODUCTION

The incentives that motivate shareholders' investments in business organizations tend to be wealth maximization and economic benefits. In today's corporate world, there are few simple and straightforward ways to assess the degree of shareholders' investment decisions and each investor's right to an acceptable amount of shareholder wealth maximization (Akindehinde, Folajimi, & Olutokunbo, 2022; Birindelli, Dell'Atti, & Iannuzzi, 2018). A major goal of management and basis for making strategic decisions is shareholders' wealth maximization and protection. According to Igbudu, Garanti, and Popoola (2018), accomplishing these goals at the expense of environmental accounting and protection would likely backfire against global initiatives to reduce greenhouse gas emissions and unethical ecological practices in Nigeria. Izzo, Ciaburri, and Tiscini (2020) opines that careful consideration of shareholders' investment decisions entails the rights of shareholders to adequate returns in form of dividend payments, higher market price per share, and market capitalization.

Hu, Du, and Zhang (2020) documented that the expectations of shareholders are diverse and multifaceted. Some shareholders are concerned with long-term growth of the company and as such, expect an adequate profit retention policy to give the company ample opportunity to carry out all investable projects and plough back earnings to such investments (Bala et al., 2024; Fasua & Osifo, 2020). In contrast, some shareholders prefer annual dividend payment as a signal of shareholder protection and managerial efficiency (Hussain, Slusarczyk, Kamarudin, Thaker, & Szczepa, 2020). In the end, meeting the investment expectations of shareholders at the business operations level in Nigeria, is difficult given the numerous issues of inadequate infrastructure, security concerns, and a host of challenges that stiffen economic activity. In addition to these difficulties, businesses that operate in Nigeria have shown a lack of environmental consciousness in the course of their business, which has raised serious questions about the companies' efforts to protect the environment and the efficacy of Nigeria's environmental protection regulatory bodies.

Business challenges of gaining public approval, generating wealth for shareholders and satisfying public legitimacy have prompted the promotion of environmental management and environmental accounting information disclosure (Ilemena, 2020). Economic value generation and shareholders' investment decisions have been linked to the strong institutionalization of environmental accounting information disclosure, economic, social, and environmental sustainability in an economy (Izzo et al., 2020). On the other hand, Ong, Tho, Goh, Thai, and Teh (2016) saw that when companies are seen as not caring about protecting the environment, they could face risks and a signaling affect through liquidations that lead to fines, sanctions, and legal consequences (Osemene, Kolawole, & Oyelakun, 2016). Consistent with these views, Omoloso, Wise, Mortimer, Jraisat, and Omoloso (2020) noted there are consequences for unethical environmental practices, and sadly, weak environmental regulations in Nigeria have fuelled nonchalance and non-compliance.

The study examines shareholders' investment decisions and examines the issues of transparency regarding environmental protection efforts and the resulting loss of investor confidence. According to Olusola, Solanke, Adeusi, Alade, and Agbaje (2022), effective disclosure of environmental accounting information is associated with increased turnover, cost efficiency, and protection of shareholder interests. There is however a lack of consensus on the impact of these disclosures on shareholders' investment decisions in Nigeria.

Conversely, Susanto and Meiryani (2019) found that the publication of environmental accounting information had no bearing on returns to shareholders. Similarly, Ahmad, Yaqub, and Lee (2023) found that the publication of environmental accounting information had a detrimental effect on market capitalization and that, despite the companies' violations of environmental protection laws, there is no proof that they have faced penalties in Nigeria. These contradictory findings and differing viewpoints indicate that there are still disagreements and uncertainties regarding the degree to which environmental accounting information disclosure affects shareholders' interests, resulting in gaps in the body of research.

As a result, there are uncovered areas in empirical research on the subject matter because there are few studies that have looked at how environmental accounting information disclosure affects shareholders' investment decisions. This study bridges the gap in this regard. The following research questions and hypotheses are advanced:

Research Question One: How does environmental accounting information disclosure affect market price per share of listed oil and gas firms in Nigeria?

*Hypothesis (H<sub>0</sub>): Environmental accounting information disclosure has no significant effect on market price per share of listed oil and gas firms in Nigeria*

Research Question Two: What effect does environmental accounting information disclosure have on market price per share of listed oil and gas firms in Nigeria?

*Hypothesis (H<sub>0</sub>): Environmental accounting information disclosure has no significant effect on the market capitalization of listed oil and gas firms in Nigeria.*

The subsequent sections of the study are organized as follows: Section Two covers the review of literature and theoretical framework. Section Three details the methodology. Section Four presents the data analysis, findings, and discussion. Finally, Section Five includes the conclusion, recommendations, and implications for future research.

## 2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

### 2.1. Conceptual Review

**Shareholders' Investment Decisions:** The decisions made by shareholders about their investments hold strategic importance, as management is incentivized to pursue the goals of maximizing shareholder wealth and interest. The capacity to pursue company objectives and strategic measures aimed at maximizing shareholder value or achieving other financial well-being goals. This relates to the managers' ability to successfully manage and account for environmental challenges in a way that advances the interests of shareholders while preserving their financial stability (Aguguom, 2020). Enhancing shareholder value requires compliance with environmental regulations and legal framework to avoid sanctions and liquidations in extreme situations (Hu & Lo, 2018). Managers bears the responsibility of protecting the interests of shareholders and their investments by effectively managing and controlling any environmental pollution resulting from their operations. Additionally, management must insist on full disclosure of all environmental information to interested parties, including shareholders. This interpretation suggests that market capitalization and market price per share significantly influences shareholders' investment decisions (Bondarenko et al., 2020; Hussain, Rigoni, & Orij, 2018).

**Market Price per Share:** Market price per share is concerned with the value of corporate stock not being negatively affected due to sanctions and loss of legitimacy resulting from defaults in disclosure of environmental accounting information in pollution-sensitive companies (Boiral & Henri, 2017). Market price per share to a large extent reveals how far the interests of the shareholders are being protected and the amount of economic wealth being made by the managers of an organization (Bonilla-Priego, Font, & del Rosario Pacheco-Olivares, 2014). According to Aguguom, Salawu, and Akintoye (2018) managers are sensitive to market price per share, and this motivates undue pressure and unethical behaviors of insider dealing and discretionary earnings when the company and the market price per share are not responding to their desirability.

