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DOES ESG INVESTMENT IMPACT THE FINANCIAL SUSTAINABILITY OF NIGERIAN ENERGY COMPANIES: A PANEL REGRESSION APPROACH?

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Abstract

The destruction of around 5% to 10% of Nigerian mangrove ecosystems and the disappearance of approximately 7,400 square kilometres of rainforest have shifted managerial priorities in Nigeria's energy sector from purely financial gain to increased social responsibility. The rising concerns regarding climate change, environmental risks, social well-being, and sustainability have propelled ESG investment to the forefront of corporate sustainability considerations. The study delves into the influence of ESG investment on the financial sustainability of listed industry players in Nigeria's oil and gas industry. By utilizing quantitative data from sustainability and corporate annual reports of listed firms on the Nigeria Exchange Group from 2013 to 2023, a fixed pooled panel regression model was conducted to statistically test the three hypotheses anchored on the ESG nexus on financial sustainability. The findings indicate that the relationship between environmental investments, measured by environmental emissions, and return on assets (ROA) for the examined listed entities is insignificant. However, the research establishes a notable correlation between social investing practices, quantified by workforce size, and ROA, displaying a positive coefficient. Moreover, the study does not confirm a substantial impact of governance investing practices, measured by board size, on the ROA of the scrutinized corporations. The research acknowledged the impact of ESG on the financial sustainability of Nigeria's energy sector. The research recommendations include integrating ESG factors into investment strategies, enhancing disclosure and transparency, improving risk management and resilience measures, and collaborating with policymakers.

Keywords: ESG investment, financial sustainability, Nigerian energy companies, panel regression approach

1. Introduction

Nigeria is Africa's leading oil and gas producer, ranking sixth among the Organization of the Petroleum Exporting Countries (OPEC) (Graham & Ovadia, 2019). The country's economy heavily relies on its energy sector, which has contributed about 90% of its foreign exchange earnings and 80% of government revenue for over three decades. Oil production in Nigeria ranges from 2.8 to 3.0 million barrels per day (Amadi, Onuoha, & Onwuka, 2021). However, the industry has severe environmental repercussions, including oil spills and gas flaring, leading to the destruction of around 5% to 10% of Nigerian mangrove ecosystems and the disappearance of approximately 7,400 square kilometres of rainforest (Orekoya & Oluleke, 2021). Nigeria has experienced a 25% increase in carbon dioxide and greenhouse gas emissions due to ecosystem damage from energy sector exploration activities (Curtin et al., 2019; Ting et al., 2019), adversely affecting farmers, fishermen, and the environment. Younger generations' activities, such as pipeline destruction, worsen the situation, negatively impacting energy companies' sales and operations (Adishi & Hunga, 2017) and reducing social and economic viability (Ruan & Liu, 2021). To thrive sustainably amidst social pressure and industry growth, energy companies adopt diverse business philosophies and engage in socially responsible practices, prioritizing social responsibility over financial gain (Trumpp & Guenther, 2017). The use of natural resources requires businesses to protect the environment and the community, emphasizing the importance of reviewing sustainability strategies and outcomes (Xie et al., 2019). Given sustainable challenges like corporate scandals, financial difficulties, and social costs over the past decade (Chao & Farrier, 2021; Patil, Ghisellini, & Ramakrishna, 2021), energy companies are advised to prioritise economic, social, and governance (ESG) investment for sustainability in people, profit, and planet.

Corporate sustainability has gained significant traction among researchers and industries in recent years due to pressing environmental and social challenges like population growth and climate change. To tackle these challenges, businesses must prioritise strategies and initiatives related to sustainability, especially those critical for their practices (Lim, 2022; Heras-Saizarbitoria, Urbieta, & Boiral, 2022). Many organisations are focusing on practices such as waste management, carbon reduction, and operational efficiency (Okoye et al., 2024). However, achieving sustainability entails ensuring these practices benefit all stakeholders while enhancing the corporation's value. Stakeholder theory (Freeman, 1984) emphasises that organisations should not solely focus on generating profit for owners or stockholders but should also consider the best interests of all stakeholders.

Consequently, investing in ESG activities can provide a competitive advantage and lead to improved financial performance (Freeman, 1984). In contrast, shareholder theory (Santa-Maria, Vermeulen, & Baumgartner, 2021) argues that socially responsible activities are not the corporation's responsibility. According to shareholder theory, corporations should prioritise maximising value and profit for owners or stockholders and conduct business operations solely for their benefit (Mrabure & Abhulimhen-Iyoha, 2020). However, shareholder theory does not prohibit socially responsible practices as long as they are economically beneficial (Surroca, Aguilera, Desender, & Tribó, 2020), with studies indicating that ESG investments can indeed be economically advantageous (Minh & Hong, 2022).

In recent years, there has been a notable increase in the importance placed on environmental and social considerations within society. An expanding segment of consumers now actively choose environmentally friendly products, even when they come at a higher cost than conventional alternatives (Taghikhah et al., 2020). Concurrently, a growing number of investors are seeking opportunities to invest in companies that are not only financially profitable but also sustainable in the long term, with the goal of benefiting society as a whole (Hatane, 2015; Yu & Zhao, 2015). As a result, ESG factors have become critical criteria for the investment decisions of many capital providers, with a significant portion of traditional fund managers now embracing ESG investment strategies (Harjoto, Laksmana, & Lee, 2015). The ESG investment landscape has experienced substantial growth, with approximately $26 billion in exchange-traded funds categorised as ESG assets. This growth is described as exponential, with BlackRock, the world's largest investment group, projecting in 2019 that ESG assets would reach $400 billion within the next decade (Hartmann & Carmenate, 2021; Trumpp & Guenther, 2017). Furthermore, investors not only seek to make a positive societal impact but also expect financial returns. Companies that adopt ESG strategies are perceived as having a more sustainable and forward-thinking approach compared to traditional companies, and they are more likely to outperform those that do not prioritise ESG (Ting et al., 2019; Linnenluecke, 2022). This perspective is supported by numerous academic studies. Whelan et al. (2021) conducted a comprehensive analysis that consolidated findings from over 2,200 previous studies. The vast majority of these studies, around 90%, reported a positive or neutral correlation between financial performance and ESG investing (Xie et al., 2019). Moreover, most studies consistently identified positive and enduring connections between the two factors over time (Patil et al., 2021; Pandey et al., 2023).

