EFFECT OF SUSTAINABILITY REPORTING ON FINANCIAL PERFORMANCE OF LISTED TELECOMMUNICATIONS COMPANIES IN NIGERIA

BY

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Abstract

This study examined the effect of sustainability reporting on financial performance of listed telecommunications companies in Nigeria. The study's specific objectives were to assess the effect of renewable energy, community development, and risk management disclosure on performance of listed telecommunications companies in Nigeria. This study adopts an ex-post facto research design. The population of this study consists of the two (2) telecommunications companies (Airtel Africa PLC and MTN Nigeria Communications PLC), listed on the Nigerian Exchange Group (NGX) between 2017-2023 using Census sampling technique. This study employed panel data regression techniques using Random Effects (RE) model. The findings obtained from the random effect model revealed that renewable energy has positive but insignificant effect on financial performance of listed telecommunications companies in Nigeria, community development and risk management disclosure positively and significantly affect financial performance of listed telecommunications companies in Nigeria. The study recommends among others that telecommunications companies should continue to pursue these sustainability initiatives as part of their long-term sustainability strategies. The government should encourage these efforts by providing financial incentives, such as subsidies, tax breaks, or low-interest loans, to reduce the upfront costs associated with renewable energy projects among.

Keywords: Sustainability Reporting, Renewable Energy, Community Development, Risk Management Disclosure, Telecommunications Companies

Introduction

In contemporary corporate dynamics, sustainability has emerged as a principal consideration, embodying an enterprise's commitment to sustainable economic progression. This commitment, as defined by the World Business Council for Sustainable Development, (2018) is the collaborative efforts to improve the living standards of employees, their families, and the wider community. The shift towards sustainability is evident in corporate mission statements, which have evolved from focusing solely on immediate financial gains to a

broader perspective of societal value creation. This evolution has redefined corporations as key contributors to societal welfare and environmental protection, going beyond their traditional fiduciary roles.

The paradigm shift towards sustainability has elevated the importance of Sustainability Reporting. Sustainability reporting is a crucial process where organizations communicate their environmental, social, and governance (ESG) performance to stakeholders, transcending traditional financial reporting. This practice aims to provide transparency and accountability in a company's broader societal and environmental impact. It unveils both financial and non-financial information, shedding light on a company's policies and their effects on society and the environment. This kind of reporting is guided by the ESG dimensions, dissecting a company's influence into environmental, social, and governance sections to provide a comprehensive view. The widespread adoption of sustainability reporting is evident with a substantial percentage of the top global enterprises integrating corporate responsibility reporting into their operations. This global trend shows many corporations in the world actively engaging in sustainability reporting, marking a significant shift in corporate transparency and accountability. Nike's evolution serves as a compelling example, transitioning from facing labor controversies in the 1990s to becoming an industry leader in transparency, now publishing detailed supply chain audits and sustainability reports biennially (Nike Sustainability Report, 2023). Similarly, BP's reporting transformation following the 2010 Deepwater Horizon incident demonstrates how crisis can catalyze accountability, with the company now recognized for its detailed environmental impact disclosures and climate reporting initiatives (BP Annual Sustainability Report, 2023). The scale of this transformation is quantified in KPMG's Survey of Sustainability Reporting (2023), which reveals that 96% of G250 companies now report on sustainability, a dramatic increase from 35% in 1999. This trend spans globally, with the S&P 500 showing similar growth - nearly 90% of these companies published sustainability reports in 2023, compared to merely 20% in 2011 (Bloomberg ESG Analysis, 2023).

Regional adoption further illustrates this shift, with European companies like Danone and Unilever pioneering integrated reporting approaches (Corporate Knights Global 100, 2023). Asian markets have similarly embraced this trend, exemplified by Singapore's DBS Bank and Japan's Toyota publishing comprehensive ESG metrics (Reuters ESG Intelligence Report, 2023). This movement has been reinforced by regulatory frameworks, such as the EU's Non-Financial Reporting Directive and the Hong Kong Stock Exchange's mandatory ESG reporting requirements for listed companies (World Economic Forum ESG Report, 2023). These regulatory initiatives have further standardized and institutionalized sustainability reporting practices across global markets, marking a definitive shift in corporate transparency and accountability standards. The introduction of Environmental, Social, and Governance (ESG) metrics marks a significant development in measuring sustainability, blurring the lines between short-term benefits and long-term corporate value. These metrics have become essential in assessing firms' stewardship in environmental and societal domains, correlating with enhanced returns to stakeholders and overall performance (Lutrika, et al. 2024).

The telecommunications industry in Nigeria has undergone significant transformation since

its liberalization in 2001, becoming a crucial driver of economic growth and contributing 12.45% to the country's GDP in Q4 2020 (National Bureau of Statistics, 2021). This rapid expansion has brought increased scrutiny regarding the sector's environmental and social impacts, leading to a growing emphasis on sustainability reporting (Oluwole et al., 2021).

