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Department of Philosophy and Religious Studies, Tansian University, Umunya

GREENHOUSE GAS EMISSION AND ENERGY CONSUMPTION DISCLOSURE ON MARKET COMPETITIVENESS OF LISTED NON-FINANCIAL FIRMS IN NIGERIA

Agbo, Emmanuel, Uchenna, Uwaleke & Achema, Friday
Department of Accounting, Veritas University Abuja
achemaf@veritas.edu.ng

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Abstract
This study examinedthe effect of Greenhouse Gas emission (GHGD) and energy consumption disclosure (ECDI) on the market competitiveness of listed non-financial firms on the Nigerian Exchange Group (NGX).Market competitiveness was proxied using the market-to-book ratio (MTBR).The study anchored on two theories: 'agency theory' and 'stakeholder theory'. The expost facto research design was used and a purposive sample of thirty-eight non-financial firms listed on the NGX during the study period were selected as the sample. This study utilised secondary sources of data, from annual financial statements retrieved from the MachameRatios® database. The data were analysed using multiple regression techniques. The results showed a significant negative effect of the GHGD on MTBR (p=0.0164); while ECDI had a non-significant positive on the MTBR (p=0.1140) of listed non-financial firms. The study concludes that GHG emissions and energy consumption disclosure affect the market competitiveness of listed non-financial firms in Nigeria. The study recommends that management and boards of non-financial firms should strive for increased transparency and disclosure of Greenhouse Gas emissions by companies. Companies can enhance their reputation among environmentally conscious investors by disclosing their GHG emissions, demonstrating their commitment to sustainability and climate responsibility. The management of non-financial firms should improve the energy consumption disclosure of their activities. Companies can enhance investor trust and confidence by disclosing their energy consumption levels and providing valuable information about their operational efficiency and resource management practices.

Keywords: Greenhouse, Gas Emission, Energy Consumption, Disclosure, Market Competitiveness.

Introduction
Market competitiveness refers to the level of competition among producers in a market. A competitive market is characterized by many producers competing to provide consumers with the goods and services needed. Market competitiveness is influenced by various factors such as corporate political activity and corporate social responsibility enhancing firm competitiveness, especially in developing markets (Adomako *et al.*, 2023). Additionally, ownership concentration, financial policy, and profitability significantly affect the market value of non-family firms, with leverage and profitability positively impacting market value (Miao *et al.*, 2022). Firms must assume responsibility for environmental protection initiatives, such as reducing carbon emissions, utilising green energy, and reducing the effects of climate change, etc. (Zhang & Lucey, 2022). Research indicates that there is a direct relationship between market competitiveness and disclosure of greenhouse gas emissions (Prado-Lorenzo *et al.*, 2009). Companies that disclose greenhouse gas emissions voluntarily through platforms like the Carbon Disclosure

Project (CDP) are viewed more favourably by investors, suggesting that such disclosures are valued in the market and can influence equity values (Griffin *et al.*, 2017). Energy consumption disclosure can influence consumer behaviour by affecting how individuals discount future operating costs, ultimately guiding them towards more energy-efficient choices (Kontokosta, 2013). Energy disclosure plays a crucial role in transforming market behaviour by providing transparent information on energy performance (Heinzle, 2012).

Since the early 90s till date, firms have been pressurised to meet demands for different types of performance from their multi-faceted stakeholders, along with regulatory enforcement (Bodhanwala & Bodhanwala, 2018; Nishitani *et al.*, 2017). Consequently, firms have incorporated environmental management, mandatorily and voluntarily, in an effort to enhance their environmental performance (Nishitani *et al.*, 2017). Thus, non-financial firms need to respond to social and environmental matters. As a response, the Nigerian Exchange Group (NGX) has demonstrated efforts at integrating sustainability into existing business models, which culminated in the production of the Sustainability Disclosure Guidelines (SDG), covering environmental, social, and governance (ESG) issues. Thus, it would signal management efficiency and be a sign for the capital market to enhance credit ratings (Jeroh & Okoro, 2016).

Recently, little amount of work has been done to increase environmental awareness in developing countries and to look at the effect on the market competitiveness of firms (Kavitha & Sulaipher, 2023). This is because studies have shown that reporting only the economic dimension of an organization is not sufficient for, investors and other stakeholders to demand that companies report their environmental and societal impact (Maama & Appiah, 2019). Prior research documents mixed findings on the relationship between environmental disclosures and corporate performance using global or national datasets (Sekhon & Kathuria, 2019). Fatemi*et al.* (2018) using the Bloomberg ESG score find that such disclosures increase market valuation. Studies such as Zhang and Lucey (2022) revealed that ESG performance has a significant positive effect on firm performance. Hasan*et al.* (2022) in India, showed that ESG positively associated with financial performance. Buallay (2021) using a worldwide sample of agricultural firms showed that ESG had a non-significant positive relationship with ROA, ROE and Tobin's Q.

The non-financial industry has continued to be a defining aspect of the Nigerian economy. Non-financial firms are the main subjects of resource consumption and environmental damage (Tang *et al.*, 2022).The current study intends to address the population gap from prior studies, by looking at non-financial firms categorisation, and more specifically heavy polluting industrieson the NGX.Secondly, the study intends to address the variable gap from prior studies, by looking at the influence of greenhouse gas emission disclosure and energy consumption disclosure on the market competitiveness of listed non-financial firms in Nigeria. Stakeholder pressure increases after events like emissions that have a negative impact on social and environmental well-being (Sisaye, 2021). In the Nigerian context, studies that investigate factors influencing environmental accounting information disclosure fall into two groups: those that focus on determinants (Onyali, Okafor, & Egolum, 2014). The second line of research focuses on the nexus of environmental accounting information and corporate performance. They include studies by Asuquo, Dada, and Onyeogaziri (2018), green accounting by Egbunike and Okoro (2018), and sustainability accounting and reporting by Nnamani, Onyekwelu, and Ugwu (2017).

Another stream included studies on the banking industry by Onyekwelu and Ekwe (2014), and telecommunication companies by Udeh and Ezejiofor (2018). This justifies the necessity to look into how non-financial firms that are publicly traded account for GHG and energy consumption disclosure. The specific objectives of the study are to:

1. Evaluate the effect of greenhouse gas emission disclosure on the market-to-book ratio of listednon-financialfirms in Nigeria.
2. Determine the effect of energy consumption disclosure on the market-to-book ratio of listednon-financial firms in Nigeria.