While ESG practices are recognised for their effectiveness in various sectors across developing economies, the oil and gas industry remains relatively underexplored in emerging economies (Atan et al., 2018). Previous studies have predominantly focused on the people, plant, and social perspectives of corporate investment on a global scale (Abdi et al., 2022), leading to limited academic research on ESG's efficacy within Nigeria's energy sector. Despite previous research investigating the dimensions of ESG both globally and in Nigeria, the majority of studies, accounting for more than 95%, have relied on secondary data collection methods from sources like Asset4.0-Refinitiv/Thomson Reuters, according to Eccles et al., (2011) and Kenny et al., (2022). This might not reflect the industrial landscape in Nigeria. While the social dimension of ESG has received considerable attention, with over 80% of research studies in ESG using either a mixed approach or quantitative methods based on questionnaire instruments to establish its cause-effect relationship, these methods have been criticised for their inadequacy in capturing the broader perspective of ESG investing on a national and global scale (Harjoto et al., 2015; Xu et al., 2021). Thus, while global studies often cover the conceptual aspects of ESG investing, they tend to neglect the theoretical framework and the economic and governance dimensions of ESG investing in Nigeria's energy sector, which have not been adequately explored (Aqabna et al., 2023; Albitar et al., 2020). Consequently, the research adopted a pooled panel regression approach to explore the impact of ESG on the financial sustainability of Nigerian energy companies. The specific objective intends to:

i. Examine how environmental investing practices affect the financial sustainability of Nigerian energy companies.
ii. Analyse the impact of social investing practices on the financial sustainability of Nigerian energy companies,
iii. Evaluate the influence of governance investing practices on the financial sustainability of Nigerian energy companies.

2. Literature Review

ESG, acknowledged as environmental, social, and governance, represents a comprehensive framework that delineates the nonfinancial prerequisites for organizations (Naeem et al., 2022). This framework is shaped by two key factors (Zahid et al., 2022). Initially, numerous countries have enacted laws and regulations that prioritize specific standards and effectiveness beyond financial aspects (Behl et al., 2022). Subsequently, there is a burgeoning emphasis from the general public

on organizations' behaviour and actions as responsible societal members. Adhering to emerging social norms allows organizations to retain their social license to operate (Bai et al., 2022). ESG encompasses a broad spectrum of components. The first component pertains to environmental factors, which include addressing climate change, reducing carbon emissions, and ethically managing limited natural resources such as water and air (Naeem et al., 2022). The second component focuses on social factors, which involve combating issues such as child labour, human trafficking, ensuring health and safety, promoting diversity, inclusion, equity, data privacy, livelihood, and overall employee and human well-being. Lastly, the third element, governance factors, relates to the control, oversight, and independence of the organization's board and management, its purpose, political and social influence, as well as addressing corruption and compensation issues (Olsen et al., 2021). Thus, ESG is not a rigid framework but rather an ongoing process of discovery that holds organizations accountable to evolving ethical, moral, and sustainable expectations beyond financial considerations, while also recognizing that organizations have stakeholders and are stakeholders themselves, making it a benchmark for their purpose and existence (Xu et al., 2021).

Natural crises have historically acted as catalysts for raising awareness of societal responsibilities. For instance, the Great Depression of 1929 prompted the establishment of the US Generally Accepted Accounting Principles (GAAP), introducing explicit accounting standards (Chairani & Siregar, 2021). Similarly, the financial crisis of 2008–2009 led to the implementation of measures to enhance risk management and address financial vulnerabilities (Abdi et al., 2022). The COVID-19 pandemic, with its profound impact on social, racial, and health-related issues, has heightened the demand for organizations to actively contribute to positive change (Folger-Laronde et al., 2022). This has resulted in a focus on environmental, social, and governance (ESG) considerations, initially introduced by the United Nations in 2004 to encourage financial markets to incorporate these aspects into their guidelines. Over time, it became evident that ESG encompassed various existing concepts such as corporate social responsibility (CSR), sustainability, environmental health and safety (EHS), and corporate social performance (CSP) (Giannopoulos et al., 2022). However, in the 20th century, these concepts were still evolving and largely dependent on voluntary efforts by organizations to be seen as socially responsible, lacking legal or financial enforcement (Dalal & Thaker, 2019). Consequently, ESG remained a secondary concern for organizations, with financial goals often taking precedence, influenced by the philosophy of maximizing shareholder value, as advocated by Friedman's (1999) stakeholder theory, which

emphasized the primary responsibility of CEOs and boards towards shareholders' value prepositions (Friede, Busch, & Bassen, 2015).

Paradigm of Financial Sustainability

Corporate sustainability is a prevalent topic in management literature and is increasingly important for businesses worldwide. Despite losing public trust due to environmentally harmful practices like improper waste disposal and causing extensive environmental damage, sustainability impacts all sectors and industries. This is crucial for industrial firms' survival and competitiveness. For example, oil and gas companies are pushed to enhance the quality of their products, reduce waste, and expand their market share to remain sustainable. Management's dedication to achieving the triple bottom line has made corporate sustainability a key focus for these firms (Ivwurie & Akpan, 2021; Mogaji et al., 2021). Businesses now strive to produce goods that not only meet economic objectives but also fulfil social and environmental obligations. Consequently, academic scholars coined sustainability differently. According to the World Commission on Environment and Development, sustainability refers to development that meets present needs without compromising future generations' ability to meet their own needs (Ezejiofor & Emeneka, 2022). This concept encompasses economic, environmental, and social aspects of an organization, promoting its ability to achieve goals through profitability and social responsibility. Despite social and managerial criticism, sustainability can also be synonymous with the concepts of "responsibility marketing, corporate social responsibility (CSR), corporate social investment (CSI), and triple bottom line (TBI), which emphasizes socially responsible business practices. Consequently, "corporate sustainability" often closely aligns with the oil and gas firms' CSR efforts (Sharma, 2016).

