BOARD ATTRIBUTES AND FIRM PERFORMANCE: EVIDENCE FROM LISTED MANUFACTURING FIRMS IN NIGERIA

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Abstract
Corporate governance has become increasingly important in enhancing organizational performance, particularly in emerging economies where firms operate under institutional, economic, and regulatory constraints. Despite extensive research on board attributes and firm performance, empirical findings remain inconsistent due to differences in governance structures, institutional environments, and performance measurement approaches. Moreover, most previous studies have relied predominantly on traditional financial indicators, which provide only a partial assessment of organizational performance. This study therefore examines the relationship between board attributes and firm performance among manufacturing firms listed on the Nigerian Exchange Group (NGX) over the period 2012-2024 using the Balanced Scorecard (BSC) framework. Firm performance was measured using a composite BSC index developed from four standardized dimensions, financial performance, customer perspective, internal business processes, and learning and growth, with equal weighting assigned to each dimension to capture both financial and non-financial outcomes. The study employed a correlational panel research design based on secondary data obtained from the annual reports of 38 listed manufacturing firms. Fixed-effects panel regression with robust standard errors was adopted following the Hausman specification test, while robustness analyses were conducted using alternative model specifications. The findings indicate that board education, board information technology (IT) expertise, gender diversity, and board meeting attendance exhibit positive and statistically significant associations with selected dimensions of firm performance. Conversely, larger board size and multiple directorships are associated with weaker performance in some dimensions, while CEO nationality shows no statistically significant association with overall firm performance. These findings contribute to the corporate governance literature by demonstrating that human capital related board characteristics and digital competencies are particularly relevant for multidimensional organizational performance in an emerging economy. The study provides practical implications for regulators, investors, and corporate boards seeking to strengthen governance quality through evidence-based board composition and governance practices.

Keywords: Board attributes, corporate governance, balanced scorecard, firm performance, manufacturing, Nigeria.

1.0 Introduction

Corporate governance is considered one of the crucial aspects of maintaining and enhancing the competitiveness of any organization. Central to the concept of corporate governance is the board of directors. The board is charged with the responsibility of appointing executives, maintaining oversight of the executives, protecting the interests of shareholders, and translating the firm's strategies into operational action. Given the rapid changes in the business environment, boards are expected to provide leadership beyond the oversight function to help firms respond to the emerging global challenges of technology, sustainability, and competition. (OECD, 2023; IFC, 2023).

Corporate collapses that shook global investors and highlighted the failures of boards and oversight prompted the need to strengthen boards and oversight. After gaps were identified, the need to fill the gaps became urgent. The global capital market regulators' response was to formulate more corporate governance frameworks. For many researchers, the response was to design governance board dimensions to facilitate governance and performance of corporations. In many developing markets, like Nigeria, the response was of little use relative to the advancements in the developed markets. Some of the challenges of corporate governance in Nigeria are concentrated ownership structures, weak enforcement of governance regulations, and inconsistent governance due to the varying economic conditions and corporate boards and governance (Adegbite et al., 2023).

Nigeria's manufacturing sector is one of the sectors crucial for the process of the country's industrialization and diversification. This sector, however, is less competitive due to the combination of external competition and inflation, and the National Bureau of Statistics has suggested that the two combined lead to lower productivity and profitability of manufacturing in Nigeria. While these challenges are broadly accounted for as underpinning the dismal performance of manufacturing in Nigeria, at the firm level, the performance is worse due to adverse macroeconomic conditions. Firms need governance structures to face challenges rationally and to better utilize their resources to boldly undertake greater and more creative innovations.

Evaluating how characteristics of a board impact the performance of a firm is challenging. There are cases where characteristics of a board have a positive impact on performance, and there are cases where characteristics of a board have a negative impact on performance, or the characteristics of a board are unrelated to performance. These differences are thought to be a product of the different corporate governance systems, legal systems, and models of ownership around the world (Terjesen et al., 2021; Adegbite et al., 2023; Nguyen et al., 2024). Consequently, research attempts that focus on comparing developed and developing countries, like Nigeria, with their different systems of corporate governance, have to be abandoned.

The second important issue with the current research relates to form of performance appraisal. Most studies on corporate governance rely heavily on few accounting measures of performance, namely Return on Assets (ROA), Return on Equity (ROE), and Tobin's Q. Even though these measures offer a firm some insight into its financial performance, they are backward looking. Today, many firms recognize that competitive advantage is based on their customers and employees from a more holistic view of a firm. Kaplan and Norton's Balanced Scorecard framework offers firms a means to integrate their financial and non-financial performance measures.

As per current research, evaluations of corporate governance in Nigeria have focused on the normatively articulated features of boards (for example, size, independence, gender diversity) to the exclusion of members' educational qualifications, digital and IT competence, the nationality of a board's CEO, and the board's active engagement. Given that companies are embracing digital technologies, the Fourth Industrial Revolution and the governance of Artificial Intelligence, Enterprise Information Systems and Cybersecurity, boards would be better placed to move beyond traditional skills of oversight. The educational qualifications and digital skills of directors are governance resources that can create a competitive advantage for the firm in the long run.

This research offers several notable advances to corporate governance scholarships. It first moves corporate governance studies away from the constraint of financial performance by employing the Balanced Scorecard as a comprehensive framework for understanding organizational performance. Second, it integrates both board structural characteristics (size, independence, multiple directorships and attendance) and human capital-related characteristics of a board (education, IT skills, gender diversity and the CEO's nationality) in one study. Third, it assesses corporate governance in Nigeria's manufacturing sector and, thus, in the context of developing and emerging economies. Finally, it extends the studies of corporate governance by taking into account both the characteristics of the board and the various dimensions of firm performance while using the panel data for the years 2012-2024.

Expected findings will clarify elements of corporate governance by explaining how different boards in emerging countries relate to different aspects of corporate performance. They will also help regulatory authorities, policymakers, and nomination committees, as well as corporate board members and investors, by analyzing boards and governance to improve corporate governance.

The rest of this document is structured as follows. Refer to Section 2 for the literature review, Section 3 for the methodology, Section 4 for the empirical results, and Section 5 for the conclusions.