Literature Review

GreenhouseGas Emission Disclosure (GHGD)

Greenhouse gases trap heat and make the planet warmer. A worldwide agreement for reducing GHG emissions, the Kyoto Protocol, was ratified by more than 160 countries in 1997. The target was a reduction of 5.2% from 1990 levels within the year 2012 (Cucchiella *et al.*, 2017). Human activities are responsible for almost all of the increase in greenhouse gases in the atmosphere over the last 150 years (USEPA, 2023). GHG has become a major factor that hinders global sustainable development and endangers human life (Peng *et al.*, 2022). The United Nations and the European Union have further mentioned the 17 Goals for People, Planet and the Post-2015 EU and Global Development Framework to integrate ecological protection and sustainable development into their long-term development strategies. The main sources of GHG due to human activity are:

- Carbon dioxide (CO2): CO2 is naturally present in the atmosphere as part of the Earth's carbon cycle, but human activities such as burning fossil fuels for electricity, heat, and transportation have significantly increased its concentration in the atmosphere.
- Methane (CH4): Human activities emitting methane include leaks from natural gas systems and the raising of livestock. Methane is also emitted by natural sources such as termites. In addition, natural processes in soil and chemical reactions in the atmosphere help remove CH4 from the atmosphere.
- Nitrous oxide (N2O): Human activities that contribute to N2O emissions include agricultural and industrial activities, as well as fossil fuel combustion.
- F-gases: These are a group of trace gases that include hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (Sf6).

GHG contributes to pollution, biodiversity loss, and emissions, among others (Rahi, Akter, & Johansson, 2022). The methane emissions resulting from the inefficiency of the flare combustion contribute significantly to global warming. This is particularly so in the short to medium term, according to the Intergovernmental Panel on Climate Change, methane is over 80 times more powerful than carbon dioxide as a warming gas in a 20-year timeframe. Secondly, black carbon - more commonly known as soot - is another pollutant released by gas flares. Black carbon is produced through the incomplete combustion of fossil fuels and despite remaining in the atmosphere for just a few days or weeks, black carbon may have the second-largest warming effect on the atmosphere, after carbon dioxide.The failure to consider GHG by stakeholders can result in conflicts and reduce financial performance (Arvidsson, 2014). Presently, companies cause a lot of environmental problems because of profit maximization, endless needs, rapidly advancing technological developments, and unconscious consumption of natural resources, as they execute their operations (Hasan & Hakan, 2012). According to Ali (2002), there are several reasons for the growing interest in such costs, such as strategic cost leadership, prioritizing such costs for managerial decision making and the growing demands from different stakeholders (government, investors,

lenders, banks, non-governmental organizations, etc.) to have such data. They further noted that many environmental costs can be significantly reduced or eliminated as a result of business decisions, ranging from operational and housekeeping changes to investment in cleaner production, to redesign of processes/products.

Studies have substantiated the link between GHG disclosure and the market competitiveness of non-financial firms across several contexts. The study by Lu *et al.* (2017) demonstrates that environmental accounting can influence specific behaviours that result in the efficient use of capital, which in turn can enable corporate managers to make better investment decisions. By examining manufacturing enterprises in 30 different nations, El Ghoul *et al*. (2018) discovered that CSR can assist lower the cost of equity capital and decrease firms' risk exposure, easing financial limitations.

Energy Consumption Disclosure (ECDI)

Energy consumption is a significant contributor to greenhouse gas emissions. According to the United Nations, cities consume 78% of the world's energy and produce more than 60% of greenhouse gas emissions. The energy supply sector, which includes electricity, heat, and other energy, is the largest contributor to global greenhouse gas emissions, responsible for approximately 73% of total emissions (United Nations, 2023). Energy consumption is an important means of corporate environmental governance strategy (Tang *et al.*, 2022). Presently, global organisations and scholars alike have argued for the use of sustainable practices or green innovations in business and production. ECDI is important in today's business environment, which is highly competitive and volatile due to frequent changes and rapid advancements in technology. This non-financial disclosure can help managers in the fulfilment of their strategic objectives (Alewine & Stone, 2013).Firms with responsible energy consumption satisfy the interests of stakeholders which improve firm performance (Aboud & Diab, 2018).

Using data from China's 209 listed companies that belong to heavily polluting manufacturing industries, Xie *et al.* (2019) found that both green process innovation and green product innovation can improve a firm's financial performance. Farza *et al.* (2021) investigated the relationship between green innovation and corporate financial performance for German HDAX companies from 2008 to 2019 and found a linear positive effect of green innovation on different financial performance measures. Zeng *et al.* (2010) found that cleaner production activities positively influenced financial performance indicators in Chinese firms. Yet others, such as de Azevedo *et al.* (2019) examine the role of green innovation intensity on financial performance based on data from 356 multinational firms and found that there is no significant association of green innovation's intensity with firm financial performance in the immediate year. Furthermore, energy consumption disclosure mitigates the information asymmetry between investors and enterprises and enables investors to better measure the potential risks and future opportunities of enterprises and reduce their investment risks (Healy & Palepu, 2001; Dhaliwal *et al.*, 2011). Lucato *et al.* (2017) found a non-significant link between environmental management and corporate performance.

Market Competitiveness

Market competitiveness refers to the ability of a company to effectively compete in the market against its rivals (Burinskienė & Daškevič, 2023; Li, 2020). It involves optimizing resources, implementing strategic marketing strategies, and continuously evaluating and adjusting these strategies to gain a competitive edge (Turgunpulatovich, 2022). Market

competitiveness refers to the capacity to sustain or grow market share through low costs or product features in comparison to similar industries in other countries (Turgunpulatovich, 2022). Evaluating market competitiveness involves assessing various factors such as product competitiveness, market conditions, and sales performance (Shvindina, 2022).The process of assessing an organization's level of competitiveness starts with evaluating the impact factors. These factors, which can be either endogenous or exogenous depending on their sphere of influence, play a crucial role in determining competitiveness (Achema et al, 2022).

Endogenous factors, which are internal to the organization, include processes, systems, human capital, organizational structure, efficiency, and practices.Internal factors within businesses and organizations work together to enhance productivity and establish a sustainable competitive edge.Considering external factors is crucial, as organizations are integrated into industries and function within various environments. External factors have the potential to impact an organization's competitive standing by influencing and altering the external resources and opportunities available (Kotenko, Heiets, & Yacout, 2021). Competitive strategies vary among businesses, with some focusing on being market leaders, challengers, followers, or niche players.

Theoretical Framework

Agency Theory

Agency theory was proposed by Jensen and Meckling (1976). According to Jensen and Meckling (1976),an agency relationship is a form of "contract under which one or more persons (the principal(s) engage another person (the agent) to perform some service on their behalf which involves delegating some decision-making authority to the agent". The theory implies that agency costs arise from the divergence of ownership and control (Murekefu & Ouma, 2012). Agency cost is an internal cost which arises between management (agent) and shareholder (principal), because of the differing interests of the two groups (Jensen *et al.*, 1992; Jensen & Meckling, 1976). There are two types of agency costs present in an organization: first, due to conflicts between shareholders and management (Myers, 1977) and the other due to conflicts between shareholders and debt holders (La Porta*et al.*, 2000). In addition, free cash flow (FCF) is also a form of agency cost which increases agency costs as managers use this for their own compensations and benefits or use in some low returns projects (Zhang, 2009; Yermack, 2006).

