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ABSTRACT

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Keywords: environmental expenditure disclosure, stakeholder engagement disclosure, market value, market capitalisation.

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ABSTRACT

The oil and gas sector plays a crucial role in global economic development, yet it faces increasing scrutiny due to its environmental impact. In Nigeria, Africa's largest oil producer, the sector significantly contributes to environmental degradation, including oil spills and gas flaring. This study explores the effect of green accounting on the market value of listed oil and gas companies in Nigeria. Specifically, it aims to assess the impact of environmental expenditure disclosure (EEXD) and stakeholder engagement disclosure (SED) on the market value of these companies. The population of the study comprises nine (9) publicly listed oil and gas companies on the Nigerian Exchange Group (NGX) as of December 31, 2023. Using purposive sampling technique, five (5) companies with substantial environmental disclosures in their annual reports were selected. Data were sourced from the NGX Fact Book and the annual reports of the selected companies from 2014–2023. Descriptive statistics were employed to summarise the data characteristics, while correlation analysis examined the relationships between environmental expenditure disclosures and market value. Multivariate regression analysis was conducted to assess how EEXD and SED predict market value, with statistical analysis performed using Jamovi software (Version 2.3.28). The findings reveal that both Environmental Expenditure Disclosure and Stakeholder Engagement Disclosure have positive and statistically significant effects on market value. This study contributes to the growing body of literature on environmental disclosures in Nigeria's oil and gas sector, emphasising the importance of transparent disclosure practices to foster market competitiveness and stakeholder confidence.

Keywords: environmental expenditure disclosure, stakeholder engagement disclosure, market value, market capitalisation.

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I. INTRODUCTION

The oil and gas sector plays a pivotal role in global economic growth but remains one of the most scrutinised industries due to its significant environmental impact. Concerns over climate change, pollution, and resource depletion have intensified calls for greater corporate responsibility. In response, Environmental Accounting Disclosure (EAD) has emerged as a critical aspect of corporate reporting, particularly for industries with substantial ecological footprints. With growing global emphasis on sustainability, oil and gas firms face increasing pressure from governments, investors, and civil society to disclose their environmental performance, including expenditures on green initiatives and stakeholder engagement efforts. These disclosures are now recognised as strategic tools for mitigating risks, building stakeholder trust, and enhancing corporate market value (KPMG, 2022).

Environmental expenditure disclosure reflects a company's commitment to addressing environmental challenges by allocating resources

to mitigate its ecological impact. Similarly, stakeholder engagement disclosure demonstrates an organisation's efforts to maintain transparent and collaborative relationships with its stakeholders, including communities, investors, and regulators. Together, these disclosures play a vital role in shaping perceptions of corporate accountability and sustainability (Chopra et al., 2023).

In Nigeria, the largest oil producer in Africa, the oil and gas sector is both the backbone of the economy and a significant contributor to environmental degradation. Challenges such as oil spills, gas flaring, and deforestation are prevalent, particularly in the Niger Delta region (Akeju & Oguntimein, 2023). The weak enforcement of environmental regulations and the lack of comprehensive disclosure frameworks exacerbate these issues. Despite these challenges, environmental accounting disclosure is gradually gaining traction, driven by rising awareness of its potential benefits in enhancing corporate reputation, investor confidence, and financial performance (Igbekoyi et al., 2022).

The relationship between environmental expenditure and stakeholder engagement disclosures and firm value has been extensively debated in the literature. Studies suggest that firms engaging in robust environmental expenditure reporting and stakeholder engagement disclosuesr can improve their market value by reducing information asymmetry and enhancing investor trust (Ejoh, Orok, and Sackey, 2014; Ojiakor and E-Obodoekwe, 2018; Kujala et al., 2022). The legitimacy theory further underscores the importance of aligning corporate activities with societal expectations to maintain a competitive edge (Mousa & Hassan, 2015). However, while some research such as Arena, Bozzolan, and Michelon (2014), and Jamil and Rodiel (2020) highlight the financial benefits of environmental expenditure and stakeholder engagement disclosures, others argue that the associated costs may outweigh immediate gains (Kujala et al., 2022; Ayuba & Yunusa, 2023 and Osayabor and Izedonmi (2023). This underscores the need for further exploration of these dynamics, particularly in the context of Nigeria's oil and gas sector.

Despite the growing interest in environmental accounting disclosure, existing studies in Nigeria have primarily focused on general environmental accounting and financial performance (Adegbie et al., 2020; Gbenga & Josiah, 2020; Osayabor and Izedonmi, 2023). Limited attention has been given to the combined impact of environmental expenditure and stakeholder engagement disclosures on the market value of oil and gas companies. Studies conducted in other regions, such as Arena, Bozzolan, and Michelon (2014), Griffin et al. (2017) and Bogdan et al. (2022), provide valuable insights but lack direct applicability to the Nigerian context. Similarly, research that examined environmental accounting disclosures and market value such as Olagunju & Ajiboye (2022) excluded environmental expenditure and stakeholder engagement, focusing instead on economic value added (EVA) rather than market value. Furthermore, Oshiole, Elamah, and Amahalu (2020) and Osayabor and Izedonmi (2023) examined environmental cost disclosure with a focus on the profitability, but produced a conflicting result.

To address these gaps, this study investigates the effect of environmental expenditure and stakeholder engagement disclosures on the market value of oil and gas firms listed on the Nigerian Exchange Group (NGX). By doing so, it contributes to the understanding of how these disclosures can influence corporate value in a developing economy with unique regulatory and environmental challenges such as the Nigeria's oil and gas industry.

