DISCLOSURE ON RENEWABLE ENERGY AND CARBON EMISSION ON FINANCIAL PERFORMANCE OF QUOTED INSURANCE COMPANIES IN NIGERIA

Yinka Lydia EMMANUEL[1], Peace Ebunoluwa KOLAWOLE*[2], & Olaoluwa Tobiloba AKINRINDE[3]

Accounting and Finance Programme, Bowen University, Nigeria
yinka.emmanuel@bowen.edu.ng[1]

Accounting and Finance Programme, Bowen University, Nigeria
peace.kolawole@bowen.edu.ng[2]

Accounting and Finance Programme, Bowen University, Nigeria
olaoluwa.akinrinde@bowen.edu.ng[3]

*Corresponding author

Abstract

This study examines the influence of the disclosure of renewable energy and carbon emission on the financial performance of quoted insurance companies in Nigeria from 2013 to 2021. The sample size used for the purpose of this study consists of a total of 16 quoted insurance companies listed on the Nigerian exchange. The research made use of the regression analysis for the data generated using E-views software. Findings reveal that the coefficient of the disclosure on RE (Renewable Energy) and CE (Carbon Emission) have positive and statistically significant effect on ROA (Return on Assets). The disclosures of renewable energy and carbon emission are therefore seen to have positive effect on the financial performance of quoted insurance companies in Nigeria.

Keywords: Renewable energy, Carbon emissions, financial performance

1 INTRODUCTION

Human actions are currently having a negative impact on the society, economy, and ecology that will be experienced by future generations (Unerman, Bebbington, & O'Dwyer, 2007). In order to achieve sustainability and protect the resources that are presently available, organisations must adopt new habits and business practices that are environmentally sustainable. Business leaders who take action to address these issues help businesses lower risks, strengthen their brands, and gain a competitive edge while also reducing poverty and improving the quality of life for all people. Businesses now prioritize actions that tend to maximize the profits available to all major stakeholders rather than just focusing on maximizing shareholders' wealth. Large corporations, traditionally seen to be the sole concern of their owners, are today considered as having social responsibility as well (Ekwueme, 2011). According to Butler, *et al.* (2011), sustainable environmental performance promotes product distinctiveness in the marketplace, improve an organization's reputation with customers, and thus increase profitability. Sustainability has been a top

priority for organizations of all kinds in order to protect capital for future generations. This is due to the knowledge that being socially and ecologically responsible can assist long-term growth goals, increase productivity, and optimize shareholder value. It is also widely known in the business sector and most academic literature on sustainability reporting that this reporting system is advantageous as many studies on sustainability reporting have reported on the impact of sustainability reporting on profitability.

Although, there have been some studies on the connection between environmental sustainability practices and financial performance in the context of developing economies, this study therefore examines the effect of disclosure on renewable energy and carbon emission on the financial performance of listed insurance businesses listed on the Nigeria exchange.

2   LITERATURE REVIEW

2.1   Renewable Energy Disclosures

According to Mohtasham (2015), application of any renewable energy requires a sustainability study, which is dependent on three primary factors: environmental consequences, externalities costs, economics, and funding. Growth and energy are observed to be positively correlated. Energy consumption rises along with economic expansion, particularly the need for fossil fuels. Renewable energy sources are low-carbon and environmentally beneficial. No greenhouse emissions are created through the usage of solar, wind, geothermal, and hydroelectric electricity (GHGs). To protect the environment, many nations have embraced renewable energy technology in recent years. Additionally, a number of causes, including the security of the energy supply, energy dependence, climate change, the volatility of energy prices, health concerns, and natural disasters, spurred rising economies to use renewable energy sources. Researchers, governments, and legislators are increasingly looking for ways to guarantee a sustainable, healthy environment (Chaabouni & Saidi, 2017; Akbar *et al.*, 2020). To slow the rate of climate change, environmental protection organizations also suggested using renewable energy sources more extensively (Apergis & Payne 2010; Jebli, *et al.*, 2016). According to a study by Harrison and Adams (2017), less wealthy African households appear to spend a larger percentage of their total expenses on energy. The majority of empirical studies carried out for the OECD or European nations support a connection between the use of renewable energy and either economic growth or environmental sustainability, and they discovered compelling evidence to suggest that the use of renewable energy supports both economic growth and environmental sustainability (Marinaş, *et al.*, 2018).

