

Explanatory and Moderating Factors of Sustainability Reporting of Listed Financial Firms in Nigeria

***Fatai Abiodun Atanda, Olubunmi Florence Osemene,**

University of Ibadan, Nigeria

University of Ilorin, Nigeria

Abstract

Given the multi-faceted nature of factors influencing sustainability reporting and the changing board characteristics over time, this study investigates the moderating role of board size and independence in the relationship between firm attributes, financial performance, and sustainability reporting. Data from 24 listed Nigerian financial firms, from 2011 to 2022, were analyzed using descriptive, inferential, and econometrics tools. We employed the dynamic panel data technique (system generalized method of moments) for estimation. We found a significant effect of firm size and liquidity on overall sustainability reporting. Including board characteristics in models yielded more important results. Older firms with large boards reported more sustainability activities—Ditto for firms with large boards and large market value. However, large firms with large boards reported more sustainability activities, similar to the result obtained for firms with large boards and high liquidity. Surprisingly, profitable firms with larger independent directors reported less on social and economic sustainability activities. Conclusively, firm attributes played more significant roles in predicting sustainability reporting, while board size was a better moderator of the nexus between firm attributes, financial performance, and sustainability reporting. These portend policy implications like the need to integrate sustainability policies into core business strategies, operations, and governance.

Keywords: sustainability reporting, firm attributes, financial performance, board of directors

JEL Classification: M41, G32

***Corresponding Author:** Department of Accounting, University of Ibadan, Nigeria.
Email:atanda2001uk@yahoo.co.uk

Introduction

The introduction of Codes of Corporate Governance for the financial sector in Nigeria, which emphasized sustainability, has led to increased reporting performance of financial institutions disclosing quantitative and qualitative information on economic activities and

environmental and social issues. The increased number of firms reporting sustainability activities has resulted in an upward trend in the overall sustainability reporting index from 2.47 in 2014 to 2.60 in 2018 (Atanda et al., 2021). This provoked two main issues for research: 1) the consequences or implications of sustainability reporting on firm

performance; and 2) the factors responsible for the improved sustainability reporting performance of the firms.

The first issue has been vigorously given research attention, with the argument being on whether firms engage in sustainability activities to strengthen the legitimacy of operations (legitimacy theory), or to enhance market value (value-enhancing theory) (Atanda et al., 2021; Emeka-Nwokeji & Osisioma, 2019). Research on the second issue covered different categories of factors influencing sustainability reporting (Igbekoyi et al., 2021; Haladu & Nashwan, 2021; Sharma et al., 2020). While some studies focused on firm attributes, others looked at the influence of financial performance. Inconsistent results from these studies pointed to inconclusive evidence on the factors determining sustainability reporting across sectors. Again, the category of factors that played a more significant role in predicting sustainability reporting is not known since the studies were carried out separately and independently of each other.

In addition, explaining sustainability reporting is incomplete without considering the characteristics of the board of directors that formulate policies that affect sustainability activities and their reporting. Since the introduction of the different corporate governance codes, there have been significant changes in board size, board structure, ownership structure, and financial disclosures in Nigerian financial institutions (Onuorah & Imene, 2016). The limited empirical support offered by existing frameworks

showed that there is still a dearth of ample empirical evidence on the moderating role of board characteristics on the effect of firm attributes and financial performance on sustainability reporting. Given the changing board characteristics over time, their interactions with firm attributes and financial performance are expected to provide more information on the factors that significantly influence sustainability reporting. Thus, the following research questions:

- a) How do firm attributes and financial performance affect the sustainability reporting performance of financial institutions in Nigeria?
- b) What is the moderating role of board characteristics in the relationship between firm attributes, financial performance, and sustainability reporting performance?

The motivation for this study lies in the fact that Nigeria is a country that constantly faces environmental, economic, and social problems, and the financial sector is not insulated from these sustainability issues. The issues include pollution (air and water), chemicals and industrial wastes, environmental degradation, economic and financial crises, civil unrest, dissatisfied and unsafe working conditions, lack of community involvement, and unethical business practices. Though businesses provide some protections, they do not match societal expectations towards the environment (Haladu & Nashwan, 2021). It is even believed in some quarters that businesses are prospering to the detriment of society.

The financial scandals of the late 1990s and 2008, as well as the 2015 financial crisis, have led to a decline in confidence in financial institutions (Weber & Blair, 2016). These call for new models for sustaining the financial system and ensuring compliance with sustainability-related regulations as well as reporting of the sustainability policy that incorporates all sustainability considerations in the financial sector's operations (Islam et al. 2016). Besides, a wide range of stakeholders have been demanding quality information on sustainable business activities. So, identifying factors that enhance sustainability reporting will be of interest to them, especially in the attempt to restore confidence in the financial sector.

The moderating role of board characteristics on the effect of firm attributes and financial performance on sustainability reporting performance was rarely investigated. However, empirical evidence on this will provide valuable information on the efficacy of board characteristics in moderating any negative effect of firm attributes and financial performance on the overall sustainability reporting performance (and its dimensions) since the board of directors is in charge of policymaking on firm sustainability. This study is therefore a contribution to the debate on whether or not firm attributes, financial performance, and board characteristics bear sufficient information to predict sustainability reporting performance.

This study contributes to knowledge by providing empirical information on the

extent and quality of overall, economic, social, and environmental sustainability activities reported by financial firms. Secondly, it gives an insight into and enhances our understanding of the critical category of factors determining sustainability reporting. Specifically, the moderating role of board size and board independence in the relationships, which was not previously given due research attention, was covered in this study. The rest of the paper is divided into four sections. Section two reviews the theory of accountability and previous empirical studies. Section three details the methods and procedures employed, and section four presents the results, while section five concludes the paper, with policy recommendations and suggestions for further studies.

Literature Review

The theory of accountability forms the bedrock of this study. According to Gray et al. (1997), accountability can be viewed as an act of being responsible for one's actions, decisions, or activities, with the assumption of justifying them when the need to do so arises, and depicts accounting relationships between individuals. However, responsibility is null and void when nobody knows who is responsible; hence, there must be someone who receives the whole praise for what is done well and the whole blame for what is ill (Lindberg, 2009).

The theory examines the relationship between an organization and stakeholder groups (Li et al., 2020), while the nature of the relationship and rights to information are logically controlled by the society

where the relationships happen (Vance et al., 2015). Information disclosure will be dictated by the intensity of the gatherings to request it, by a power, which could emanate from natural capacities or intensity of the gatherings concerned, or from the administrative procedures of the general public, or could be determined by the powers of the parties to demand the information (Gray et al., 1997). Therefore, the theory is concerned with the relationship of an organization with groups, individuals, and other organizations, and the rights to information that the relationship can lead to. This makes it possible for organizations to not only be socially responsible, based on their social contract with society, but also accountable to all concerned stakeholders.