Academic efforts to redefine sustainability are gaining traction, with scholars presenting compelling arguments. Ben Clarke, as noted by Mogaji et al., (2021), suggests that sustainability revolves solely around profitability through social responsibility, while Yadav, Bhudhiraja, and Gupta, (2021) argue that risk is a significant literary element in sustainability. Uduji, Okolo-Obasi, and Asongu, (2021) expand the concept by integrating ethics and education, indicating that sustainability serves as a valuable criterion for holding companies accountable to societal standards, despite the absence of a specific law governing it. This accountability is achieved by ensuring companies prioritize social profits by "doing the right thing." Corporate ethics play a crucial role in the success of sustainability initiatives, emphasizing the importance of maintaining high living standards for the

workforce through skills improvement and talent development within the business, securing the firm's future success (Uduji, Okolo-Obasi, & Asongu, 2019). Elkington's Triple Bottom Line (TBL), introduced in 1999, offers a holistic framework for evaluating corporate success by balancing profit, people, and planet objectives, as showcased in Figure 1 (Babajide et al., 2021). This model underscores the significance of sustainable practices, demonstrating that businesses can thrive financially while also benefiting the environment and society. The profit aspect of the TBL emphasizes efficient resource utilization to achieve long-term financial goals (Angela et al., 2021), while the people considerations involve engaging multiple stakeholders and meeting their needs. Finally, the planet dimension promotes eco-friendly practices and technological innovations. For optimal societal impact, firms should address all three components of the triple bottom line for sustainable practices (Angela et al., 2021).

Figure 1: Triple Bottom Line Dimension of Sustainability (Author, 2024)

The literature focuses primarily on the people and plant aspects of sustainability, leaving the financial dimension less defined despite its importance. Gómez-Bezares et al., (2017) describe financial sustainability as a binary criterion comparing the actual growth rate to the sustainable growth rate, measured by the return on equity (RoE) net of dividends and share buybacks. This suggests that firms integrating sustainability into their operations aim to improve financial performance and create shareholder value. Zabolotnyy and Wasilewski, (2019) define financial

sustainability in terms of value and continuity, using indicators like net profit/equity, total assets/current assets, and market value, but criticise them for not justifying their choice of metrics by using fuzzy set logic to aggregate these measures. As against the backdrop of Gómez-Bezares et al., (2017), Zabolotnyy and Wasilewski, (2019) do not explore associations with ESG outcomes. Henock, (2019) defines financial sustainability as the relationship between adjusted financial revenue and adjusted operating expenses, assessing firms' self-sufficiency, which includes operational efficiency, return on assets, and other factors. This concept is crucial for risk management (Lenssen et al., 2014) and has been linked to strategic risk governance (Stein & Wiedemann, 2016). It is often evaluated based on its contribution to company value but should also consider risk-limitation goals. Consequently, financial experts are increasingly adopting a more enlightened stance, acknowledging that shareholder wealth is best achieved by maximising benefits for all stakeholders and recognising that an organisation's purpose extends beyond mere profit maximization. (Okeke, 2021). Financial sustainability is paramount in the energy sector, underpinning long-term viability and growth. It facilitates investments in renewable energy sources, drives technological innovation, and sustains critical infrastructure. Moreover, it aligns with environmental objectives by decreasing reliance on fossil fuels. Beyond these benefits, financial stability draws investors, stimulates economic progress, and bolsters energy security. Ultimately, fostering financial sustainability in the energy industry is not just about financial prudence; it is a strategic imperative that intertwines environmental protection, economic prosperity, and energy autonomy.

Empirical Review and Hypotheses Development

Academic researchers explore the dimension of ESG criteria within a firm's performance system, which has evolved significantly since the 1970s. Research studies, including meta-analyses, have attempted to understand this relationship using various methodologies. Friede et al., (2015) systematically reviewed 2,200 articles, concluding that approximately 90% of the studies suggest a favourable relationship between ESG and financial performance. Similarly, Alshehhi et al., (2018) analysed 132 pieces of literature, revealing that 78% of them indicated a positive correlation. However, a more recent meta-analysis of 1,000 articles published between 2015 and 2020 by Whelan et al., (2020), Goel, (2018), and Kao, (2018) revealed a nuanced picture of the ESG and performance relationship. While 58% of the articles found a positive relationship between ESG and financial performance, 8% indicated a negative relationship, 13% showed no relationship, and 21% reported mixed results. This suggests mixed findings that indicate

significant disagreement warranting further research to nullify or support previous findings of the academic literature. However, studies by Alshehhi, Nobanee, and Khare, (2018), Bhaskaran, Ting, Sukumaran, and Sumod, (2020), De-Lucia, Pazienza, and Bartlett, (2020), and Friede, Busch, and Bassen, (2015) have all found that ESG performance has a beneficial impact on various measures of corporate financial performance. Despite their demonstrated effectiveness, ESG practices have gained widespread acceptance in developed nations. This trend is driven by an increased emphasis on environmental investments that address sustainability and stakeholder concerns. Consequently, corporations in developed economies face mounting pressure and regulatory scrutiny to integrate ESG initiatives into their business strategies. Despite this, few studies have established the correlation between environmental investment and financial performance among corporations in environmentally sensitive industries (Garcia & Orsato, 2020). Consequently, the research hypothesized that:

H_{01}: Environmental investment practices have no significant effect on the financial sustainability of Nigerian energy companies.