Agency theory is an important issue in corporate governance and has a significant impact on corporate decisions, such as environmental accounting information disclosure, among others and ultimately the performance of the organization (Byrd, 2010).Eisenhardt (1989) outlined two streams of the theory which developed over time: the *principal-agent* where both act in concert and the *positivist* perspective where they are likely to have conflicting goals. She further explained that the agency problem arises when "(a) the desires or goals of the principal and agent conflict and (b) it is difficult or expensive for the principal to verify what the agent is actually doing".

Agency theory rests on a number of assumptions, including human assumptions, of self-interest, bounded rationality and risk aversion; organisational assumptions, of partial goal conflict among participants, efficiency as the effectiveness criterion and information asymmetry between principal and agent; and, information assumptions, on information as a valuable commodity.

Stakeholder Theory

The stakeholder theory was propounded by R. E. Freeman (1984). According to the stakeholder theory, management choices should balance and accommodate all stakeholders' interests. According to Freeman (1984), managers are required to comprehend the organisational strategy utilised by organisations to manage their interactions with stakeholders as well as the range of transactions that take place between those organisations and their stakeholders. Based on a stakeholder perspective, companies need to fulfil expectations beyond mere shareholder interest, satisfying many stakeholders, such as employees, customers, suppliers, financiers, communities, government bodies, political groups, trade associations, and trade unions (Freeman, 1984; Ifeani *et al.*, 2016).

According to Freeman (1984), a firm interacts with a wide range of stakeholders, including governments, rival businesses, groups that support consumers and the environment, the media, and others. In this regard, firms benefit from social and environmental responsibility, where stakeholder relationships are key to the expression of such responsibility (Sisaye, 2021). Stakeholders have different expectations of firm performance, and firms need to please the different stakeholders to ensure long-term survival and success. Freeman and Reed (1983), state that "management thought has dramatically changed in recent years. There have been, and are now underway, both conceptual and practical revolutions in the way that management theorists and managers think about organizational life". The authors have proposed two definitions of stakeholders: a wide and a narrow sense. The wide sense includes "any identifiable group or individual who can affect the achievement of an organization objectives" whereas the narrow sense includes any identifiable group or individual on which the organization is dependent for its continued survival.

Freeman *et al.* (2010) hold that: (1) the basic objective of a firm is to create value for stakeholders; (2) business is a set of relationships among groups which have a stake in the business activities; (3) business is about how customers, suppliers, employees, financiers (such as stockholders, bondholders, banks, or investors), communities, and managers interact and create value (ACHEMA Friday, 2023).

Empirical Review

Agyemang *et al.* (2023) conducted a study titled "Environmental accounting and performance: empirical evidence from China". Using a sample of fifty-one companies in the mining sector, the authors utilized secondary data from 2000 to 2020 and utilized the Common Correlated Effects Mean Group (CCEMG) estimation for the long-run analysis. The CCEMG estimator was employed because it deals with possible cross-sectional dependencies, heteroscedasticity, serial correlation, and endogeneity, thereby freeing the results from these issues. The findings revealed a mixed conclusion between board attributes and EAID. Moreover, the findings posit that both EAID and EPI have a positive slope connection with the profitability of the mining firms.

Agyemang *et al.* (2023) studied "Assessing the impact of environmental accounting disclosure on corporate performance in China".This explored the relationship between EAID and firm performance using a sample of 34 listed mining companies and secondary data from 2000 to 2018. The study identifies 12 variables to measure firm performance and uses Principal Component Analysis (PCA) to reduce them to four factors. The GMM

regression analysis is then employed to analyze the data. The results show that there is a positive relationship between EAID and return on equity and quick ratio, while return on assets (ROA) has a positive but insignificant link with EAID.

Javed (2023) conducted a study titled "Environmental management accounting and corporate performance: The mediating role of corporate environmental ethics: evidence from the manufacturing sector". The study adopted a quantitative design and relied on primary data from the Indian manufacturing sector. The sample comprised 384 participants which were analysed using CFA and SEM. The results showed that EMA adoption was positively associated with firms' financials, environmental, and social performance; which was significant and positive.

Wang*et al.*(2023) examined the "Impact of environmental information disclosure on corporate performance in the building material industry". The sample comprised Chinese A-share listed companies in the building materials industry from 2015 to 2019. The data were analysed using multiple regression techniques. The results showed that environmental information disclosure significantly positively correlated with corporate performance at the 1% level.

Zhang and Lucey (2022) conducted a study titled "Sustainable behaviors and firm performance: The role of financial constraints' alleviation". The sample comprised 215,110 firm-year observations from global, publiclytraded firms during the period 2016-2020. The data were analysed using the multiple regression technique and the results revealed that ESG performance has a significant and positive effect on firm performance.

Rahi*et al.* (2022) conducted a study titled "Do sustainability practices influence financial performance? Evidence from the Nordic financial industry". They adopted a quantitative design. The sample comprised 39 financial firms in the Nordic region, i.e., Sweden, Denmark, Finland and Norway. The study relied on secondary data obtained from the Thomson Reuters Eikon database from 2015 to 2019. The data were analysed using the fixed effects model and generalised method of moments. The empirical results revealed that ESG is negatively related to financial performance, i.e., return on invested capital, return on equity and EPS.

Hasan*et al.* (2022) conducted a study titled "Does corporate social responsibility disclosure impact firm performance? An industry-wise analysis of Indian firms". The sample comprised 287 Indian firms. The study relied on secondary data from the financial year 2014 to 2019. The data were analysed using the pooled OLS, fixed and random effects models. In consumer goods, consumer services and heavy engineering, ESG was positively associated with financial performance; while, in the healthcare, energy and utility firms, the relationship between ESG and financial performance was negative.

Buallay (2021) conducted a study titled "Sustainability reporting and agriculture industries'performance: worldwide evidence". The sample comprised 1426 observations from 31 countries over ten years, i.e., from 2008 to 2017. The secondary data were analysed using multiple regression techniques and the dependent variables were: ROA, ROE and Tobin's Q. The results showed that ESG had no significant relationship with ROA, ROE and Tobin's Q.

Dakhli (2021) undertook a study titled "The impact of corporate social responsibility on firm financial performance: does audit quality matter?". The sample comprised 200 French firms. The secondary obtained from annual financial reports from 2007 to 2018. The data were analysed using the panel regression technique. The results showed that ESG positively affected firm financial performance measured using the ROA, ROE and Tobin's Q.

Buallay*et al.*(2020) conducted a study titled "Corporate social responsibility disclosure and firms' performance in Mediterranean countries: A stakeholders' perspective". The quantitative study relied on secondary data from 203 firms listed in six Mediterranean countries for a period of 10 years, i.e., 2008 to 2017. The results showed that CSR disclosure negatively affects operational and market performance but had no effect on the financial performance proxy.