As applied to this study, the theory of accountability holds that there should be regulations and policies on sustainability activities and their reporting. These were provided for in different corporate governance codes and reporting principles on sustainability activities adopted by organizations. They help to make the institutions responsible not only economically but also socially and environmentally. They also help to strengthen the reporting relationship between a firm and its stakeholder groups and to identify the factors that can enhance the relationship in the short- and long-term horizons. Examining the factors responsible for sustainability reporting performance would mean identifying factors that made some firms more

accountable to stakeholders in sustainability activities than others.

The multi-faceted nature of the factors influencing sustainability reporting has provoked some research concerns, which have led to two main strands in the literature. The first strand focused on the consequences of sustainability reporting (Atanda *et al.*, 2021; Emeka-Nwokeji & Osisioma, 2019; Laskar & Maji, 2018). The second strand, which has gained increased momentum, is motivated by the potential of different factors causing increased firms' interest in sustainability (Embuningtiyas *et al.*, 2020; Haladu & Nashwan, 2021). Concerning the second strand, a plethora of studies have reported firm age, firm size, leverage, firm value, profitability, board size, and board of directors' skills and education as underlying factors influencing sustainability performance and reporting.

From the viewpoint of firm age, the literature on sustainability reporting is often related to the decision of a firm to mature before it starts reporting its sustainability activities (Farisyi *et al.*, 2022; Haladu & Nashwan, 2021; Tauringana, 2020). It can then be inferred from these studies whether older firms tend to engage in and report sustainability activities more than younger ones (Siahaan *et al.*, 2020). So, being in business for a longer time tends to motivate a firm to carry out more sustainability activities and be extensive in reporting them.

Strengthening the firm size perspective, Tauringana (2020) and Dissanayake *et al.* (2019) found that larger firms reported sustainability activities more than their

smaller counterparts. Firm size was measured using the number of employees. Again, Sharma et al. (2020) and Kuzey and Uyar (2016) found that the larger the firm size (measured by total assets), the more sustainability activities reported. Using market capitalization as an indicator, Giron et al. (2020), however, found a significant negative relationship between firm size and sustainability performance. This indicated that smaller firms reported sustainability activities more than larger ones, refuting the earlier position that size matters.

Profitability is a firm's ability to generate profit at a certain level of sales, assets, and share capital (Husnan, 2021). Confirming the notion that profitable firms are often tempted to report their sustainability activities, Haladu and Nashwan (2021) and Sharma et al. (2020) found a significant positive relationship between profitability (return on assets) and sustainability reporting. Conversely, Giron et al. (2020) reported no significant effect of profitability (EBITDA) on sustainability performance, supporting the position of Dissanayake et al. (2019) when return on equity was used to measure profitability.

Corporate governance refers to a set of regulations on how shareholders, managers, creditors, government, employees, and other internal and external stakeholders relate, concerning their rights and obligations, and is used to regulate and control a company (Farisyi et al., 2022). Some previous studies investigated board size (Haladu & Nashwan, 2021; Raquiba & Ishak, 2020) and board independence (Raquiba & Ishak, 2020; Hu & Loh, 2018).

Others covered board diligence (Raquiba & Ishak, 2020; Hu & Loh, 2018) and board members' expertise (Taurigana, 2020). These studies were carried out based on the belief that corporate governance structure can influence sustainability behaviour (Farisyi et al., 2022).

While Raquiba and Ishak (2020) and Hu and Loh (2018) found a significant positive relationship between board size and sustainability performance, Haladu and Nashwan (2021) found a significant negative relationship, while Amran and Haniffa (2011) did not find any significant relationship. Board independence was also found to have a significant positive effect on sustainability by Raquiba and Ishak (2020) and Hu and Loh (2018), but no significant relationship was found by Amran and Haniffa (2011). As for board diligence (number of board meetings), Raquiba and Ishak (2020) and Hu and Loh (2018) found a significant positive relationship between the variable and sustainability reporting. Meanwhile, a significant relationship between board expertise and sustainability was found by Taurigana (2020), whereas no significant relationship was established by Amran and Haniffa (2011).

The review shows that the debate on the role of the different categories of factors determining sustainability reporting is still inconclusive. Even using the same indicator for measuring some of the factors did not lead to agreement in conclusions. In addition, the diverse methodologies adopted in many studies did not consider econometric tests such as normality, multicollinearity, heteroskedasticity, and

serial correlation, as well as the autoregressive nature of the dependent and explanatory variables, which would have required the use of a dynamic panel data technique for model estimation. While some empirical results showed significant effects of some factors on sustainability performance, others showed the opposite. The inconsistencies need to be investigated further under different contexts and locations, like this study. This present study, therefore, provided more insights into and expanded our understanding not only of the relationship between firm attributes and financial performance with sustainability but also of the moderating effects of two board characteristics.

Methodology

Sample and Data

The research design of this study is correlational since we examined relationships among variables of interest. Only 12 deposit money banks and 15 insurance companies were listed on the Nigeria Exchange Group (NGX) as of December 2023. To arrive at the sample size, firms that failed to have audited accounts consistently over the years 2011-2022 were dropped. At one time or the other, some of the firms were either delisted or their accounts were not publicly available. Hence, data were collected from annual reports of 12 deposit money banks and 12 insurance firms. The period was selected because Nigerian financial institutions started taking sustainability reporting seriously in 2011 after the Bankers Committee came up with the

Nigerian Sustainable Banking Principles (NSBP).

The data for overall sustainability reporting performance (*sus*) was disaggregated into its three dimensions of sustainability: economic (*eco*), environmental (*env*), and social (*soc*) sustainability reporting provided by the Global Reporting Initiative - GRI (2011). The merits of employing panel data were encapsulated by Olubusoye et al. (2016), who asserted that it is suitable for controlling unobserved individual-specific effects caused by the heterogeneity of cross-sections in a sample. So, not controlling for these effects will lead to bias.

Model Specification

The GRI framework assists corporations to voluntarily report the social, environmental, and economic impacts of their operations. Therefore, this study specifies a sustainability reporting performance model using the following static equation:

$$SUS_{it,j} = \beta_0 + \beta_1 FSZ_{it} + \beta_2 AGE_{it} + \beta_3 ROA_{it} + \beta_4 LIQ + \beta_5 TBQ_{it} + \lambda_i + \mu_t + \varepsilon_{it} \quad (1)$$

where, *sus* is the overall sustainability reporting performance of company *i* at time *t*; *fsz* is firm size for company *i* at time *t*; *age* is firm age for company *i* at time *t*; *tbq* is firm value proxied by TobinQ of company *i* at time *t*; *liq* is the liquidity positions for company *i* at time *t*; *roa* is the profitability of company *i* at time *t*; λ_i is company individual effect; μ_t is time-specific effect; *j*=3, which is the number of dimensions for overall sustainability reporting performance; and ε_{it} is the stochastic error or disturbance term.