**Market Capitalization:** Market capitalization sometimes serves as a metric for making corporations in size. It does not represent management's choice of how much debt (or leverage) is utilized to finance the company; rather, it solely assesses the equity portion of a company's capital structure. Market capitalization is one of the financial ratios that guides investors, analysts, and other financial information users to assess the extent of economic rewards that are accruable to equity shareholders in line with the number of shares outstanding at the end of the accounting period ranking for dividends. Shareholders' investment decisions and shareholders' value are closely correlated and interconnected with corporate performance of the companies, hence, earnings of companies that are not the outcome of discretionary earnings are highly desired, and this gives higher market capitalization. The ability of the companies to adhere to environmental accounting information disclosure is a good signal that tends to reflect managerial competence and efficient asset utilization, giving rise to robust market capitalization.

**Environmental Accounting Information Disclosure:** Accounting for changes in the usage or depletion of natural resources is a focus of green accounting, which also includes environmental accounting information disclosure. It calls for actions to help businesses manage the environment and maximize shareholder profit while adhering to environmental regulations (Agirre & Gomez, 2019). Although corporate financial reporting practices and economic benefit analyses take into account the principles of environmental management and ecological conservation when disclosing environmental accounting information, the degree of responsiveness exhibited by Nigerian manufacturing companies has proven to be quite elusive. Regrettably, Nigeria's history of inadequate regulatory bodies has not supported stringent adherence.

According to [Budiharta and Kacaribu \(2020\)](#) a company's ability to comprehend and assess the potential effects of ecological sustainability performance on all supply chain practices is made possible by environmental accounting information disclosure. This enables the business to disclose the potential financial effects of management decisions made to comply with environmental laws and to satisfy shareholders' demands for market capitalization and market price per share in response to safeguards. Based on the aforementioned, the carbon accounting disclosure index, energy accounting disclosure index, and water and environmental compliance accounting index in Nigeria are used to evaluate the extent of environmental accounting information disclosure.

**Carbon Accounting Disclosure Index:** The capacity of corporate entities to disclose information on the usage and management of corporate carbons, as well as whether or not ethical guidelines were followed when managing carbon, is known as carbon accounting disclosure. According to [Cardoni, Kiseleva, and Terzani \(2019\)](#) the carbon accounting disclosure index focuses on the checklist index of how responsive the companies have been in terms of carbon usage and volume involved without negatively impacting the environment, the handling of chemicals, and the disposal of their waste. Additionally, the percentage of used carbon and recycled input carbons will be a matter of concern. The proportion of carbon usage and recycled input carbons will also be of concern. [Emeka-Nwokeji and Osisoma \(2019\)](#) noted that when the carbons are handled to reduce the extent of carbon emission from chemicals and other corrosive carbons used in the production process. The carbon accounting index ultimately measures the reduction of harmful chemical and carbon emissions as reported by the companies.

**Energy Accounting Disclosure Index:** According to [Hong and Chao \(2018\)](#) the energy accounting disclosure index takes into account the energy consumption both inside and outside of the chosen companies, energy intensity, potential reductions in energy consumption, and accounting for a decrease in the energy requirements of the companies for their corporate products and services. The energy accounting disclosure index calculates environmental protection using gigajoules per ton of energy consumption. [Fasua and Osifo \(2020\)](#) noted that certain businesses have a history of disregarding environmental regulations, policies, and ecosystems that are meant to safeguard the environment.

**Water and Environmental Compliance Accounting Index:** The study employs environment compliance accounting to disclose the extent of fines and sanctions incurred by the companies, as well as the financial impact on their operating profit. According to [Ezeagba, John-Akamelu, and Umeoduagu \(2017\)](#) in other words, environmental accounting information disclosure will be necessary to determine the monetary value of fines and sanctions as well as the potential loss of legitimacy and public patronage of products and services due to environmental protection negligence. It will also determine the number of non-monetary sanctions for environmental issues, non-compliance with environmental regulations, and require requirements. For instance, the policies of the companies concerning water usage, control, and sewage management will be examined.

## *2.2. Theoretical Framework*

**Stakeholder Theory:** [Freeman \(1984\)](#) introduced stakeholder theory ([Eriabie & Odia, 2016](#)). According to the theory, every group with a stake in business is a stakeholder and seeks to safeguard their interests. The stakeholder interest went on to say that stakeholders often consist of those who would be impacted, either directly or indirectly, by the company's successes or misfortunes. [Ehimare, Taiwo, and Uche \(2013\)](#) listed the following as the company's stakeholders: the government, which expects the company to pay taxes; the employees, who expect salaries and benefits; the labor union; the customers, who want credit and business relationships; suppliers; lenders; the host communities; the media; and many more. According to [Effiong, Oti, and Akpan \(2019\)](#) managers of corporate organizations must recognize that stakeholders want accurate information about the companies in which they have invested on a regular basis. They also pointed out that without the cooperation of stakeholders, strategic plans aimed at maximizing shareholder wealth will ultimately fail to maximize shareholder wealth. According to [Etale and Otuya](#)

(2018) an organization must take into account the interests of its stakeholders in order to fulfill its obligations to create economic value and other duties; otherwise, it is likely to fail.

**Environmental Protection Theory:** The environmental protection philosophy focuses on all initiatives and resources aimed at preserving and safeguarding the environment. One of Florence Nightingale's environmental theories, which she formulated in 1859, was the theory of environmental preservation (Bonilla-Priego et al., 2014). She was able to attend to her patients and ensure their speedy recovery by making adjustments to the surroundings, according to the notion. According to the environmental protection hypothesis, businesses, both private and corporate, should design their operations to minimize hazards that could degrade the condition of the planet Earth in the present and the future. According to Budiharta and Kacaribu (2020) trash disposal and waste control must be carefully managed to create a green environment because pollution and contamination of the environment would have major implications in the near future. According to Ong et al. (2016) everyone who lives in and benefits from the environment has a communal responsibility to protect the environment and greenhouse. Although the idea of environmental conservation is compared to the idea that patient care takes precedence over patient nursing. Therefore, in order for the businesses to attain the legitimacy of their stakeholders as well as the production of profit for the shareholders, they must make efforts to ensure the three key drivers of environmental and sustainability: economic, social, and environmental.