Xiao, (2023) employed quantitative methodologies to explore the relationship between ESG and performance systems, finding a positive correlation between the variables, with gender diversity moderating their connection in the Indonesian and Chinese contexts, respectively. Şeker and Gungor's (2022) study, however, challenges this narrative, as they find no significant impact of ESG performance on financial performance in the utilities sector globally. Additionally, Zioło, Bąk, and Spoz, (2023) emphasizes the importance of integrating ESG risks into business models, particularly in the energy sector, highlighting geographical and sectoral differences in this integration. Deb et al., (2022) focus on the Indian context by analyzing the impact of CSR on the efficiency of companies listed on the Bombay Stock Exchange (BSE). Their findings suggest a positive correlation between CSR and market efficiency, offering insights for stakeholders and policymakers. Velte, (2017) demonstrated that ESG factors positively impact firm value (Tobin's Q) and profitability (Return on Assets) for German firms. The study also found that governance significantly affects financial performance. Yoon et al., (2018) investigated the relationship between ESG ratings and market value in Korea, showing that CSR initiatives have a favourable and significant effect on firm market value, albeit with variations based on firm characteristics. Zhao et al., (2018) reviewed China's listed energy enterprises and found that higher ESG performance can boost their financial performance. Dalal and Thaker, (2019)

studied 65 Indian enterprises from 2015 to 2017, revealing a positive impact of ESG scores on financial success. Fatemi et al., (2018) analyzed US companies from 2006 to 2011, concluding that strong ESG activities and reporting enhance firm value, with reporting moderating valuation by reducing the impact of deficiencies and amplifying strengths. Xie et al., (2019) focused on specific ESG initiatives and the financial performance of a large sample of global firms, finding a positive association between most ESG initiatives and financial performance. Bhaskaran et al., (2020) reviewed 4887 firms from 2014 to 2018, indicating that firms excelling in environmental, governance, and social aspects tend to create more market value. Similarly, De-Lucia et al. (2020) investigated 1038 public companies across 22 European countries from 2018 to 2019, finding a positive association between ESG variables and financial performance (ROE and ROA). Naeem et al., (2022) examined 1042 companies from emerging countries from 2010 to 2019, revealing that both individual and combined ESG scores have a positive and significant association with firm value (Tobin's Q) and profitability (ROA). Consequently, the research intends to fill the industry gap by testing the below hypothesis:

$H_{02:}$ Social investment practices have no significant effect on the financial sustainability of Nigerian energy companies.

Chairani and Siregar, (2021) examined listed firms in the ASEAN region (Indonesia, Malaysia, the Philippines, Singapore, and Thailand) from 2014 to 2018. Their study discovered that ESG practices enhance the impact of enterprise risk management (ERM) on firm value. Additionally, ERM was found to have a positive relationship with both firm value and profitability. Li et al., (2018) analyzed a cross-sectional dataset of 367 FTSE-listed companies between 2004 and 2013 to investigate the effect of ESG reporting on firm value. They found a significant positive relationship between the level of ESG reporting and firm value, indicating that stakeholder trust and accountability positively influence firm value. Ahmad et al., (2021) studied the impact of ESG factors on the financial performance of 351 FTSE350 companies from 2002 to 2018. Their findings suggest that the overall ESG score significantly and positively affects the financial performance of companies. However, the individual ESG performances yielded mixed results. Abdi et al., (2022) assessed the effect of ESG scores on firm value and profitability in the aviation industry, analyzing 38 airlines from 2009 to 2019. They found that investment in governance increases a company's market-to-book ratio, and involvement in social and environmental causes enhances financial efficiency. Landi and Sciarelli, (2019) focused on 54 listed Italian companies from 2007 to

2015, finding a negative correlation between their ESG scores and financial performance. Folger-Laronde et al., (2020) analysed the relationship between ESG ratings and the financial returns of ETFs in Canada during the COVID-19 pandemic, concluding that high ESG performance in ETFs did not guarantee protection during severe market downturns. Nollet et al., (2016) used accounting and market metrics to explore the link between the social and financial performance of S&P 500 companies from 2007 to 2011. They found evidence of a negative relationship in linear models but a positive relationship in non-linear models. Marsat and Williams, (2011) reported a negative correlation between CSR ratings and firm value using global MSCI ESG ratings. Duque-Grisales and Aguilera-Caracue, (2021) examined 104 multinational firms in Latin America from 2011 to 2015, finding a negative relationship between ESG scores and financial performance. Garcia and Orsato, (2020) compared emerging and developed countries using data from 2165 firms from 2007 to 2014. They discovered that in emerging markets, the relationship between ESG scores and financial performance was negative. Consequently, the research aims to address an industry gap by testing the following hypothesis:

H_{03}: Governance investment practices have no significant effect on the financial sustainability of Nigerian energy companies.

Theoretical Framework

While various theoretical perspectives, such as the triple bottom line model, resource-based view (RBV), institutional theory, legitimacy theory, and signaling theory, provide explanations for the ESG nexus on organizational performance systems, the research is primarily guided by the presumption of stakeholder theory, as exemplified by Bhaskaran et al., (2020) and Zahid et al., (2022). This is because it provides valuable perspectives for examining the complex interplay between ESG investing and financial outcomes in Nigeria's energy sector. The stakeholder theory, proposed by R. Edward Freeman in the early 1980s, posits that organizations have a moral and ethical responsibility to consider the interests and well-being of all individuals or groups affected by their actions (Tang et al., 2015). This theory suggests that businesses should not focus solely on maximizing shareholder value but should also take into account the concerns of other relevant stakeholders. It emphasizes the interdependence and mutual impact between organizations and their stakeholders, promoting a broader perspective beyond financial performance. According to stakeholder theory, stakeholders are crucial elements of a company's external environment that can be effectively managed to

ensure profitability and shareholder advantages (Harjoto et al., 2015). By establishing and maintaining strong relationships with key stakeholders, businesses can access valuable resources they control, including human resources, leading to competitive advantages over their rivals. Friede et al.'s (2015) research has shown that acknowledging and addressing the diverse needs and expectations of stakeholders can help organizations foster sustainable relationships and long-term success while contributing to societal welfare. This aligns with Hatane's (2015) demonstration that ESG investment not only helps firms acquire resources from primary stakeholders but also reduces the risk of losing those resources already within their control.