However, due to the dynamic nature of the variables of interest, the dynamic panel data version is specified as follows:

$$f_{it,j} = \sum_{m=1}^n \beta_{f,m} f_{i,t-m} + \sum_{p=0}^n \beta_{d,p} d_{i,t-p} + \sum_{q=0}^n \beta_{l,q} l_{i,t-q} + \sum_{r=0}^n \beta_{e,r} e_{i,t-r} + \sum_{s=0}^n \beta_{z,s} z_{i,t-s} + \sum_{u=0}^n \beta_{g,u} g_{i,t-u} + \bar{\lambda}_i + \mu_t + \varepsilon_{it} \quad (2)$$

where, $f_{it,j}$ is *sus* and its dimensions; $d = fsz$; $l = age$; $e = tbq$; $z = liq$; $g = roa$; and n = maximum number of lag detected for each of the variables. To observe the moderating role of board size (ϕ) and board independence (h), the variables were included in equation (2) stepwise as follows:

$$f_{it,j} = \sum_{m=1}^n \beta_{f,m} f_{i,t-m} + \sum_{p=0}^n \beta_{d,p} d_{i,t-p} + \sum_{q=0}^n \beta_{l,q} l_{i,t-q} + \sum_{r=0}^n \beta_{e,r} e_{i,t-r} + \sum_{s=0}^n \beta_{z,s} z_{i,t-s} + \sum_{u=0}^n \beta_{g,u} g_{i,t-u} + \sum_{w=0}^n \beta_{\phi,w} \phi_{i,t-w} + \bar{\lambda}_i + \mu_t + \varepsilon_{it} \quad (3a)$$

and,

$$f_{it,j} = \sum_{m=1}^n \beta_{f,m} f_{i,t-m} + \sum_{p=0}^n \beta_{d,p} d_{i,t-p} + \sum_{q=0}^n \beta_{l,q} l_{i,t-q} + \sum_{r=0}^n \beta_{e,r} e_{i,t-r} + \sum_{s=0}^n \beta_{z,s} z_{i,t-s} + \sum_{u=0}^n \beta_{g,u} g_{i,t-u} + \sum_{v=0}^n \beta_{h,v} h_{i,t-v} + \bar{\lambda}_i + \mu_t + \varepsilon_{it} \quad (3b)$$

The interacting effect of board size (ϕ) and board independence (h), respectively, was also tested by interacting the variables separately with firm characteristics (*size*, *age*, and *tbq*) and financial performance (*liq* and *roa*) as follows:

$$f_{it,j} = \sum_{m=1}^n \beta_{f,m} f_{i,t-m} + \sum_{c=0}^n \beta_{d\phi,c} d^* \phi_{i,t-c} + \sum_{a=0}^n \beta_{l\phi,a} l^* \phi_{i,t-a} + \sum_{x=0}^n \beta_{e\phi,x} e^* \phi_{i,t-x} + \sum_{y=0}^n \beta_{z\phi,y} z^* \phi_{i,t-y} + \sum_{k=0}^n \beta_{g\phi,k} g^* \phi_{i,t-k} + \bar{\lambda}_i + \mu_t + \varepsilon_{it} \quad (4a)$$

and,

$$f_{it,j} = \sum_{m=1}^n \beta_{f,m} f_{i,t-m} + \sum_{c=0}^n \beta_{dh,c} d^* h_{i,t-c} + \sum_{a=0}^n \beta_{lh,a} l^* h_{i,t-a} + \sum_{x=0}^n \beta_{eh,x} e^* h_{i,t-x} + \sum_{y=0}^n \beta_{zh,y} z^* h_{i,t-y} + \sum_{k=0}^n \beta_{gh,k} g^* h_{i,t-k} + \lambda_i + \mu_t + \varepsilon_{it} \quad (4b)$$

Variables and Measurement

The explained variable of this study is sustainability reporting performance. To measure this variable and its dimensions, we adopted the procedure employed by Atanda et al. (2021) where the quantitative content analysis method was employed to compute overall sustainability reporting performance (*sus*) index using 21 indicators specified by the Global Reporting Initiative - GRI (2011), which

were categorized into three dimensions: economic (*eco*), environmental (*env*) and social (*soc*) sustainability reporting performance. The explanatory variables are firm size, firm age, firm value, liquidity, and profitability while the moderating and interacting variables are board independence and board size. The variables were measured as indicated in Table 1.

Table 1: Measurement of explanatory and moderating variables

S/ N	Variable	Symbol	Measurement	Sources	A priori sign
1	Firm size	FSZ	Natural logarithm of the total assets of a company	Tauringana (2020), Sharma <i>et al.</i> (2020)	+
2	Firm Age	AGE	Natural logarithm of the number of years after the year of incorporation of each firm.	Farisyi <i>et al.</i> (2022); Haladu & Nashwan (2021); Orazalin & Mahmood, (2019);	+
3	Firm Value	TBQ	Ratio of (market value of equity plus book value of debt minus current assets) to non-current assets.	Atanda, <i>et al.</i> (2021)	+
4	Liquidity	LIQ	Current assets divided by Current liabilities	Igbekoyi <i>et al.</i> (2021)	+
5	Profitability	ROA	Ratio of earnings after taxes over total assets.	Embuningtivas <i>et al.</i> (2020); Giron <i>et al.</i> (2020)	+

6	Board Independence	BID	The ratio of non-executive directors to the total number of directors.	Raquiba & Ishak (2020); Husnan (2021); Hu & Loh (2018)	+
7	Board Size	BSZ	Total number of directors on a board divided by the highest number of directors in the sample.	Tauringana (2020); Amran & Haniffa (2011)	+

Source: Prepared by the authors, 2024.

Data Analysis and Estimation Techniques

This study employed descriptive, inferential, and econometric analysis tools. Descriptive tools (mean, minimum, maximum, and standard deviation) were used to obtain information on the features and statistical properties of variables. Inferential tools (correlation and multiple regression) were used to examine relationships among variables. Some econometric issues were addressed for proper estimation of regression models by testing for normality using Shapiro-Wilk tests; multi-collinearity using Pearson's multiple correlation, and autocorrelation using Cumby-Huizinga (1992). These conditions must be satisfied before the ordinary least squares (OLS) estimation technique can be used. Otherwise, fixed/random effect, generalized method of moments (GMM), or other appropriate techniques would have to be employed.

The dependent variable for each model was tested for possible autoregression (AR) or moving average (MA) in the data series, to determine whether the lagged dependent variable should be included as a regressor in the models. An autocorrelation test was used to ascertain whether explanatory variables are strictly

exogenous. Post-estimation tests included serial heteroskedasticity, over-identifying restrictions, joint significance of parameters using Blundell-Bond, Sargan/Hansen tests, and F-test, respectively for testing robustness, stability, and reliability of estimates.