**Legitimacy Theory:** The symbiotic economic link and the legalism of corporate acceptance are central to the legitimacy theory (Guthrie, Cuganesan, & Ward, 2007). According to the legitimacy hypothesis, a corporate entity must actively seek for and win over society's acceptance in order for it to be able to sell its goods and services. The legitimacy theory, according to Omran and Ramdhony (2015) tends to take into account and be consistent with the contextual prepositions of the corporate social contract, which theorizes the necessity for a corporation to acknowledge, accept, and legitimate its corporate culture in relation to societal norms and cultural beliefs. Susanto and Meiryani (2019) assert a direct relationship between corporate legitimacy and the achievement of business goals and financial targets. A company cannot expand until its goods and services are widely recognized and accepted. For this reason, some companies have gone so far as to engage in corporate social responsibility, in an effort to gain the respect and legitimacy of the public. According to Susanto and Meiryani (2019) the legitimacy theory posited that corporate organizations should take steps to improve their relationships with stakeholders in order to secure and maintain their operational existence.

**Information Asymmetry Theory:** Eriabie and Odia (2016). According to the principle of information asymmetry, some people possess more information than others, and they take advantage of their privileged knowledge to give themselves an unfair advantage over others (Boiral & Henri, 2017). Managers of corporate organizations do have access to sensitive information that is not available to shareholders or other stakeholders, claim (Agirre & Gomez, 2019). Businesses that have better information at their disposal often allow their management to set higher pricing for their items and skew those prices. The idea went on to say that if consumers lack the knowledge to distinguish between high- and low-quality products, they may purchase goods and services of same or greater quality for the same price (Onyali, Okafor, & Onodi, 2015). Market failure can come from an unequal exchange of information between the buyer and seller, and in a potential free market scenario, market failure is caused by an inefficient allocation of products and services. If shareholders have access to sufficient information, their wealth could increase; otherwise persistent withholding of sensitive information could lead to information asymmetry, unfavourable effects, and moral hazard, which could be detrimental to shareholders.

This work draws a strong theoretical foundation from stakeholder theory and environmental protection theory, and incorporates a survey of other theories deemed pertinent to its philosophy. The environmental protection theory is in line with the ideology that emphasizes the significance of environmental accounting information, whereas the stakeholder theory backs the investment decisions made by managers for the economic value for the shareholders and the other stakeholders.



### 2.3. Empirical Review

Agyemang, Yusheng, Twum, Edziah, and Ayamba (2024) examined the relationship between environmental accounting and firm performance in China using an ex-post facto research design. Their study sampled fifty-one mining companies and analyzed secondary data from 2000 to 2020. The results from the CCEMG estimation revealed a positive link between the disclosure of environmental accounting information and profitability, highlighting the benefits of such disclosures for the mining sector in China.

Kujoro and Adegbe (2024) investigated how environmental accounting information disclosure affects shareholders' investment decisions in listed consumer goods firms in Nigeria. Their ex-post facto research, covering a decade from 2012 to 2021, included sixteen purposefully selected firms. GRI standards guided the collection of data. The multiple regression analysis showed that community development and employee health and safety disclosures had a significant positive impact on earnings per share.

Nguyen, Duy, Thanh Hang, and Ha (2024) explored the relationship between financial risk and environmental accounting information disclosure in the Vietnamese stock market. Their five-year study from 2018 to 2022 concluded that greater transparency in environmental accounting reporting is associated with reduced financial risk.

Adebayo and Ajiboye (2022) analyzed how environmental accounting disclosure affects the market value of non-financial firms listed in Nigeria. The researchers purposefully selected 72 firms from a population of 112 firms. The panel regression analysis revealed a significant positive relationship between earnings per share and market price, suggesting that prioritizing environmental accounting information can enhance firm value.

Obiora, Onuora, and Sandra (2022) conducted a five-year study from 2017 to 2021 on the impact of environmental accounting disclosure on firm profitability in Nigeria. Using an ex-post facto design and secondary data from financial statements of five selected companies, their analysis found that environmental accounting disclosure positively influenced investments. However, it also had a negligible negative impact on the capital employed.

Similarly, Emmanuel and Ifeanyichukwu (2021) studied the relationship between environmental accounting information disclosure and the financial performance of Nigerian manufacturing firms over a ten-year period from 2010 to 2019. Their analysis of secondary data from 40 selected companies revealed that disclosure had a positive impact on market capitalization and share price.

From 2012 to 2018 Ilemena (2020) investigated the effect of environmental accounting disclosure on the financial performance of listed oil and gas companies in Nigeria. Using ex-post facto design and global reporting initiatives as a disclosure index, the study measured financial performance through market capitalization and return on assets. The regression analysis revealed that environmental accounting disclosure had a positive influence on both market capitalization and return on assets.

Fasua and Osifo (2020) studied the impact of environmental accounting information disclosure on the performance of 18 randomly selected listed companies in Nigeria. The results of the regression analysis indicated significant relationship between market capitalization, return on assets, and disclosure. However, there was a negative earnings per share.

Susanto and Meiryani (2019) explored the effect of environmental accounting information systems on the performance of Indonesian firms. The study concluded that alignment positively and significantly influenced firm performance, with structural equation modeling supporting these findings.

Cardoni et al. (2019) examined the financial performance of Nigerian oil and gas companies in relation to environmental accounting information disclosure using an ex-post facto design and secondary data from annual financial statements. Pooled ordinary least squares (OLS) analysis revealed that disclosure improved financial performance.