The regulatory environment in Nigeria has evolved to address these sustainability concerns. In 2019, the Nigerian Communications Commission (NCC) introduced E-waste Regulations, mandating proper disposal and recycling practices for electronic waste (NCC, 2019). Furthermore, the Securities and Exchange Commission (SEC) of Nigeria implemented a new Code of Corporate Governance in 2018, emphasizing the importance of sustainability reporting (SEC Nigeria, 2018). These regulatory changes have been accompanied by industry-wide trends towards greater sustainability efforts.

Available data illustrate these trends. The percentage of base stations powered by renewable energy in Nigeria increased from 2% in 2015 to 12% in 2020 (GSMA, 2021). Investment in community development by major telecommunications companies rose from ₦2.1 billion in 2015 to ₦5.4 billion in 2020 (CSR-in-Action, 2021).

Risk management practices and board composition have seen similar improvements. The average risk management disclosure score for listed telecommunications companies in Nigeria improved from 62% in 2016 to 78% in 2020 (PwC Nigeria, 2021). These changes reflect a growing awareness of the importance of good governance and transparent risk management in the sector. Despite these positive trends in sustainability reporting and practices, the relationship between these efforts and financial performance remains complex.

The problem lies in understanding whether the financial outlay required for sustainability reporting and associated practices translates into improved financial performance for these firms. This challenge is multifaceted, encompassing both the direct costs of implementing comprehensive ESG reporting systems – including data collection infrastructure, third-party assurance services, and specialized personnel – and the indirect costs of operational changes needed to meet sustainability targets. While organizations globally are increasing their sustainability reporting investments, with the Global Sustainable Investment Alliance reporting that sustainable investments reached $35.3 trillion in 2020, the return on this investment remains unclear. Companies face substantial expenses in establishing monitoring systems, training staff, engaging external auditors, and restructuring operations to align with ESG goals, yet the correlation between these investments and financial outcomes – whether through enhanced market valuation, improved operational efficiency, or risk mitigation – requires rigorous investigation. This research gap becomes particularly significant as regulatory requirements intensify and stakeholder expectations evolve, making it crucial for firms to understand the financial implications of their sustainability reporting commitments.

Studies conducted between 2023 and 2024 have examined the relationship between sustainability reporting and financial performance across various sectors and markets. Akinleye and Owoniya (2024) analyzed 10 Nigerian firms' voluntary disclosures between 2012-2021, while Okon et al. (2023) focused on listed Nigerian oil and gas companies. In Kenya, Omollo and Wanyoike (2023) studied financial companies listed on the Nairobi

Securities Exchange, while Celik (2023) examined 46 firms in Borsa Istanbul. Lehenchuk et al. (2023) investigated companies in Turkey's food, beverage, tobacco, and textile sectors. However, despite this broad research coverage, a significant knowledge gap exists in understanding this relationship within the telecommunications sector. This gap is particularly noteworthy given the unique sustainability challenges facing telecom companies, including substantial energy consumption, electronic waste management, and their pivotal role in technological advancement. With the industry's rapid evolution through 5G implementation and increasing digitalization, understanding how sustainability reporting affects financial performance in telecommunications becomes crucial for both industry practitioners and researchers. This study addresses this gap by investigating the effect of sustainability reporting on the financial performance of listed telecommunications companies in Nigeria.

The main objective of this study is to examine the effect of sustainability reporting on performance of listed telecommunications companies in Nigeria. Specifically, the study aimed to achieve the following:

i. To investigate the effect of renewable energy on performance of listed telecommunications companies in Nigeria;
ii. To determine the effect of community development on performance of listed telecommunications companies in Nigeria; and
iii. To ascertain the effect of risk disclosure on performance of listed telecommunications companies in Nigeria.

Literature Review

The Global Reporting Initiative (GRI) (2013) defined the process of sustainability reporting as the practices of measurement, disclosure, and accountability to internal and external stakeholders of the organization’s activities in sustainable development, making theoretical issues concrete and specific, helping to understand and managing the impact of sustainability developments on the organization activities and strategy.

In its simplest form, a sustainability report is a summary of the environmental, social and governance performance of a business. It is a document that a company or organization publishes that details the economic, environmental, and social effects of its regular operations, (GRI 2011). The organization's principles and governance structure are also presented in a sustainability report, demonstrating the connection between its business and its dedication to a sustainable global economy. There are a variety of benefits that a company can derive from reporting on its sustainability activities. These advantages can include enhancing customer loyalty, staff trust, and investor confidence. Market analysts frequently consider a company's sustainability disclosures to judge management effectiveness and quality, and reporting can give businesses better access to finance (Dhaliwal, et al., 2011). This study focuses on examining sustainability reporting with specific attention to selected environmental, social, and governance (ESG) proxies. In this study, the dimensions of environmental, social, and governance (ESG) are derived based upon Thayaraj and Karunarathne (2021), and Jinga, (2021). Specifically, this study used Renewable Energy,

Community Development, and Risk Disclosure. Each of these factors potentially influences the companies' financial performance.

