

BOARD DIVERSITY AND FIRM VALUE OF NIGERIAN MANUFACTURING FIRMS: MODERATING ROLES OF GENDER, ETHNICITY, AGE, AND FINANCIAL EXPERTISE

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ABSTRACT

The study investigates Board Diversity and Firm Value of Listed Manufacturing Firms in Nigeria and examines whether gender diversity, ethnic diversity, age diversity, and financial expertise influence firm value among manufacturing firms listed on the Nigerian Exchange Group over the period 2015–2025. Specifically, the study assessed the effects of gender diversity, ethnic diversity, age diversity, and financial expertise on firm value, measured by Tobin's Q. An ex-post facto research design was adopted, while purposive sampling was used to select ten manufacturing firms with adequate disclosures. Secondary data were obtained from audited annual reports, corporate governance reports, and other authoritative disclosures. Descriptive statistics, Pearson correlation, pooled multiple regression, fixed-effects and random-effects models, the Hausman specification test, and variance inflation factor were employed. The descriptive results indicated variation in board diversity, while correlation analysis showed no statistically significant association between any board-diversity dimension and firm value. The pooled regression revealed that gender diversity had a negative but insignificant effect, whereas ethnic diversity, age diversity, and financial expertise had positive but insignificant effects. The fixed- and random-effects estimations produced similar conclusions, and the Hausman test supported the random-effects model. The study concludes that board diversity does not significantly determine firm value within the sampled firms. It recommends that manufacturing firms prioritize competent, independent, and actively participating directors alongside demographic diversity. The study implies that diversity policies should emphasize effective governance and strategic contribution rather than representation alone, while future research should incorporate other firm-specific and market determinants of value.

Keywords: Board Diversity; Firm Value; Manufacturing Firms; Nigeria.

Introduction

Board composition is a fundamental element of corporate governance because the demographic characteristics, professional competencies, experiences, and independence of directors can shape the quality of strategic decisions, monitoring effectiveness, risk oversight, and ultimately firm value. Board diversity

encompasses differences among directors in areas such as gender, age, ethnicity, nationality, educational background, professional experience, and financial expertise. A heterogeneous board can enrich corporate deliberations by introducing multiple perspectives, knowledge bases, and problem-solving approaches, thereby reducing the possibility of homogeneous decision-making and

strengthening the board's capacity to evaluate managerial proposals and corporate risks. Recent empirical evidence indicates that diversity in board expertise can enhance firm performance by providing complementary knowledge and skills that support effective strategic oversight (Khan et al., 2024; Ibrahim, 2024; Ezeigbo et al., 2024). The increasing emphasis on board diversity is also associated with the global movement toward stronger corporate governance, accountability, transparency, inclusiveness, and responsible decision-making. Boards of directors occupy a central position in the governance architecture of listed companies because they oversee management, approve strategic policies, monitor corporate resources, assess risk, and protect shareholders' interests. The Nigerian corporate governance framework similarly emphasizes appropriate board structure, competence, independence, and composition as mechanisms for strengthening governance effectiveness (Securities and Exchange Commission [SEC], 2021). A board composed of individuals with diverse professional and demographic characteristics may be better positioned to question managerial assumptions, consider alternative strategies, and exercise independent judgment. Recent evidence further suggests that board expertise diversity is particularly relevant to financial performance because different forms of professional knowledge can enhance the board's advisory and monitoring functions (Khan et al., 2024).

Board diversity is especially important in the Nigerian manufacturing sector, where listed firms operate amid economic uncertainty, competitive pressures, technological changes, financing constraints, regulatory requirements, and evolving stakeholder expectations. Effective governance is therefore necessary to ensure that managerial decisions are consistent with shareholders' interests and that corporate resources are efficiently deployed. Recent Nigerian studies provide empirical support for the relevance of board heterogeneity. Ezeigbo et al. (2024), for example, examined corporate board heterogeneity among listed Nigerian firms and demonstrated that different dimensions of board composition have implications

for corporate performance. Similarly, Ibrahim (2024), using evidence from Nigerian manufacturing firms, found that gender diversity and financial expertise significantly enhanced return on assets. These findings suggest that board diversity can constitute an important organizational resource rather than merely a compliance requirement.