Research Objectives

1. Evaluate the effect of environmental expenditure disclosure on the market value of listed oil and gas companies in Nigeria.
2. Assess the effect of stakeholder engagement disclosure on the market value of listed oil and gas companies in Nigeria.

Research Hypotheses

H_{01}: Environmental expenditure disclosure does not have significant effect on the market value of listed oil and gas companies in Nigeria.
H_{02}: Stakeholder engagement disclosure does not have significant effect on market value of listed oil and gas companies in Nigeria.

The rest of the paper is structured as follows: Section 2 reviews the literature; Section 3 outlines the methodology; Section 4 presents data analysis and discusses the results; Section 5 concludes with key findings and recommendations.

II. LITERATURE REVIEW

2.1.1 Environmental Expenditure Disclosure

Environmental expenditure refers to the financial resources allocated by companies to mitigate the environmental impacts of their operations. Hansen and Mowen (2007) describe these expenditures as investments aimed at protecting the environment from operational activities. These include pollution control, resource conservation, and the adoption of eco-friendly technologies. Environmental expenditure disclosure involves the transparent reporting of such financial commitments in a company's statements, enabling stakeholders to assess its environmental accountability (Ojiakor & E-Obodoekwe, 2018). Wang et al. (2023) described environmental expenditure disclosure as reporting financial investments in initiatives like pollution control, resource conservation, and sustainability programmes. It includes expenses for waste management, renewable energy, compliance with regulations, and eco-friendly research, aiming to demonstrate a company's commitment to mitigating environmental impact and promoting sustainability (Almaqtari et al., 2023).

The practice of environmental expenditure disclosure serves multiple purposes, including enhancing corporate reputation, fostering stakeholder trust, and ensuring regulatory compliance. For instance, Pekovic, Grolleau, and Mzoughi (2018) argue that such disclosures highlight a firm's commitment to sustainability through investments in green infrastructure and environmental management systems. Similarly, Wang et al. (2023) emphasise the role of environmental expenditure disclosure in addressing stakeholder concerns about corporate environmental responsibility.

In the Nigerian context, where environmental degradation due to oil and gas activities is prevalent, environmental expenditure disclosure is crucial for demonstrating corporate accountability. It plays a pivotal role in addressing challenges such as oil spills and gas flaring (Ojiakor & E-Obodoekwe, 2018). Ibrahim, Ibrahim, and Hussain (2023) note that such disclosures can bolster investor confidence by showcasing a company's dedication to mitigating environmental risks. Companies that actively disclose environmental expenditures not only demonstrate their commitment to environmental sustainability but also enhance their corporate reputation, attract socially responsible investments, and comply with regulatory requirements (Almaqtari et al., 2023).

Drawing from these perspectives, this study defines environmental expenditure disclosure as the practice of providing comprehensive information about a company's financial commitments toward mitigating environmental impacts of its activities. This includes investments in waste management, pollution control, renewable energy, and other sustainability initiatives, as adapted from Hansen and Mowen (2007) and Ojiakor et al. (2018).

2.1.2 Stakeholder Engagement Disclosure

Stakeholder engagement is a critical aspect of corporate governance that involves interacting with individuals or groups affected by a company's operations. According to Freeman (1984), stakeholders include employees, customers, investors, and communities, among others. Stakeholder engagement disclosure refers to the transparent reporting of strategies and activities related to stakeholder interactions, particularly concerning environmental matters (Kujala et al., 2022). Stakeholder engagement disclosure involves the practices and policies

companies use to communicate and interact with stakeholders, such as local communities, regulators, investors, employees, and NGOs (Kujala et al., 2022). It entails transparent reporting on strategies, activities, and outcomes to address stakeholder concerns, foster dialogue, and incorporate feedback into decision-making (Olutimehin et al., 2024; Ardiana, 2019). While definitions vary, the consensus highlights activities aimed at understanding stakeholder concerns, exchanging information, and fostering mutually beneficial relationships.

Stakeholder engagement demonstrates a company's efforts to foster dialogue, address stakeholder concerns, and incorporate feedback into decision-making processes. Galeotti et al. (2023) highlight that stakeholder engagement enhances transparency, accountability, and inclusivity by detailing how companies engage stakeholders on sustainability initiatives. Such disclosures often include information on community outreach programmes, environmental education campaigns, and collaborative projects with non-governmental organisations (Olutimehin et al., 2024).

In the oil and gas sector, stakeholder engagement is particularly significant due to the environmental and social challenges associated with resource extraction. Ardiana (2019) argues that effective stakeholder engagement can mitigate conflicts, improve community relations, and enhance corporate reputation. In Nigeria, where oil exploration has led to environmental degradation and social unrest, SED serves as a vital tool for rebuilding trust between companies and affected communities (Dewi et al., 2023).

This study adopts the definition of SED as outlined by Galeotti et al. (2023) and Dewi et al. (2023), which emphasises the level of disclosure regarding a company's interactions with stakeholders concerning environmental issues. This includes engaging investors, regulators, and communities in discussions about environmental policies and mitigation strategies, thereby demonstrating a commitment to sustainability and inclusivity.

2.1.3 Market Value

Market value is a fundamental measure of a company's worth, reflecting investor perceptions of its future prospects. Damodaran (20002) defines market value as the price at which an asset or company can be bought or sold in a competitive marketplace. It is influenced by factors such as financial performance, growth potential, and prevailing economic conditions. Fama and French (1992) describe it as the total value of a firm's equity, calculated by multiplying the current share price by the total number of outstanding shares. According to Brealey, Myers, and Allen (2008), market value represents a company's perceived worth to investors, shaped by factors like its financial performance, growth prospects, and economic environment. Penman (2013) describes it as the price investors are willing to pay for a firm's equity in the market, reflecting their expectations of its future earnings and potential returns. Similarly, Ross et al. (2021) define market value as a firm's economic worth, determined by the balance of supply and demand in financial markets and encompassing both tangible and intangible assets. Collectively, these perspectives emphasise that market value is a dynamic measure influenced by market conditions, investor sentiment, and a firm's performance.