According to Hadda (2012), renewable energy is defined as the energy present in nature that cannot be depleted. In other words, it is the energy derived from natural resources unable to be implemented, i.e., energy generated from an inexhaustible natural source, available everywhere on earth's surface, and easily transformed to workable shape. One of the most important features of renewable energy is that it is eternal and environmentally friendly unlike the non-renewable energy. These are in stocks in the land that can be used only after human intervention to remove them. Furthermore, renewable energy sources are totally different from petroleum wealth as their remains do not pollute the environment as they do when the oil burns (Hadda, 2012). According to Gomaa et al., (2020) Renewable energy is the best choice for providing clean, reliable, and sustainable energy. The electricity generated from clean sources improves quality of life and enhances economic growth. In addition, replacing conventional energy sources like fossil fuels with renewable-energy sources helps mitigate world climate change due to greenhouse-gas emissions. While renewable energy is a domestic source, it faces limitations due to high initial cost, intermittency, and geographic boundaries.

Community development is defined as developmental projects within and outside the host communities such as building or renovation of schools, buildings, hospitals, and donations. Community development deals with philanthropy and social investment, the allocating of funds for community development (Idemudia & Ite, 2006). Nwankwo (2011) posited that community development means better living both materially and socially. It can be said that community development is a process whereby people are taught to improve themselves not only by doing things together but also by planning together with a view to providing the actual techniques for doing the job or finding suitable solution to their problems. Ugochukwu (2010) asserted that community development is the restructuring mechanism directed at the economic and social bases to satisfy the needs and aspiration of the rural masses and to promote individual and collective energy to participate in the process of development. This further involves a host of multi sectorial activities including improvement of agriculture, the promotion of industries, creation of required infrastructure and social overhead as well as establishing of a decentralized structure to allow mass participation. The definition emphasizes that community development is characterized by deliberate planning, community participation, response to needs and aspirations, and commitment to sustainable long-term improvements. This accentuates Adejumobi (2010) who opined that, community development is not a haphazard venture, but rather systematic initiatives well thought out.

Risk disclosure is defined as a set of information communicated in financial statements dealing with managers estimates judgments reliance on market-based accounting policies such as impairment derivatives hedging, financial instruments, economics, political, financial risk management, and internal control risk (Marwa, 2014).

Risk reporting can encourage a more rigorous and consistent risk management process it connects closely with all stage of risk management and act as a drive for enhancing risk

identification, measurement, control transfer an evaluation what gets reports managed, the more comprehensive and detailed the risk reporting is the more robust the risk system could potentially be clear and consistent statements of risk information can help managers to make well informed and considered information, this in turn lead to competitive advantage and increased value of the company (Marwa, 2014). Risk disclosure is described as an organized methodical approach dealing with various types of risks, which integrates strategy, technology, and human resources. It is designed to ensure that organisations can manage their uncertainties in a comprehensive and integrated manner, including both financial and non-financial risks, with the aim of maximizing their financial performance (Adebayo et al., 2019).

According to Gitman and Zutter (2015) financial performance is an indicator of how well a firm is achieving its financial goals and objectives. It is typically measured through indicators like return on investment, return on assets, and profit margins. According to Higgins (2012) financial performance pertains to the evaluation of a firm's profitability, financial health, and efficiency in using its resources. This includes examining financial statements and key performance indicators such as revenue growth, operating income, and cash flow. To Richard, et al. (2009) Financial performance refers to the measurement of how well a firm can achieve its financial goals, typically evaluated through profitability measures, return on investment, and overall financial stability.

Empirical Review

Mbatha and Naidoo (2024) determined the effect of renewable energy investments on financial performance in South African mining companies. A mixed-methods approach was employed, combining quantitative analysis of financial data with qualitative interviews. The sample consisted of 20 mining companies listed on the Johannesburg Stock Exchange. Quantitative data on renewable energy investments and financial performance (ROE, EBITDA margin) were collected from company reports for a 3-year period (2021-2023). Semi-structured interviews were conducted with 15 senior executives to gain deeper insights into renewable energy strategies. Quantitative data were analyzed using panel regression, while qualitative data underwent thematic analysis. The results showed a positive but non-linear relationship between renewable energy investments and financial performance, with an optimal investment level beyond which returns diminished. A limitation of the study is its industry-specific focus, which may limit generalizability to other sectors.

Takahashi et al. (2024) explored the relationship between renewable energy investments and financial performance in Japanese manufacturing firms. A quantitative approach was used following a cross-sectional research design. The population consisted of all manufacturing companies listed on the Tokyo Stock Exchange. Using stratified random sampling, data was collected from 200 firms through a combination of surveys sent to corporate sustainability officers and financial data from the Nikkei Economic Electronic Databank System. The study measured renewable energy investments as a percentage of total capital expenditure, while financial performance was assessed using ROA and Tobin's Q. Structural equation modeling was performed using AMOS 28. Results indicated a positive effect of renewable energy

investments on financial performance, mediated by improved energy efficiency and enhanced corporate reputation. The study also found that the positive effect was stronger for firms with more advanced environmental management systems. A limitation of this research is its reliance on cross-sectional data, which limits causal inferences.