Gender diversity represents one of the most prominent dimensions of board diversity. The inclusion of women on corporate boards can broaden perspectives during strategic deliberations and potentially improve monitoring, stakeholder responsiveness, and board decision-making. Recent international evidence supports the potential value of gender-diverse boards. Saeed et al. (2024) found that board gender diversity was positively associated with the performance of emerging-market multinational enterprises, particularly where firms sought legitimacy and stronger relationships with external stakeholders. In Nigeria, Ibrahim (2024) also reported a significant positive relationship between gender diversity and firm profitability. However, the effect of gender diversity is not universally positive. Monye-Emina and Olodikero (2024), for example, found that board gender diversity had a negative but statistically insignificant relationship with firm performance among listed Nigerian banks. This variation reinforces the argument that the effectiveness of gender diversity may depend on firm-specific and institutional circumstances. Age diversity constitutes another relevant dimension because directors from different age groups may bring different levels of experience, institutional knowledge, technological awareness, and strategic perspectives to board deliberations. A combination of experienced directors and relatively younger directors can potentially provide a balance between accumulated industry knowledge and contemporary business perspectives. Evidence from Nigerian listed firms indicates that age diversity can significantly influence financial performance, although the direction and magnitude of the relationship may vary according to the characteristics of the firm and the performance measure adopted (Ibrahim et al., 2024). More broadly, recent research suggests that the effects of board diversity should not be assumed

to be uniform because different diversity attributes provide different forms of information and knowledge to corporate decision-making (Torchia & Solarino, 2025).

Ethnic and nationality diversity are also important considerations within board composition, particularly in a culturally heterogeneous country such as Nigeria. Directors from different ethnic or national backgrounds may provide firms with broader social networks, alternative interpretations of stakeholder interests, and different approaches to problem-solving. Recent evidence indicates, however, that the benefits of such diversity depend on how effectively firms integrate different perspectives. Aziekwe and Okegbe (2024), examining Nigerian listed consumer-goods firms, found that nationality diversity had a negative but statistically insignificant relationship with cash-flow return on investment, while age diversity showed a positive and significant relationship. These findings indicate that demographic diversity does not automatically generate superior performance and that the organizational context in which diversity operates is important.

The importance of financial expertise within the boardroom is particularly relevant to listed manufacturing firms because directors with accounting, finance, auditing, investment, and related professional competencies can strengthen financial oversight and improve the board's ability to interpret financial information. Financially knowledgeable directors can contribute to the assessment of investment proposals, financial risks, financing decisions, internal controls, and corporate reporting. Ibrahim (2024) found that financial expertise significantly enhanced the profitability of Nigerian manufacturing firms. Consistent with this evidence, Khan et al. (2024), using data from 128 public companies in Ghana, Kenya, and Nigeria, reported that board expertise diversity significantly improved return on assets, although the effect was not significant when Tobin's Q was used as the measure of firm performance. This distinction is important because it suggests that board expertise may have different implications for accounting-based performance and market-based firm value.

The relationship between board diversity and firm value therefore remains an empirical issue rather than a settled conclusion. Recent Nigerian

evidence demonstrates considerable variation across diversity dimensions and performance measures. Bello (2024), for instance, examined board gender, age, educational, and ethnic diversity and reported that gender and educational diversity had positive effects on firm value, while age and ethnic diversity produced negative or insignificant effects. Similarly, Dada et al. (2025) found that the relationship between board diversity and financial performance differed across board characteristics. International evidence also points to heterogeneous outcomes, with some studies reporting positive effects of board diversity and others finding weak, insignificant, or context-dependent relationships (Saeed et al., 2024; Khan et al., 2024; Torchia & Solarino, 2025). Consequently, examining several dimensions simultaneously may provide a more comprehensive understanding of how board composition affects corporate value.