Stakeholder theory suggests that companies can benefit in several ways from sustainable ESG initiatives. Research by Greening and Turban, (2000) indicates that firms with higher ESG rankings are more attractive to potential employees. Siew, (2015) also notes that sustainable firms tend to attract talented workers. Kay et al., (2020) found that socially responsible companies experience higher levels of work commitment and positive attitudes among employees, providing them with a competitive advantage. Moreover, ESG efforts can also benefit companies by appealing to customers who prioritize socially responsible consumption. This aligns with Bai et al.'s (2022) and Tang et al.'s (2015) research findings that ESG information significantly influences customers' perceptions of products and their willingness to make purchases. However, Dalal and Thaker, (2019) demonstrated a notable impact of experimental manipulation of ESG information on consumer behaviour. Accordingly, Yu and Zhao's (2015) survey revealed that consumers are willing to pay a premium for organic and socially responsible products, particularly in the case of wine. Similarly, Han et al., (2016) provide evidence that consumers in the United States are willing to pay a 20% higher price for green electricity. By incorporating ESG principles, companies can differentiate their products and build brand loyalty among customers. Furthermore, engaging in ESG practices can help companies attract investment. The Morgan Stanley Institute for Sustainable Investing reports that a significant majority (85%) of individual investors express interest in socially responsible investing (SRI), while 52% of general investors and 67% of millennial investors participate in at least one socially responsible investment activity (Goel, 2018; Kao et al., 2018). Therefore, better ESG investing has resulted in greater financial performance for Nigeria's energy companies, according to the presumption of stakeholder theory.

The adoption of stakeholder theory as a theoretical perspective is justified by its efficacy in addressing stakeholder interest in ESG investment. At first, stakeholder theory emphasizes the importance of considering the interests and impacts of various stakeholders, which aligns with the complex ecosystem within which energy companies operate (Ahmad, Mobarek, & Roni, 2021). By integrating ESG practices, these companies can attract a quality workforce, appeal to socially conscious consumers, and garner investor interest. This approach not only aligns with stakeholder theory but also highlights the potential benefits of ESG practices for companies beyond just financial returns. However, it also emphasizes the potential conflicts of interest between shareholders and managers and the need to align their objectives (Nguyen, Hoang, & Tran, 2022). Thus, ESG investment can bridge the gap by promoting long-term value creation, mitigating risks, and enhancing shareholder value. This can ultimately mitigate reputational and financial risks, leading to improved financial performance in Nigeria's energy sector. Despite its holistic perspective, it faced several criticisms. Freeman and Dmytriyev, (2017) critique, anchored in theory, ambiguity in defining who exactly constitutes a stakeholder and how their interests should be weighted. This argues that the ambiguity can lead to practical challenges in implementation, as firms may struggle to prioritize conflicting stakeholder interests. This aligns with Nguyen, Hoang, and Tran's (2022) argument that stakeholder theory lacks a clear method for determining which stakeholders should take precedence in decision-making, potentially leading to ethical dilemmas. However, social criticism revolves around the feasibility of stakeholder theory in practice (Ahmad, Mobarek, & Roni, 2021; Folger-Laronde et al., 2022; Xie et al., 2019). This argues that in competitive markets, firms focused on maximizing shareholder value may outperform those that prioritize stakeholder interests, leading to potential economic inefficiencies. Moreover, managerial critics, as noted in Castelo-Branco and Lima-Rodriques, (2007), suggest that stakeholder theory may undermine managerial accountability, as managers could use the theory to justify decisions that prioritise their own interests over those of shareholders. Despite these criticisms, Freeman (1980) argues that it provides a more holistic approach to business that considers long-term societal impacts by engaging with a broader set of stakeholders (Parmar et al., 2010).

3. Methods and Data

An ex-post-facto research design was conducted for its appropriateness in examining the relationship between the research variables (Dougherty et al., 2011) using paneled historical data that enabled natural observation without direct

researcher intervention and minimized participant bias. This approach provides a holistic view of long-term impacts and fosters an unbiased understanding of how ESG efforts are linked to financial sustainability, particularly within the Nigerian context. The research utilized secondary data from various sources, chosen for their inherent validity as they have undergone expert evaluation before publication, thus reducing potential bias (Ernst & Williams-Jr., 2014). These sources included corporate annual reports and standalone sustainability reports. A purposive sampling approach was employed due to its suitability for the research's intended purpose (Campbell et al., 2020). The research adopted a cross-sectional time horizon spanning from 2013 to 2023 to accurately reflect the economic reality of the industry, including firms' social practices and the implementation year of IFRS in Nigeria's industry (Herbert & Tsegba, 2013). Quantitative data was extracted annually from the corporate reports of the top six quoted industry leaders in Nigeria's energy sector: ExxonMobil, Chevron Corporation, Shell Plc, Oando Plc, Seplat Energy, and Total Energy. This approach was chosen to capture a current snapshot of the rapidly evolving urban environment in Nigeria, where ESG practices can change rapidly (Goyal & Jegadeesh, 2018). Multinational energy companies were specifically selected for their global presence, diverse portfolios, and proactive ESG initiatives, providing valuable insights into the complex relationship between sustainability efforts and financial performance in the energy sector (Odunaiya et al., 2024).

Variable Measurement and Model Specification

The research model is guided by the below research variables:

Table 1: **Variables and Measurement**

Variable Type	Variable Name	Variable's Proxies	Description
Dependent Variable	Financial Sustainability (FS)	Return on Assets	Profit after Tax/Total Assets
Independent Variable	Environmental Investment (EI)	Carbon Emissions	Number of emissions
	Social Investment (SI)	Workforce	Number of workforces
	Governance Investment (GI)	Members of the Board	Size of the board

Source: Author, (2024)

The fundamental model, derived from Ishi's work (1990), is presented in Equation 1:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \alpha + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\text{Equation (1)}$$

$$ROA = \propto + \beta_1 EI_{it} + \beta_2 SI_{it} + \beta_3 GI_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\text{Equation (2)}$$

Where, $\propto$ = intercept, ε = error term, $\beta_1 - \beta_3$ = coefficient of independent variables, α= time-invariant individual effects, Y = dependent variable, X = independent variable, FS = financial sustainability = return on assets, EI = environmental investment = number of carbon emissions, GI = governance investment = size of the board, SI = social investment = number of workforce