This study proxied market value as market capitalisation, as defined by Pavone (2019). Market capitalisation is calculated by multiplying a company's current stock price by its total number of outstanding shares. Recognised as a reliable indicator of a firm's value and financial health, it reflects investor confidence and the overall performance of the market (Gujarati, 2009). Market capitalisation is widely used in financial analysis as an indicator of a firm's valuation and stability in the marketplace (Brealey, Myers, & Allen, 2008).

2.2 Theoretical Frameworks/Models

2.2.1 Legitimacy Theory

Legitimacy theory, introduced by Dowling and Pfeffer (1975) and refined by Suchman (1995), asserts that organisations seek to align their

operations with societal norms to maintain legitimacy and ensure survival. Suchman describes legitimacy as a critical resource firms strive to acquire and sustain. In the oil and gas industry, environmental disclosures are a means to exhibit corporate social responsibility and counteract negative public perceptions. Deegan (2002) highlights the role of environmental disclosure in upholding legitimacy, arguing that firms in environmentally scrutinised industries use such practices to safeguard their standing.

For Nigerian oil and gas companies, legitimacy theory is particularly relevant due to public and regulatory concerns over environmental damage. Disclosing environmental information enables these firms to align with societal expectations and demonstrate responsibility. Deegan (2002) warns that failure to conform to societal norms can lead to reputational damage and loss of market value.

Studies by Akbaş and Canikli (2018) suggest that larger firms are more inclined to engage in environmental disclosure to preserve legitimacy. Nigerian firms are likely to follow this trend, using disclosures to protect or enhance their market value. However, the theory's applicability in Nigeria is influenced by factors such as weak regulatory enforcement and the socio-political environment, which can shape corporate behaviour and perceptions of legitimacy.

2.2.2 Stakeholder Theory

Stakeholder theory, developed by Freeman (1984), emphasises the need for organisations to address the interests of various stakeholders, including shareholders, employees, and the broader community. Transparent communication, particularly through environmental disclosures, becomes essential for maintaining trust and meeting stakeholder expectations.

In the oil and gas sector, environmental issues significantly concern stakeholders such as local communities and government bodies. Firms use environmental disclosures to build trust, demonstrate accountability, and foster stronger stakeholder relationships. Emeka-Okoli et al. (2024) argue that transparent environmental practices not only strengthen stakeholder ties but also contribute to enhanced market value.

In Nigeria, environmental disclosures are crucial for managing relationships with local communities impacted by issues like oil spills. However, weak regulatory enforcement and limited public awareness of environmental challenges may reduce the effectiveness of stakeholder theory, resulting in less pressure on companies to provide comprehensive disclosures.

2.2.3 Signalling Theory

Signalling theory, proposed by Spence (1973), explains how organisations convey information to reduce information asymmetry between themselves and external parties. Companies use environmental disclosures as signals to highlight their quality, ethical standards, and commitment to environmental stewardship (Connelly et al., 2011).

In Nigeria's oil and gas sector, robust environmental disclosures can differentiate firms from competitors and reassure investors of their efforts to manage environmental risks. Effective disclosures may attract socially responsible investors and bolster global reputations. However, inadequate regulatory enforcement may encourage "greenwashing," where firms present misleading environmental claims, undermining the credibility of such signals and reducing the theory's overall efficacy.

2:2:4 Relevance of Theories to the Study

Among these theories, Legitimacy Theory is most applicable to this research. It underscores the importance of aligning corporate practices, including environmental disclosures, with societal expectations to maintain legitimacy. In Nigeria's oil and gas sector, where environmental concerns and public scrutiny are significant, disclosures related to greenhouse gas emissions and waste management play a critical role in sustaining legitimacy. Firms can improve their reputation and market value by demonstrating environmental accountability, hence Legitimacy theory is the best framework for understanding

how environmental accounting disclosures affect market value in this industry.

2.3 Empirical Review

2:3:1 Environmental Expenditure Disclosure

Ejoh, Orok, and Sackey (2014) examined environmental accounting and disclosure practices in Nigeria's manufacturing sector. The study aimed to evaluate the extent of environmental accounting practices and the level of awareness regarding environmental costs among Nigerian manufacturing firms. The sample included three companies: UNICEM Plc, Niger Mills Nigeria Plc, and PAMOL Nigeria Ltd. The period of the study was not defined. Data were gathered using questionnaires and annual reports. Independent t-tests and ANOVA were employed to test the hypotheses. Findings revealed a negative and statistically insignificant difference between environmental cost awareness and environmental expenditures accounted for in the firms' financial reports. The study concluded that environmental expenditures should be tracked and disclosed independently to enhance transparency. However, the sample size limited the generalisability of the findings, and the study did not have a defined period neither did it consider stakeholder engagement in driving environmental disclosure practices, which could influence reporting effectiveness. Furthermore, the focus on manufacturing excluded the oil and gas sector, which is a significant part of Nigeria's economy.