Ahmad et al. (2023) in their work, evaluated the impact of environmental, social, and governance related factors on business investment and sustainability among a subset of Pakistani companies listed between 2006 and 2016. The results project a significant positive relationship between the predictor variables and explained variables. Similarly,

Nyirenda and Ngwakwe (2014) analyzed the interconnectedness between environmental accounting and corporate performance of listed mining firms in South Africa. The study concluded that good disclosure practices had a positive impact on company performance due to high compliance and response rates.

The reviewed studies contribute significantly to literature, although many of these works are focused on environmental accounting without specifically addressing its impact on shareholders' investment decisions in Nigeria. The study therefore bridges this gap and contributes to the empirical discourse on the nexus between environmental accounting information disclosure and investors' decisions in Nigeria.

### 3. METHODOLOGY

**Research Design:** Utilizing secondary data from available audited financial statements of listed oil and gas firms in Nigeria, the study adopted the ex-post facto research approach.

**Sample Size:** The study purposefully selected eight listed oil and gas firms. The validity and reliability of the financial statements were based on their certification by the statutory auditors' of the sampled firms for the period 18 years, from 2005 to 2022, providing 144 firm-year observations.

**Data Collection:** Data was extracted from the annual reports of the sampled firms, in line with the Global Regulatory Initiative (GRI). A dummy variable was used, with "1" denoting evidence of economic, social, and environmental reporting from the companies and "0" denoting a lack of evidence from the financial statements. Environmental accounting information disclosure was measured using  $e_1$  = carbon emission reduction (Co2) = measured in metric tons of CO2 equivalent to (mCo2e) for the carbon accounting disclosure index;  $e_2$  = energy usage = measured in gigajoules per tonne (Gj/t) for the energy accounting disclosure index; and  $e_3$  = water usage = measured in kiloliters per tonne (Kl/t) for the environmental compliance disclosure index.

**Method of Data Analysis:** The study employed Driscoll and Kraay's approach to covariance matrix estimation, considering the large size of the data, to address several deficiencies in prior studies associated with other estimators, particularly in the context of panel data with a large time dimension (Odunayo, Adegbe, & Agugom, 2023).

Table 1 presents the selected sample of eight listed oil and gas firms in Nigeria.

Table 1. Sample size of the study.

No.	Firms	Ticker	Market classification
1	11 Plc (formerly Mobil Oil Nig. Plc)	Double one	Oil and gas
2	Arдова Plc	Arдова Plc	Oil and gas
3	Conoil Plc	Conoil	Oil and gas
4	Eternal Plc	Eternal	Oil and gas
5	Japaul maritime services Plc	Japaul	Oil and gas
6	MRS oil Nigeria Plc	MRS	Oil and gas
7	Oando Plc	Oando	Oil and gas
8	Total Nigeria Plc	Total	Oil and gas

Source: Nigerian exchange group (2023).

Model Specification

$$SHID = f(ENACC) \quad (1)$$

$$SHID = e_1 + e_2 + e_3 \quad (2)$$

$$Y = y_1, y_2: f({}_1xe_1 + {}_2xe_2 + {}_3xe_3) \quad (3)$$

$$y_1 = MPPS = f({}_1xe_1 + {}_2xe_2 + {}_3xe_3) \quad (4)$$

$$y_2 = MKTCAP = f({}_1xe_1 + {}_2xe_2 + {}_3xe_3) \quad (5)$$

Model Specification

$$MPPS_{it} = \alpha_0 + \beta_1e_{1it} + \beta_2e_{2it} + \beta_3e_{3it} + \mu_{it} \quad (6)$$

$$MKTCAP_{it} = \alpha_0 + \beta_1e_{1it} + \beta_2e_{2it} + \beta_3e_{3it} + \mu_{it} \quad (7)$$

Where:

SHID = Shareholders' investment decisions; ENACC = Environmental accounting information disclosure; MPPS = Market price per share; MKTCAP = Market capitalization, e1 = Carbon Accounting Disclosure Index; e2 = Energy Accounting Disclosure Index; e3 = Water and environmental compliance accounting index.

Table 2 provides a description of the adopted surrogates of environmental accounting information disclosure and shareholders' investment decisions.

Table 2. Variables and measurement.

Variables	Measurement	Source
<b>Dep. variables</b>		
Market price per share	MPPS = Market share price per share at accounting year end (Absolute fig).	Odunayo et al. (2023)
Market capitalization (MKTCAP)	Current share price x total number of share outstanding	Agugom et al. (2018)
<b>Independent variables</b>		
Environmentally accounting (Carbon, energy and water)	e1 = Carbon emission reduction (Co2) (In metric tonnes= (mCo <sub>2</sub> e). e2 = Energy usage (in Giga joules/tonne(Gj/t) e3 = Water usage (In kilo liters/ tonne (Kl/t).	Niyirenda, Ngwakwe, and Ambe (2013) and Odunayo et al. (2023)

Source: Researcher (2023).

Table 3 describes the content checklist of the adopted GRI indicators.

Table 3. Environmental accounting information disclosure/Sustainability/GRI index indicators with the measurement scales.

SN	Hypotheses	Checklist & measures
1	Regarding the carbon accounting disclosure index (e2), how much information does the company provide?	0 = No information in any subsection about the carbon accounting disclosure index (Co2). 1 = Only data related to sustainability, environmental accounting information disclosure, environmental protection policies, and GRI Index Statements that are relevant to the carbon accounting disclosure index. 2 = An explanation detailing the events and their notable effects. 3 = An explanation including actual figures that details the events and their noteworthy effects.
2	What is the scope of the company's energy accounting disclosure index (e2) information provision?	0 indicates there is no information on the energy accounting disclosure index in this subsection. 1 = Exclusive data regarding sustainability, environmental accounting information disclosure, environmental protection policy, and the GRI index A declaration on the energy accounting disclosure index. 2 = A description of the events and their noteworthy effects. 3 = A detailed explanation of the events and their major effects, accompanied by a recorded real number.
3	Regarding water and environmental compliance accounting index (e3), how much information does the company offer?	0 indicates there is no information in any subsection regarding the accounting index for water and environmental compliance. 1. Information solely regarding sustainability, environmental accounting information disclosure, environmental protection policy, and the GRI index A statement regarding the accounting index for environmental compliance and water consumption 2 = A description of the events and their noteworthy effects. 3 = A detailed explanation with actual numbers that illustrate what occurs and its major effects.