2.0 Literature Review

Corporate governance is concerned with management's accountability and the long-term viability of the firm in relation with the effects governance has on various facets and activities of a firm (OECD, 2023; Adegbite et al., 2023). The board of directors is the firm's highest governance structure and is in charge of performing agency functions. The board is to carry out the function of management and provide oversight, and protect the legal and ownership interests of the firm's owners (Fama and Jensen, 1983; IFC, 2023). Governance reforms have extended the boundaries of boards' obligations. Boards are to provide oversight to the firm's innovation and digital transformation, and to the firm's environmental and enterprise risks (OECD, 2023; Dahunsi & Soetan, 2025).

There is considerable research that examines how specific board characteristics influence firm performance. Many of these studies often report conflicting observations. In many developed markets, strong firm performance is often positively correlated with the independence of the board and the gender and skills diversity of the board. This is often attributed to the governance systems' evolutionary stage and the enforcement of governance frameworks (Terjesen et al., 2022; Nguyen et al., 2024). On the other hand, developing markets are characterized by

concentrated ownership structures, a diversity of governance frameworks, and lack of adequate enforcement of governance frameworks (Oyerinde et al., 2022; Adegbite et al., 2023).

A number of recent studies conducted in Nigeria seem to support these findings. A number of studies documented a positive relationship between firm performance and board competency; however, several studies conducted in the same sector documented no relationship, and in some case a negative relationship, between the two. This could be attributed to the research approach, the governance constructs utilized, and the performance indicators employed (Akinwale et al., 2024; Dahunsi & Soetan, 2025). In these instances, the governance relationships are determined by the specific context and condition of the firm, prevailing economic conditions, and the maturity of the institutional structures.

Measuring Firm Performance with the Balanced Scorecard

Traditional corporate governance systems tend to favor a series of performance measures that are primarily accounting-based or associated with the capital markets. Examples include Return on Assets and Return on Equity, Earnings per Share, and Tobin's Q. These measures are backward-looking and affect the financial statements of the corporation (Hoque, 2023; Kaplan & Norton, 1992, 1996).

To deal with some of these limitations, the Balanced Scorecard (BSC) introduces a framework that comprises both financial and non-financial measures (Kaplan & Norton, 1996). The BSC, in particular, depicts the performance of the organization from four integrated and interrelated perspectives, namely financial, customer, internal business processes, and learning and growth. Collectively, these perspectives depict both lagging and leading views of corporate performance (Hoque, 2023).

The Balanced Scorecard contains several elements of corporate governance. Corporate boards affect areas that go beyond financial results, including corporate strategy and innovation, the design of internal control systems, the corporation's stakeholders, and the creation of long-term value (Kaplan & Norton, 2001; Adegbite et al., 2024). Evaluating the effectiveness of governance from a financial performance perspective may be at the expense of overlooking the strategic value of board oversight. The emerging governance literature increasingly advocates the use of multidimensional performance measures that combine strategic and operational performance with financial performance (Menshawy et al., 2022; Dahunsi & Soetan, 2025).

Empirical review on board attributes

Board Size

There is a notable debate on board size in corporate governance. Resource Dependency Theory contends that larger boards are more useful because they have the capacity to gain access to many resources (Pfeffer & Salancik, 1978). A combination of Agency Theory and Organizational Behavior Theory explains that larger boards create problems with the capacity to control and monitor the boards (Jensen, 1993).

Generally, changes have not been many. Nguyen et al. (2024) argue that large boards have the power of oversight and strategy in many of the developing economies. Dahunsi and Soetan (2025) argue that large boards impact the operational efficiency negatively because of

coordination problems. Large boards negatively impact the operational efficiency because of coordination problems (Akinwale et al, 2024)of board size depends largely on institutional context and governance quality.

Board Independence

Agency Theory suggests that independent Board members can perform better control functions and reduce agency problems related to managers and shareholders (Jensen and Meckling, 1976). These directors are expected to provide more objective control and increase the management accountability (Fama and Jensen, 1983).

More recent studies have shown contrary evidence. For example, Oyerinde et al. (2022) found no significant relationship between board independence and firm performance in Nigeria. In the same vein, Adegbite et al. (2023) reported that in the absence of a strong culture of governance and institutional enforcement, board independence alone cannot lead to improved performance.

Board Gender Diversity

Board Gender Diversity is an area that has received considerable interest due to the believed potential of diverse Boards to improve stakeholder relations, enhance the creativity of Boards, improve the quality of board decisions, and increase organizations' legitimacy (Adams and Ferreira, 2009).

In recent studies, the addition of women to corporate Boards is believed to improve Board meetings, enhance corporate social responsibility, active stakeholder relations, and promote innovation (Terjesen et al., 2022; Akinwale et al., 2024). However, in many developing countries, the impact of women in Boards is limited due to the inadequate number of women in the Boardrooms to reach the 'critical mass' to promote a substantive change in Boards and influence the organizational strategies (Adegbite et al., 2023).

CEO Nationality

Globalization has led to the increasing hiring of Foreign CEOs within Emerging Markets. Foreign CEOs can bring Global Operations Management, International Technology, and Global Strategic Networks (Carpenter et al. 2001) to Emerging Markets.Masulis et al. (2012) argue that Foreign CEOs may struggle to penetrate emerging Markets due to the Cultural Gap, Local Institutions, and Regulations. Newer studies have suggested that in developing countries, the Nationality of the CEO may have varying impacts on the Company's performance (Adeyemi et al., 2024).

Board Education

Directors' formal education is the most crucial governance asset in Human Capital Theory. Becker (1964) proposes that formal education contributes to the development of the capacity to analyze and think strategically and to make and implement decisions of higher quality in organizations.There is a growing agreement throughout governance literature that the education of Directors is a more substantial predictor of Firm performance than the Constituencies and Relationships of the board (Pham et al., 2021; Menshawy et al., 2022; Ibrahim & Samad, 2023). Boards with higher education deal more effectively with the Strategic Ambiguity of Organizational Change.

Board Information Technology Expertise

Modern corporate governance has been impacted by the rapid changes in technology. Boards of Directors have the new challenge of governing all Business Technology Innovations (OECD, 2023).It is appreciated today that having IT specialists on the board raises the caliber of digital governance and cyber security, and builds the resilience and innovative capacity of the organization (Cruz-González et al., 2021; Kronke et al., 2022; Adegbite et al., 2024). IT Competence of the Board is being recognized as an important governance resource.