Polycarp (2019) explored the relationship between environmental accounting practices and financial performance in Nigerian oil and gas companies. The study targeted oil and gas firms, using a sample of eleven (11) companies for which financial reports were available from 2015 to 2017. Secondary data were analysed using multiple regression analysis to examine the relationship between environmental expenditures, such as those for pollution control, and financial performance indicators like return on capital employed (ROCE), net profit margin (NPM), and earnings per share (EPS). The results showed a positive and significant relationship between employee health and safety compliance cost, and pollution prevention cost. This study contributes to understanding environmental disclosures' effect in the oil and gas sector. However, while the study's methodological rigor was commendable, it focused on financial performance and not market value. It also did not consider stakeholders' engagement.

Jamil and Rodiel (2020) investigated the effect of environmental accounting disclosures on financial performance in publicly traded mining and oil firms in the Philippines. The study covered the period of 2012 to 2016. The population included publicly traded firms in the mining and oil sectors, with a sample of 24 firms selected for the study. Panel regression analysis was used, incorporating both time-series and cross-sectional data. Findings revealed that environmental accounting disclosures had a negative and statistically insignificant impact on business value. The study suggested that factors such as location and firm characteristics played a crucial role in determining the financial impact of environmental practices. However, the study's focus on return on equity and the Philippine context limited its generalisability to other regions like Nigeria and their market value.

Amahalu (2020) investigated the effect of environmental cost disclosure on profitability in listed oil and gas firms in Nigeria between 2010 and 2019. The study focused on environmental disclosures related to waste management, employee health and safety, and remediation costs, analysing a purposive sample of 11 firms. Data were analysed using content analysis, Pearson correlation, and Panel Least Squares (PLS) regression. The study found that environmental cost disclosures had a significant positive impact on net profit margin. The study concluded that environmental cost disclosure is value-relevant for strategic business decisions. However, the study focused primarily on profitability, neglecting other forms of value variables such as market value, market capitalisation, and stakeholder engagement.

Oshiole, Elamah, and Amahalu (2020) examined the effect of environmental cost disclosure on

profitability in Nigerian oil and gas firms listed on the Nigerian Stock Exchange (NSE) between 2010 and 2019. The study used a purposive sample of 11 firms and analysed data through content analysis, Pearson Correlation Coefficient, and Panel Least Squares (PLS) regression. Findings showed that environmental cost disclosures, including waste management and health and safety costs, had a significant positive effect on market value. These suggests that firms providing more detailed environmental disclosures are likely to see improved financial performance. However, the study did not address other critical factors such as stakeholder engagement and market value, which are particularly relevant in the oil and gas sector.

Olayemi and Ishola (2021) investigated the impact of green accounting on financial performance among natural resource companies in Nigeria. The study used data from two companies listed on the Nigerian Stock Exchange (NSE) from 2015 to 2019 and employed Ordinary Least Squares (OLS) regression. The study found that environmental conservation costs a statistically significant positive effect on the financial performance of natural resource firms. However, the study was limited in sample size by focusing on just two listed companies. Secondly, the period from 2015 to 2019 is small and may not reflect current realities.

Nkwoji (2021) examined the relationship between environmental expenditure and profitability in quoted oil and gas companies in Nigeria, using secondary data from the annual reports of indigenous companies available at the Nigeria stock exchange from 2012 to 2017. The study adopted an explanatory, historical, and correlational design, with data analysed through regression analysis. The findings revealed no statistically significant relationship between environmental expenditure and net profit, suggesting that environmental spending may not have an immediate direct effect on profitability. The study's sample size was not clearly defined and it focused on profitability and not market value. Also, the period ended in 2017 and does not reflect current realities. Thus, the findings underscore the need to further explore environmental cost disclosure and additional variables such as stakeholder engagement to understand their impact on company market value with a more recent data.

Osayabor and Izedonmi (2023) examined the relationship between sustainability disclosure and market value among quoted oil and gas companies in Nigeria. The sample consisted of seven (7) firms selected using purposive sampling based on their full study period from 2012 to 2021. The study employed an ex-post facto research design and used descriptive and inferential statistics, particularly panel data regression analysis. Findings showed that environmental cost disclosure had a negative and significant impact on market value, while community development cost disclosure had an insignificant effect. The study's strength lies in its robust methodology and identification of key variables affecting market value. However, the study did not consider stakeholder perspectives. This study provides a more comprehensive analysis of environmental cost disclosure, including stakeholder engagement, which is critical for assessing the market value of oil and gas firms.

2:3:2 Stakeholder Engagement

Arena, Bozzolan, and Michelon (2014) investigated whether environmental reporting functions as a transparency tool to communicate sound environmental policies or as a manipulation tool to influence stakeholders' perceptions. The study aimed to assess the effectiveness of environmental disclosure in fostering transparency, as well as how the governance structure of firms influenced disclosure practices. The sample consisted of 288 US oil and gas firms, selected through purposive sampling. Data was collected over several years through environmental disclosure reports from 2008-2010. A regression analysis technique was employed to examine the relationship between the tone of environmental disclosures (positive or negative) and future environmental performance. The findings revealed that positive language in environmental disclosures was linked to improved future environmental performance, suggesting that these disclosures served as genuine signals of

transparency. Furthermore, the study found that the stakeholder orientation of the board played a significant role in how effectively environmental efforts were communicated. However, a key limitation of the study is its focus on US firms, which may not fully reflect the context-specific challenges faced by firms in Nigeria's oil and gas sector. The regulatory and market conditions in the US differ significantly from those in other regions, raising questions about the applicability of these findings in Nigeria.