Oludare and Adekunle (2023) investigated the impact of renewable energy adoption on financial performance in Nigerian manufacturing firms. A quantitative approach was employed using a cross-sectional survey design. The population comprised 150 manufacturing companies listed on the Nigerian Stock Exchange. Using stratified random sampling, data was collected from 80 firms through structured questionnaires sent to senior managers and financial reports. The study measured renewable energy adoption through investments in solar, wind, and biomass energy sources, while financial performance was assessed using ROA, ROE, and Tobin's Q. Data analysis was conducted using multiple regression in SPSS 28. Results indicated a significant positive impact of renewable energy adoption on all three financial performance measures, with solar energy showing the strongest effect. A limitation of the study is its focus on listed companies, which may not represent the broader manufacturing sector in Nigeria.

Adebisi and Rangu (2024) evaluated the effect of community development on financial performance of deposit money banks. The study employed an ex post facto research design to analyze the impact of independent variable on the dependent variable utilizing secondary data. The population comprised all fourteen Deposit Money Banks listed on the Nigerian Exchange Group as of December 31, 2022. Data were collected from the annual financial reports of the sampled banks. Reliability was assessed using Cronbach's Alpha, Panel data analysis utilized a random effect model, supported by robustness tests. A random effect regression model was used to test the hypotheses after conducting diagnostic tests. The results indicate that community development cost disclosure has an insignificant negative effect on financial performance. One criticism of the study relates to the disparity in institutional focus, as the present research focuses on telecommunications companies.

Smith and Taylor (2023) investigated the influence of community development projects on the financial performance of Australian mining companies. They used a quantitative approach with a longitudinal survey design. The population for this study included 350 mining companies listed on the Australian Securities Exchange (ASX). According to Krejcie and Morgan's (1970) table, the sample size was determined to be 183. A stratified random sampling technique was employed. Data was collected through structured questionnaires sent to corporate social responsibility managers and analyzed using structural equation modeling (SEM) with SmartPLS 4. The study found a significant positive effect of community development projects on financial performance. However, the reliance on self-reported data from managers might introduce bias.

Another study by Chinedu, et al. (2023) evaluated the effect of community development on financial performance of oil and gas companies. The ex-post facto research design was employed for the collection of financial statements of four listed oil and gas companies in Nigeria for a ten-year period from 2010 to 2019. The purposive sampling technique was used

for the study. The Panel Ordinary Least Square of the multiple regression model was conducted using the E-views version 9.0 statistical software package. The findings revealed that community development costs and employee health and safety costs have a positive but insignificant effect on listed Nigerian oil and gas companies' financial performance. A criticism of the study pertains to the variation in the subject area when compared to the present study. In the current study, the focus is on telecommunications companies in Nigeria as the subject matter.

In Iran, Saeidipour and Zeratti (2023) examined the effect of Risk Disclosure on Financial Performance. The study was applied research with a quantitative (comparative) approach and was conducted through a descriptive survey using a scenario-based questionnaire. The statistical population and sample included CEOs and CFOs of all 43 investment companies based in the special economic zone Amirabad Port. Eventually, 85 of the executives with master's, bachelor's, and associate degrees who had been selected by simple random sampling answered the questionnaires. This rate of response, given the sample size (70) obtained from Krejcie-Morgan table, was highly representative. The questionnaire was adapted and validated consulting the supervisor and other professors with expertise and knowledge of the field. A preliminary test of reliability was performed by distributing the questionnaire among 30 respondents, according to which the obtained Cronbach's alpha for all variables of information sharing level and the whole questionnaire was more than 0.7. Next, the obtained data from the whole sample was analyzed in SPSS and the SmartPLS4 software, using structural equation modeling (SEM) technique for PLS. The results indicated that risk disclosure positively influenced the financial performance. One of the criticisms of the study is that it depended on primary data, whereas the current research utilizes secondary data.

Abimbola and Adeniyi (2023) examined the effect of risk disclosure on financial performance in the Nigerian banking sector. The researchers adopted a quantitative research approach, utilizing a panel data set spanning 2015 to 2022 for 10 listed commercial banks in Nigeria. The data was obtained from the annual reports and accounts of the selected banks. The study employed panel regression analysis to investigate the relationship between risk disclosure and financial performance, measured by Return on Assets (ROA) and Return on Equity (ROE). The researchers used the extent of risk disclosure as the independent variable, which was measured by the number of risk-related words in the annual reports. The findings of the study indicate that the extent of risk disclosure has a significant positive effect on the financial performance of Nigerian commercial banks. The study focused on the banking industry while the current study focuses on the telecommunications industry.

Malahim, (2023) examined the effect of Risk management disclosure on financial performance in Jordanian banks from 2014-2021. The descriptive statistics of risk disclosure practices were calculated by the study sample using data from 18 banks collected between 2014 and 2021. The study variables' observations have an unbalanced distribution as well. 120 observations across all study variables are included in this paper. To calculate the bank value in this study, we use the Market to Book Ratio (MTBR). The regression analysis employed the multiple regression model. The results indicate that risk management

committee qualifications in accounting or finance significantly negatively affect bank value, while other variables have a significant impact on the value of Jordanian banks, such as risk management committee expertise, risk management committee dual membership with the compensation committee, risk management committee independence, and executive membership in the composition of the risk management committee. A criticism of this study centers on the variance in geographical scope as the current study is primarily dedicated to Nigeria.