Source: Sustainability disclosure checklist.



Table 4. Summary statistics.

Variable	Obs.	Mean	Std. dev.	Min.	Max.
Market price per share (MPPS)	144	0.12	0.15	-0.64	0.86
Market capitalization (MKTCAP)	144	0.17	0.32	-2.06	1.53
e <sub>1</sub> = Carbon accounting disclosure index	144	1.82	0.75	0.00	3.00
e <sub>2</sub> = Energy accounting disclosure index	144	1.66	0.90	0.00	3.00
e <sub>3</sub> = Water and environmental compliance accounting index	144	1.80	0.77	0.00	3.00

## 4. RESULTS, DATA ANALYSIS, AND DISCUSSION OF FINDINGS

### 4.1. Correlation Matrix

Based on the data gathered, as shown in Table 4, the average value of MPPS is 0.12, with values ranging from -0.64 to 0.86, and the standard deviation is 0.15. The performance indicators are market price per share (MPPS) and market capitalization (MKTCAP), and the environmental sustainability indicators are Carbon Accounting Disclosure Index (e<sub>1</sub>), Energy Accounting Disclosure Index (e<sub>2</sub>), and Water and environmental compliance accounting index (e<sub>3</sub>). This indicates that by utilizing their assets, the enterprises were able to turn a profit of almost 12%. Furthermore, the selected companies' average MKTCAP for the study period was 0.17, indicating that they generated a profit margin of approximately 17.0% using the shareholder's fund. The lowest and highest values of the rate of dispersion, or standard deviation, were -2.06 and 1.53, respectively. The rate of dispersion was 0.32. The qualitative nature of the values is shown by the minimum and maximum scores of 0.00 and 3.00, respectively, for the Carbon Accounting Disclosure Index (e<sub>1</sub>), Energy Accounting Disclosure Index (e<sub>2</sub>), Water, and Environmental Compliance Accounting Index (e<sub>3</sub>). Their standard deviations and average scores, however, differ from one another. e<sub>1</sub>, e<sub>2</sub>, and e<sub>3</sub> had average scores of 1.82, 1.66, and 1.80, respectively, with matching standard deviation values of 0.75, 0.90, and 0.77.

Table 5. Regression results.

Independent variables	Random effect model with Driscoll-Kraay standard errors				Random effect model with Driscoll-Kraay standard errors			
	MPPS <sub>it</sub> = α <sub>0</sub> + β <sub>1</sub> e <sub>1it</sub> + β <sub>2</sub> e <sub>2it</sub> + β <sub>3</sub> e <sub>3it</sub> + μ <sub>it</sub> (Model 1)				MKTCAP <sub>it</sub> = α <sub>0</sub> + β <sub>1</sub> e <sub>1it</sub> + β <sub>2</sub> e <sub>2it</sub> + β <sub>3</sub> e <sub>3it</sub> + μ <sub>it</sub> (Model 2)			
	Dependent variable = MPPS				Dependent variable = MKTCAP			
	Coef.	Std error	t-stat.	Prob.	Coef.	Std error	t-stat.	Prob.
E <sub>1</sub> = Carbon accounting disclosure index	0.031	0.018	1.73	0.118	0.081	0.055	1.47	0.175
E <sub>2</sub> = Energy accounting disclosure index	-0.078	0.023	-3.44	0.007	-0.321	0.024	-1.32	0.221
E <sub>3</sub> = Water and environmental compliance accounting index	0.061	0.017	3.65	0.005	0.079	0.312	2.52	0.035
_Cons	0.082	0.027	3.95	0.003	-0.066	0.06	-0.05	0.321
No of observations	144				144			
R-squared	0.059				0.079			
Adjusted R-squared	0.036				0.041			
F-stat./Wald Chi2. test [Sig.]	6.27 [0.014]				13.97 [0.003]			
Breusch-Pagan Lm test [Sig.]	199.61 [0.000]				110.19 [0.000]			
Hausman test [Sig.]	7.26 [0.064]				1.12 [0.772]			
Het. test [Sig.]	30801.55 [0.000]				1000.005 [0.000]			
Cross-sectional dependence -Cd Pesaran's test [Sig.]	7.262 [0.000]				6.400 [0.000]			

Model 1

$$MPPS_{it} = \alpha_0 + \beta_{1E}1_{it} + \beta_{2E}2_{it} + \beta_{3E}3_{it} + \mu_{it}$$

$$MPPS_{it} = 0.082 + 0.315^* e_{1it} - 0.779^* e_{2it} + 0.060 e_{3it} + \mu_{it}$$

Model 2

$$MKTCAP_{it} = \alpha_0 + \beta_{1e}1_{it} + \beta_{2e}2_{it} + \beta_{3e}3_{it} + \mu_{it}$$

$$MKTCAP_{it} = -0.066 + 0.081^* e_{1it} - 0.321^* e_{2it} + 0.079 e_{3it} + \mu_{it}$$

## 4.2. Regression Analysis and Discussion of Findings

### 4.2.1. Interpretations

The F-statistics/Wald Chi<sup>2</sup> = 6.27 (sig. = 0.014) and 13.97 (sig. = 0.003) in models (1) and (2) in Table 5 show statistically significant models at 5% levels. However, they contend that there is a sizable combined impact on market price per share (MPPS) and market capitalization (MKTCAP) of the Carbon Accounting Disclosure Index, Energy Accounting Disclosure Index, and Water and Environmental Compliance Accounting Index. To be more precise, the insignificant coefficients of the Carbon Accounting Disclosure Index ( $\beta_1 = 0.031$ ; sig. = 0.118 and  $\beta_1 = 0.081$ ; sig. = 0.175) show that, by itself, the Carbon Accounting Disclosure Index has no discernible effect on the performance of the chosen companies over the study period (as measured by Models 1 of MPPS and Model 2 of MKTCAP).