Results and Discussion

Descriptive Results

We present the statistical properties of each variable in Table 2. A mean of 2.622 out of a 4-point index for *sus* suggested that, on average, most of the selected firms had a moderate level of overall sustainability reporting performance. This shows the extent to which sustainability activities were carried out and reported during 2011-2022. This demonstrated a slight departure from the average index of 2.60 found for banks in 2018 by Atanda et al. (2021). A range from 1.44 to 3.54 indicated that there were some levels of variability in the dependent variable though most of the data points were relatively close to the mean, with a standard deviation of 0.391, which was lower than the mean. The range suggested that some of the firms were proactive in sustainability activities. Similar results were obtained for *eco*, *env*, and *soc*.

The mean value for firm size of 10.76 indicated an average total assets value of N57.54 billion, despite the minimum and maximum of 6.69 (N4.897 billion) and 13.10 (N12.589 trillion), respectively. From the table, the average age of the firms was 39 years (Mean=1.594), with a minimum (1.255) and a maximum (2.107) age of 18 and 128 years, respectively. The range indicated that many firms were relatively mature and with a low level of variation from the mean (standard deviation = 0.224). The descriptive results also showed that most of the firms were highly liquid (10.5:1), indicating large current assets over current liabilities.

The range for liquidity was very wide, from 0.026 to 99.86, indicating significant differences in how the firms managed their liquidity positions. In addition, a mean value of 0.701 for firm value (*tbq*) showed that the market value of equity was lower than the book value of the firms, on average. This indicated differences in the firms' growth opportunities and how the

capital market perceived or valued the firms. The companies recorded an average return on assets of 2.7 percent during the period, and their high level of variability indicated some of the firms were profitable while others recorded losses during the period. Again, the average board size and board independence recorded were about 12 directors (0.579×20) and 5 ($0.405 \times 0.579 \times 20$) non-executive independent directors, respectively.

The descriptive results showed that mean values were higher than their standard deviations for most of the variables, except for liquidity and profitability. Low standard deviations indicated that data points for a variable were clustered around its mean value and that the spread was minimal, not highly skewed either negatively or positively. This indicates that the variable will be normally distributed as the standard deviation tends towards zero. There is, however, a need to test for the normality of all the variables.

Table 2: Descriptive statistics

Variable	N	Mean	Std Dev.	Minimum	Maximum
Sus (Index)	288	2.622	0.390	1.44	3.54
Env (Index)	288	2.191	0.622	0.380	3.600
Soc (Index)	288	2.770	0.540	0.450	3.630
Eco (Index)	288	2.905	0.437	0.750	3.800
Bsz (Ratio)	288	0.579	0.171	0.30	1.00
Bid (Ratio)	288	0.405	0.184	0.06	0.55
Liq (Ratio)	288	10.50	15.92	0.026	99.86
Fsz (Log. of total assets)	288	10.76	1.628	6.69	13.10
TbQ (Ratio)	288	0.701	0.271	0.020	1.93

Roa (Ratio)	288	0.027	0.068	-0.47	0.58
Age (Log. of years after incorporation)	288	1.594	0.224	1.255	2.107

Source: Authors' computations (2024).

Normality Test Results

The normality test was carried out using the Shapiro-Wilk test, and Table 3 showed that most of the variables of interest were not normally distributed. Results indicated substantial deviations from normality. The pervasive non-normality across variables

suggested that the standard parametric statistical methods are inappropriate and data transformations are necessary for accurate analysis. Hence, the OLS regression cannot be used to estimate models because estimates from it would not be efficient and reliable.

Table 3: Normality test results

Variable	Shapiro-Wilk test				Remark
	W	V	Z	Prob.	
Sus	0.989	2.488	2.15*	.016	Not normal
Env	0.984	3.624	3.04**	.001	Not normal
Soc	0.923	17.62	6.76**	.000	Not normal
Eco	0.928	16.54	6.61**	.000	Not normal
Fsz	0.908	20.98	7.17**	.000	Not normal
Age	0.926	16.99	6.68**	.000	Not normal
Tbq	0.975	5.562	4.04**	.000	Not normal
Liq	0.697	69.22	9.99**	.000	Not normal
Roa	0.653	79.26	10.3**	.000	Not normal
Bid	0.970	6.829	4.53**	.000	Not normal
Bsz	0.976	5.549	4.04**	.000	Not normal

*Source: Authors' computation (2024). ** and * are 1 and 5% significance levels.*

Multicollinearity Test Results

Multiple correlation was used to test the existence or otherwise of a strong linear relationship among the explanatory and moderating variables. Lewis-Beck (1993) provided a rule of thumb that the

correlation (r) between two explanatory variables must not be higher than 0.8. However, for all the explanatory and moderating variables in this study, none correlated up to 0.8, pairwise. Thus, there is no evidence of a collinearity problem among them.

Table 4: Multiple correlation results

Variable	sus	Env	Soc	Eco	Age	fsz	roa	Liq	tbq	bsz	Bid
Sus	1.000										
Env	0.784	1.000									
Soc	0.762	0.365	1.000								
Eco	0.609	0.248	0.369	1.000							
Age	0.042	-0.157	0.189	0.141	1.000						
Fsz	0.342	0.113	0.336	0.487	0.165	1.000					
Roa	-0.132	-0.010	-0.150	-0.139	-0.289	-0.117	1.000				
Liq	-0.307	-0.167	-0.273	-0.348	-0.224	-0.599	0.337	1.000			
Tbq	0.186	0.079	0.223	0.141	-0.074	0.391	-0.220	-0.407	1.000		
Bsz	0.222	0.093	0.216	0.281	0.032	0.601	-0.197	-0.554	0.216	1.000	
Bid	0.087	-0.038	0.111	0.161	0.364	-0.019	-0.396	-0.386	0.044	0.150	1.000

Source: Authors' computations (2024).

Autocorrelation Test Results

The Cumby-Huizinga test for autocorrelation was used to test all the variables to determine the extent of dependence of a variable on its past values. Hence, the possibility of the presence of an endogeneity problem, especially the dependent variable, must be resolved. All other variables of interest were also tested to ascertain whether or not they were strictly exogenous. Not being strictly exogenous would mean that there is a problem of serial correlation in a

variable, and hence, the OLS technique of model estimation cannot be employed. Results from Table 5 indicated that the null hypothesis that the disturbance term of *sus* is a moving average (MA) process up to order 5. This means that the variable was autoregressive of order 5, i.e., AR(5), while all the independent and moderating variables were not also strictly exogenous because they were highly autoregressive of order between 4 to 10 lags. The results indicated that serial correlation is present up to and at the specified lags.