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

Buallay*et al.* (2020) conducted a study titled "Sustainability reporting and performance of MENA banks: is there a trade-off?" The sample comprised 59 banks in the Middle East and North Africa (MENA) region. The study relied on secondary data from annual financial reports from 2008 to 2017. The results showed a significant positive effect of ESG on firm performance, i.e., proxied using ROA and Tobin's Q.

Sekhon and Kathuria (2019) conducted a study titled "Analyzing the impact of corporate social responsibility on corporate financial performance: evidence from top Indian firms". The study employed a quantitative approach and the sample comprised the top 137 companies listed in CNX-500. The secondary data covered from 2008 to 2017. The data were analysed using a panel regression technique. The study finds a negative influence of CSR on financial performance, i.e., proxied as ROE.

Bodhanwala and Bodhanwala (2018) conducted a study "Does corporate sustainability impact firm profitability? Evidence from India". The sample comprised 58 Indian companies that regularly participate in the Thomson Reuters Asset 4 ESG database. To examine the effect of sustainability (environmental, social, and governance) on company profitability, an empirical multivariate panel data model is created. Additionally, the study aims to determine whether high-ranking businesses perform superior to low-ranking businesses. A parametric t-test was used to test this. The study finds a significant positive relationship between sustainability and firm performance measures (ROIC, ROE, ROA and EPS). The evidence suggests that firms that practice remarkable sustainable development strategies report higher profitability and have substantially low gearing levels.

Cucchiella *et al.* (2017) conducted a study titled "The management of greenhouse gas emissions and its effects on firm performance". The study sample comprised 500 Italian

firms from 2008 to 2013 for a total of 2904 observations. To achieve this purpose, this paper applies a simple theoretical model derived from a Cobb–Douglas production function and an inverse demand function to identify how these effects influence a firm's economic performance. The results showed that GHG management brings about an increase in sales through an increase in demand by environmentally conscious customers and through cost reductions given by the improvement in productivity.

Nishitani *et al.* (2017) undertook a study titled "Does corporate environmental performance enhance financial performance? An empirical study of Indonesian firms". This study examines if a firm's environmental performance improves its financial success and why this occurs using data from a questionnaire survey of Indonesian businesses. The main findings of the regression analysis are as follows. First, firms that implement environmental management more aggressively are more likely to reduce greenhouse gas (GHG) and pollution emissions. Second, firms that reduce GHG emissions to a greater extent are more likely to enhance profit further, whereas this is not the case for firms that reduce pollution emissions more. Third, firms that reduce GHG emissions more are more likely to improve productivity and are not more likely to increase sales.

In prior studies the firm performance has mostly been measured using two main methods in the classical research literature: One is the value measurement based on the capital market, such as Tobin's Q; the other is accounting profitability indicators, such as return on net assets and return on total assets. In most studies, scholars use profitability indicators to represent the financial performance of enterprises. Therefore, this study selects the market-to-book (MTB), which can reflect the utilization efficiency of total assets.Previous research attempting to link environmental and financial performance produced mixed results. This study focuses on the connection between greenhouse gas emissions and energy consumption disclosure on the market-to-book ratio of listed non-financial firms in Nigeria.

Methodology

The study employed the *expost facto* research design, in which the observer has no direct control of the variables because their manifestations have already occurred. The area of the study is Nigeria, as the study focuses on non-financial firms listed on the NGX as of 31st December 2023. The study sample comprised thirty-eight listednon-financial companies listed on the Nigerian Exchange Group (NGX) as of 31st December 2023. The sample was selected usingthe purposive sampling technique. Thestudy utilised secondary data from the Annual Reports of the selected oil and gas, industrial goods and consumer goodssectors of NGX. The Companies and Allied Matters Act require companies to keep and produce accounts that render a true and fair view of the state of affairs of the company.

Method of Data Analysis

The data were analysed using descriptive and inferential statistical techniques. The hypotheses were tested using the multiple regression technique. Multiple regression is a statistical technique to analyze the relationship between a single dependent variable and several independent variables (Sekaran & Bougie, 2010). The study used panel regression analysis to capitalize on its strength to control for omitted/unobservable variables that threaten causal inference in observational studies (Halaby, 2004). The panel data approach is consistent with the cross-sectional and time-series properties of the data and is employed in studies by Agyemang *et al.* (2023) in China and Javed (2023).

Control Variables

The study employs the firm size and firm leverage as control variables in this study. Younis and Sundarakani (2020), using a sample of firms in the UAE found that there is a positive relationship between firm size and environmental performance, economic performance and social performance. Firm size has also been employed in the study by Oraka and Egbunike (2016). They found a negative effect of firm size on total asset turnover and cash flow ratio. Firm size positively correlated with the current ratio.Alareeni and Hamdan (2020) on a sample of the US S&P 500-listed companies showed that ESG, CSR, EVN and CG tend to be higher with firms that have high assets and high financial leverage. Furthermore, Bodhanwala and Bodhanwala (2018) using a sample of 58 Indian companies that regularly participate in the Thomson Reuters Asset 4 ESG database find evidence that firms that practice remarkable sustainable development strategies report higher profitability and have substantially low gearing levels. And, the study by Tang *et al.* (2022) also employed the company size (SIZE) and capital structure (LEV), as control variables to rule out the influence of other factors on the dependent variable. Liu *et al.* (2021) also included firm size and leverage in examining the impact of natural resources and the environment on firms.

Model Specification

The following model from the study of Oladele *et al.* (2021) was adapted for the study. The model is specified as follows:

$$ROA = \beta_0 + \beta_1 ENV_t + \beta_2 BC_t + \beta_3 EMR_t + \beta_4 CR_t + \Sigma_{it} \ldots\ldots\ldots (1)$$

Where:

ROA = Returns on Asset
ENV = Environmental Reporting
BC = Board Composition
EMR = Employee Relations
CR = Community Relations

The modified model is shown below as follows:

$$MTBR_{it} = \beta_0 + \beta_1 GHGD_{it} + \beta_2 ECDI_{it} + \beta_3 FSIZ_{it} + \beta_4 FLEV_{it} + \mu_i \ldots (2)$$

Where:

MTBR = Market to Book Ratio
GHGD = Greenhouse Gas Emission Disclosure
ECDI = Energy Consumption Disclosure
FSIZ = Firm Size
FLEV = Firm Leverage
β_0 = Intercept (Constant)
$\beta_1 - \beta_4$ = Coefficients of the explanatory variables
μ_i = Error term

Variables in the Model

The following firm-specific dependent, independent and control variables were included in the model analysis:

Table 1: List of variables for multiple regression analysis

Variables	Description	Source
MTBR	Market Value of Equity/Capitalisation / Book Value of Equity	Liu *et al.* (2021)
GHGD	'1' if an item of GHG is disclosed, '0'otherwise	Zhang & Lucey (2022);, Akter, & Johansson (2022)
ECDI	'1' if an item of energy consumption is disclosed, '0'otherwise	Zhang & Lucey (2022); Rahi, Akter, & Johansson (2022)
FSIZ	Natural logarithm of total assets	Younis & Sundarakani (2020)
FLEV	Debt to total assets	Younis & Sundarakani (2020)

Source: Researcher's Compilation (2023)

Data Analysis

Descriptive Statistics

The descriptive statistics were computed for the dataset in this section using the key parameters. The results revealed important information about the distribution and central tendency of the data.