Multiple Directorships

Multiple Directorships continues to attract debate in governance literature. Resource Dependence Theory claims that directors of several boards offer a wider array of networks and strategic insight (Hillman et al., 2009). The Busyness Hypothesis claims that several board appointments limit the capacity of directors to govern, as other constraints limit the time and the attention resources available to a directorship (Ferris et al., 2003; Fich & Shivdasani, 2006). Newer research supports both perspectives, but largely depends on the research context (Baccouche et al., 2024).

Board Meeting Attendance

Attendance is a valid indicator to assess a director's diligence and commitment, and to assess the overall effectiveness of governance (Vafeas, 1999). It is presumed that a board that meets often provides more oversight to the organization and helps in advancing the organization’s strategies, and thus aids in adapting to the challenges and changes faced by the organization (Chou et al., 2013). However, more recent research in governance has argued that meeting quality is more important than meeting quantity. This is because the effectiveness of governance relies more on the deliberations and decisions made by the board than the number of meetings that are conducted (Vafeas, 2022; Adegbite et al., 2024).

Theoretical Review

Resource Dependence Theory (RDT) is the theory that underpin this study. Pfeffer & Salancik (1978) posited that boards of directors can enhance organizations performance by providing resources, for example, skills, social networks, strategies, and their reputation. The theory is appropriate for this study because of the resources that are examined in the study, for example, board size and composition, gender and educational qualifications, IT skills, the nationality of the CEO, directorship, and attendance of board meetings, are likely to impact the four perspectives of the Balanced Scorecard. Besides RDT, Agency Theory and Human Capital Theory can tackle the monitoring role of independent directors and board meetings (Jensen & Meckling, 1976) and the educational and IT skills of directors (Becker, 1964). Finally, Organizational Behavior Theory may explore the implications of board size and multiple directorships on the effectiveness of boards (Jensen, 1993). When taken together, these theories provide a high level of breadth and depth for the study on the impact of boards of directors of listed manufacturing firms in Nigeria on performance.

3.0 Methodology

This study employed a positivist research philosophy and a deductive approach. The primary purpose was to explore the association between attributes of a board and performance of a firm

for listed manufacturing firms in Nigeria. In terms of research design, a correlational panel research design was adopted. This design was based on the suggestions of Saunders et al. (2019) and Baltagi (2021) and was intended to combine the advantages of a cross-sectional and time-series research design. It was, therefore, intended to deal with unobserved firm-specific heterogeneity and was expected to provide better estimation. The study covered all the 38 manufacturing firms listed on the Nigerian Exchange Group (NGX) between 2012 to 2024, and a census sampling technique was adopted. The necessary information was obtained from the published annual audited corporate filings and financial statements of the firms, corporate governance disclosures, and NGX publications.

Firm performance was calculated using a Balanced Scorecard (BSC) Composite Performance Index (Kaplan & Norton, 1996). The four BSC performance dimensions included financial performance, customer perspective, internal business processes, and learning and growth. To formulate a composite BSC index, the four BSC performance dimensions were standardized using the z-score, and then an average, unweighted, was calculated. To study the effect of board attributes on various BSC dimensions that represent the performance of a firm from different strategic perspectives, several regression models were run. Firm age, firm size, and financial leverage were included as control variables in the models. The board characteristics that were the focus of this study were board size, board independence, board gender diversity, nationality of the CEO, board education, board IT skills, several directorships, and attendance to board meetings (Adegbite et al., 2023; Nguyen et al., 2024).

Panel regression analysis explores the relationship between firm performance and board attributes. The Hausman specification test concluded that Fixed Effects model was better, as compared to the Random Effects model. Thus, the FE estimator was applied (Baltagi, 2021). The results of the Variance Inflation Factor (VIF), Modified Wald Test, Wooldridge Test and Pesaran Cross-sectional Dependence Test, among several others, demonstrated that there was no multicollinearity, and heteroskedasticity was dealt with. Governance variables are known to be endogeneous. However, application of fixed-effects estimation, firm-level control variables, and robustness checks meant that results would have low endogeneous bias. Thus, results would be regarded as low endogeneous bias and should be interpreted with caution as results have only a statistical relationship, and do not have a causal relationship. Future studies should focus on dynamic panel operators like System Generalized Method of moments (System GMM) for better causal inference (Wintoki et al., 2012).

Model specification and estimation

$$PERit = \beta 0 + \beta 1BSit + \beta 2BIit + \beta 3BGDit + \beta 4COENATit + \beta 5BEDit + \beta 6BITit + \beta 7BDIRECTit + \beta 8BMit + \beta 9CSit + \beta 10CAit + \beta 11LEVit + \mu it.$$

4.0 Results and Discussion

Descriptive Statistics

Table 1 presents the descriptive statistics for dependent, independent, and control variables. Results indicate manufacturing firms in the sample had a high level of performance and showed diverse corporate governance. Regarding panel data, this level of variability is considerable and increases the probability that regression will estimate a model with a good statistical fit (Baltagi, 2021).

Table 1:
Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Financial perspective (BSFINP)	364	0.1817	0.4418	-0.6068	1.6165
Business process perspective (BSBUSP)	364	0.3201	0.1941	0.0563	0.7346
Customer perspective (BSCUP)	364	0.1886	0.3363	-0.3945	0.9719
Learning & growth perspective (BSLGRP)	364	0.0737	0.0591	0.0111	0.1996
Board size (BSIZE)	364	9.4093	2.5411	4	16
Board independence (BID)	364	0.664	0.1233	0.25	1.14
Female directors (FD)	364	0.2054	0.1424	0.0	0.6667
CEO Nationality (CEONT)	364	0.4478	0.498	0	1
Board education (BED)	364	8.3819	2.4517	0	14
Board IT knowledge (BITK)	364	0.0194	0.0449	0	0.14
Board Multiple Directorship (BDIRECT)	364	3.8846	1.8341	0	9
Board Meeting Attendance (BMA)	364	5.1456	1.4232	2	11
Leverage (LEV)	364	0.2008	0.1998	0	0.8496
Firm size (FSIZE)	364	10.6054	0.7561	9.2405	12.7156
Firm age (FAGE)	364	33.8929	12.945	5	59

Source: Author's computation from Stata output, 2026.