Kujala et al. (2022) conducted a comprehensive literature review on stakeholder engagement, synthesizing 90 articles spanning 15 years (2006 – 2020) across various disciplines such as management and environmental policy. The review aimed to identify key components of stakeholder engagement, such as moral, strategic, and pragmatic elements, and to propose a unified definition. The authors employed descriptive analysis to examine patterns and key themes from the literature. The review also highlighted the potential "dark side" of stakeholder engagement, noting that poorly managed interactions could lead to negative outcomes. The study concluded by outlining future research directions to further explore stakeholder engagement. A limitation of the study is its reliance solely on literature, without empirical data to support the conclusions. As a result, while it provides valuable theoretical insights into stakeholder engagement, further empirical research is needed to validate these findings and understand the practical implications of effective stakeholder engagement in real-world business contexts.

Pwagusadi (2024) examined the effect of environmental disclosure on the market value of listed oil and gas companies in Nigeria, using data from 2009 to 2019. The study focused on 15 oil and gas companies listed on the Nigerian Stock Exchange, selected through purposive sampling. Environmental disclosure was proxied through factors such as environmental management policies, recognition of environmental activities, and stakeholder engagement. Data was collected from secondary sources, and descriptive statistics along with OLS regression analysis were employed to assess the impact of environmental disclosure on market value, measured using Tobin's Q. The study found a significant negative effect of environmental management policies on market value, indicating that investors perceive these policies as costly. However, other environmental activities, including stakeholder engagement, had positive but insignificant effects on market value. The study's reliance on a single financial metric, Tobin's Q, and the focus on voluntary environmental disclosures limit the robustness of the findings. Additionally, the study period may not fully capture current trends in environmental regulations and investor preferences, making the findings less reflective of contemporary conditions.

III. METHODOLOGY

3.1 Research Design

This study employs a quantitative research design to examine the effect of environmental expenditure and stakeholder engagement disclosures on the market value of oil and gas firms in Nigeria. The research used an ex-post facto design , which is appropriate for analysing historical data (Creswell and Creswell, 2018). The analysis focuses on secondary data obtained from the annual reports of oil and gas companies over a ten-year period (2014–2023).

3.2 Population and Sample

The population for this study consists of nine (9) oil and gas companies listed on the Nigerian Exchange Group (NGX) as at December 31, 2023. These companies include Caverton Offshore Support Group, Conoil, Eterna, Japaul Gold and Ventures, MRS Oil Nigeria, Oando, Seplat Energy, TotalEnergies Marketing Nigeria, and Rak Unity Petroleum (Nigerian Exchange Group, 2024). Table 1 contains the population and sample selection.

Table 1: Population and sample selection

S/No	Population	Sample selection
1	Caverton Offshore Support Group	✔ Selected
2	Conoil	✔ Selected
3	Eterna	✔ Selected
4	Japaul Gold and Ventures	
5	MRS Oil Nigeria	
7	Oando	
8	Seplat Energy	✔ Selected
9	TotalEnergies Marketing Nigeria	✔ selected

Source: Research's Compilation, 2024

The study employs a purposive sampling technique to select five (5) companies based on the following criteria: (i) availability and comprehensiveness of environmental disclosures in their annual reports, (ii) consistency in reporting environmental accounting information over the past five years, and (iii) company size and market capitalisation, as larger firms are more likely to engage in and disclose environmental initiatives. These criteria ensure that the selected companies provide sufficient data for meaningful analysis of the effect of green accounting on market value. This technique is recommended by Palinkas et al. (2015) and Campbell et al. (2020) for ensuring the sample is representative of firms with comprehensive environmental information, thus enhancing the validity of the research findings.

3.3 Data Collection and Analysis Techniques

For data collection, the study relies on secondary sources, specifically the Nigeria Exchange Group Fact Book and annual reports and financial statements of publicly listed oil and gas companies. These reports include key disclosures on environmental expenditure, stakeholder engagement, and market capitalisation. To ensure consistency in the data collection process, the study utilises the Environmental Disclosure Index prescribed by the Global Reporting Initiative (GRI) Standards, specifically the GRI 11.1–11.7 indices that focus on environmental impact (Solsbach et al., 2014; Kaoje et al., 2024). The content analysis method was used to systematically extract and quantify the relevant environmental data from the reports, ensuring a rigorous and objective examination of the disclosures related to environmental expenditure and stakeholders engagement. Descriptive statistics was used to summarise the characteristics of the data, offering insights into the central tendencies and variability of environmental disclosures. Correlation analysis was used to explore relationships between environmental disclosures (e.g., environmental expenditure and stakeholder engagement) and market value (Osayabor and Izedonmi, 2023). To determine how these environmental disclosures predict market value, the study used multivariate regression analysis, which assesses the influence of multiple independent variables (disclosure practices) on the dependent variable (market value). This approach helps identify significant predictors of market value, as supported by Okeke, Ifurueze & Nwadiaro, 2021). The statistical analysis is conducted using Jamovi software (Version 2.3.28), selected for its user-friendly interface and robust capabilities in both descriptive and regression analysis (Şahin & Aybek, 2020).

3.4 Model Specification

The functional relationship in equation (i) expresses the idea that the market capitalisation (MCAP) of a firm is a function of environmental

expenditure disclosure (EEXD) and stakeholder engagement disclosure (SED). The multiple regression model is as follows:

$$MCAP = f(EEXD, SED, FSZ) \quad .....(i)$$

Where:

MCAP represents the market capitalisation of the firm, which serves as the dependent variable.

EEXD stands for Environmental Expenditure Disclosure.

SED stands for Stakeholder Engagement Disclosure.