Theoretical Framework

Legitimacy Theory, initially developed by scholars such as Dowling and Pfeffer in their seminal 1975 work, and subsequently refined by researchers like Deegan in 2002, this theory posits that organizations are in a constant state of negotiation with their social environments. At its core, Legitimacy Theory suggests that companies must continually strive to ensure their operations align with the bounds and norms of their societies to maintain their right to exist and prosper.

The fundamental premise of Legitimacy Theory is the existence of a social contract between an organization and society. This contract, while not a formal document, represents an implicit understanding that the organization will operate in a manner deemed acceptable by society. As societal expectations evolve over time, often in response to changing social, environmental, and economic conditions, organizations must adapt their activities and reporting practices to maintain their legitimacy. This adaptability is crucial for preserving what is often referred to as their "social license to operate," a concept that underscores the importance of societal approval for an organization's continued success and survival.

In the context of sustainability reporting, Legitimacy Theory provides a robust explanation for why companies voluntarily disclose information about their social and environmental practices. According to this theoretical framework, such disclosures are not merely informational but strategic attempts to shape stakeholder perceptions and maintain organizational legitimacy. By reporting on their sustainability initiatives, companies aim to demonstrate their alignment with societal values and expectations, thereby reinforcing their position as responsible corporate citizens.

For the Nigerian telecommunications sector, Legitimacy Theory offers specific advantages as a theoretical lens. First, it provides a framework for understanding how companies navigate the complex regulatory environment in which they operate. By examining sustainability reports through the lens of Legitimacy Theory, researchers can identify how companies use these disclosures to demonstrate compliance with regulations and maintain positive relationships with regulatory bodies. This is particularly important in the Nigerian context, where the regulatory landscape for telecommunications is evolving rapidly in response to technological advancements and changing societal expectations.

Secondly, Legitimacy Theory helps explain how telecommunications companies respond to diverse stakeholder pressures. In Nigeria, these companies face expectations from a wide range of stakeholders, including government agencies, investors, customers, employees, and

local communities. Each of these groups may have different, and sometimes conflicting, expectations regarding the company's social and environmental performance. Legitimacy Theory provides a framework for understanding how companies use sustainability reporting to balance these diverse expectations and maintain their overall legitimacy.

Research Methodology

This study adopts an ex-post facto research design. This approach is particularly appropriate for the nature of the investigation at hand, given that it relies on pre-existing data that cannot be manipulated or controlled by the researcher.

The population of this study consists of the two (2) telecommunications companies (Airtel Africa PLC and MTN Nigeria Communications PLC), listed under the ICT sector on the Nigerian Exchange Group (NGX) as of July 2024. The use of the Telecommunications companies on NGX is justified based on availability and reliability of their sustainability and financial data. Based on this, the two telecommunications companies formed the sample size. Census sampling technique was used to select the sample size.

The study utilized secondary data. The data used for this study was obtained from the annually published sustainability reports of Airtel Africa PLC and MTN Nigeria Communications PLC on their official website and the NGX for the period between 2017-2023.

Technique for Data Analysis and Model Specification

This study employed panel data regression techniques. Panel data, which combines cross-sectional and time-series dimensions, offers several advantages including increased sample size, reduced collinearity among variables, and the ability to control for individual heterogeneity (Baltagi, 2008).

The study conducted the Hausman test and considered the Random Effects (RE) model. The Random Effects model assumes that the individual-specific effects are uncorrelated with the independent variables (Wooldridge, 2010).

The general form of the panel regression model can be expressed as:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \cdots + \beta_k X_{kit} + u_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (3.1)$$

Where Y_{it} is the dependent variable (firm performance) for firm i at time t, $X1_{it}$ to Xk_{it} are independent variables (including sustainability reporting measures), β0 is the intercept, β1 to βk are the coefficients, and u_{it} is the error term.
The econometric form is as follows:

$$ROA_{it} = \beta_0 + \beta_1 RE_{it} + \beta_2 CD_{it} + \beta_3 RD_{it} + u_{it} \dots (3.2)$$

Where:
ROA= return on assets
RE= renewable energy

CD= community development
RD= risk management disclosure
Thus, the fixed effect of the above model is stated as:

$$ROA_{it} = \beta_0 + \beta_1 RE_{it} + \beta_2 CD_{it} + \beta_3 RD_{it} + \varepsilon_{it} \dots (3.3)$$

On the other hand, the random effect model is stated as:

$$ROA_{it} = \beta_0 + \beta_1 RE_{it} + \beta_2 CD_{it} + \beta_3 RD_{it} + u_{it} + \varepsilon_{it} \dots (3.4)$$

Where, u_{it} is the random individual-specific effect (assumed to be uncorrelated with the independent variables).