The financial outlook's average is 0.18, showing high dispersion. This means the financial outlook is not showing the profitability level across the firms. The dispersion may result from the differences in governance quality, operational quality, and exposure to the macroeconomic conditions of the emerging markets (Olayinka and Akinyomi (2021); Dahunsi and Soetan (2025)). The business process view shows a mean of 0.32 and less dispersion, meaning more reliability. The process literature shows governance mechanisms will influence internal process and operational activities more than short-run profitability (Kaplan and Norton, 2001; Etim et al., 2024). The customer view shows some variation with customer satisfaction, customer retention, and market responsiveness having lower means. With stakeholder theory, this variation shows poor customer satisfaction, poor market responsiveness, and poor board oversight and stakeholder engagement (Adams and Ferreira, 2009; Adegbite et al., 2023). The learning and growth perspective shows the least level of interest, focus, and investment. The results may show the poor investment and low competitiveness of African firms (Akinwale and Grobler, 2020). The average of nine directors per board generally satisfies the governance requirements in the emerging marketplaces, but indicates a large variation in board composition.

Average Board Independence is at 66%, which is below the governance code standardsperspective.8t satisfies higher Institutional Quality. In this scenario, Board Independence does not enable adequate monitoring (Adegbite et al., 2023). The average percentage of women on Boards is currently at 21% and is on a slow upward trend. This will create Boards of an increasingly Diverse nature who will Stakeholder engage and will positively impact Boards' Non-Financial performance (Terjesen et al., 2023). The widening Strategic and Digital Governance Gaps of other countries is the result of the Boards' lack of education and a deficit in IT knowledge (Menshawy et al., 2022). In Khanna and Palepu's (2010) hybrid board leadership model, it is shown that approximately 55% of the firms in Nigeria have local Chief Executive Officers, among whom the remaining 45% have Foreign Chief Executive Officers. Continuous Board Activity is evidenced by an average of at least five meetings per year, and is described as strong and systematic Active Oversight (Vafeas, 1999). The impact of Competitive

Pressure is described by a high average and low range, as all firms are subject to the same pressures. Thus, in this case, Competition cannot fully account for firms' performance unless other governance and capacity investments are made (McConnell and Perez-Quiros, 2000). A high degree of variation of both large and small firms and of both old and young firms is evident for Firm Size and Firm Age. Leverage has a 20% average, and is considered a balance of performance and risk for firms in a likely unstable macro environment (Dang et al., 2018; Dahunsi and Soetan, 2025).

Correlation Analysis

Table 2 presents Balanced Scorecard performance metrics, board attributes, control variables, and Pearson correlation coefficients. Correlation matrices reveal at most low and moderate coefficients. Since low to moderate coefficients do exist, this means that while some of these variables may be related, they exhibit little to moderate interdependence. Board attributes, control variables, and performance measures, among others, contain multiple dimensions of firm governance and performance, and firm characteristics, and therefore, addresses the redundancy concern.

Correlation Matrix

Table 2

Correlation Analysis

Variable	BSFINP	BSBUSP	BSCUP	BSLGRP	BSIZE	BID	BGD	CEONT	BED	BITK	BDIRECT	BMA	COMPINT	LEV	FSIZE	FAGE
BSFINP	1.00															
BSBUSP	-0.12	1.00														
BSCUP	0.05	-0.01	1.00													
BSLGRP	-0.08	-0.18	-0.29	1.00												
BSIZE	0.08	-0.19	0.05	-0.02	1.00											
BID	-0.03	-0.03	0.00	0.13	0.32	1.00										
BGD	-0.01	0.08	0.18	-0.20	-0.07	-0.05	1.00									
CEONT	0.07	-0.20	0.02	-0.03	0.15	-0.02	0.10	1.00								
BED	-0.06	-0.10	0.06	0.04	0.87	0.25	0.03	0.04	1.00							
BITK	0.01	0.23	-0.08	-0.11	-0.17	-0.16	-0.06	0.14	-0.18	1.00						
BDIRECT	-0.00	-0.11	0.04	-0.10	0.44	0.14	0.04	0.06	0.40	-0.10	1.00					
BMA	0.05	0.02	-0.01	0.05	0.14	0.10	0.13	-0.01	0.22	-0.08	0.03	1.00				
LEV	-0.04	0.26	0.08	-0.22	0.07	-0.10	-0.08	-0.14	0.03	0.24	-0.01	-0.13	0.03			
FSIZE	0.24	-0.24	0.17	-0.35	0.60	0.10	0.20	0.33	0.54	-0.03	0.37	0.17	0.05	1.00		
FAGE	-0.15	0.02	-0.04	0.27	-0.14	-0.12	0.08	0.20	-0.01	0.11	-0.20	0.06	0.05	0.07	1.00	
														-0.19	-0.15	1.00

Source: Author's computation from Stata output, 2026.

The four Balanced Scorecard dimensions (Financial, Business Process, Customer, Learning and Growth) depict weak inter-correlations. This suggests performance measures capture different organizational outcomes and do not capture overlapping constructs, which is in line with the Balanced Scorecard's multidimensional framework (Kaplan and Norton, 2001). Specifically, Financial Performance has weak relationships with Internal Process and Learning and Growth measures while a Customer Performance measure exhibits a negative relationship with Learning and Growth. The data indicates that improvement in one dimension of performance does not guarantee improvement in the other dimensions.

Most Board Attributes depict weak correlations with the performance measures suggesting an absence of strong bivariate relationships. Board Size has a weak positive relationship with Financial Performance and a negative relationship with Business Process. An increase in Board Size does not lead an improvement in Business Processes. There are weak positive relationships between Board Independence and Learning and Growth and the development of long-term capabilities.

Board Gender Diversity has a positive relationship with Customer Performance and a negative relationship with Learning and Growth indicating a given dichotomy with respect to the performance of the relevant dimensions. CEO Nationality has weak relationships with the performance outcomes and a positive relationship with firm size indicating that foreign CEOs lead larger firms with no performance differentiation when viewing firms in a broad context.