FSZ stands for Firm Size (Control variable)

To further specify the model in a linear form for empirical testing, the following equation is used:

$$MCAP_{it}=\beta 0+\beta 1EEXD_{it}+\beta 2SED_{it}+FSZ_{it}+\epsilon_{it} \quad .....(ii)$$

Where:

$MCAP_{it}$ = Market capitalisation of firm i at time t (the dependent variable)

β_0 = Intercept (constant term)

β_1, β_2, β_3, = Coefficients for the independent variables, measuring their impact on market capitalisation

$EEXD_{it}$ = Environmental Expenditure Disclosure for firm i at time t

SED_{it} = Stakeholder Engagement Disclosure for firm i at time t

FSZ_{it} = Firm Size for firm i at time t

ε_{it} = Error term for firm i at time t, accounting for unexplained variations in market capitalisation

i represents the individual firm (cross-sectional unit) in the sample (different oil and gas companies).

t represents time, indicating the specific time period (year) during which the observations were recorded.

3.5 Description and Measurement of Variables

The following firm-specific dependent and independent variables were included in the model.

Table 1: Variables, definitions and measurements

Variable	Description	Measurement	Source	Validated Literature/Studies
Market Capitalisation (MCAP)	The total market value of the firm's outstanding shares	Log. of Market Capitalisation.	Annual Reports; Nigeria Exchange Group Fact Book.	Omodero (2020)
Environmental Expenditure Disclosure (EEXD)	Financial investments in eco-friendly practices, technologies, or environmental conservation	Log. of environmental Cost	Annual Reports: Sustainability Reports	Ayoola-Akinjobi, & Akintoye (2024), Oshiole, et al. (2020).
Stakeholder Engagement Disclosure (SED)	Disclosure of engagement with stakeholders regarding environmental policies, impacts, and sustainability efforts.	Number of Stakeholders engaged	Annual reports: Sustainability Reports, CSR Reports	Kujala et al. (2022); Pwagusadi (2024)
Firm Size	Control variable	Log. of Total Asset	Annual reports	Okpala and Iredele (2018)

Source: Researcher's Compilation (2024)

IV. DATA ANALYSIS

4.1 Descriptive Statistics

Descriptive statistics were calculated for the dataset based on key parameters to provide valuable insight into the data's distribution and central tendencies. Table 2 contains the results

Table 2: Descriptive Statistics

	EEXD	SED	FSZ	MCAP
N	50	50	50	50
Missing	0	0	0	0
Mean	8.13	23.7	4.23	10.4
Median	8.09	20.0	4.09	10.3
Standard deviation	0.433	11.1	0.724	0.674
Minimum	7.15	12.0	3.11	9.48
Maximum	8.72	57.0	5.57	11.9

Source: Jamovi Output

Environmental Expenditure Disclosure (EEXD): The mean score for Environmental Expenditure Disclosure (EEXD) is 8.13, with a standard deviation of 0.433, indicating generally consistent disclosure practices among the firms, but with a slight variability in environmental expenditure disclosure. The median value of 8.09 is close to the mean, suggesting that the majority of firms are consistent in their environmental expenditure disclosure. The range from 7.15 to 8.72 shows minor variations in environmental expenditure across firms.

Stakeholder Engagement Disclosure (SED): The mean for Stakeholder Engagement Disclosure (SED) is 23.7, with a higher standard deviation of 11.1, indicating a wider variability in the level of stakeholder engagement. The median value of 20.0, which is lower than the mean, suggests that half of the firms report lower levels of stakeholder engagement compared to the average. The range is from 12.0 to 57.0, indicating wide differences in engagement levels.

Firm Size (FSZ): The mean score for Firm Size (FSZ) is 4.23, with a standard deviation of 0.724, suggesting moderate variability in firm size across the firms in the sample. The median of 4.09 is close to the mean, indicating that most firms are similar in size. The range of 3.11 to 5.57 shows that the firms exhibit moderate variation in size, with some being slightly larger or smaller than others.

Market Capitalization (MCAP): The mean value for Market Capitalisation (MCAP) is 10.4, with a standard deviation of 0.674, indicating moderate variability in market capitalisation across firms. The median of 10.3 is very close to the mean, indicating that most firms have similar market capitalisations. The range from 9.48 to 11.9 shows that the firms have similar market capitalizations, with some slightly higher than others.

4.2 Diagnostic Tests/Assumption Checks

Prior to conducting regression analysis, it is essential to ensure that the assumptions underpinning the model are satisfied. Key diagnostic evaluations required for regression include tests for autocorrelation using the Durbin-Watson statistic, multicollinearity and normality. The results of these tests are presented and discussed in the subsequent sections.

4.2.1 Durbin-Watson (DW) statistic

The Durbin-Watson (DW) statistic measures autocorrelation in regression residuals. A DW value of around **2** indicates no autocorrelation. That is, a DW between 1.5 and 2.5 is generally considered acceptable independence of residuals and suggests little to no autocorrelation. Values much below or above this range (especially approaching 0 or 4) signal more severe autocorrelation, which can affect the reliability of the model.

Table 3: Durbin–Watson Test for Autocorrelation

Autocorrelation	DW Statistic	p
0.517	0.915	< .001

Source: Jamovi Output

The Durbin–Watson test indicates moderate positive autocorrelation in the residuals, with a DW statistic of 0.517, which is considerably below the threshold of 2. The p-value of < 0.001 confirms that this positive autocorrelation is statistically significant. Therefore, collinearity statistics and normality tests are necessary to confirm the suitability of parametric test such as regression.

4.2.2 Variance Inflation Factor (VIF)

The Variance Inflation Factor (VIF) measures multicollinearity. A VIF below 5 indicates no issue, 5–10 suggests moderate multicollinearity, and above 10 signals problematic multicollinearity. Tolerance, the reciprocal of VIF (1/VIF), provides an additional measure. A tolerance value below 0.1 indicates high multicollinearity, whereas values closer to 1 reflect greater independence among predictors, which is ideal.