In addition, the result shows that the coefficients of the Energy Accounting Disclosure Index are negative but only statistically significant in model 1 ( $\beta_2 = -0.779$ ; sig. = 0.007 and  $\beta = -0.032$ ; sig. = 0.221), suggesting that the Energy Accounting Disclosure exerted a significant negative effect on the performance of listed oil and gas firms in Nigeria; though in terms of market price per share only. In a similar way, the positive and statistically significant coefficients of the water and environmental compliance accounting index ( $e_3$ ) ( $\beta = 0.061$ ; sig. = 0.005 and  $\beta = 0.032$ ; sig. = 0.033) at 5% levels imply that water and environmental compliance accounting index ( $e_3$ ) has significant positive effect on the performance of the sampled firms in terms of both the MPPS and MKTCAP.

AdjR<sup>2</sup> value measures the explanatory power of the model. It measures the percentage of changes in market price per share and market capitalization that affect shareholders' investment decisions due to shifts in the carbon accounting disclosure index ( $e_1$ ), energy accounting disclosure index ( $e_2$ ), and water and environmental compliance accounting index ( $e_3$ ). Models 1 and 2, with adjusted R<sup>2</sup> values of 0.036 and 0.041 in models 1 and 2, respectively, indicate that 3.6% and 4.1% of variations in market price per share and market capitalization are explained by the models, while the remaining balance reflects other factors that the models do not account for. This could account for poor compliance with environmental standards in Nigeria.

In Model 1, with a significance level of 0.05 and degrees of freedom 3 and 141, the F-statistic is 6.27, and the p-value is 0.014. Because the p-value is less than the significance level of 0.05, the study rejected the null hypothesis and accepted the alternative hypothesis, indicating that environmental accounting information disclosure has a significant impact on the market price per share of listed oil and gas firms in Nigeria.

Similarly, in Model 2, with a significance level of 0.05 and degrees of freedom 3 and 141, the F-statistic is 13.97, and the p-value is 0.003. As the p-value is below the 0.05 significance level, the study rejected the null hypothesis and accepted the alternative hypothesis, showing that environmental accounting information disclosure significantly impacts the market capitalization of listed oil and gas firms in Nigeria.

### 4.2.2. Post Estimation Tests

To select the most suitable estimator for models one and two among the pooled OLS, fixed effects, and random effect regression estimators, the Hausman test is conducted. The p-values (0.064) > 0.05 and (0.072) > 0.05 for models one and two signifies that the random effect technique is appropriate for estimating the models. The Bresuch-Pagan LM test was employed to validate the effect of the random effect model. The Bresuch-Pagan LM test confirms the

appropriateness of the random effect estimation technique. The result proves that the random effect model is suitable, since the probability value is  $(0.000) < 0.05$  for models one and two.

Accordingly, the chosen model was tested for the presence of heteroscedasticity and cross-sectional dependence. The heteroscedasticity test with p-value of 0.00 for models one and two, which is less than the 5 percent level of significance selected for the study, indicates the presence of heteroscedasticity, i.e., the residuals of the models do not have constant variance over time.

The study also carried out the cross-sectional dependence test. The result showed a probability value of 0.00, which is lower than the 5% level of significance, depicting that the residuals are correlated. In order to address these problems, robust estimates with Driscoll-Kraay standard errors were adopted.

#### 4.3. Discussion of Findings

Model 1: The study investigated the effect of environmental accounting information disclosure on market price per share, yielding mixed results. Carbon accounting disclosure index ( $\{e2\}$ ) was shown to have an insignificant positive effect, energy accounting disclosure index ( $\{e2\}$ ) exhibited a negative significant effect, while water and environmental compliance accounting index ( $\{e3\}$ ) yielded a positive significant effect. However, the combined influence of the carbon accounting disclosure index ( $\{e1\}$ ), energy accounting disclosure index ( $\{e2\}$ ), and water and environmental compliance accounting index ( $\{e3\}$ ) had a positive impact on the market price per share of listed oil and gas companies in Nigeria. Similarly, in Model 2, the water and environmental compliance accounting index ( $\{e3\}$ ) showed an insignificant negative effect, while the carbon accounting disclosure index ( $\{e2\}$ ) displayed an insignificant positive effect ( $\{e2\}$ ). The F-statistics also showed that the variables in Model 2 showed that disclosing environmental accounting information had a positive effect on the market capitalization (MKTCAP) of Nigerian oil and gas companies that were on the stock market. These results align with previous studies by [Olusola et al. \(2022\)](#), [Obiora et al. \(2022\)](#), [Ilemena \(2020\)](#), [Fasua and Osifo \(2020\)](#), [Susanto and Meiryani \(2019\)](#) and [Cardoni et al. \(2019\)](#) which documented positive effects of environmental accounting information disclosure.

## 5. CONCLUSION, RECOMMENDATIONS, AND SUGGESTION FOR FURTHER RESEARCH

Conclusion: Market price per share (MPPS) and market capitalization (MKTCAP) were adopted as surrogates of shareholders' investment decisions. The independent variable, environmental accounting information disclosure, was measured using carbon accounting disclosure index, energy accounting disclosure index, and environmental compliance accounting index. The results of the regression analysis imply that environmental accounting information disclosure exerts significant positive effect on investment decisions of the sampled firms.

Recommendations: The findings reveal that energy accounting disclosure index had a negligible negative impact, suggesting a lack of environmental regulation and non-compliance concerning the potential harm of energy consumption. To address this, the study recommends that policymakers ensure the effective enforcement and compliance with existing environmental laws to preserve Nigeria's environment and natural resources. Company managers should be more aware of environmental pollution's deteriorative effects, as these factors could jeopardize the firms' legal operations, attract fines and penalties, and impact their viability as going concerns.