There are other governance variables which have more noticeable relationships with one another. Board Size has a strong relationship with Board Education and a moderate relationship with Multiple Directorships. Firm age positively affects learning and growth but negatively affects financial performance. On the other hand, leverage positively affects business process performance and negatively affects learning and growth. Dividing the correlation coefficient by 10 shows most the coefficients are low and suggests multicollinearity will not have a substantial effect on the regression estimates. This claim is a justification to conduct a multivariate analysis.

Multicollinearity diagnostics

VIF statistics are presented in Table 3. The average VIF is 1.96. Since this is well below both the traditional cutoff of 10, and the morestrict cutoff of 5, we conclude multicollinearity is not a serious concern (Gujarati and Porter, 2009; Hair et al., 2019).

Variance Inflation Factor (VIF) Results

Table 3

Variance Inflation Factor (VIF)

Variable	VIF	Tolerance (1/VIF)
Board size (BSIZE)	5.69	0.176
Board education (BED)	4.88	0.205
Firm size (FSIZE)	2.06	0.485
CEO nationality (CEONT)	1.39	0.721
Multiple directorships (MDDS)	1.32	0.756
Firm age (FAGE)	1.30	0.768
Leverage (LEV)	1.21	0.826

Variable	VIF	Tolerance (1/VIF)
Female directors (FD)	1.19	0.842
Board IT knowledge (BITK)	1.19	0.844
Board independence (BID)	1.18	0.851
Board meetings (BM)	1.11	0.898
Competitive intensity (COMPINT)	1.02	0.976
Mean VIF	1.96	-

Source: Author's computation from Stata output, 2026.

Board size has the highest VIF (5.69) and board education (4.88) follows. These values indicate the two variables are related, in that more educated directors are in larger boards.However, both remain within acceptable limits and do not threaten the stability or interpretability of the regression coefficients. All remaining variables have VIF values close to or below 2, indicating very low multicollinearity. Consequently, all variables are retained in the regression models.

Model selection and endogeneity

The Hausman test produces a chi-square statistic of 20.04 with a p-value of 0.066, which is marginally significant at the 10 per cent level. This result favours the Fixed Effects specification over the Random Effects model, suggesting that unobserved firm-specific effects are correlated with the explanatory variables. This finding is consistent with corporate governance literature emphasising the endogenous nature of governance variables and the need to control for firm heterogeneity in panel estimations (Wintoki et al., 2012).

Diagnostic tests and model validity

A series of diagnostic tests supports the robustness of the panel estimations. The modified Wald test rejects the null hypothesis of homoskedasticity ($p < 0.001$), indicating the presence of groupwise heteroskedasticity across firms. Pesaran's cross-sectional dependence test is insignificant, suggesting the absence of contemporaneous correlation across firms. Also, the Wooldridge test does not reject the null hypothesis of no first-order autocorrelation, which also supports the absence of serial correlation among the error terms. Given the presence of heteroskedasticity but the absence of cross-sectional dependence and serial correlation, the use of Panel-Corrected Standard Errors (PCSE) is appropriate. PCSE provides consistent inference by correcting for heteroskedasticity without imposing restrictive assumptions on the error structure (Beck and Katz, 1995).

Regression results

Table 4

Direct Effect of Board Attributes on Financial Perspectives

Variables	Coefficient	Std. Error	z-Statistic	p-Value
Board Size (BSIZE)	0.0735***	0.0209	3.51	0.000
Board Independence (BID)	−0.2441	0.1706	−1.43	0.152
Female Directors (FD)	−0.1092	0.1651	−0.66	0.508
CEO Nationality (CEONT)	−0.0709	0.0522	−1.36	0.175
Board Education (BED)	−0.1007***	0.0211	−4.76	0.000
Board IT Knowledge (BITK)	0.2362	0.5002	0.47	0.637

Variables	Coefficient	Std. Error	z-Statistic	p-Value
Multiple Directorships (MDDS)	−0.0251**	0.0115	−2.18	0.029
Board Meetings (BM)	0.0179	0.0152	1.18	0.239
Leverage (LEV)	−0.2563**	0.1300	−1.97	0.049
Firm Size (FSIZE)	0.2066***	0.0427	4.84	0.000
Firm Age (FAGE)	−0.0029	0.0018	−1.60	0.109
Constant	−1.4916***	0.3888	−3.84	0.000
R-Square	0.1691			
P-Value	0.001			

Source: Author's computation from Stata output, 2026.

Regression results for investigating the direct effects of board attributes on the financial perspective of firm performance are reported in Table 4. The Wald chi-square statistic is significant ($\chi^2 = 44.12$, $p < 0.01$) confirming joint significance of the model. The R^2 value is 0.169 showing board attributes and firm-specific controls account for 16.9 percent of the variation in financial performance. This level of explanatory power of the model is consistent with the corporate governance literature. In this body of literature, firm performance is impacted by several macroeconomic and industry-related factors which are largely outside the scope of the internal governance mechanisms (Dalton et al., 2023; Adegbite et al., 2024). Based on the results of the diagnostic tests, there is no evidence of serial auto-correlation and as such the estimated coefficients are valid.

Financial performance is positively and significantly associated with the size of the board of directors. This finding is believed to be in support of the resource dependence theory, since larger boards are believed to improve a firm's ability to gain a broad range of skills, contacts, and resources, particularly in emerging markets that are resource constrained (Nguyen et al., 2021; Owusu et al., 2024). This finding is in direct contrast to the agency-related arguments that dominate the developed economies, which associate larger boards with higher costs of coordination (Jensen, 1993). For Nigeria's manufacturing sector, having independent directors has no positive impact on firm performance. This is consistent with independent directors in Africa's governance literature. It shows there is no impact of independent directors in firms with few owners and in contexts with low enforcement (Oyerinde et al., 2022; Adegbite et al., 2023).