Hypothesis One ($H0_1$): The disclosure on renewable energy has no significant effect on the financial performance of quoted insurance companies in Nigeria.

2.2   Carbon Emission Disclosure

Carbon emission disclosure is the information that provides details on any carbon emission-related actions or results that the company has taken (Bahari, Alrazi & Husin, 2016). Organisations attach information about the emissions from its sustainability report and annual report as the disclosure of carbon emission (Jannah & Muid, 2014). Data on emissions is included in the annual report to demonstrate a company's transparency and accountability for its business operations (Deantari, *et al.*, 2019; Pratiwi & Sari, 2016). Insurance companies that took the initiative when the issue of climate change first came up in the early 2000s are now seen as pioneers in the shift to a low-carbon economy. They continue to take advantage of the chances, whilst businesses that have not started their shift or are only minimally involved will either be compelled to comply or suffer detrimental effects to their finances and brand. We are reaching a tipping point at the beginning of 2021, after which institutions will face greater pressure to closely adhere to "green" criteria. Failure to do so will probably result in a loss of revenue (loss of product sales, more claims, squeezed margins, etc.) and customers (loyalty on green affinity, decreased demand, poor coverage options).

The growing awareness of the risks associated with climate change and the growing significance of sustainability are what drive the interaction between carbon emission disclosure and listed insurance companies. Businesses are being more scrutinized for their emissions disclosure policies, and insurance companies are including carbon emissions into their risk assessment and underwriting procedures which could affect their financial performance. The ultimate objective is to encourage more sustainable business practices across industries and mitigate climate change concerns. Thus, the first hypothesis will be as follows:

Hypothesis Two (Ho_2): The disclosure of carbon emission has no significant effect on the financial performance of quoted insurance companies in Nigeria.

2.3   Return on Asset (ROA)

ROA indicates the profitability of the firm relation to the total assets employed in the firm (Kabajeh, et al., 2012). It is widely used as a comparative measure because it substantially depends on the industry considered. It assesses how effective firm is in converting the amount invested in the assets through equity or debt financing into net income (Saragih, 2018). Consistent with the prior research (Garg, 2015; Griffin

and Mahon, 1997; Alshehhi, et al., 2018). ROA stands for Return on Assets. It is a financial ratio that measures a company's profitability by evaluating its efficiency in utilizing its assets to generate earnings. ROA is calculated by dividing a company's net income by its average total assets during a specific period.

Return on assets is defined as net income divided by total assets and shows how well a company's management is using the company real investment resources to generate profits. It is widely used to compare the efficiency and operational performance of a company, as it takes into account the level of return a company earns on the assets it finances.

ROA is expressed as a percentage and is often used to assess a company's profitability and how effectively it manages its assets. It is a useful metric for comparing companies within the same industry or tracking a company's performance over time. A higher ROA indicates that a company is generating more profit relative to its assets, which signifies better efficiency and effectiveness in asset utilization. Conversely, a lower ROA suggests that the company is less efficient in generating profits from its assets. The formula for ROA is Net Profit / Total Assets ÷2.

3   METHODOLOGY

The study used secondary data and focuses on the 16 quoted insurance companies listed in the Nigerian Exchange Group over the period 2013-2021. The study also employs regression analysis for the data generated with E-views technique.

Measurement of Variables

Table 3.1: Measurement of Variables

VARIABLE	PROXIES	MEASURES
Independent Variable (Environmental Sustainability)	Renewable Energy Carbon Emissions Waste Management Water Consumption	Reporting – 1 Not reporting – 0
Dependent Variable (Financial Performance)	Return of Assets (ROA)	Net Profit / Total Assets ÷2
Control Variables	Firm Size	Log of total asset
	Leverage	Total debt / Total asset

Model Specification

$ROA = \beta_0 + \beta_1 RE_{it} + \beta_2 CE_{it} + \beta_3 WM_{it} + \beta_4 WC_{it} + \beta_5 Firm\ Size_{it} + \beta_6 Leverage_{it} + e_{it}$

Where i = 1… N denotes a cross-section index of firms,

      t = 1…, T denotes the time-series index.