Table 2:Descriptive statistics of model variables

	MTBR	GHGD	ECDI	FSIZ	FLEV
Mean	2.875618	2.326582	2.093671	7.338772	50.51680
Median	0.670000	3.000000	2.000000	7.562265	61.97000
Maximum	140.8700	5.000000	5.000000	9.378765	1449.190
Minimum	0.000000	0.000000	0.000000	4.758056	-1844.060
Std. Dev.	11.46723	1.479874	1.573523	1.030886	230.7540
Skewness	7.994443	-0.492545	0.091670	-0.443743	-2.851256
Kurtosis	76.62645	2.307198	1.912168	2.455042	40.03716
Jarque-Bera	93425.71	23.87077	20.02966	17.85085	23111.95
Probability	0.000000	0.000007	0.000045	0.000133	0.000000
Sum	1135.869	919.0000	827.0000	2898.815	19954.13
Sum Sq. Dev.	51809.96	862.8709	975.5342	418.7139	20979477
Observations	395	395	395	395	395

Source: E-Views 11

Key: MTBR-Market to Book Ratio; GHGD-Greenhouse Gas Emission Disclosure; ECDI- Energy Consumption Disclosure; FSIZ-Firm Size; FLEV-Firm Leverage.

The Table above indicated that on average the value of MTBRof the sampled companies was 2.88 while its median value was 0.67. The maximum value of MTBR was 140.87 while the minimum was 0.00. The Skewness and Kurtosis had positive values of 7.99 and 76.63, which implies that the distribution is peaked than normal. The J-B statistic confirms the non-normality of the distribution. The average GHGD is 2.33, the median value is 3.00.

The maximum value of GHGD was 5.00 while the minimum was 0.00. The Skewness had a negative value of -0.49 and Kurtosis showed a positive value of 2.31, which implies that the distribution is moderately peaked. The J-B statistic confirms the non-normality of the distribution. The mean of ECDI is 2.09, the median value is 2.00. The maximum value of ECDI was 5.00 while the minimum was 0.00. The Skewness and Kurtosis showed positive values of 0.09 and 1.91, which implies that the distribution is Platykurtic having a thin tail. The J-B statistic confirms the non-normality of the distribution.

The control variables of FSIZ and FLEV showed mean values of 7.34 and 50.52. The median values were 7.56 and 61.97 respectively. The Skewness showed negative values of -0.44 and -2.85; while, the Kurtosis showed values of 2.46 for FSIZ which implies a Platykurtic distribution and the FLEV had a value of 40.04 i.e., a Leptokurtic distribution with a very long and thick tail. The J-B statistics for both FSIZ and FLEV with p-values <.05 confirm the non-normality of the distribution.

Correlation Matrix

The correlation matrix is a square matrix that displays the correlation coefficients between each pair of variables in a dataset.

Table 3:Correlation analysis of model variables

	MTBR	GHGD	ECDI	FSIZ	FLEV
MTBR	1	-0.02542	-0.02443	-0.33761	-0.41524
GHGD	-0.02542	1	0.865328	0.024203	0.126313
ECDI	-0.02443	0.865328	1	0.040898	0.080926
FSIZ	-0.33761	0.024203	0.040898	1	0.141161
FLEV	-0.41524	0.126313	0.080926	0.141161	1

Source: E-Views 11

Key: MTBR-Market to Book Ratio; GHGD-Greenhouse Gas Emission Disclosure; ECDI- Energy Consumption Disclosure; FSIZ-Firm Size; FLEV-Firm Leverage.

MTBR negatively correlated with GHGD (r=-0.03), ECDI (r=-0.02), and the control variables of FSIZ (r=-0.34) and FLEV (r=-0.42). In the case of GHGD, there exists a positive correlation with ECDI (i.e., r=0.87), FSIZ (r=0.02), and FLEV (r=0.13). The correlation between ECDI and FSIZ showed a *weak* positive correlation (i.e., r=0.04). ECDI positively correlated with FLEV (r=0.08). FSIZ positively correlated with FLEV (r=0.14).

The Hausman test supported the use of FEM in the case of the study sample, since, the p-value is small ($p < 0.05$).

Test of Hypotheses

Table 4:OLS regression output for the test of hypotheses

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	14.18063	2.147878	6.602156	0.0000
GHGD	-0.087673	0.036350	-2.411899	0.0164
ECDI	0.065344	0.041239	1.584518	0.1140
FSIZ	-1.521371	0.281199	-5.410302	0.0000
FLEV	-0.001442	0.000420	-3.432268	0.0007
R-squared	0.806940	Mean dependent var		6.488612
Adjusted-R squared	0.785730	S.D. dependent var		6.869214
S.E.of regression	3.480213	Sum squared resid		4299.719
F-statistic	38.04628	Durbin-Watson stat		1.173347
Prob(F-statistic)	0.000000			

Source: E-Views 11

The R-squared value of 0.806indicates that about 80.6% of the variability in the data can be explained by the regression model. The adjusted R-squared is slightly lower at 0.785and penalizes the addition of unnecessary variables which makes it a more reliable measure of the model's effectiveness. Thus, 78.5% of the systematic variation in MTBR was jointly explained by all the explanatory variables.The model is statistically significant (F-statistic=38.046) with a p-value=0.0000 < .05. The Durbin-Watson value of 1.173; suggests a positive auto correlation.

Hypothesis One:

Ho_1: There is no significant effect of greenhouse gas emission disclosure on the market-to-book ratio of listed non-financial firms in Nigeria.

GHGD as an independent variable to MTBR appears to have a negative coefficient (i.e., -0.087) which is significant at a 5% level. This, therefore, implies that an increase in GHGD will cause a decrease in MTBR.

This evidence, therefore, leads to a rejection of the null hypothesis and acceptance of the alternatehypothesis; thus, “There is a significant effect of greenhouse gas emission disclosure on the market-to-book ratio of listed non-financial firms in Nigeria”.

Hypothesis Two:

Ho2: Energy consumption disclosure does not affect the market-to-book ratio of listed non-financial firms in Nigeria.