There is a negative impact on financial performance in association with women's representation on boards, and although this is a small effect, it is consistent with developing countries, where due to lack of empowered boards and supportive institutions, the gender diversity of boards is often a token. In developed countries where governance systems are developed and advanced, board level gender diversity has an effect on performance (Ujunwa and Salami, 2023; Akinwale et al., 2024; Terjesen et al., 2022). There is no evidence that the nationality of the CEO influences a company's financial performance. This is consistent with new research and calls for governance and firm strategies and resources to take precedence over a prescriptive approach to demographics (Adeyemi et al., 2024).

There is a high inverse relationship between board education and financial performance. It appears that boards with higher education levels adopt more risk-averse strategies, which may hurt profits in the short run. This is consistent with the literature from emerging economies,

which indicates that excessive conservatism runs counter to the organization's ability to innovate. Here, the human capital theory from developed markets is clearly contradicted. The lack of a positive relationship between a board's Financial IT and a board's Financial IT skills denotes a lost economic opportunity. An explanation of this finding may be that in the absence of organizational digital maturity paired with advanced IT governance and management, the advanced Financial IT skills of boards may be underappreciated (Kronke et al., 2022; Adegbite et al., 2023).

The negative influence of several directorships on financial performance aligns with the `busyness` hypothesis. Directors occupied with several directorships may be time poor or otherwise distracted, with limited strategic or monitoring control (Ferris et al., 2023; Baccouche et al., 2024). A positive but statistically insignificant relationship exists between the number of meetings held by the board and performance. Here, the number of meetings held by the board cannot compensate for the quality of governance, which is also evident in the governance literature (Vafeas, 2022). Among the control factors, business performance and financial performance are negatively related, indicating that higher levels of indebtedness will probably lead to business failure. This also corresponds with the capital structure theory and the related recent studies from Nigeria on the effects of excessive lending in a difficult economy (Salawu and Oladipo, 2023). A positive and significant relationship with firm size shows that larger firms have better performance and greater financial resources (Dang et al., 2024). The negative and insignificant relationship with firm age shows that older firms do not necessarily have better performance, but the focus may be on the ability to adjust (Coad et al., 2023).

According to the emerging market studies, the number of board members and the number of employees within the firm positively affect overall financial performance. Referring to the busyness hypothesis, board education and multiple directorships had a negative impact. Excessive conservatism was a general problem. The null hypothesis (H01) of the firm's financial performance was found to be invalid.

Table 5.
Direct Effect of Board Attributes on Internal Business Process Perspective

Variables	Coefficient	Std. Error	z-Statistic	p-Value
Board Size (BSIZE)	−0.0183**	0.0093	−1.97	0.049
Board Independence (BID)	0.0939	0.0626	1.50	0.134
Female Directors (FD)	0.1923***	0.0406	4.74	0.000
CEO Nationality (CEONT)	−0.0380**	0.0177	−2.15	0.032
Board Education (BED)	0.0189**	0.0090	2.10	0.036
Board IT Knowledge (BITK)	0.8881***	0.1418	6.26	0.000
Multiple Directorships (MDDS)	0.0012	0.0044	0.28	0.783
Board Meetings (BM)	0.0093*	0.0051	1.83	0.068
Leverage (LEV)	0.2429***	0.0713	3.41	0.001
Firm Size (FSIZE)	−0.0647***	0.0105	−6.17	0.000
Firm Age (FAGE)	−0.0001	0.0006	−0.21	0.837
Constant	0.8212***	0.1010	8.13	0.000
R-Square	0.2217			

Variables	Coefficient	Std. Error	z-Statistic	p-Value
P-Value	0.001			

Source: Author's computation from Stata output, 2026.

Table 5 indicates the relevance of board attributes to the internal business process perspective of firm performance, shown with a Wald chi-square statistic ($\chi^2 = 1206.01$, $p < 0.01$). The model has a business process performance variance capture of 22.2% ($R^2 = 0.2217$) and is more consistent than most models built on financial performance. In the Balanced Scorecard, it is said that most governance mechanisms affect the results of the internal processes more than the financial results (Kaplan and Norton, 2001; Hoque, 2023). The results were bolstered with a panel-level contemporaneous correlation. The size of the board negatively affects business processes. A large board leads to slow decision-making and a lack of cohesion and control over the business. Agency theory and process governance posit that smaller boards govern more effectively in an operational sense (Vafeas, 2022; Hoque, 2023). This is evident in the results. Board independence had a small positive and negligible effect. This indicates that the control of the business activities was not affected. This finding is in agreement with Oyerinde et al. (2022) in that independent directors of the emerging markets are governance oriented rather than operational.

There is a positive and highly significant correlation between female board representation and business process performance. This finding aligns with Terjesen et al. (2022), Akinwale et al. (2024), and shows that gender board diversity counters the tokenism discourse and positively affects business process performance by enhancing process discipline and monitoring and ethical business process compliance. There is a significant inverse relationship between business process performance and the existence of foreign CEOs. Hence, foreign CEOs are assumed to face more constraints in successfully managing business processes. These findings are consistent with most contextual leadership studies and the work of Adeyemi et al. (2024), and suggest that developing economies have business practices that are highly context-dependent and influenced by local practices.

Board education is positively related to business process performance. This means that well-educated Boards standardize business processes and improve internal and operational controls. This finding is congruent with human capital theory and the recent research that supports the notion that Director education enhances business processes (Pham et al. 2021). The positive relationship between business process performance and Board IT knowledge shows that IT knowledge of the Board is the most important variable of the governance framework of this research. From a digital governance perspective, the finding shows that an IT knowledgeable Board enhances process automation and integration of IT systems, cyber governance, and the Balanced Scorecard Framework with the objective of improving internal business processes (Kaplan and Norton, 2001; Kronke et al. 2022). The effects of Multiple Directorships are positive but small. It could show growing institutionalized processes which encumber organizational activities with barriers that would make the specific input or oversight of a particular Director redundant or unnecessary. The frequency of board meetings exercised a positive and marginally significant influence on business process performance. What this means is that while meetings that were held with greater frequency had an impact on the business's critical processes, that impact was marginal.

Among the control variables, leverage had a positive impact on the process control and cost management and was the only positive and significant variable. This would mean that process control and cost management would influence the demand/pressure of leverage.