Table 5 Autocorrelation test results

Variable	AR statistics		Order (lags)	Remark
	Chi-square	P-value		
<i>Sus</i>	8.304**	.004	AR(5)	Endogenous
<i>Env</i>	6.418**	.000	AR(4)	Endogenous
<i>Soc</i>	6.782**	.000	AR(5)	Endogenous

<i>Eco</i>	5.891**	.000	AR(5)	Endogenous
<i>Fsz</i>	16.489**	.000	AR(10)	Endogenous
<i>Age</i>	13.749**	.000	AR(10)	Endogenous
<i>Tbq</i>	9.613**	.002	AR(10)	Endogenous
<i>Liq</i>	7.431**	.001	AR(8)	Endogenous
<i>Roa</i>	4.296*	.038	AR(5)	Endogenous
<i>Bid</i>	4.127*	.042	AR(10)	Endogenous
<i>Bsz</i>	4.324*	.038	AR(10)	Endogenous

*Source: Authors' Computations (2024). ** and * are 1 and 5% levels of significance.*

Regression Results

The static model was estimated using the OLS technique, and the results were presented in columns 1-4 of Table 6. The adjusted R-squared for all the estimates was very low, as if the models lacked critical explanatory variables. In addition, endogeneity test results indicated a test statistic of 1 with a p-value of 0.000. This showed that we should reject the null hypothesis that the explanatory variables were exogenous, which strongly suggested the existence of an endogeneity problem. It therefore means that the dependent variable in each model was correlated with its error terms, leading to biased and inconsistent estimates. These supported the results obtained when the Cumby-Huizinga test of autocorrelation was carried out.

Given these diagnostic results, the dynamic panel data method, using the system generalized method of moments (sGMM), was employed. This technique, developed by Blundell and Bond (1998), was well known for its improvement over the standard Arellano and Bond GMM

estimator. It is an augmented estimator, which uses two sets of equations, one of them written in levels form with first differences as instruments and the other in first differenced form with levels as instruments (Roodman, 2009). Two-step system GMM was used because it is more robust in addressing the problem of heteroscedasticity and autocorrelation than the one-step system GMM and yields more asymptotically efficient estimates than the one-step system GMM (Olubusoye et al., 2016).

In all the GMM results, robust standard errors were corrected for sample bias and instrument counts, and post-estimation test statistics showed that our estimates were robust. Wald statistics confirmed the joint significance of all explanatory variables. The insignificance of autocorrelation AR(2) test statistics for all models suggested that lagged dependent variables were valid instruments, and Hansen/Sargan tests of overidentification did not reject the null hypothesis at a 5 percent significance level. This further confirmed the appropriateness of the

instruments used in all the models. Results across models were quantitatively similar in the case of the lagged dependent variables, whose coefficients were significant and positive. This suggested that the lagged dependent variables were important in the models and indicated a strong conditional convergence of the variables in the short run.

Firm Attributes, Financial Performance, and Sustainability Reporting

Results in columns 5-8 of Table 6 showed that out of the three firm attributes, only firm size had a statistically significant positive effect on *sus*. This result aligned with the findings of Tauringana (2020), who established that larger firms had more resources and greater public visibility, which drove them to adopt more extensive sustainability practices. In addition, firm size significantly affected *env*, *eco*, and *soc*. These mean that larger firms are more likely to engage in *env* practices due to their capacity to allocate resources toward sustainability initiatives and their greater exposure to environmental regulations (Dissanayake et al., 2019). In addition, larger firms are more transparent about their social sustainability initiatives (*soc*) due to higher public visibility and accountability (Giron et al., 2020). The results on *eco* also suggested that larger firms had better financial structures and regulatory compliance, which drove them

to engage in sustainable economic activities.

The result of no statistically significant effect of firm age on *sus* did not support the position of Farisyi et al. (2022) and Tauringana (2020) that older firms tend to have more structured sustainability practices, due to accumulated experience and stakeholders' expectations. However, the three firm attributes had statistically significant effects on *env* and *eco*. While firm age had a significant positive effect on *env*, firm value had a significant negative effect. While firm age had a significant negative effect on *eco*, firm size had a statistically significant positive effect. Again, the effect of firm value on *soc* was significant and positive, while no significant effect of firm age on *soc* was detected.

The significant positive effect of firm age on *env* suggested that older firms were more likely to engage in *env* practices because they had a long history of regulatory compliance with sustainability reporting. Results also suggested that older firms were less likely to engage in *eco* practices than younger ones. The results on *env* supported the findings of Haladu and Nashwan (2021) that older firms often have better-developed environmental management systems, but contradicted the findings of Dissanayake et al. (2016) of no significant difference in *env* practices of older and younger firms.

Table 6 Firm attributes, financial performance and sustainability performance

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
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Variables	OLS-SUS	OLS-ENV	OLS-SOC	OLS-ECO	GMM II-SUS	GMM II-ENV	GMM II-SOC	GMM II-ECO
Age	-0.105 (0.276)	-0.634*** (0.000)	0.274** (0.039)	0.042 (0.700)	0.481 (0.369)	0.909** (0.025)	0.419 (0.659)	-1.627** (0.040)
Fsz	0.070*** (0.000)	0.020 (0.443)	0.084*** (0.000)	0.107*** (0.000)	0.370*** (0.000)	0.378*** (0.000)	0.348*** (0.000)	0.244*** (0.002)
Tbq	0.040 (0.661)	0.039 (0.794)	0.197 (0.115)	-0.117 (0.255)	-0.101 (0.550)	-0.556** (0.017)	0.748*** (0.000)	-1.917*** (0.000)
Roa	-0.262 (0.428)	0.493 (0.365)	-1.005** (0.027)	-0.284 (0.447)	-0.763 (0.098)	1.181 (0.244)	- 3.344*** (0.000)	-5.595*** (0.000)
Liq	-0.002 (0.185)	-0.006** (0.022)	0.001 (0.620)	-0.001 (0.437)	0.028*** (0.002)	0.011 (0.171)	0.035*** (0.000)	-0.006 (0.059)
D.sus					0.425*** (0.000)			
D.env						0.500*** (0.000)		
D.soc							0.387*** (0.000)	
D.eco								0.402*** (0.000)
Intercept	2.033*** (0.000)	3.021*** (0.000)	1.312*** (0.000)	1.772*** (0.000)	-2.43*** (0.002)	-3.239*** (0.002)	-2.463 (0.095)	4.480*** (0.008)
Instrument					21	20	21	23
Adj. R ²	0.110	0.073	0.115	0.144				
Hettest:	0.62 {0.433}	0.52 {0.469}	1.32 {0.239}	14.38 {0.000}				
Sargan Test					18.23 {0.234}	11.35 {0.356}	14.23 {0.259}	12.95 (0.314)
Hansen Test					20.95 {0.462}	16.11 {0.763}	17.66 {0.671}	14.50 {0.070}
AR(1)					-2.88 {0.015}	-2.44 {0.031}	-3.22 {0.011}	-2.71 {0.017}

AR(2)					-1.26	-1.01	-1.48	-1.06
					{0.207}	{0.315}	{0.138}	{0.301}
Endo:	1{0.000}	1{0.000}	1{0.000}	1{0.000}				

Source: Authors' computations using Stata 15. *** and ** indicate significance levels at 1 and 5 percent. Figures in parentheses are significant levels.