Contribution to Future Studies: The study found that while the energy accounting disclosure index had a negative impact, the carbon accounting disclosure index showed a moderate influence. However, this study only examined environmental compliance accounting, energy accounting disclosure index, and carbon accounting disclosure index. Future research could explore other aspects of the environmental accounting information disclosure as well as other constructs of shareholders' investment decisions.

Contribution/Originality: The research expands the frontiers of empirical evidence on the determining factors of shareholders' investment decisions, especially in the context of an emerging economy such as Nigeria. The findings

of this study highlight the significance of environmental accounting information disclosure on shareholders' investment decisions. The study therefore contributes to empirics and accounting practice.

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## REFERENCES

- Adebayo, O., & Ajiboye, O. O. (2022). Environmental accounting disclosure and market value of listed non financial firms in Nigeria. *International Journal of Management, Accounting & Economics*, 9(7), 1-18.
- Agirre, A., I., & Gomez, P. I. (2019). The effects of corporate social responsibility on customer loyalty: The mediating effect of reputation in cooperative banks versus commercial banks in the Basque country. *Journal of Business Ethics*, 15(4), 701–719.
- Aguguom, T. A. (2020). Cash flow optimality and investment returns: Investors expectations in listed manufacturing firms in Nigeria. *Asian Journal of Economics, Business and Accounting*, 16(4), 39-50. <https://doi.org/10.9734/ajebe/2020/v16i430247>
- Aguguom, T. A., Salawu, R. O., & Akintoye, R. I. (2018). Earnings quality and firms' performance: A missing link in the listed firms in Nigeria. *ICAN 2018 International Academic Conference Proceedings ICAN-International Journal of Accounting and Finance*, 7(2), 30-53.
- Agyemang, A. O., Yusheng, K., Twum, A. K., Edziah, B. K., & Ayamba, E. C. (2024). Environmental accounting and performance: Empirical evidence from China. *Environment, Development and Sustainability*, 26(2), 3687-3712.
- Ahmad, H., Yaqub, M., & Lee, H. S. (2023). Environmental, social and governance-related factors for business investment and sustainability: A scientometric review of global trends. *Environmental Development and Sustainability*, 26(4), 2965-2987. <https://doi.org/10.1007/s10668-023-02921-x>
- Akindehinde, A., Folajimi, A., & Olutokunbo, A. (2022). Cost management and financial sustainability: Evaluating its effect on liquidity and solvency of manufacturing companies. *Academy of Accounting and Financial Studies Journal*, 26(3), 1-16.
- Bala, H., Al-Absy, M. S. M., Ya'u, A., Abdullahi, M., Sani, A. A., Khaton, G., . . . Musa, B. (2024). The effect of environmental taxes on environmental accounting disclosure of Nigerian oil and gas companies. *International Journal of Energy Economics and Policy*, 14(2), 477-483. <https://doi.org/10.32479/ijeep.15426>
- Birindelli, G., Dell'Atti, S., & Iannuzzi, A. P. (2018). Composition and activity of the board of directors: Impact of environmental, social and government performance. *Sustainability*, 10(10), 1-20. <https://doi.org/10.3390/su10124699>
- Boiral, O., & Henri, J.-F. (2017). Is sustainability performance comparable? A study of GRI reports of mining organizations. *Business & Society*, 56(2), 283-317. <https://doi.org/10.1177/0007650315576134>
- Bondarenko, T., Borodin, A., Zholamanova, M., Panaedova, G., Belyanchikova, T., & Gurieva, L. (2020). Investments to the petrochemical sector: The value of the competitiveness of petrochemical companies. *Entrepreneurial Sustainability Issues*, 7(3), 2510-2525. [https://doi.org/10.9770/jesi.2020.7.3\(70\)](https://doi.org/10.9770/jesi.2020.7.3(70))
- Bonilla-Priego, M. J., Font, X., & del Rosario Pacheco-Olivares, M. (2014). Corporate sustainability reporting index and baseline data for the cruise industry. *Tourism Management*, 44, 149-160. <https://doi.org/10.1016/j.tourman.2014.03.004>
- Budiharta, P., & Kacaribu, H. E. P. B. (2020). The influence of board of directors, managerial ownership, and audit committee on carbon emission disclosure: A study of non-financial companies listed on BEI. *RIBER*, 9(5), 75-87.
- Cardoni, A., Kiseleva, E., & Terzani, S. (2019). Evaluating the intra-industry comparability of sustainability reports: The case of the oil and gas industry. *Sustainability*, 11(4), 1093. <https://doi.org/10.3390/su11041093>