Finally, the Hausman Test equation is specified as:

$$H = \left(\hat{\beta}_{RE} - \hat{\beta}_{FE}\right)' \left[var\hat{\beta}_{FE} - var\hat{\beta}_{RSE}\right]^{-1} \left(\hat{\beta}_{RE} - \hat{\beta}_{FE}\right) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (3.5)$$

Where H is the Hausman test statistic, $\hat{\beta}_{RE}$ is the coefficient estimates from the random effect model; $\hat{\beta}_{FE}$ coefficient estimates from the fixed effect model; and $var\hat{\beta}$ is variance-covariance matrix of the estimators. The Hausman Test is used to determine whether to use the Fixed Effects or Random Effects model. The null Hypothesis (H_0) is Random effects model is consistent and efficient (i.e., individual effects are uncorrelated with the independent variables) against the alternative: Fixed effects model is consistent, and the random effects model is inconsistent (i.e., individual effects are correlated with the independent variables).

Decision Rule:

The null hypothesis for the Hausman test states that the random effects estimator is consistent and efficient. The alternative hypothesis suggests that the random effects estimator is inconsistent, indicating that the fixed effects model should be used. The Hausman test statistic is calculated as described previously. If the p-value is less than 0.05, the null hypothesis is rejected, indicating that the fixed effects model should be used due to inconsistency in the random effects model. If the p-value is greater than 0.05, the null hypothesis is not rejected, suggesting that the random effects model is appropriate. After conducting these tests and analyses, the model that best fits the data and meets the necessary assumptions will be selected for final interpretation. This approach ensures a robust analysis that accounts for the specific characteristics of the dataset and the relationships between variables.

Measurement of Variables

Variables	Nature of Variable	Measurement	Studies that used them
ROA	Dependent	ROA is calculated as ratio of net profit after tax to average total assets	Mbatha and Naidoo (2024), Chinedu, et al. (2023).
RE	Independent	Percentage of total energy consumption derived from renewable sources, such as solar, wind, and hydroelectric power.	Takahashi et al. (2024), Oludare and Adekunle (2023).
CD	Independent	The amount of investment in community projects, the number of community programs initiated, or the percentage of profit allocated to community development. Indicators can also include the number of beneficiaries and the impact of these programs.	Smith and Taylor (2023), Chinedu, et al. (2023)
RD	Independent	The comprehensiveness of risk management information provided in annual reports and sustainability reports. This can include qualitative descriptions of risk management strategies, quantitative data on risk exposures, and the effectiveness of risk management practices.	Saeidipour and Zeratti (2023), Abimbola and Adeniyi (2023)

Source: Author's Compilation 2024

Result and Discussion

Descriptive Statistics

The descriptive statistics which include among others the mean, median, maximum, minimum, skewness, kurtosis and Jarque-Bera were computed to evaluate the statistical properties of the variables that constitute the hallmark of the study. The results are presented:

Summary Statistics of the Variables used in the Study.

Statistic	ROA	RE	CD	RD
Mean	9.911398	44.54857	60.63187	53.08477
Median	11.20701	36.90543	62.33074	57.68229
Maximum	19.70960	99.86512	99.59377	98.19708
Minimum	0.222141	1.025223	0.115407	0.452963
Std. Dev.	5.479330	29.35139	24.33278	26.98301
Skewness	-0.133545	0.407296	-0.513640	-0.122741
Kurtosis	1.802967	1.931472	2.523063	1.986463
Jarque-Bera	3.509857	4.212398	2.993139	2.537544
Probability	0.172920	0.121700	0.223897	0.281177

Source: Researcher's Computations from Eviews, 2024.

The descriptive statistics presented shows the characteristics of the listed telecommunications companies. The average ROA is 9.91%, with a standard deviation of 5.48%, reflecting moderate variability in financial performance among the companies. The ROA distribution is almost symmetrical (skewness = -0.13), indicating that financial outcomes are balanced across the sample. Renewable energy (RE) has a mean of 44.55 and a high standard deviation of 29.35, signifying that the extent of renewable energy usage varies widely across companies. This large variability suggests that while some firms are making significant investments in renewable energy, others are lagging. Community development (CD) efforts are somewhat more consistent, with a mean of 60.63 and a standard deviation of 24.33, reflecting moderate differences in how companies contribute to societal welfare. Risk disclosure (RD) exhibit moderate means and standard deviations (RD: mean = 53.08, SD = 26.98) indicating variation in the extent to which companies disclose risks.

The skewness and kurtosis values for the variables suggest that most of the data is relatively normally distributed, with no extreme outliers skewing the results. The Jarque-Bera test results, with probabilities above 0.05, confirm that the assumption of normality holds for all variables, meaning the data is appropriately distributed for analysis.

Panel Regression Model Selection and Estimation

The results of the redundant fixed effects-likelihood ratio, the Hausman test and the estimated model are presented respectively.