This contributes to the understanding of leverage as a governance model, which actually stretches the lower extreme of managerial discretion (Salawu and Oladipo, 2023). Firm Size had a favorable impact on process control and cost management and was the only variable that had a negative and significant impact. This indicates a direct and positive relationship between the size of the firm and the level of organizational complexity, which is in support of the organizational complexity theory (Dang et al., 2024). Firm Age had a positive impact on custom process control, but the impact was not significant.

The results indicate that the effects of governance are more evident on internal business processes than on financial performance. Increased knowledge and gender diversity of board members positively impacts internal business processes. Coordination and bureaucracy challenges are associated with larger boards and larger firms. These results are consistent with the causal relationships posited by the Balanced Scorecard model.

Table 6.
Direct Effect of Board Attributes on Customer Perspective

Variables	Coefficient	Std. Error	z-Statistic	p-Value
Board Size (BSIZE)	−0.0062	0.0155	−0.40	0.689
Board Independence (BID)	0.0245	0.1505	0.16	0.871
Female Directors (FD)	0.3639***	0.1215	2.99	0.003
CEO Nationality (CEONT)	−0.0164	0.0414	−0.40	0.692
Board Education (BED)	−0.0005	0.0133	−0.04	0.968
Board IT Knowledge (BITK)	−0.7406*	0.4213	−1.76	0.079
Multiple Directorships (MDDS)	−0.0035	0.0103	−0.34	0.735
Board Meetings (BM)	−0.0114	0.0134	−0.85	0.394
Leverage (LEV)	0.1616	0.1046	1.54	0.122
Firm Size (FSIZE)	0.0816**	0.0345	2.37	0.018
Firm Age (FAGE)	0.0002	0.0013	0.13	0.894
Constant	−0.6495**	0.3185	−2.04	0.041
R-Square	0.0707			
P-Value	0.0046			

Source: Author's computation from Stata output, 2026.

Table 6 reports the regression results examining the direct effects of board attributes on the customer perspective of firm performance. The Wald chi-square statistic is significant (χ^2 = 26.99, $p < 0.01$), confirming the joint significance of the regressors. The R^2 value of 0.0707 indicates that board attributes and firm-level controls explain approximately 7.1 per cent of the variation in customer performance.Despite being conceptually weak, this explanatory power theoretically corresponds with the Balanced Scorecard framework, which regards all customer-related results as downstream variables that are not directly impacted by governance structures,

but which are ultimately shaped by internal processes and the organization's learning capabilities (Kaplan and Norton, 2001; Hoque, 2023).

Board size has a negative and statistically insignificant relationship with customer performance, implying that board size does not impact customer satisfaction and/or market evaluation. This is in line with the governance literature which maintains that boards shape the strategic pathway of the firm, but do not shape the operational interface with customers (Kaplan and Norton, 2001). There is also a positive, but insignificant, relationship of Board Independence with customer outcomes. This indicates minimal impact with respect to stakeholder-related performance. This is consistent with the studies of developing economies which have shown that independent directors focus on compliance, controlling the numbers and risks, as opposed to creating value for the customer (Oyerinde et al., 2022).

Finally, it is shown that Female Board Representation positively affects customer performance, and is the strongest governance factor. Board diversity improves support and trust for stakeholders, and enhances a board's reputation and ethical standing. These findings support theory-based studies, and are echoed by recent empirical studies that show improved outcomes for customers and society with increased female board representation (Terjesen et al., 2022; Akinwale et al., 2024). The lack of impact in Financial Performance further amplifies the multidimensional nature of the Balanced Scorecard.

Lastly, the relationship of CEO Nationality and customer performance is negative and statistically non-significant, indicating that the nationality of the CEO does not impact customer results. Customer satisfaction relies more on services offered to customers, the quality of service, and distribution systems rather than the demographics of the CEO (Adeyemi et al., 2024). The lack of evidence on the impact of board education on customer performance shows that formal education on boards may improve governance, but will not likely improve empathy to customers, or innovation services for customers. It shows that traditional methods of measuring human capital fall short when it comes to outcomes that are of interest to stakeholders.

Board IT knowledge has a negative, and borderline, insignificant impact on customer performance. This appears to show that digital services may focus on improving services to the company rather than improving customer experience, IT services may improve internal services and reduce costs, but may negatively impact customer service. This is consistent with research that shows that poorly focused digital services impact customer satisfaction (Kronke et al., 2022).

Having multiple directorships and frequency of board meetings have a negative, yet insignificant impact on customer outcomes, which indicates that busy directors, and frequency of board meetings do not impact customer outcomes. These results show that customer outcomes are largely driven by systems in place, and market facing services, and not services offered at board level.

Among the control factors, the size of the firm has a positive, and significant impact on customer performance, indicating the positive impacts of firm size on customer value via superior brand

recognition and reliability in the market (Dang et al., 2024). Firm age and leverage do not have a significant impact on customer outcomes.

The results overall show that governance mechanisms do not have a strong direct impact on customer performance, with the exception of female board representation. The findings support the view that customer outcomes are influenced primarily through indirect governance channels, consistent with the Balanced Scorecard framework.

Table 7.
Direct Effect of Board Attributes on Learning & Growth Perspective

Variables	Coefficient	Std. Error	z-Statistic	p-Value
Board Size (BSIZE)	0.0001	0.0025	0.05	0.960
Board Independence (BID)	0.0467***	0.0141	3.32	0.001
Female Directors (FD)	−0.0630***	0.0205	−3.08	0.002
CEO Nationality (CEONT)	0.0096**	0.0042	2.30	0.022
Board Education (BED)	0.0060**	0.0028	2.16	0.031
Board IT Knowledge (BITK)	−0.0894*	0.0469	−1.91	0.057
Multiple Directorships (MDDS)	−0.0003	0.0011	−0.29	0.776
Board Meetings (BM)	0.0023	0.0016	1.45	0.147
Leverage (LEV)	−0.0370**	0.0150	−2.47	0.013
Firm Size (FSIZE)	−0.0364***	0.0030	−12.28	0.000
Firm Age (FAGE)	0.0009***	0.0002	5.06	0.000
Constant	0.3550***	0.0297	11.96	0.000
R-Square	0.3024			
P-Value	0.0000			

Source: Author's computation from Stata output, 2026.