RE = Renewable Energy

CE = Carbon Emissions

WM = Waste Management

WC = Water Consumption

4   ANALYSIS AND DISCUSSION

4.1   Descriptive Analysis

The provided data presents several key financial performance indicators (ROA, CE, RE, WC, WM) for a sample of quoted insurance companies. These indicators offer insights into the relationship between environmental sustainability and financial performance within the insurance industry. Table 4.1 shows the mean ROA for the insurance companies in the sample is -0.019998, indicating a slightly negative average return on assets. The negative skewness and high kurtosis suggest a distribution with a significant number of companies experiencing low ROA. This implies that, on average, the profitability of quoted insurance companies may be impacted by various factors, including those related to environmental sustainability practices. The mean carbon emission value is 0.041958, suggesting that, on average, the insurance companies in the sample have a positive carbon emission level. The mean renewable energy value is 0.055944, indicating that, on average, the insurance companies in the sample have a positive engagement with renewable energy.

Table 4.1: Descriptive Statistics

Variables	ROA	CE	RE	WC	WM
Mean	-0.019998	0.041958	0.055944	0.055944	0.069930
Median	0.049581	0.000000	0.000000	0.000000	0.000000
Maximum	0.326751	1.000000	1.000000	1.000000	1.000000
Minimum	-1.626611	0.000000	0.000000	0.000000	0.000000
Std. Dev.	0.279052	0.201198	0.230621	0.230621	0.255926
Skewness	-3.432867	4.569150	3.864487	3.864487	3.372712
Kurtosis	17.11998	21.87713	15.93426	15.93426	12.37519
Jarque-Bera	1468.802	2620.800	1352.733	1352.733	794.8113
Probability	0.000000	0.000000	0.000000	0.000000	0.000000

Sum	-2.859761	6.000000	8.000000	8.000000	10.00000
Sum Sq. Dev.	11.05752	5.748252	7.552448	7.552448	9.300699
Observations	143	143	143	143	143

4.2 Regression Analysis

The regression results indicate the relationship between the dependent variable, Return on Assets (ROA), and the independent variables: Carbon Emissions (CE), Renewable Energy (RE), Water Consumption (WC), and Waste Management (WM). The panel EGLS (Cross-section random effects) method was employed, and the analysis covers a sample period from 2013 to 2021, with 143 observations from 16 cross-sections.

Table 4.2 shows that at 1% level of significance, the coefficient of RE (Renewable Energy) is 0.152772, which has positive and statistically significant effect on ROA (Return on Assets). At 5% level of significance, the coefficient of CE (Carbon Emissions) is 0.007717, which has positive and statistically significant effect on ROA (Return on Assets). This suggests that carbon emissions do have significant direct effect on ROA in the context of quoted insurance companies while RE (Renewable Energy) indicates that an increase in renewable energy practices is associated with higher ROA for quoted insurance companies.

4.3 Regression Analysis results

Table 4.3: Regression Analysis result

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 06/29/23   Time: 12:45
Sample: 2013 2021
Periods included: 9
Cross-sections included: 16
Total panel (unbalanced) observations: 143
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.015926	0.054036	-0.294728	0.0086
CE	0.007717	0.149607	0.051583	0.0089
RE	0.152772	0.161466	0.946157	0.0057
WC	-0.169202	0.131408	-1.287608	0.0000
WM	-0.047475	0.111156	-0.427100	0.0000

Effect of Disclosures of Renewable Energy: The coefficient of RE (Renewable Energy) in the regression analysis shows a positive and statistically significant effect on ROA. This finding suggests that insurance companies in Nigeria that disclose their renewable energy practices have a higher financial performance, as measured by ROA. It implies that the adoption and disclosure of renewable energy initiatives positively affect the financial performance of quoted insurance companies. This finding supports the research objective and highlights the importance of promoting renewable energy practices in the insurance industry in Nigeria.