ECDI as an independent variable to MTBR appears to have a positive coefficient (i.e., 0.065) which is not significant at a 5% level. This, therefore, implies that an increase in ECDI will cause an increase in MTBR.

This evidence, therefore, leads to a rejection of the alternatehypothesis and acceptance of the null hypothesis; thus, "Energy consumption disclosure does not affect the market-to-book ratio of listed non-financial firms in Nigeria".

Discussion of Findings

The result showed that GHG emission disclosure negatively affectsthe market-to-book ratio of listed non-financial firms. The findings are supported by Rahi et al. (2022) in the Nordic region, i.e., Sweden, Denmark, Finland and Norway using the fixed effects model and GMM revealed that ESG is negatively related to financial performance, i.e., return on invested capital, return on equity and EPS.In the Mediterranean region, Buallay et al. (2020) showed that CSR disclosure negatively affects operational and market performance. Likewise, Sekhon and Kathuria (2019) in India find a negative influence of CSR onROE.

However, in contrast, Alareeni and Hamdan (2020) in the US showed a positive association between ESG disclosure and firm performance. However, the environmental and CSR dimensions were negatively associated with ROA and ROE. Nishitani et al. (2017) in Indonesiashowed that firms that reduce GHG emissions to a greater extent are more likely to enhance profit further. Cucchiella et al. (2017) using a sample of 500 Italian firms showed that GHG brings about an increase in sales through an increase in demand by environmentally conscious customers and through cost reductions given by the improvement in productivity.

The second hypothesis showed that energy consumption disclosure positively affects the market-to-book ratio of listednon-financial firms.The findings are somewhat consistent with Agyemang et al. (2023) in China which revealed that EAID and EPI have a positive slope connection with profitability.Also, Javed (2023) in India showed that EMA adoption was positively associated with firms' financials, environmental, and social performance. Wanget al. (2023) using Chinese A-share listed companies showed that environmental information disclosure significantly positively correlated with corporate performance. From a global perspective, Zhang and Lucey (2022) using a sample of 215,110 firm-year observations from global, publicly traded firms revealed that ESG performance has a significant and positive effect on firm performance. In France, Dakhli (2021) showed that ESG positively affected financial performance measured using the ROA, ROE and Tobin's Q. Bodhanwala and Bodhanwala (2018) in India finds a significant positive relationship between sustainability and firm performance measures.

Conclusion

The study concludes that GHG emissions and energy consumption disclosure affect the market competitiveness of listed non-financial firms in Nigeria. The data utilised in this study was analysed using descriptive statistics, a correlation matrix, and Fixed Effect Model regression (FEM). The FEM regression was used to test the hypotheses. The empirical results specifically showed that GHG disclosure negatively affectsthe market-to-book ratio; while energy consumption disclosure positively affectsthe market-to-book

ratio of listed non-financial firms. Based on the findings, the study makes the following recommendations in the Nigerian context as follows:

1. The Management and Board should strive for increased transparency and disclosure of greenhouse gas emissions by companies. This is because investors are increasingly considering environmental performance as a factor in their investment decisions. Companies can enhance their reputation among environmentally conscious investors by disclosing their greenhouse gas emissions, demonstrating their commitment to sustainability and climate responsibility. Furthermore, greenhouse gas emission disclosure can also provide valuable insights into a company's risk management practices and long-term sustainability strategy. This information can help investors better evaluate the company's potential for future growth and profitability, leading to a higher market-to-book ratio.
2. The Management and Board should improve the energy consumption disclosure of their activities. The disclosure of energy consumption data by companies can have a significant impact on their market-to-book ratio. In today's business environment, there is a growing awareness and focus on sustainability and energy efficiency. Companies that transparently disclose their energy consumption practices demonstrate their commitment to responsible environmental stewardship, which can positively influence investor perception and valuation. Investors are increasingly considering energy efficiency as a key factor in assessing a company's long-term viability and potential for growth. Companies can enhance investor trust and confidence by disclosing their energy consumption levels and providing valuable information about their operational efficiency and resource management practices.

References

Aboud, A., & Diab, A. (2018). The impact of social, environmental and corporate governance disclosures on firm value. *Journal of Accounting in Emerging Economies*, *8*(4), 442-458.

ACHEMA Friday: Liquidity Management and Firm Value of Listed Deposit Money Banks in Nigeria. IOSR Journal of Business and Management (IOSR-JBM), Vol. 25, No. 12, pp 2319-7668. December, 2023

Adomako, S., Abdelgawad, S. G., Ahsan, M., Amankwah-Amoah, J., & Liedong, T. A. (2023). Nonmarket strategy in emerging markets: The link between SMEs' corporate political activity, corporate social responsibility, and firm competitiveness. *Journal of Business Research*, *160*, 113767.

Agyemang, A., Yusheng, K., Kongkuah, M., Musah, A., & Musah, M. (2023). Assessing the impact of environmental accounting disclosure on corporate performance in China. *Environmental Engineering & Management Journal (EEMJ)*, *22*(2), 389-397.

Agyemang, A. O., Yusheng, K., Twum, A. K., Edziah, B. K., & Ayamba, E. C. (2023). Environmental accounting and performance: Empirical evidence from China. *Environment, Development and Sustainability*, 1-26.

Alareeni, B. A., & Hamdan, A. (2020). ESG impact on performance of US S&P 500-listed firms. *Corporate Governance*, *20*(7), 1409-1428.

Alewine, H. C., & Stone, D. N. (2013). How does environmental accounting information influence attention and investment? *International Journal of Accounting and Information Management*, *21*(1), 22-52.

Ali, M. E. (2002). Transfer of sustainable energy technology to developing countries as a means of reducing greenhouse gas emission-The case of Bangladesh: Review of relevant literature. Discussion Paper No. 02.08 – August 2002, Department of

Applied and International Economics, Massey University, New Zealand.

Arvidsson, S. (2014). Corporate social responsibility and stock market actors: A comprehensive study. *Social Responsibility Journal*, *10*(2), 210-225.

Asuquo, A. I., Dada, T. E., & Onyeogaziri, U. R. (2018). The effect of sustainability reporting on corporate performance of selected quoted brewery firms in Nigeria. *International Journal of Business & Law Research*, *6*(3), 1-10.

Bodhanwala, S., &Bodhanwala, R. (2018). Does corporate sustainability impact firm profitability? Evidence from India. *Management Decision*, *56*(8), 1734-1747.

Buallay, A. (2021). Sustainability reporting and agriculture industries' performance: worldwide evidence. *Journal of Agribusiness in Developing and Emerging Economies*.

Buallay, A., Fadel, S. M., Al-Ajmi, J. Y., & Saudagaran, S. (2020). Sustainability reporting and performance of MENA banks: is there a trade-off? *Measuring Business Excellence*, *24*(2), 197-221.