Table 4: Collinearity Statistics

	VIF	Tolerance
EEXD	3.14	0.319
SED	2.33	0.429
FSZ	4.25	0.236

Source: Jamovi Output

The collinearity statistics indicate no significant multicollinearity among predictors. VIF values for EEXD (3.14) and SED (2.33) are well below the critical threshold of 10, while FSZ has a slightly higher VIF of 4.25, still within acceptable limits. Tolerance values—0.319 for EEXD and 0.429 for SED—confirm sufficient independence among variables. Though FSZ shows some correlation (tolerance: 0.236), it remains manageable. Overall, multicollinearity is not a concern for the model.

4.2.3 Normality Test

A normality test assesses whether a dataset follows a normal distribution, crucial for parametric statistical methods. The Shapiro-Wilk test compares the observed data to a normal distribution. A p-value above 0.05 indicates normality, supporting parametric tests, while a p-value below 0.05 suggests significant non-normality, favouring non-parametric methods (Shapiro & Wilk, 1965). Table 5 presents the normality test results.

Table 5: Normality Test (Shapiro-Wilk)

Statistic	p
0.965	0.189

Source: Jamovi Output

The Shapiro-Wilk test for normality confirms that the residuals are approximately normally distributed, with a statistic of 0.965 and a p-value of 0.189. This result supports the assumption of normality, indicating that the model meets this essential criterion for valid regression analysis.

4.3 Correlation Matrix

Correlation analysis is a statistical technique used to evaluate the strength and direction of the relationships among two or more variables (Field, 2013). Table 6 contains the result of correlation between MCAP and the predictor variables

Table 6: Correlation Matrix

		MCAP	EEXD	SED	FSZ
MCAP	Pearson's r	—			
	df	—			
	p-value	—			
EEXD	Pearson's r	0.138	—		
	df	48	—		
	p-value	0.366	—		
SED	Pearson's r	0.210	0.646	—	
	df	48	48	—	
	p-value	0.166	< .001	—	
FSZ	Pearson's r	0.156	0.825	0.754	—
	df	48	48	48	—
	p-value	0.307	< .001	< .001	—

Source: Jamovi Output

MCAP and Environmental Expenditure Disclosure (EEXD): The Pearson's r value is 0.138, showing a weak positive correlation with MCAP. This suggests that firms with higher environmental expenditure disclosure tend to have slightly higher market capitalisation, though the correlation is weak. The p-value of 0.366 indicates that this relationship is not statistically significant, meaning it is not a meaningful or reliable association.

MCAP and Stakeholder Engagement Disclosure (SED): The Pearson's r value is 0.210, indicating a weak positive correlation with MCAP. This implies that firms with higher stakeholder engagement disclosure may have slightly higher market capitalisation. However, the p-value of 0.166 suggests the correlation is not statistically significant, meaning the relationship is not strong enough to be conclusive or reliable.

MCAP and Firm Size (FSZ): The Pearson's r value is 0.156, showing a weak positive correlation with MCAP. This suggests that larger firms may have slightly higher market capitalisation, but the correlation is weak. The p-value of 0.307 indicates that this relationship is not statistically significant.

4.4 Regression analysis

Regression analysis was conducted to determine the influence of Environmental Expenditure Disclosure and Stakeholder Engagement Disclosure on market capitaisation. Results are presented in Tables 7 and 8.

Table 7: Model Fit Measures

				Overall Model Test			
Model	R	R^2	Adjusted R^2	F	df1	df2	p
1	0.683	0.467	0.428	12.0	3	47	< .001

Note. Models estimated using sample size of N=45

Source: Jamovi Output

The model fit measures in Table 7 show that the independent variables explain a moderate amount of the variation in market capitalisation (MCAP). The R^2 value of 0.467 indicates that approximately 46.7% of the variation in MCAP is explained by the model. The adjusted R^2 value of 0.428 accounts for the number of predictors and suggests a relatively strong fit. The F-statistic of 12.0 with a p-value of < 0.001 confirms that the model is statistically significant, indicating a meaningful relationship between the predictors and MCAP.

Table 8: Model Coefficients - MCAP

Predictor	Estimate	SE	t	p
Intercept	4.8078	1.9873	2.42	0.020
EEXD	1.2122	0.3143	3.86	< .001
SED	0.0436	0.0106	4.12	< .001
FSZ	1.2463	0.2187	5.70	< .001

Source: Jamovi Output

Table 8 presents the model coefficients for MCAP. The intercept is 4.8078, with a p-value of 0.020, indicating that it is statistically significant.

Environmental Expenditure Disclosure (EEXD) has a positive effect on MCAP, with an estimate of 1.2122, and a p-value of < 0.001, indicating a strong, statistically significant positive impact on market capitalisation.

Stakeholder Engagement Disclosure (SED) also positively influences MCAP, with an estimate of 0.0436 and a p-value of < 0.001, showing a statistically significant positive association.

Firm Size (FSZ) has a positive effect on MCAP, with an estimate of 1.2463 and a p-value of < 0.001, indicating that larger firms tend to have higher market capitalisation.

4.5 Test of Hypotheses

Ho_1: Environmental Expenditure Disclosure (EEXD) does not have a significant effect on the market value of oil and gas companies in Nigeria.

From Table 8, the coefficient for EEXD is 1.2122 with a p-value of < 0.001, which is highly significant. Since the p-value is less than 0.05, we reject the null hypothesis (H01) and conclude that Environmental Expenditure Disclosure has a significant effect on the market value of oil and gas companies in Nigeria.