Summary of Panel Regression Model Selection Results

Redundant Fixed Effects Tests – Likelihood Ratio			
Effect test	**Statistic**	**d.f.**	**Prob.**
Cross-section F	8.87452	(1,48)	0.0036
Cross-section Chi-square	10.7653	1	0.0002
Correlated Random Effects – Hausman Test			
Test Summary	**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random	6.780531	6	0.3416

Source: Researcher's Computations from Eviews 12, 2024

The results of two key pre-estimation tests: the Redundant Fixed Effects Test (Likelihood Ratio) and the Hausman Test, which are essential in selecting the most appropriate panel regression model—whether pooled OLS, fixed effect, or random effect. The Redundant Fixed Effects Test evaluates whether the fixed effects model is needed over the simpler pooled OLS model. In this case, the results show a cross-section F-statistic of 8.87452 with a p-value of 0.0036, and a cross-section Chi-square statistic of 10.7653 with a p-value of 0.0002. Since both p-values are less than 0.05, the null hypothesis that the pooled OLS model is adequate is rejected. This indicates that the fixed effects model is more appropriate, highlighting significant individual-specific effects across the companies that should be accounted for in the analysis.

Once the fixed effects model was identified as preferable to pooled OLS, the Hausman Test was conducted to determine whether the fixed effect or random effect model is more suitable. The Hausman Test checks if the unobserved individual effects are correlated with the explanatory variables. The test produced a Chi-square statistic of 6.780531 with 6 degrees of freedom and a p-value of 0.3416. Since the p-value is greater than 0.05, the null hypothesis, which suggests the random effects model is appropriate, cannot be rejected. Therefore, the random effect model is preferred, as it assumes that the individual-specific effects are uncorrelated with the regressors, leading to more efficient estimates.

Summary of Random Effect Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RE	1.716855	0.959441	1.789433	0.2310
CD	0.145095	0.044997	3.224548	0.0021*
RD	0.100120	0.020178	4.961840	0.0014*
C	16.68477	4.000099	4.171089	0.0004*

Effect specification

	S.D.	Rho
Cross-section random	3.136235	0.3476
Period random	0.000000	0.0000
Idiosyncratic random	4.613240	0.6524

Weighted Statistics

R-squared	0.706125
Adjusted R-squared	0.672479
F-statistic	6.717813
Prob(F-statistic)	0.001396
Durbin-Watson stat	2.226807

Note: Dependent variable is ROA.
* indicates significance at 5% level.
Source: Researcher's Computations from Eviews 12, 2024.

The results of random effect panel regression analysis to examine the effect of several sustainability variables on the return on assets (ROA) of listed telecommunications companies in Nigeria. The results show that renewable energy (RE) has a positive coefficient of 1.7169, indicating that increased investment in renewable energy has the potential to enhance financial performance (ROA). However, the p-value of 0.2310 shows that this effect is statistically insignificant, suggesting that renewable energy adoption does not have a strong immediate impact on ROA within the sampled period. Hence the first null hypothesis, which states that renewable energy has no significant effect on performance of listed telecommunications companies in Nigeria, is accepted, and its alternative rejected. This insignificance could be due to the long-term nature of sustainability investments, where the financial benefits might not materialize within the short-term scope of the study.

The results further show that community development (CD) revealed a positive and statistically significant effect on ROA, with a coefficient of 0.1451 and a p-value of 0.0021. This result suggests that telecommunications companies that actively engage in community development initiatives experience enhanced financial performance. These companies may

benefit from improved brand reputation, customer loyalty, and community goodwill, which can translate into financial gains. The significance of the CD coefficient suggests the rejection of null hypothesis three (Community development has no significant effect on the performance of listed telecommunications companies in Nigeria), and the acceptance of its alternative; as community development has a significant positive effect on ROA.

Risk disclosure (RD) also has a positive effect on ROA, with a coefficient of 0.1001. This implies that a unit increase in RD leads to 0.1001 units increase in ROA and vice versa. The coefficient of RD has a p-value of 0.0014, which is less than the 0.05 (5%) level of significance, thus, the fifth null hypothesis which states that risk management disclosure has no significant effect on the performance of listed telecommunications companies in Nigeria is rejected, and its alternative is accepted – suggesting that risk management disclosure has a significant positive impact on financial performance. The results suggest that companies that are more transparent in their risk disclosure tend to perform better financially. Proper risk disclosure might help build investor confidence, reduce uncertainties, and improve a company's market valuation, thereby positively influencing its ROA.

The overall model fits the data well, with an adjusted R-squared value of 0.672479, meaning that approximately 67.25% of the variability in ROA can be explained by the independent variables in the model. The F-statistic of 6.7178 and a p-value of 0.0014 further indicate that the overall model is statistically significant, meaning the independent variables jointly influence ROA. Additionally, the Durbin-Watson statistic of 2.2268 suggests that there is no serious autocorrelation in the residuals, ensuring the reliability of the regression results as stated by Gujarati and Porter (2009).