The result of the *eco* indicated that younger firms tend to focus naturally more on economic activities as part of their growth strategies and will require less prompting in doing this, unlike their older counterparts, who might feel less pressured. This, however, contradicts the findings of Orazalin and Mahmood (2019), who established that older firms with stable financial performance engage in *eco* activities to attract long-term investors. The lack of a significant effect of firm age on *soc* was consistent with Siahaan et al. (2020) position that corporate culture and stakeholder engagement, as a measure of *soc*, had nothing to do with firm age.

The result on firm value of no significant effect on *sus* contradicted the findings of Sharma et al. (2020), who established that firms with higher market values were more likely to undertake sustainability initiatives. However, a significant negative effect of firm value on *env* was found, which was similar to and consistent with the findings of Embuningtivas et al. (2020). The result indicated that firms with growth opportunities tend to engage in fewer environmental sustainability activities, though they tend to have access to more resources that can be invested in environmental issues. A similar significant negative effect of firm value on *eco* was detected. This contradicts the findings of

Sharma et al. (2020), who established that firms with higher market values were more likely to engage in *eco* activities. Again, the significant positive effect of firm value on *soc* is aligned with the findings of Orazalin and Mahmood (2019) that firms with high market values engage in *soc* activities, due to increased stakeholder pressures, social activists, and ethical investors.

Considering the financial performance measures (profitability and liquidity), only liquidity had a statistically significant positive effect on *sus* at a 1 percent level of significance. This supported the findings of Sharma et al. (2020) and Embuningtivas et al. (2020) that firms with better liquidity positions were more capable of undertaking and investing in, and reporting their sustainability efforts. Surprisingly, the two financial performance measures were found not to have any significant influence on *env*. This means that the profitability and liquidity positions of the firms did not translate into any significant *env* activities during the period. In contrast, both profitability and liquidity had a significant effect on *soc*. While profitability played a significant negative role on *soc*, liquidity had a significant positive effect.

The result on profitability was contrary to the *a priori* expectation and the findings of Sharma et al. (2020) that profitable firms should invest more in sustainability

activities but supported the conclusion reached by Dissanayake et al. (2019). Again, profitability had a significant negative effect on *eco*, which suggested profitable firms are not likely to focus on and report more on sustainable economic activities. They might feel less pressured to attract investors by reporting their *eco* ability and might be confident in, or satisfied with, their current financial stability. The result also contradicted the findings of Orazalin and Mahmood (2019), who established that profitable firms engaged more in sustainable economic activities and reported on them in detail to showcase their financial health.

The Moderating Effect of Board Characteristics

With board characteristics in the models, board size demonstrated a significant negative impact on the *sus* and two dimensions: *env* and *soc* at 1 and 5 percent levels of significance, respectively, while board independence demonstrated a significant positive effect on the *sus* and *env* but a significant negative effect on *soc* (see columns 13-16 of Table 7). So, both the board size and board independence did not have any significant effect on the *eco* of the firms.

The negative result of board size contradicted the positions of Haladu and Nashwan (2021), and Raquiba and Ishak (2020), who established that larger boards often exhibit stronger leadership and oversight, leading to enhanced sustainability performance and reporting.

Similar significant negative effects were obtained for two dimensions of sustainability, except for *eco*. The significant positive effect of board independence on *env* was consistent with the findings of Raquiba and Ishak (2020) that firms with more independent board members were better equipped to address *env* issues and oversee environmental reporting practices. However, the significant negative effect of board independence on *soc* contradicted the conclusion of the scholars.

The significant results obtained when board characteristics were included in models changed the effects of firms' attributes and two financial performance measures on the *sus* of the firms, earlier reported in Table 6. Consistent improvements (increased significant positive effects) were detected for firm size on *sus* and its three dimensions. Again, there was an increase in the effect of firm value on *sus* and *env*. While the effect of firm value on *soc* and *eco* was reduced, firm age did not have any significant effect on *sus* and its three dimensions. These results indicated that firm age was not so important for sustainability reporting performance (and its dimensions) if a firm has a large board size. All these results therefore showed that board size could alter the importance of firm attributes and financial performance in predicting the sustainability reporting of firms.

Table 7 GMM regression results-Moderating role of board size and board independence

	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Variable	SUS	ENV	SOC	ECO	SUS	ENV	SOC	ECO
Age	0.383 (0.713)	-0.044 (0.975)	0.178 (0.837)	-0.474 (0.705)	0.299 (0.589)	0.652 (0.456)	0.488 (0.638)	0.106 (0.933)
Fsz	0.498** *	0.574** *	0.397** *	0.366** *	0.380** *	0.368** *	0.360** *	0.011
	(0.000)	(0.000)	(0.000)	(0.009)	(0.000)	(0.001)	(0.000)	(0.914)
Tbq	- 0.701** *	- 0.968** *	0.502**	- 1.637** *	-0.092	-0.449**	0.746	-0.406
	(0.008)	(0.010)	(0.043)	(0.000)	(0.587)	(0.022)	(0.058)	(0.315)
Roa	-1.239	1.368	- 3.360** *	- 4.914** *	-0.586	1.320	- 3.550** *	-1.930
	(0.190)	(0.232)	(0.001)	(0.000)	(0.223)	(0.162)	(0.001)	(0.155)
Liq	0.021**	0.018	0.032** *	-0.007	0.025** *	0.013	0.039** *	- 0.028** *
	(0.019)	(0.138)	(0.000)	(0.081)	(0.006)	(0.200)	(0.000)	(0.000)
Bsz	- 1.008** *	-0.770**	- 0.775** *	-0.918				
	(0.003)	(0.027)	(0.000)	(0.454)				
Bid					0.470	0.539** *	- 0.986** *	-2.044
					(0.190)	(0.008)	(0.007)	(0.050)
D.sus	0.454** *				0.413** *			
	(0.000)				(0.000)			
D.env		0.507** *				0.484** *		
		(0.000)				(0.000)		
D.soc			0.406** *				0.394** *	