Table 7 reports the regression results for the learning and growth perspective. The Wald chi-square statistic is highly significant ($\chi^2 = 1118.34$, $p < 0.01$), indicating strong joint explanatory power of the model. The R^2 value of 0.3024 shows that about 30.2 percent of the variation in learning and growth outcomes can be explained by board attributes and firm traits. This level of explanation is significantly beyond the financial perspective, the customer perspective, and the internal business process perspective. This level of explanation supports the Balanced Scorecard, which states that the influence of the governance mechanisms is likely to be strongest on the long-term capabilities of the organization rather than short-term performance (Kaplan and Norton, 2001).The number of directors on a board does not seem to affect learning and growth and capability development, which focuses on board composition, board experience, and board goals and strategies. Higher quality governance facilitates capability development.

On the other hand, board independence positively and significantly impacts learning and growth. This means independent directors are likely to have a long-term focus on the education, growth, and enhancement of the organization and its members. This finding extends the stewardship theory, which posits that independent directors concern themselves with the long-term health of an organization, and ignore the short-term performance priorities (Adegbite et al., 2024). The findings indicate that as women's representation on boards increases, firms experience a decrease

in learning and growth. Looking at the emerging markets, where the impact of women on boards is contextualized, the results indicate that more governance and a less risky, more stable approach to innovation may lead to less of a propensity to invest in uncertain innovative and experimental activities (Ibrahim and Samad, 2023). This is even further extended by the contrasting findings for women on boards and customer performance.

The effects of having a foreign or internationally exposed CEO on learning and growth are positive and significant. This is consistent with the Upper Echelons theory and suggests that foreign or internationally exposed CEOs have a significant positive effect on the learning and growth of the firm. The positive and significant effect of board education on learning and growth suggests that boards with a higher learning capacity are able to appreciate the benefits of learning and growth.

This result strengthens human capital theory. While there is a negative effect of board education on financial performance, and a lagged effect of investment in learning on financial returns (Pham et al., 2021), the marginal negative effect of board IT knowledge on learning and growth depicts a technology, learning trade-off. The focus of IT and digital controls will, most likely, substitute investment in the development of employees and their skills in the absence of purposeful alignment of digital transformation with the organization's learning objectives (Kronke et al., 2022). This is consistent with the earlier studies, where it was suggested that knowledge of IT positively influences internal business processes.

The negative effects of multiple directorships and board meeting frequency indicate that the learning systems of organizations are mostly institutionalized, and are not strongly influenced by the busyness of directors or the frequency of meetings. Of the control variables, learning and growth has a negative effect and debt, which demonstrates that the burden of debt constrains the investment in the training and development of new ideas. There is a negative effect of firm size, which supports the notion that the larger the firm, the more the rigid its structure (Dang et al., 2024). The positive and significant effect of firm age on learning and growth, suggests that the older a firm is, the more learning it has, due to the more experiences it has (Coad et al., 2023). The results indicate that of the four perspectives of the Balanced Scorecard, learning and growth is the most influenced by governance mechanisms. The positive aspects of board independence, board education, CEO nationality, and firm age on capability development, along with the negative aspects of leverage and firm size, show that, within the Balanced Scorecard framework, corporate governance focuses on developing the long-term capability of the organization instead of the short-term impacts on financial performance (Kaplan and Norton, 2001; Adegbite et al., 2024).

5.0 Conclusion

The purpose of this study was to analyze board attributes and their relationship to multidimensional firm performance for manufacturing companies listed on the Nigerian Exchange Group from 2012 to 2024. This study was different from most other studies as it did not focus solely on financial performance, but rather looked at financial performance, customer impact, internal business process, learning, and growth, by utilizing the Balanced Scorecard framework.

The results of this research highlighted that board attributes impacted the different aspects of organizational performance, but did not have a uniform impact on all performance measures. Board education, board IT expertise, board gender diversity, board independence, and board meeting attendance had positive impacts on various Balanced Scorecard dimensions. Board size and multiple directorships had positive and negative impacts on different performance dimensions. CEO nationality had minimal but positive impact on organizational learning.

The results of the research further indicate that the impacts of governance extend beyond traditional board structures and director competencies and digital skills, to require board members who are actively engaged. Also, the relatively low impact of some regression models on corporate governance shows that corporate governance is one of the many dimensions that impacts firm performance.

There are multiple ways this study enhances literature on corporate governance. First, it helps advance governance research by combining board structure with board-level human capital within one empirical study. Second, it shows that the Balanced Scorecard can be a useful tool as a multidimensional performance measurement system that incorporates the impact of governance beyond the bounds of traditional accounting measures. Third, it helps to further develop the extant literature on comparative corporate governance by providing research from an emerging African economy.

Boards, especially in Nigeria, should look to appoint directors that are better qualified, more educated, digitally competent, and more diverse in their careers. Better governance is a likely outcome of this. It is also likely that performance and customer service will improve with an increase in gender diversity, but only where qualified candidates exist. The Financial Reporting Council of Nigeria and the Nigerian Exchange Group should introduce governance requirements that support continuous education and training of directors in digital governance and the evaluation of board effectiveness. The study demonstrates that there should also be restrictions on the number of directors' external board appointments and the size of the board. The performance of those boards was weak in the areas measured.

The limitations of the paper are many. First, the analysis includes only listed manufacturing firms in Nigeria. As a result, the analysis of financial institutions and unlisted firms is limited. Second, although Fixed Effects estimation considers omitted variable bias, the potential for endogeneity is still present. Third, the effects of inflation, the volatility of the exchange rate, interest rates, and other macroeconomic variables are contextually rather than descriptively analyzed. Lastly, the dimensions of the Balanced Scorecard used may have limited the assessment of the performance of a firm.

Implications

Many areas of this study can be improved. First, with the purpose of inferring a stronger cause relationship, dynamic panel estimation methods such as the System GMM may be used. Also, macroeconomic variables that include inflation and the volatility of the exchange rate, along with interest rate variables, may be incorporated into governance models. In addition, corporate governance of other sectors in Nigeria may be analyzed. Also, the relationship between board digital competences, the ESG governance framework, sustainability reporting, and organizational

resilience may be investigated. Finally, other performance frameworks that exist may be used in conjunction with the Balanced Scorecard.

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