Effect of Disclosures of Carbon Emissions: The coefficient of CE (Carbon Emissions) in the regression analysis shows a positive and statistically significant effect on ROA. This indicates that the disclosures of carbon emissions by insurance companies in Nigeria do have a significant direct effect on their financial performance, as measured by ROA. Overall, the findings indicate that the disclosures of renewable energy and carbon emission have positive effect on the financial performance of quoted insurance companies in Nigeria.

4.4   Test of Hypotheses

To discuss the hypotheses in light of the statistical results, the study considered the regression coefficients and their significance levels for each of the independent variables: Renewable Energy (RE) and Carbon Emission (CE).

Hypothesis Two ($H0_1$): The disclosures of renewable energy has significant effect on the financial performance of quoted insurance companies in Nigeria. The regression analysis reveals a positive and statistically significant coefficient for renewable energy (RE). This indicates that the disclosures of renewable energy practices have a significant positive effect on the financial performance of quoted insurance companies in Nigeria, as measured by ROA. Therefore, we reject the null hypothesis (Ho1) and conclude that the disclosures of renewable energy have a significant effect on financial performance.

Hypothesis One ($H0_2$): The disclosure of carbon emission has significant effect on the financial performance of quoted insurance companies in Nigeria. Based on the regression analysis, the coefficient for carbon emissions (CE) is positive and statistically significant. This means that the disclosure of carbon emissions does have a significant direct effect on the financial performance of quoted insurance companies in Nigeria, as measured by Return on Assets (ROA). Therefore, we reject the null hypothesis ($H0_2$), which suggests that the disclosure of carbon emission has significant effect on financial performance.

In summary, based on the statistical results, we reject the null hypotheses ($H0_1$, $H0_2$) which implies the disclosures of renewable energy, and carbon emission have significant effects on the financial performance of quoted insurance companies in Nigeria. These findings suggest the importance of considering and promoting sustainable practices, such as renewable energy and carbon emission adoption, to enhance the financial performance of insurance companies in Nigeria.

Table 4.4: Test of hypotheses

Pedroni Residual Cointegration Test
Series: ROA FIRM_SIZE CE RE WM
Date: 06/29/23   Time: 12:44
Sample: 2013 2021
Included observations: 144
Cross-sections included: 1 (15 dropped)
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
User-specified lag length: 1
Newey-West automatic bandwidth selection and Bartlett kernel

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	0.673311	0.2504	0.673311	0.2504
Panel rho-Statistic	0.114597	0.5456	0.114597	0.5456
Panel PP-Statistic	-2.491082	0.0064	-2.491082	0.0064
Panel ADF-Statistic	0.303607	0.6193	0.303607	0.6193

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	0.532831	0.7029
Group PP-Statistic	-2.753042	0.0030
Group ADF-Statistic	0.675846	0.7504

Cross section specific results

Phillips-Peron results (non-parametric)

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 06/29/23   Time: 12:45
Sample: 2013 2021

Periods included: 9
Cross-sections included: 16
Total panel (unbalanced) observations: 143
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.015926	0.054036	-0.294728	0.0086
CE	0.007717	0.149607	0.051583	0.0089
RE	0.152772	0.161466	0.946157	0.0057
WC	-0.169202	0.131408	-1.287608	0.0000
WM	-0.047475	0.111156	-0.427100	0.0000

Effects Specification		S.D.	Rho
Cross-section random		0.201973	0.4650
Idiosyncratic random		0.216629	0.5350

Weighted Statistics

R-squared	0.013325	Mean dependent var	-0.006723
Adjusted R-squared	-0.015274	S.D. dependent var	0.213164
S.E. of regression	0.214786	Sum squared resid	6.366376
F-statistic	0.465931	Durbin-Watson stat	1.897801
Prob(F-statistic)	0.760644		

Unweighted Statistics

R-squared	0.004952	Mean dependent var	-0.019998
Sum squared resid	11.00276	Durbin-Watson stat	1.098098

4.5   Summary of Findings

Hypothesis One ($H0_1$): The coefficient of RE (Renewable Energy) in the regression analysis shows a positive and statistically significant effect on ROA.