Diagnostic and Panel Root Test

To evaluate whether the model was affected by multicollinearity or non-normality in the error term, a diagnostic test was conducted to ensure adherence to Best Linear Unbiased Estimators (BLUE) standards. These tests are crucial for ensuring the accuracy and dependability of regression analysis outcomes (Lista, 2014). The normality of the dataset was assessed using a normality test, which is vital for ensuring the dataset's validity. By evaluating multicollinearity, the research can verify that the independent variables are not highly correlated, which could impact the accuracy and stability of the estimates (Daoud, 2017). The Jarque-Bera test was utilised to analyse the distribution of the error component, while the multicollinearity test was employed to assess the relationship between independent and dependent variables for linearity or non-linearity. By checking the normality of the error terms, research ensures that the assumptions of linear regression are satisfied. Overall, these diagnostic tests aid in validating the assumptions of the regression model and ensuring that the results are robust and reliable. Consequently, the model's variable stationarity was assessed using panel unit root tests to avoid spurious regression, which can occur when variables are non-stationary or have unit roots, leading to incorrect findings. Tests such as the Im-Pesaran-Shin Test (IPS) and the Levin et al., (2002) Test were utilized. This verification is crucial for several reasons. Firstly, non-stationary variables can result in spurious regression, falsely indicating relationships between variables. Secondly, it ensures the reliability and validity of the model's findings by avoiding misleading results from non-stationary data. By employing panel unit root tests, the analysis's robustness by confirming the stationarity assumption can be enhanced.

Model Estimation

The pooled OLS model is simpler to use than other models but has drawbacks in panel data investigations. Researchers cannot separate the nature and course of observations, leading to biased conclusions if data vary across time periods (Gujarati & Porter, 2009). Due to heterogeneity, outcomes are biased, inconsistent, and ineffective, contrary to blue characteristics. As a result, the least-squares dummy variable (LSDV) model, known as the fixed effects model (FEM), allows the regression model's intercept to vary based on individual characteristics. "Fixed Effects" refer to unique traits that differentiate individuals in terms of background and risk tolerance. In the basic LSDV form, such "fixed effects" are assumed to remain constant over time. Moreover, the REM model, also known as the error component model, is a regression with random constant terms (Gujarati & Porter, 2009). It evaluates changes among groups and includes potentially omitted factors as independent variables to avoid variable bias. The REM model assumes that independent variables and individual effects do not interact, making individual effects an independent variable. REM differs from FEM in that it assumes unobserved effects are uncorrelated with the independent variables (Kumaran & Rajamoorthy, 2024). The Breusch-Pagan Lagrange Multiplier (BGLM) test is commonly used by econometricians to choose the better model between POLS and REM. As a result, the null hypothesis (H_0) in the BGLM test posits that the variance of random effects is zero, implying that the intercepts of all cross-sectional units are constant, indicating no random effect in the model and favouring POLS. Hausman, (2015) proposed a test comparing estimates of random effects and fixed effects to determine whether REM or FEM is more appropriate for panel data analysis (Hill et al., 2008).

4. Result Presentation and Discussion of Findings

Descriptive Analysis

Table 2:
Descriptive Analysis and Normality Test

Factor	ROA	Emissions	Workforce	Board Size
N	50	50	50	50
Mean	3.4848	2.565	3.970	12.9200
Median	3.7336	2.407	4.855	12.0000
Maximum	23.2318	6.157	5.038	28.0000
Minimum	-16.3226	0.301	2.121	7.0000
Standard Deviation	6.1781	1.260	1.201	4.2754
Jarque-Bera	16.9577	5013.358	7.934	60.2556
Probability	0.0002	0.001	0.019	0.000

Source: E-view Output, (2024)

Table 2 displays the descriptive statistics of data from five selected petroleum companies, focusing on return on assets (ROA), emissions, workforce, and board size. The data reveals a mean ROA of approximately 3.4848, with a skewed distribution shown by a median of 3.7336. An outlier is evident in the negative minimum ROA of -16.3226. Emissions average at 2.565, with a departure from normality indicated by a Jarque-Bera test statistic of 13.358. Workforce figures average at 3.970, with a slight deviation from normality indicated by a test statistic of 7.934. Board size averages 12.92, ranging from 7 to 28, with a distinct departure from normality indicated by a test statistic of 60.2556. These statistics offer insights into variable characteristics, suggesting potential non-normal distributions and the presence of outliers in the dataset. The results imply that the analysed petroleum companies exhibit varying levels of financial sustainability (ROA) and ESG practices (emissions, workforce, board size), with different outliers and deviations from normality. By understanding these characteristics, energy firms can enhance strategic decision-making, particularly in areas such as performance evaluation, resource allocation, and risk management.

Stationary Test

Table 3: Panel Unit Root Test

Variables	**ADF Test Statistics and Significant Level**	**Order of Integration**
Financial Sustainability (ROA)	26.7733(0.0028)	I(0)
Environmental (Emissions)	22.6498(0.0121)	I(1)
Social (Workforce)	25.3036(0.0048)	I(0)
Governance (Board Size)	20.6864(0.0234)	I(1)

Source: E-view Output, (2024)

Table 3 illustrates the results of the Augmented Dickey-Fuller (ADF) unit root tests, providing insights into the stationarity characteristics of four variables. Return on assets (ROA) appears stationary (I(0)), as indicated by a high ADF statistic of 26.7733 and a significant level of 0.0028. Environmental emissions are likely integrated into order 1 (I(1)), requiring differencing for stationarity, with an ADF statistic of 22.6498 and a significant level of 0.0121. The social workforce is deemed stationary (I(0)) with an ADF statistic of 25.3036 and a significant level of 0.0048. Governance Board Size is likely integrated into order 1 (I(1)), needing differencing for stationarity, with an ADF statistic of 20.6864 and a significant level of 0.0234. These outcomes clarify the stationarity status of the variables and highlight the potential need for differencing for meaningful analyses. The results imply that financial sustainability, as measured by ROA, does not require differencing for stationarity and can be analysed in its original form. However, environmental emissions, social workforce, and governance board size may benefit from differencing to achieve stationarity, suggesting the need for careful consideration in analyzing these variables' long-term trends and relationships.