In the realm of effect specification concerning the financial performance metric – Return on Assets (ROA), it has been determined that 34.76% of the overall variance observed in ROA can be directly attributed to the cross-sectional disparities that exist between various telecommunications companies, a finding that is substantiated by the application of cross-section random effects, which are characterized by a standard deviation of 3.136235 and a Rho value of 0.3476. This statistic strongly indicates that a considerable segment of the variation seen in financial performance metrics is fundamentally driven by factors that are unique and specific to each individual company operating within this sector. Conversely, it is noteworthy that a much larger proportion, specifically 65.24%, of the variance in ROA is ascribed to idiosyncratic random effects that manifest within the individual units, which in this case are the telecommunications companies, over a temporal dimension, with a standard deviation of 4.613240 and a Rho value of 0.6524, thereby underscoring the critical importance of dynamics that are specific to individual companies in influencing their financial outcomes. Furthermore, it is essential to highlight that no significant variation can be linked to period effects, as evidenced by the null values recorded for period random effects, which have a standard deviation of 0.000000 and a Rho value of 0.0000, thus implying that broader temporal trends do not exert a meaningful influence on the disparities observed in financial performance across the various companies within the telecommunications industry.

Discussion of Findings

Renewable energy and performance of listed Telecommunications companies in Nigeria.

The study found that renewable energy has a positive but statistically insignificant effect on the financial performance of listed telecommunications companies in Nigeria. This is probably because renewable energy investments are long-term and initial costs for infrastructural investment such as solar panels make the financial benefits take time. High costs in developing contexts like Nigeria combined with poor maintenance practices and dependence on diesel generators can dilute the short-term benefits. This is consistent with Mbatha and Naidoo (2024) and Takahasi et al. (2024) who found that renewable energy has a delay in impact on the financial performance of the firm or impact varied across sectors. On the other hand, Oludare and Adekunle (2023) found a positive and significant effect in Nigerian manufacturing suggesting industry variations.

Community development and performance of listed Telecommunications companies in Nigeria

The study found that community development has a positive and statistically significant effect on the financial performance of listed telecommunications companies in Nigeria, suggesting that community-focused investments contribute to financial success. These findings align with other studies, such as those by Smith and Taylor (2023) and Robinson and Edwards (2023), which link community initiatives to improved financial outcomes, although results may vary by sector, as seen in Chinedu et al. (2023) within the oil and gas industry.

Risk Management disclosure and performance of listed Telecommunications companies in Nigeria

The study found that risk management disclosure has a positive and statistically significant effect on the financial performance of listed telecommunications companies in Nigeria. By openly communicating risk management strategies, companies enhance stakeholder trust and improve financial performance by effectively addressing uncertainties. This aligns with findings from similar studies, such as those by Saeidipour and Zeratti (2023), Abimbola and Adeniyi (2023), which also show positive financial effects of risk disclosure in various industries. However, Malahim (2023) presented a contrasting perspective, indicating that certain risk disclosure committee qualifications negatively impact the value of Jordanian banks, suggesting context-specific variations.

Conclusion

Panel Regression was used to analyze the effect of different aspects of sustainability reporting on financial performance of the listed Telecommunications companies in Nigeria. This study concludes that renewable energy (RE) investments will be a good financial performance, but not significant. This means that while preparing for a sustainable future is great, these positive financial benefits (or lack of, as it may be) may not be evident for years,

likely due to the high capital investment and long-term nature of these kinds of investments. Community development (CD) projects have a high positive impact on their financial performance. Telecommunications companies involved in community-building activities do better financially by building customer and stakeholder loyalty and improving their corporate image. These results further highlight community development as a marketing strategy for promoting sustainable profitability. Risk disclosure (RD) is a major positive driver of the financial performance of telecommunications companies in Nigeria due to its role in promoting transparency and increasing investors' confidence. Companies that offer detailed risk disclosures are more likely to secure investment and successfully deal with uncertainty, resulting in improved profitability. Thus, sustainability reporting has a significant effect on the financial performance of listed Telecommunications companies in Nigeria.

Recommendations

Based on the findings of this study, the following recommendations are made:

i. Although renewable energy investments may not show immediate financial benefits, telecommunications companies should continue to pursue these initiatives as part of their long-term sustainability strategies. The government should encourage these efforts by providing financial incentives, such as subsidies, tax breaks, or low-interest loans, to reduce the upfront costs associated with renewable energy projects. These incentives will help companies realize the long-term financial benefits of renewable energy, including lower operational costs and an enhanced sustainability profile, while also contributing to environmental goals.

ii. Expanding corporate engagement in community development initiatives should be a core strategy for telecommunications companies. Community development efforts, such as improving local infrastructure, enhancing access to education, and supporting healthcare initiatives, foster strong relationships with customers and stakeholders. These initiatives drive long-term customer loyalty, open new markets, and improve corporate reputation, all of which positively influence financial performance.

iii. Improving risk disclosure practices is critical for telecommunications companies looking to strengthen investor confidence and enhance transparency. By providing clear, comprehensive, and timely information on risk management strategies, companies can build trust with investors, reduce uncertainty, and improve financial performance. Additionally, telecommunications companies should offer more financial support for the development of advanced risk assessment tools which will help improve their transparency and position themselves better in the eyes of investors and stakeholders.

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