Buallay, A., Kukreja, G., Aldhaen, E., Al Mubarak, M., & Hamdan, A. M. (2020). Corporate social responsibility disclosure and firms' performance in Mediterranean countries: A stakeholders' perspective. *EuroMed Journal of Business*, *15*(3), 361-375.

Burinskienė, A., & Daškevič, D. (2023). Contemporary concept of business competitiveness. *Management/Vadyba (16487974)*, *39*(1).

Byrd, J. (2010). Financial Policies and the agency costs of free cash flow: Evidence from the Oil Industry. *IRABF*, *2*(2), 23–50.

Cucchiella, F., Gastaldi, M., & Miliacca, M. (2017). The management of greenhouse gas emissions and its effects on firm performance. *Journal of Cleaner Production*, *167*, 1387-1400.

Dakhli, A. (2021). The impact of corporate social responsibility on firm financial performance: does audit quality matter? *Journal of Applied Accounting Research*.

de Azevedo Rezende, L., Bansi, A. C., Alves, M. F. R., & Galina, S. V. R. (2019). Take your time: Examining when green innovation affects financial performance in multinationals. *Journal of Cleaner Production*, *233*, 993-1003.

Dhaliwal, D. S., Li, O. Z., Tsang, A., & Yang, Y. G. (2011). Voluntary nonfinancial disclosure and the cost of equity capital: The initiation of corporate social responsibility reporting. *The Accounting Review*, *86*(1), 59-100.

Dhar, B. K., Sarkar, S. M., & Ayittey, F. K. (2022). Impact of social responsibility disclosure between implementation of green accounting and sustainable development: A study on heavily polluting companies in Bangladesh. *Corporate Social Responsibility and Environmental Management*, *29*(1), 71-78.

Egbunike, A. P., & Okoro, G. E. (2018). Does green accounting matter to the profitability of firms? A canonical assessment. *Ekonomski horizonti*, *20*(1), 17-26.

Eisenhardt, K. M. (1989). Agency theory: An assessment and review. *International Journal of Management*, *5*, 341-353.

El Ghoul, S., Guedhami, O., Kim, H., & Park, K. (2018). Corporate environmental responsibility and the cost of capital: International evidence. *Journal of Business Ethics*, *149*(2), 335-361.

Farza, K., Ftiti, Z., Hlioui, Z., Louhichi, W., & Omri, A. (2021). Does it pay to go green? The environmental innovation effect on corporate financial performance. *Journal of Environmental Management*, *300*, 113695.

Freeman, R.E. (1984). *Strategic Management: A Stakeholder Approach*. Pitman, Boston, MA.

Freeman, R. E., Harrison, J. S., Wicks, A. C., Parmar, B. L., & De Colle, S. (2010). *Stakeholder theory: The state of the art*. Cambridge University Press.

Freeman, R. E., & Reed, D. L. (1983). Stockholders and stakeholders: A new perspective on corporate governance. *California Management Review*, *25*(3), 88-106.

Friday Achema[1], Terzungwe Nyor[2], Samuel Eniola Agbi[3], Onipe Adabenege Yahaya[4]: Liquidity Management and Profitability of Listed Deposit Money Banks in Nigeria. European Accounting and Management Review. Vol. 9, No. 2, pp 83-100. May, 2022

Griffin, P. A., Lont, D. H., & Sun, E. Y. (2017). The relevance to investors of greenhouse gas emission disclosures. *Contemporary Accounting Research*, *34*(2), 1265-1297.

Halaby, C. (2004). Panel models in sociological research: Theory into practice. *Annual Review of Sociology*, *30*, 507-544.

Hasan, I., Singh, S., & Kashiramka, S. (2022). Does corporate social responsibility disclosure impact firm performance? An industry-wise analysis of Indian firms. *Environment, Development and Sustainability*, *24*(8), 10141-10181.https://doi.org/10.1007/s10668-021-01859-2

Hasan, Ş., & Hakan, Ö. (2012). The Importance of Environmental Accounting in the Context of Sustainable Development and Within IFRS Evaluation. 3rd International Symposium on Sustainable Development, May 31 - June 01 2012, Sarajevo. Available [Online] at: http://eprints.ibu.edu.ba/1282/

Healy, P. M., & Palepu, K. G. (2001). Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of accounting and economics*, *31*(1-3), 405-440.

Heinzle, S. L. (2012). Disclosure of energy operating cost information: A silver bullet for overcoming the energy-efficiency gap? *Journal of Consumer Policy*, *35*(1), 43-64.

Ifeani, O.E., Oge, M.G., & Gozie, A.C. (2016). Effective stakeholders' management in banking industries. *International Journal of Information, Business and Management*, *4*(1), 32-36.

Javed, S. (2023). Environmental management accounting and corporate performance: The mediating role of corporate environmental ethics: Evidence from the manufacturing sector. *Journal of Environmental Accounting and Management*, *11*(01), 41-52.

Jensen, M.C., & Meckling, W.H. (1976). Theory of the firm: managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305-360.

Jensen, G. R., Solberg, D. P., & Zorn, T. S. (1992). Simultaneous determination of insider ownership, debt, and dividend policies. *Journal of Financial and Quantitative Analysis*, *27*(2), 247-263.

Jeroh, E., & Okoro, G. E. (2016). Effect of environmental and dismantling costs on firm performance among selected oil and gas companies in Nigeria. *Sahel Analyst: Journal of Management Sciences, 14*(5), 14-26.

Kavitha, T. N., & Sulaipher, M. (2023, May). Environment accounting and reporting in fossil fuel sector in India. In *AIP Conference Proceedings* (Vol. 2477, No. 1). AIP Publishing.

Kotenko, S., Heiets, I., & Yacout, D. (2021). Organizational competitiveness: a systematic literature review. *Marketing i menedžment innovacij*, (3), 175-187.

Kontokosta, C. E. (2013). Energy disclosure, market behavior, and the building data ecosystem. *Annals of the New York Academy of Sciences*, *1295*(1), 34-43.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (2000). Agency problems and dividend policies around the world. *The Journal of Finance*, *55*(1), 1-33.

Liu, C., Su, K., & Zhang, M. (2021). Water disclosure and financial reporting quality for social changes: Empirical evidence from China. *Technological Forecasting and Social Change*, *166*, 120571.

Li, Y. (2020, September). Research on the Construction of Marketing Competitiveness Evaluation Index System Based on Association Rules Algorithm. In *2020 International Conference on Advance in Ambient Computing and Intelligence (ICAACI)* (pp. 135-138). IEEE.

Lucato, W. C., Costa, E. M., & de Oliveira Neto, G. C. (2017). The environmental performance of SMEs in the Brazilian textile industry and the relationship with their financial performance. *Journal of Environmental Management*, *203*, 550-556.

Lu, L. Y., Shailer, G., & Yu, Y. (2017). Corporate social responsibility disclosure and the value of cash holdings. *European Accounting Review*, *26*(4), 729-753.