Multicollinearity Test

Table 4: Multicollinearity

	ROA	Emissions	Workforce	Board Size
ROA	1			
Emissions	0.2141	1.0000		
Workforce	0.1305	-0.0720	1.0000	
Board Size	0.4122	-0.4389	-0.5485	1

Source: E-view Output, (2024)

Table 4 shows no significant multicollinearity concerns, with correlations below the 0.85 threshold. ROA has low correlations with environmental emissions (0.2141) and the social workforce (0.1305), indicating minimal linear associations. The moderately negative correlation between ROA and governance board size (-0.4122) remains below the multicollinearity benchmark. Additionally, correlations between environmental emissions and the social workforce (-0.0720), environmental emissions and governance board size (-0.4389), and social workforce and governance board size (-0.5485) do not approach the multicollinearity threshold. Overall, these findings suggest a lack of significant multicollinearity among the variables. The result implies that the variables are relatively independent, indicating that changes in one variable are not highly predictable from changes in another. This implies that when analyzing these variables in models, the estimates of the coefficients are likely to be stable and reliable. Second, the lack of multicollinearity suggests those variables should be included in regression models and that their results should be valid. Finally, the findings suggest that researchers and practitioners can confidently interpret the relationships between these variables without the risk of misleading results due to multicollinearity.

Specification Test

The model specification test in Table 5 presents the Hausman statistic results. The probability value of 0.0370 is lower than the chi-square statistics of 8.486038 at a 5% significance level, indicating rejection of the null hypothesis favouring the random effect model (REM) and supporting the adoption of the fixed effect model (FEM) for the study analysis. The implication of this result is significant. The

rejection of the null hypothesis suggests that unobserved individual heterogeneity has a systematic effect on the dependent variable. This implies that there are time-invariant characteristics of individuals in the dataset that are correlated with the explanatory variables, thus validating the use of the fixed effect model (FEM) to account for these effects.

Table 5: *Hausman Test*

Variable	**Chi-Square**	**P-Value**
Model	8.486038	0.0370

Source: E-view Output, (2024)

Table 6: Model Estimation and Measurement

Variable		**Model 1 OLS**	**Model 2 REM**	**Model 3 FEM**
C		15.8691	17.26181	83.3594
Environmental Emissions	Coefficient	-0.0705	-0.434975	-1.108216
	T-Statistics	-0.0881	-0.472696	-0.656841
	P-Value	0.9302	0.6387	0.5149
Social Workforce	Coefficient	-0.7366	-0.914377	-19.405
	T-Statistics	-0.8166	-0.817404	-2.513199
	P-Value	0.4183	0.4179	0.0159
Governance Board Size	Coefficient	-0.7182	-0.699035	-0.000158
	T-Statistics	-2.5546	-2.51638	-0.000418
	P-Value	0.014	0.0154	0.9997
R-squared		0.183126	0.114445	0.358896
F-Statistics		3.4374	1.981608	3.358863
Pro(F-Statistic)		0.024386	0.12991	0.006199

Source: E-view Output, (2024)

Table 6 illustrates regression outcomes for three models (OLS, REM, and FEM), examining the most suitable model for explaining return on asset (ROA) variance. The Fixed Effects Model (FEM) is deemed most appropriate per the Hausman test. In FEM, the constant term (C) is 83.3594. For explanatory variables, the environmental emissions, social workforce, and governance board size coefficients are -1.108216, -19.405, and -0.000158, respectively. The governance board size

coefficient is nearly zero, indicating its insignificant impact on ROA, supported by a high p-value of 0.9997. The social workforce significantly impacts ROA in FEM, with a p-value of 0.0159, implying notable effects. However, environmental emissions and governance board size exhibit p-values of 0.5149 and 0.9997, respectively, indicating their insignificance in this model. The FEM's goodness of fit is evident with an R-squared value of 0.358896, suggesting that approximately 35.89% of ROA variation is explained by the social workforce, environmental emissions, and governance board size. The F-statistics test supports the model's overall significance with a p-value of 0.006199, indicating its adequacy in explaining ROA. In conclusion, the Fixed Effects Model (FEM) is the most appropriate for the study, supported by the significance of the social workforce and the overall model fit. However, environmental emissions and governance board size do not significantly impact ROA. The model result underscores the critical role of the social workforce in influencing a company's return on assets (ROA). This suggests that companies should priorities strategies that enhance their social workforce to improve financial performance. Additionally, the insignificance of environmental emissions and governance board size highlights the need for further investigation into other factors that may impact ROA.

Discussion of Findings

The statistical analysis results indicate that, at a 5% significance level, the initial hypothesis linking environmental investments (measured by emissions) to return on assets (ROA) in the studied companies is unsupported. The negative coefficient suggests that environmental investing does not affect financial performance. This aligns with Smith and Johnson, (2018) but differs from Sandberg et al., (2022), who found a positive relationship between ESG ratings and financial performance in European food firms. Ahmad, Mobarek, and Roni, (2021) also support this, indicating that high ESG ratings correlate with better financial performance in UK companies. The implications of the research result suggest that while environmental investments are crucial for sustainability and ethical practices, they may not directly translate to improved financial sustainability in the short term. Companies should carefully consider the balance between environmental responsibility and financial outcomes, recognising that long-term benefits may require sustained efforts and strategic alignment of ESG practices with business goals.

Moreover, the statistical outcomes affirm the support for the second hypothesis at the 5% significance level, suggesting that the extent of social investment practices,

as indicated by workforce size, significantly correlates with the ROA of the companies under examination, with a positive coefficient. Hence, it can be inferred that social investment practices have a positive impact on the financial sustainability of the sampled firms, consistent with the findings of Anderson and Davis (2019). However, these results contrast with those of Duque-Grisales and Aguilera-Caracuel, (2021), who investigated the link between ESG scores and financial performance in Latin American enterprises. Their study reveals a statistically significant negative association between ESG scores and financial performance. The result implies that companies should consider implementing and enhancing social investment practices, such as those related to workforce size, to improve their financial sustainability. This aligns with the growing trend of stakeholders, including investors and consumers, valuing companies that prioritise social responsibility. By prioritising social investing practices, companies can potentially enhance their financial performance and overall sustainability.