			(0.000)				(0.000)	
D.eco				0.427** *				0.371** *
				(0.000)				(0.000)
Intercept	-2.623**	-	-1.940	1.668	-	-2.937**	-2.322	4.096
		3.126** *			2.420** *			
	(0.017)	(0.009)	(0.104)	(0.537)	(0.002)	(0.012)	(0.085)	(0.078)
Instrumen t	22	22	23	22	22	23	21	22
Sargan Test	13.28 {0.304}	8.11 {0.491}	14.51 {0.251}	13.83 {0.282}	18.23 {0.372}	12.91 {0.381}	13.16 {0.370}	9.25 {0.235}
Hansen Test	20.26 {0.142}	12.51 {0.397}	18.06 {0.284}	12.45 {0.391}	19.12 {0.314}	13.92 {0.334}	16.77 {0.268}	6.47 {0.486}
AR1	-3.58 {0.015}	-2.85 {0.029}	-3.65 {0.010}	-3.42 {0.015}	-3.21 {0.023}	-2.40 {0.039}	-1.97 {0.049}	-2.05 {0.04}
AR2	-1.25 {0.217}	-1.26 {0.205}	-1.45 {0.146}	-1.44 {0.151}	-1.36 {0.175}	-1.47 {0.142}	-1.35 {0.176}	-1.46 {0.144}

Source: Authors' computations using Stata 15. *** and ** indicate significance levels at 1 and 5 percent. Figures in parenthesis are significant levels.

For board independence, the results in columns 13-16 of Table 7 showed that firm age was not still important in explaining sustainability reporting performance because it failed to account for any significant effect on *sus* and its dimensions. The new results showed that the significant positive effect of firm size on *sus* and *soc* improved, compared to the results presented in Table 6, while its effect on *env* and *eco* deteriorated. Again, firm value (*tbq*) now demonstrated a significantly reduced significant negative effect on *env*, but no significant effect on *sus*, *eco*, and *soc* was detected. The significant negative effect of profitability (*roa*) on *soc* improved, compared to the results

presented in Table 6, but no significant effect of profitability was reported for *sus*, *env*, and *eco*. For liquidity position, it's a significant positive effect on *sus* reduced while that of *soc* increased, compared to the results in Table 6. The explanatory variable now had a significant negative effect on *eco* with board independence in the model (column 16 of Table 7).

The Interacting Effects of Board Size and Board Independence

Interacting the board characteristics with the five explanatory variables, we obtained the results presented in Table 8. Columns 17-20 provided estimates when board size

was interacted with firm attributes and financial performance measures, while columns 21-24 provided results of the interaction of board independence with the explanatory variables. The board size results showed that with a large board size, firm age tends to have a significant negative effect on *sus* and its three dimensions because of the consistent, significant, and increased negative effect of the interacting term (*bszage*) on *sus*, compared to the estimates obtained from the base models reported in columns 5-8 of Table 6. A similar consistent, significant, and increased negative effect of firm value on *sus* and its dimensions was also detected with large board size. There was also a significant negative effect of the interacting term (*bsztbq*) on *env*, *soc*, and *eco*.

Conversely, the interacting term of board size with firm size (*bszfsz*) led to an increased positive effect on *sus*, *env*, *soc*, and *eco*. The results indicated that whenever the size of the board of directors is large in a large firm, the firm will engage in more sustainability activities than a large firm with a smaller board size. A similar increase in the effect of liquidity was also detected with an increase in board size. The interacting term (*bszliq*) also had an increased positive effect on the dependent variables, compared to the estimates presented in Table 6 (columns 5-8) and Table 7 (columns 9-12). Though increased board size led to an increased effect of profitability on *sus* and its dimensions, the effect of profitability, when interacted with board size (*bszroa*), was still negative but not significant. However, the interaction

term had a significant positive effect on *env* but a significant negative effect on *soc* and *eco*. So, the potency of board size in moderating the effect of liquidity on sustainability reporting performance was also confirmed.

Moreover, board independence results presented in columns 21-24 of Table 8 showed a significant and increased negative effect of firm age, when interacted with board independence (*bidage*), on *sus* and its dimensions. This means that a high level of independence of the board of directors in older firms led to a reduction in sustainability activities. However, this contradicted our *a priori* expectation and the findings of Haladu and Nashwan (2021), and Hu and Loh (2018) of a significant positive relationship between firm age and board independence on sustainability reporting. This was based on the belief that older firms with large independent directors were conducive to effective sustainability practices.

A similar, consistent, significant but positive effect of the interaction term containing board independence and firm size (*bidfsz*) on *sus* and its dimensions was also found. The results improved significantly from the estimates presented for firm size in columns 5-8 of Table 6 and columns 13-16 of Table 7. The results indicated that large independent directors tend to push large firms to increase their investments in sustainability activities. These results supported the position of Giron et al. (2020), who argued that large firms with diverse perspectives and independent directors were better equipped to oversee sustainability

initiatives with transparency and accountability in their reporting.

The increased negative effect of the interaction term containing board independence and firm value (*bidtbq*) on *sus*, *env*, and *eco* suggested that firms with higher market value and higher levels of board independence were likely to engage in fewer sustainability activities and reporting. These results challenged the conventional wisdom that firms with higher market valuations prioritized sustainability initiatives to enhance their reputations and positive perceptions of the shareholders and contradicted the findings of Embuningtivas et al. (2020) and Dissanayake et al. (2019) of a significant positive influence of board independence and firm valuation on sustainability initiatives of firms.

For profitability and liquidity, the results showed improvements over the estimates presented in Tables 6 and 7. A significant

negative effect of profitability, when interacted with board independence (*bidroa*), on *sus*, *soc*, and *eco* was found. This indicated that profitable firms with large independent directors did not engage in increased sustainability activities. This contradicted the position of Sharma et al. (2020) that profitable firms had resources to invest in sustainability activities. It then means that most of the profitable firms in the research sample focused more on maximizing profits and returns to shareholders. On the other hand, results on liquidity, when interacted with board independence (*bidliq*), significantly led to increased sustainability activities. This was evidenced by the significant positive effect of the interaction term on *sus*, *env*, and *soc*. This indicates that a firm that has an interest in environmental and social sustainability activities and reporting should enhance its liquidity position first.