Ho_2: Stakeholder Engagement Disclosure (SED) does not have a significant effect on the market value of oil and gas companies in Nigeria.

The coefficient for SED is 0.0436, with a p-value of < 0.001, indicating a significant positive effect. Given the p-value is less than 0.05, we reject the

null hypothesis (H02) and conclude that Stakeholder Engagement Disclosure significantly affects the market value of oil and gas companies in Nigeria.

4.6 Discussion of Findings

This study investigated the impact of Environmental Expenditure Disclosure (EEXD) and Stakeholder Engagement Disclosure (SED) on the market value of oil and gas firms in Nigeria. The findings revealed that Environmental Expenditure Disclosure (EEXD) had a positive and statistically significant effect on market value, indicating that higher environmental expenditure disclosure is associated with increased market value. Stakeholder Engagement Disclosure (SED) also showed a positive and statistically significant effect on market value, suggesting that greater stakeholder engagement tend to have significant positive effect on market value.

The positive relationship between environmental expenditure disclosure and market value in this study is in line with Amahalu (2020), who found a significant positive effect of environmental cost disclosures on strategic business decisions and profitability. Similarly, Oshiole, Elamah, and Amahalu (2020) highlighted the positive influence of environmental disclosures on profitability, indirectly supporting the notion that enhanced transparency in environmental expenditures may drive firm value. This study extends by focusing on market value rather than profitability, thus providing further evidence of the relevance of environmental expenditure disclosures in the oil and gas sector. Contrary to the negative relationship observed by Osayabor and Izedonmi (2023), where environmental cost disclosures negatively impacted market value, this study's findings show that EEXD positively influences market value. This difference could arise from variations in industry-specific factors, corporate governance practices, and investor perceptions of environmental expenditures.

The positive impact of stakeholder engagement disclosure found in this study aligns with research by Kujala et al. (2022), which emphasized the importance of stakeholder engagement in promoting transparency and enhancing corporate reputation. It also resonates with the conclusions of Arena, Bozzolan, and Michelon (2014), who suggested that transparency in stakeholder engagement contributes to improved corporate governance and market performance. Similarly, Pwagusadi (2024) suggested that stakeholder engagement could improve market value, although this effect was deemed insignificant in their study. This study's findings, however, highlight its positive and statistically significant impact on market value.

In conclusion, this study aligns with several previous studies, particularly those that underscore the importance of transparency in environmental expenditures and stakeholder engagement for enhancing corporate market value. However, it diverges from studies such as Osayabor and Izedonmi (2023) and Polycarp (2019), where environmental disclosures were found to have either negative or insignificant effects. These discrepancies highlight the evolving understanding of how environmental expenditure and stakeholder engagement practices influence market value, especially in the oil and gas sector. The findings suggest that investors in Nigerian oil and gas firms may increasingly value environmental conservation expenditure and stakeholder engagement transparency, offering new insights for both academic researchers and practitioners in the field of corporate governance.

The significant positive effect of Environmental Expenditure Disclosure (EEXD) on the market value of oil and gas companies in Nigeria supports legitimacy theory (Suchman, 1995). By disclosing environmental expenditures, firms demonstrate their commitment to sustainable practices, which enhances their legitimacy in the eyes of the public and investors. This transparency is particularly important in the Nigerian context, where environmental concerns are increasingly scrutinised, and firms need to align with societal norms to safeguard their market position (Okeke et al., 2021). The significant positive effect of stakeholder engagement disclosure on market value also aligns with legitimacy theory. By

engaging stakeholders and providing information on their environmental efforts, firms build trust and demonstrate accountability, which further strengthens their legitimacy (Kornom-Gbaraba and Chukwuemeka, 2022). This disclosure serves to assure stakeholders that the company is committed to addressing environmental issues, which in turn enhances its market value.

The significant positive effect of both environmental expenditure and stakeholder engagement disclosures on the market value of Nigerian oil and gas companies reflects firms' responsiveness to stakeholder concerns, aligning with Stakeholder theory (Freeman, 1984). In particular, environmental expenditure disclosure shows how companies are addressing the increasing pressure from stakeholders, including investors and regulatory bodies, to be more transparent about their environmental expenditures. Similarly, stakeholder engagement disclosure highlights how firms are engaging directly with stakeholders to demonstrate their commitment to addressing environmental and social concerns. These disclosures help build trust and strengthen relationships with key stakeholders, contributing to improved market value (Okeke et al., 2021; Kornom-Gbaraba and Chukwuemeka, 2022).

V. CONCLUSION

The study concludes that Environmental Expenditure Disclosure and Stakeholder Engagement Disclosure have a significant positive effect on the market value of oil and gas companies in Nigeria. The empirical results indicate that Environmental Expenditure Disclosure has a highly significant and positive impact on market capitalisation, suggesting that as companies increase their environmental expenditure transparency, their market value improves. Similarly, Stakeholder Engagement Disclosure demonstrates a positive and statistically significant effect, highlighting that firms engaging in transparent stakeholder communication related to environmental issues are likely to experience an increase in their market value.

In light of these findings, the study recommends the following:

1. Management and Board of Oil and Gas Firms should prioritise comprehensive and transparent environmental expenditure disclosures. Enhancing the quality and detail of these disclosures will help build investor trust and positively influence market perceptions.
2. Oil and Gas Companies should continue to foster strong stakeholder engagement, ensuring that their environmental and social governance (ESG) practices are clearly communicated. This will contribute to stronger relationships with key stakeholders and improve their overall market value.

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