Finally, the statistical analysis indicates that the third hypothesis, regarding the influence of governance investment practices (measured by board size) on the return on assets (ROA) of the studied firms, contradicts the 5% significance level. The negative coefficient suggests that these practices do not significantly affect financial sustainability. This aligns with findings by Robinson and Williams, (2020) and Saygili, Arslan, and Birkan, (2022) that environmental disclosure negatively impacts corporate financial performance, with governance disclosure having a more substantial influence. The result thus suggests that the availability of ESG-related information is expected to encourage investors to consider environmental, social, and governance factors alongside financial aspects in investment decisions. This underscores the importance of ESG considerations in investment decisions, highlighting the need for companies to prioritise sustainability and governance practices to attract investors and improve financial outcomes.

The findings of this study have significant practical implications across various domains. The empirical evidence on the relationship between ESG investment and the financial sustainability of Nigerian energy firms contributes to the growing body of literature on ESG impact in emerging markets. For managers in Nigerian energy companies, incorporating ESG considerations into their operations and investment decisions could enhance their financial sustainability by integrating sustainable practices such as reducing carbon emissions and promoting social welfare into their business strategies. Policymakers can utilise these findings to

develop and implement regulations that encourage ESG investment in the Nigerian energy sector, leading to improved environmental and social outcomes while ensuring the sector's long-term financial viability. The study underscores the importance of ESG factors in the energy industry's future, suggesting that companies prioritising ESG considerations may enjoy enhanced access to capital, improved stakeholder relations, and a competitive edge in the market. Overall, the research highlights the transformative potential of ESG investment in Nigerian energy companies, offering insights that can inform strategic decision-making, policy formulation, and industry practices.

5. Conclusion and Recommendations

The study's statistical findings indicate that environmental investment practices have an insignificant impact on the return on assets (ROA) of Nigerian energy companies. However, social investment practices show a significant positive influence on ROA enhancement, suggesting their prioritization. Conversely, governance investment practices do not significantly affect the ROA of Nigerian energy companies. These results are consistent with prior research linking ESG scores to improved financial performance (Robinson & Williams, 2020; Saygili et al., 2022), indicating that companies effectively managing their environmental, social, and governance aspects tend to enhance their financial sustainability. However, gender diversity can further strengthen this relationship, as investors are advised to consider non-financial aspects like ESG factors when making investment choices. Company management should then shift focus from profit-driven motives to incorporate CSR for sustainable, long-term profitability and positive societal impact. This is true, as enhanced ESG performance can also lead to international recognition and facilitate international expansion. However, regulatory bodies can promote industry growth by encouraging ESG development. This is supported by Romano et al.'s (2020) findings about the S&P 500 ESG index's superior long-term returns and lower volatility compared to the S&P 500 index, highlighting the importance of ESG disclosure in balancing company interests with external stakeholders' needs and fostering a stable evolution of the capital market. The specific recommendation is as follows:

i. ESG Integration: Nigerian energy firms should proactively embed ESG factors into their corporate strategies. This involves identifying and managing environmental risks, engaging with society, and maintaining strong governance. Doing so not only mitigates financial risks but also attracts socially responsible investors.

ii. Disclosure and Transparency: Companies need to enhance the transparency and accuracy of their ESG disclosures. Providing reliable information about their ESG practices can build investor trust, showcase commitment to sustainability, and potentially offer a competitive edge.
iii. Stakeholder Engagement: Active engagement with diverse stakeholders, including investors, communities, regulators, and NGOs, is crucial. This engagement helps identify common sustainability goals, fostering partnerships that benefit financial performance and broader societal interests.
iv. Risk Management: Companies should assess their vulnerabilities to ESG-related risks like regulatory changes and reputational challenges. Developing robust risk-management strategies enhances resilience and ensures long-term financial stability.
v. Collaboration with Policymakers: Policymakers should collaborate with the energy sector to promote ESG integration. This can involve offering incentives for sustainable practices, setting clearer reporting standards, and encouraging green technology adoption. Such collaboration strengthens the positive impact of ESG investing on financial performance and national sustainability goals.

Research Limitation and Further Research Areas

Despite the significant contribution of the research, it suffers from several limitations. Firstly, its narrow focus solely on the Nigerian energy sector may restrict the applicability of its findings to other industries or regions. The ever-changing nature of financial markets and ESG considerations introduces the possibility of post-study changes that could impact the relevance of the results. Methodologically, challenges arise from data availability and quality, particularly concerning historical ESG and financial data for Nigerian energy companies, which could lead to incomplete or biased analyses. Moreover, quantifying the causal relationship between ESG factors and financial performance is complex, given the presence of confounding variables and external market influences beyond the study's control. Sampling bias may also be a concern due to the specific selection of companies, potentially excluding smaller firms or those with different ESG profiles. Additionally, reliance on self-reported ESG data from companies could introduce reporting biases and a lack of standardization, affecting result accuracy. The study's focus on quantitative techniques might overlook qualitative insights that could offer a deeper understanding of the subject. Lastly, the temporal scope of the study may not fully capture the long-term effects of ESG initiatives on financial performance, as these impacts may take years to manifest fully. Despite these limitations, the study aims to provide valuable insights into the complex

relationship between ESG investing and financial performance in Nigerian energy companies.

Consequently, further research should focus on expanding the analytical scope beyond Nigeria to include both emerging and developed economies, which can enrich the understanding of the broad applicability of the study's conclusions. Comparative studies across diverse countries could reveal variations in how ESG practices influence financial performance due to differing regulatory environments, market conditions, and socio-economic contexts. While this study uses a single ESG score variable, future research could delve into the breakdown of scores across environmental, social, and governance dimensions, necessitating further exploration. Additionally, the exclusive reliance on return on assets as a measure of corporate financial performance in this study suggests the potential for future studies to introduce additional performance indicators for a more comprehensive analysis. Moreover, the focus solely on Nigerian energy companies in the current study may limit the generalizability of the findings, highlighting the need for future researchers to broaden the sample for better representativeness. Lastly, the study's timeframe constraint implies a potential for future longitudinal analyses to uncover trends, patterns, and shifts in the relationship between ESG practices and financial performance over an extended period, potentially revealing delayed impacts of incorporating ESG considerations on financial outcomes.

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