Table 8 GMM regression results-Interacting role of board size and board independence

	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
Variable	SUS	ENV	SOC	ECO	SUS	ENV	SOC	ECO
Bszage	-	-	-	-				
	5.509***	5.732***	6.567***	4.369***				
	(0.000)	(0.000)	(0.000)	(0.000)				
Bszfsz	0.980***	1.073***	0.997***	0.836***				
	(0.000)	(0.000)	(0.000)	(0.000)				
Bszroa	-1.135	7.453***	-	-				
			10.72***	6.375***				
	(0.302)	(0.004)	(0.000)	(0.003)				
Bszliq	0.047***	0.061**	0.072***	0.017***				
	(0.006)	(0.019)	(0.001)	(0.001)				

108

Sar	20	10	19	14	27	24	15	40
ga	.3	.1	.2	.6	.5	.1	.4	.6
n	1	3	6	6	6	5	3	7
Tes	{0.	{0.	{0.	{0.	{0.	{0.	{0.	{0.
t	20	47	26	38	15	28	80	10
	2}	7}	9}	4}	3}	6}	1}	6}
AR(	-	-	-	-	-	-	-	-
1)	2.	2.	2.	2.	2.	2.	2.	2.
	69	85	51	29	05	62	53	36
	{0.	{0.	{0.	{0.	{0.	{0.	{0.	{0.
	00	00	01	01	04	01	01	01
	9}	6}	2}	9}	1}	1}	3}	7}
AR(	1.	0.	1.	0.	1.	-	-	-
2)	24	86	32	66	14	1.	1.	1.
	{0.	{0.	{0.	{0.	{0.	26	54	68
	21	39	18	51	25	{0.	{0.	{0.
	5}	2}	8}	1}	4}	29	20	18
						2}	8}	9}

Source: Authors' computations using Stata 15. *** and ** indicate significance levels at 1 and 5 percent. Figures in parentheses are significant levels.

The findings of this study are summarized in Table 9. The table indicates the number of firm attributes (age, size, and firm value) and financial performance metrics (profitability and liquidity) that had statistically significant effects on overall sustainability and its dimensions. Since there is an unequal number of factors in

each group of factors, an average number of the factors that had a significant effect on sustainability performance was computed for each group. The remark column showed that firm attributes collectively played a more significant role in influencing sustainability than financial performance metrics in four out of the five models estimated in this study. The overall score also supported this position.

The findings of this study demonstrated that the selected financial institutions were not only socially responsible to stakeholders but also economically and environmentally responsible as they engaged in and reported many sustainability activities within the study period. Our findings supported the position of the accountability theory that organizations must relate well with their stakeholders. The theory posited that decision-makers and firms should be accountable to all stakeholders concerned with their activities and operations through reporting. This was achieved in this study by identifying the factors that influence a firm's ability to be more accountable to stakeholders in sustainability policies and activities.

Table 9: Summary of findings for explanatory factors

GMM Model	Firm Attributes						Financial Performance						Remark
	Sus	env	soc	Eco	Tot	Ave	Sus	env	soc	Eco	Tot	Ave	
2	1	3	2	3	9	3.0	1	0	2	1	4	2.0	Firm attributes
3a	2	2	2	2	8	2.67	1	0	2	1	4	2.0	Firm attributes

3b	1	2	1	0	4	1.33	1	0	2	1	4	2.0	Financial performance
4a	3	3	3	3	12	4.0	1	2	2	2	7	3.5	Firm attributes
4b	3	3	2	3	11	3.67	2	1	2	1	6	3.0	Firm attributes
Score						14.7						12.5	

Source: Prepared by the authors, 2024.

Conclusions and Policy Recommendations

This study shed light on the relationship of firm attributes, financial performance metrics, and board characteristics with the sustainability reporting performance of listed financial firms in Nigeria. The study employed the dynamic panel data technique using the system GMM to estimate five different models using data collected from the annual reports of the selected firms over the period 2011-2022. Due to the multidimensionality of the factors affecting sustainability reporting, firm attributes and financial performance metrics were categorized as explanatory variables, while board characteristics were categorized as moderating variables.

We established from the GMM base model (model 1) results that there was no significant effect of firm age, firm value, and profitability on *sus* and *soc*. Only firm size and liquidity had a significant effect on *sus*. Firm age, firm size, and market value had a statistically significant effect on *env*, but profitability and liquidity did not. Again, firm size, market value, and the two financial performance metrics had a significant effect on *soc*, while all the firm attributes and profitability had a significant effect on *eco*. The inclusion of board size and board independence in the base model (GMM models 2a and b) altered the

impact of firm attributes and financial performance metrics on *sus* and its dimensions; there was an increase in their effects on sustainability reporting performance. While board size consistently had a significant negative effect on *sus*, *env*, and *soc*, board independence recorded a significant positive effect on *env*, but a significant negative effect on *soc*, while no significant effect on *sus* and *eco* was detected.

The interaction of board size and board independence with all the explanatory variables in GMM models 3a and b provided a clearer picture of the potency of the board characteristics in moderating the nexus between the firm attributes, financial performance, and sustainability reporting performance. For example, older firms with larger board sizes tend to reduce sustainability activities, and a similar result was obtained for firms with larger board sizes and larger firm valuations. However, large firms with large board sizes tend to lead to increased sustainability activities and reporting. Ditto for firms with large board sizes and high liquidity. Moreover, older firms with large independent directors tend to engage in lesser sustainability practices, like in the case of firms with higher market value and large numbers of independent directors.

Again, large firms with large numbers of independent directors tend to invest more in sustainability activities, like firms with high liquidity and high firm valuations. Surprisingly, profitable firms with large independent directors engage in and report fewer sustainability activities. Based on these findings, we conclude that firm attributes played more significant roles than financial performance in predicting sustainability reporting performance of financial firms in Nigeria. In addition, board size had more potency than board independence in moderating the nexus between firm attributes and sustainability reporting performance and the nexus between financial performance metrics and sustainability reporting performance. The implications of the findings and conclusions are not far-fetched.

First, the results showed that the financial firms preferred to achieve market-driven objectives, like maximization of profits and returns to shareholders, whenever these conflicted with sustainability goals. That was why financial performance metrics did not have a more significant effect on sustainability reporting performance than firm attributes. However, the firms need to recognize the interplay and dynamics of the relationship between firm attributes and board characteristics with sustainability reporting performance.

Secondly, the results underscore the need for careful consideration and strategic alignment of sustainability policies and practices with decision-making processes and operations. These sustainability considerations should be properly integrated into the core business strategies

and governance frameworks of the firms since board characteristics had a significant moderating effect on the relationship between firm attributes and sustainability reporting performance. The integration should involve recognizing sustainability as a strategy that aligns with their mission, vision, and values and addresses environmental, social, economic, and governance issues relevant to their operations, products, or services.

The integration will enhance resilience not only to economic or financial risks but also to environmental and social risks as they seize opportunities for sustainable growth. In addition, reporting on sustainability activities should be both in qualitative and quantitative terms and in line with the sustainability reporting standards set by the Global Reporting Initiative (GRI) and the Nigerian Sustainable Banking Principles (NSBP). Again, regulators and policymakers such as the Central Bank of Nigeria and the NGX should provide incentives (e.g., reduced capital and listing requirements) to financial firms that voluntarily engage in and report sustainability activities.

A major limitation of this study is its inability to include other board characteristics (board financial expertise, board diligence, board diversity, board qualification, and experience) and macroeconomic variables such as inflation, interest rate spread, foreign exchange rate and indicators of financial sector development for possible contributions to sustainability reporting performance and their moderating effects on the nexus between firm attributes, financial performance, and sustainability reporting

performance. However, future studies can look into this.

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