- Effiong, S. A., Oti, P. A., & Akpan, D. C. (2019). Triple bottom line reporting and shareholders value in oil and gas marketing firms in Nigeria. *Academy of Accounting and Financial studies Journal*, 23(5), 1528-2635.
- Ehimare, O. A., Taiwo, N., & Uche, O. (2013). The role of corporate governance in the growth of Nigerian banks. *Journal of Business Law and Ethics*, 1(1), 44-56.
- Emeka-Nwokeji, N., & Osisioma, B. C. (2019). Sustainability disclosures and market value of firms in emerging economy: Evidence from Nigeria. *European Journal of Accounting, Auditing and Finance Research*, 7(3), 1-19.
- Emmanuel, U., & Ifeanyichukwu, A. P. (2021). Environmental accounting disclosure and financial performance of manufacturing firms in Nigeria. *Journal of Economics and International Business Management*, 9(2), 71-81. <https://doi.org/10.2224/sbp.2007.35.1.19>
- Eriabie, S., & Odia, J. (2016). The influence corporate governance attributes on corporate social and environmental disclosure quality in Nigeria. *ESUT Journal of Accountancy*, 7(1), 217-235.
- Etale, L. M., & Otuya, S. (2018). Environmental responsibility reporting and financial performance of quoted oil & gas companies in Nigeria. *European Journal of Business and Innovation Research*, 6(6), 23-34.
- Ezeagba, C. E., John-Akamelu, C. R., & Umeoduagu, C. (2017). Environmental accounting information disclosure disclosures and financial performance: A study of selected food and beverage companies in Nigeria (2006-2015). *International Journal of Academic Research in Business and Social Sciences*, 7(9), 162-174. <https://doi.org/10.6007/ijarbss/v7-i9/3315>
- Fasua, H. K., & Osifo, O. I. U. (2020). Environmental accounting and corporate performance. *International Journal of Academic Research in Business and Social Sciences*, 2(10), 142-154. <https://doi.org/10.37547/tajssei/volume06issue04-03>
- Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Boston: Pitman.
- Guthrie, J., Cuganesan, S., & Ward, L. (2007). *Legitimacy theory: A story of reporting social and environmental matters within the Australian food and beverage industry*. Paper presented at the In Asia Pacific Interdisciplinary Research in Accounting Conference (5th: 2007).
- Hong, L., & Chao, A. (2018). Strategic corporate social responsibility, sustainable growth, and energy policy in China. *Energies*, 11(11), 302-324. <https://doi.org/10.3390/en11113024>
- Hu, M., & Lo, L. (2018). Board governance and sustainability disclosure: A cross-sectional study of Singapore-listed companies. *Sustainability*, 10(1), 2-14.
- Hu, W., Du, J., & Zhang, W. (2020). Corporate social responsibility information disclosure and innovation sustainability: Evidence from China. *Sustainability*, 12(1), 1-24. <https://doi.org/10.3390/su12010409>
- Hussain, H. I., Slusarczyk, B., Kamarudin, F., Thaker, H. M. T., & Szczepa, W. K. (2020). An investigation of an adaptive neuro-fuzzy inference system to predict the relationship among energy intensity, globalization, and financial development in major ASEAN economies. *Energies* 2020, 13(5), 850-862. <https://doi.org/10.3390/en13040850>
- Hussain, N., Rigoni, U., & Oriij, R. P. (2018). Corporate governance and sustainability performance: Analysis of triple bottom line performance. *Journal of Business Ethics*, 149, 411-432. <https://doi.org/10.1007/s10551-016-3099-5>
- Igbudu, N., Garanti, Z., & Popoola, T. (2018). Enhancing bank loyalty through sustainable banking practices: The mediating effect of corporate image. *Sustainability*, 10(11), 1-21. <https://doi.org/10.3390/su10114050>
- Ilemena, R. O. (2020). Environmental accounting information disclosure practice and corporate performance: Study of listed oil and gas companies in Nigeria. *European Journal of Business and Management*, 12(22), 58-70.
- Izzo, M. F., Ciaburri, M., & Tiscini, R. (2020). The challenge of sustainable development goal reporting: The first evidence from Italian listed companies. *Sustainability*, 12(8), 3494. <https://doi.org/10.3390/su12083494>
- Kujoro, O. A., & Adegbe, F. F. (2024). Environmental accounting information disclosure and shareholders' investment decision in listed consumer goods manufacturing firms in Nigeria. *International Journal of Research and Innovation in Social Science*, 8(2), 1062-1076.
- Nguyen, L. S., Duy, D. D., Thanh Hang, T. T., & Ha, N. D. (2024). The impact of environmental accounting information disclosure on financial risk: The case of listed companies in the Vietnam stock market. *Journal of Risk and Financial Management*, 17(2), 1- 17. <https://doi.org/10.3390/jrfm17020062>

- Niyirenda, G., Ngwakwe, C., & Ambe, C. (2013). Environmental management practices and firm performance in a South African mining firm. *Managing Global Transitions*, 11(2), 243-260.
- Nyirenda, G., & Ngwakwe, C. C. (2014). Environmental management practices for sustainable development: Agenda for harmonization. *Environmental Economics*(5, Iss. 1), 76-85.
- Obiora, F., Onuora, J., & Sandra, E. C. (2022). An Assessment of the impact of environmental accounting disclosure on profitability of firm in Nigeria. *International Journal of Innovative Finance and Economics Research*, 10(1), 92-103.
- Ogunayo, J., Adegbe, F. F., & Agugum, T. A. (2023). Environmental accounting practice and firm value of quoted oil and gas companies in Nigeria. *International Journal of Economics, Business and Management Research*, 7(8), 149-165. <https://doi.org/10.51505/IJEBMR.2023.7811>
- Olusola, E. I., Solanke, F. T., Adeusi, S. A., Alade, M. E., & Agbaje, W. H. (2022). Environmental accounting disclosure and financial performance of listed multinational firms in Nigeria. *Global Journal of Management and Business Research*, 21(2), 17-27.
- Omoloso, O., Wise, W., Mortimer, K., Jraisat, L., & Omoloso, S. (2020). Corporate sustainability disclosure: A leather industry perspective. *Emerging Science Journal*, 4(1), 1-11. <https://doi.org/10.28991/esj-2020-01209>
- Omran, M. A., & Ramdhony, D. (2015). Theoretical perspectives on corporate social responsibility disclosure: A critical review. *International Journal of Accounting and Financial Reporting*, 5(2), 38-55.
- Ong, T. S., Tho, H. S., Goh, H. H., Thai, S. B., & Teh, B. H. (2016). The relationship between environmental disclosures and financial performance of public listed banks in Malaysia. *International Business Management*, 10(4), 461-467.
- Onyali, C. I., Okafor, T. G., & Onodi, B. (2015). Effectiveness of triple bottom line disclosure practice in Nigeria: Stakeholders perspective. *European Journal of Accounting Auditing and Finance Research*, 3(3), 45-61.
- Osemene, F. O., Kolawole, D., & Oyelakun, O. (2016). Effects of environmental accounting information disclosure practices and sustainable development on the performance of Nigerian listed manufacturing. *Journal of Clean Environmental*, 8(2), 128-143.
- Susanto, A., & Meiryani, M. (2019). The impact of environmental accounting information system alignment on firm performance and environmental performance: A case of small and medium enterprises of Indonesia. *International Journal of Energy Economics and Policy*, 9(2), 229-236.

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