Maama, H., & Appiah, K. O. (2019). Green accounting practices: lesson from an emerging economy. *Qualitative Research in Financial Markets*, *11*(4), 456-478.

Miao, L., Zhuo, Y., Wang, H., & Lyu, B. (2022). Non-financial enterprise financialization, product market competition, and total factor productivity of enterprises. *Sage Open*, *12*(2), 21582440221089956.

Murekefu, T. M., & Ouma, O. P. (2012). The relationship between dividend payout and firm performance: a study of listed companies in Kenya. *European Scientific Journal, ESJ*, *8*(9), 199-215.

Myers, S. C. (1977). Determinants of corporate borrowing. *Journal of Financial Economics*, *5*(2), 147-175.

Nishitani, K., Jannah, N., & Kaneko, S. (2017). Does corporate environmental performance enhance financial performance? An empirical study of Indonesian firms. *Environmental Development*, *23*, 10-21.

Nnamani, J., Onyekwelu, U., & Ugwu, O. (2017). Effect of sustainability accounting and reporting on financial performance of firms in Nigeria Brewery Sector. *European Journal of Business and Innovation Research*, *5*(1), 1-15.

Nurvita, T., & Priambodo, A. (2022). The Effect of Environmental Performance, Company's Characteristics and Good Corporate Governance (GCG) on Environmental Disclosure (Empirical Study of Mining Companies Listed on The Indonesia Stock Exchange (IDX) 2015-2019). *BASKARA: Journal of Business and Entrepreneurship*, *4*(2), 145-162.

Oladele, R., Aribaba, F. O., Afolabi, Y. A., Adele, H. A., Ahmodu, O. A., Babatunde, A. D., & Tuoyo, C. A. (2021). Triple bottom line reporting and corporate performance of listed manufacturing firms in Nigeria. *Academy of Accounting and Financial Studies Journal, 25*(7), 1-11.

Onyali, I. C., Okafor, T. G., & Egolum, P. (2014). An assessment of environmental information disclosure practices of selected Nigerian manufacturing companies. *International Journal of Finance and Accounting*, *3*(6) 349-355.

Onyekwelu, U. L., & Ekwe (2014). Does corporate social responsibility predicate good financial performance. *ESUT Journal of Management Sciences*, *8*(1), 1-10.

Oraka, A. O., & Egbunike, F. C. (2016). Appraisal of environmental accounting information in the financial statements of consumer goods manufacturing companies in Nigeria. *NG-Journal of Social Development*, *5*(6), 6-28.

Peng, C., Fu, W., Jiang, H., & Zou, Y. (2022). The impact of environmental information disclosure on enterprises' green preference of outbound investment: Evidence from China. *Frontiers in Psychology*, *13*, 985727.

Prado-Lorenzo, J. M., Rodríguez-Domínguez, L., Gallego-Álvarez, I., & García-Sánchez, I. M. (2009). Factors influencing the disclosure of greenhouse gas emissions in companies worldwide. *Management Decision*, *47*(7), 1133-1157.

Rahi, A. F., Akter, R., & Johansson, J. (2022). Do sustainability practices influence financial performance? Evidence from the Nordic financial industry. *Accounting Research Journal*, *35*(2), 292-314.

Sánchez-Medina, P. S., Díaz-Pichardo, R., & Cruz-Bautista, M. (2016). Stakeholder influence on the implementation of environmental management practices in the hotel industry. *International Journal of Tourism Research*, *18*(4), 387-398.

Sekaran, U., & Bougie, R. (2010). *Research methods for business: a skill-building approach*. Chichester: Wiley.

Sekhon, A. K., & Kathuria, L. M. (2019). Analyzing the impact of corporate social responsibility on corporate financial performance: evidence from top Indian firms. *Corporate Governance*, *20*(1), 143-157.

Shvindina, H. (2022). Economic competitiveness: An overview of multilevel concept. *Responsible Consumption and Production*, 160-172.

Sisaye, S. (2021). The influence of non-governmental organizations (NGOs) on the development of voluntary sustainability accounting reporting rules. *Journal of Business and Socio-economic Development*, *1*(1), 5-23.

Tang, Y., Yue, S., Ma, W., & Zhang, L. (2022). How do environmental protection expenditure and green technology innovation affect synergistically the financial performance of heavy polluting enterprises? Evidence from China. *Environmental Science and Pollution Research*, *29*(59), 89597-89613.

Tantua, B., Agbalaiko, E. G., & Etale, L. M. (2023). Green accounting and corporate viability of selected oil industry firms in Nigeria. *European Journal of Accounting, Auditing and Finance Research*, *11*(7), 16-30.

Turgunpulatovich, A. O. (2022). The concept of forming the competitiveness of small business entities and its essence. *Asia Pacific Journal of Marketing & Management Review, 11*(07), 46-55.

Udeh, F. N., & Ezejiofor, R. (2018). Effect of sustainability cost accounting on financial performance of telecommunication firms. *Journal for Studies in Management and Planning Nigeria*, *4*(6), 223-250.

United Nations (2023). Generating power. Available [Online] at: https://www.un.org/en/climatechange/climate-solutions/cities-pollution

United States Environmental Protection Agency [USEPA] (2023). Sources of Greenhouse Gas Emissions. Available [Online] at: https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions

Wang, H., Bao, X., & Wang, Y. (2023). The impact of environmental information disclosure on corporate performance in building material industry. In *The Complexities of Sustainability* (pp. 299-321).

Wang, K., Cui, W., Mei, M., Lv, B., & Peng, G. (2023). The moderating role of environmental information disclosure on the impact of environment protection investment on firm value. *Sustainability*, *15*(12), 9174.

Xie, X., Huo, J., & Zou, H. (2019). Green process innovation, green product innovation, and corporate financial performance: A content analysis method. *Journal of business research*, *101*, 697-706.

Yermack, D. (2006). Flights of fancy: corporate jets, CEO perquisites and inferior shareholder returns. *Journal of Financial Economics*, *80*(1), 211-242.

Younis, H., & Sundarakani, B. (2020). The impact of firm size, firm age and environmental management certification on the relationship between green supply chain practices

and corporate performance. *Benchmarking: An International Journal*, *27*(1), 319-346.

Zeng, S. X., Meng, X. H., Yin, H. T., Tam, C. M., & Sun, L. (2010). Impact of cleaner production on business performance. *Journal of Cleaner Production*, *18*(10-11), 975-983.

Zhang, Y. (2009). Are debt and incentive compensation substitutes in controlling the free cash flow agency problem? *Financial Management*, *38*(3), 507-541.

Zhang, D., & Lucey, B. M. (2022). Sustainable behaviors and firm performance: The role of financial constraints' alleviation. *Economic Analysis and Policy*, *74*, 220-233.