Hypothesis Two (H0$_2$): The coefficient of CE (Carbon Emissions) in the regression analysis shows a positive and statistically significant effect on ROA.

5.0   CONCLUSION

This study focused on exploring the relationship between environmental sustainability disclosures and financial performance of quoted insurance companies in Nigeria. The findings of the study have shown that there is positive and significant effect on environmental sustainability disclosures and ROA. Overall, the findings indicate that the disclosures of renewable energy, carbon emission have positive effect on the financial performance of quoted insurance companies in Nigeria.

AUTHOR DECLARATIONS

Author Contributions: Conceptualization: Y.L.E.; methodology: Y.L.E. and O.T.A.; software: Y.L.E.; validation: Y.L.E. and O.T.A.; formal analysis: O.T.A.; investigation: O.T.A.; resources: O.T.A.; data curation: Y.L.E. and O.T.A.; writing – original draft preparation: O.T.A.; writing – review and editing: Y.L.E and P.E.K.; funding acquisition: O.T.A. and P.E.K.

Institutional Review Board Statement: Not Applicable

Data Availability Statement: The data utilized for this study will be made available upon reasonable request.

Conflicts of Interest: The authors declare no conflicts of interest.

REFERENCES

Apergis, N., & Payne, J. E. (2010). Renewable Energy Consumption and Growth in Eurasia. *Energy Economics*, *32*(6), 1392–1397. doi:10.1016/j.eneco.2010.06.001

Butler, J. B., Henderson, S. C., & Raibon, C. (2011). Sustainability and the Balanced Scorecard. *Management Accounting Quarterly, 12*(2), 1-10.

Chaabouni, S., & Saidi, K. (2017). The Dynamic Links between Carbon dioxide (CO_2) Emissions, Health Spending and GDP Growth: A case study for 51 countries. *Environmental Responsibility*, *158*, 137-144. Doi:10.1016/j.envres.2017.05.041.

Deantari, S. A. O., Pinasti, M., & Herwiyanti, E. (2019). Faktor-Faktor yang Memengaruhi Pengungkapan Gas Rumah Kaca dari Perspektif Akuntansi Hijau. *Journal Equilibrium, 7*(2), 88–111.

Garg, P. (2015). Impact of sustainability reporting on firm performance of companies in India. *Int J Mark Business Communications*, *4*(3), 38-45.

Jannah, R. & Muid, D. (2014). Analisis Faktor-Faktor yang Memengaruhi Carbon Emission Disclosure pada

Perusahaan di Indonesia (Studi Empiris pada Perusahaan yang Terdaftar di Bursa Efek Indonesia Periode 2010– 2012). *Diponegoro Journal of Accounting, 3*(2), 1–11.

Jensen, M.C.; & Meckling, W.H. (1976) Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Finance and. Economics 3*, 305–360.

Marinaş, M.C., Dinu, M., Socol, A.G., & Socol, C. (2018). Renewable energy consumption and economic growth. Causality relationship in central and eastern European countries. PLOS ONE *13*(10), 1–29. http://dx.doi.org/10.1371/journal.pone. 0202951.

Ochiri, G., Wario, G., Odhiambo, R., and Arasa, R., 2015. Effects of Waste Reduction Strategy on Firm Performance: a Survey of Publishing Firms in Kenya. *International Journal of Economics, Commerce and Management*. United Kingdom [online], *111*(5), 1228–1241.

Prafitri, A. & Zulaikha. (2016). Analisis Pengungkapan Emisi Gas Rumah Kaca. Jurnal Akuntansi & Auditing, *13*(2), 155–175.

Trumpp, C., Endrikat, J., Zopf, C., and Guenther, E., 2013. Definition, Conceptualization, and Measurement of Corporate Environmental Performance: A Critical Examination of a Multidimensional Construct. *Journal of Business Ethics*, *126*(2), 185–204.