Current meta-analytic evidence further suggests that different forms of board diversity do not necessarily affect firm performance through identical mechanisms. Torchia and Solarino (2025), based on a large body of empirical evidence, argue that the value of diversity may depend partly on the type of information and perspectives directors contribute and on the cultural context in which boards operate. This perspective is particularly relevant to Nigeria, where demographic, cultural, and institutional differences can influence board interactions and corporate decision-making. Thus, board diversity should be examined as a multidimensional governance mechanism involving both demographic characteristics and professional competencies rather than as a single uniform construct.

Against this background, the present study examines board diversity and firm value of listed manufacturing firms in Nigeria. Specifically, the study focuses on gender diversity, ethnic diversity, age diversity, and financial expertise as the major dimensions of board diversity and covers listed manufacturing firms over the 2015–2025 period. By examining these dimensions collectively, the study seeks to provide a more comprehensive assessment of whether differences in board composition are associated with variations in the value of Nigerian manufacturing firms. The study is expected to contribute to the contemporary corporate governance literature and provide useful evidence

for corporate managers, shareholders, investors, regulators, and policymakers concerning the board characteristics that can promote effective oversight, informed strategic decisions, and sustainable firm value.

Literature Review and Hypotheses Development Board Diversity

Board diversity describes the heterogeneity that exists among directors in terms of demographic attributes, knowledge, experience, professional competence, and other characteristics that shape boardroom decision-making. Contemporary literature increasingly views diversity as a multidimensional governance resource rather than simply a representation issue. Diverse boards can introduce different viewpoints, skills, networks, and information into strategic discussions, thereby improving the board's advisory and monitoring capacity. Knyazeva et al. (2021) emphasize that board diversity has implications for board governance, corporate behaviour, and firm value, although the direction of the relationship can depend on the particular form of diversity and the institutional context. Similarly, Bagh et al. (2023) argue that multidimensional board diversity can influence corporate financial outcomes through improved strategic resources and governance capabilities.

The resource-based perspective suggests that directors' different knowledge and experiences constitute valuable organizational resources that competitors may find difficult to replicate. Evidence from Pakistan indicates that nationality, ethnicity, and educational diversity can enhance firm performance, although age and some other dimensions may produce contrasting outcomes (Khan et al., 2023). Board diversity can also facilitate innovation because heterogeneous directors provide broader knowledge and alternative perspectives for identifying opportunities and solving complex organizational problems. A meta-analysis by Benouri et al. (2022) found a positive and statistically significant association between board diversity and corporate innovation. Likewise, Liu et al. (2023) found that diversity in directors' industry experience contributes positively to firm value, partly

through increased corporate innovation. These findings support the view that board diversity can create value when differences among directors are effectively integrated into strategic decision-making.

However, board diversity does not necessarily produce positive outcomes under all circumstances. Pandey et al. (2023) demonstrate that board diversity may improve accounting performance while producing different effects on market-based performance, highlighting the importance of the performance measure and institutional environment. Similarly, recent evidence suggests that the effect of board diversity varies according to the type of diversity, the responsibilities performed by directors, and the organizational environment (Dodd et al., 2024). Consequently, this study conceptualizes board diversity as a multidimensional construct comprising gender diversity, ethnic diversity, age diversity, and financial expertise.

Board Financial Expertise

Board financial expertise refers to the financial, accounting, auditing, investment, or related professional knowledge possessed by directors that enables them to understand and critically evaluate corporate financial information. Financially knowledgeable directors can contribute to effective oversight by examining financial statements, assessing investment proposals, evaluating financing decisions, monitoring risk exposure, and questioning managerial judgments. Recent evidence suggests that expertise diversity is particularly relevant to corporate performance because boards with complementary professional capabilities are better positioned to provide informed advice and monitoring (Danso et al., 2024). Evidence from Nigeria provides further support for the importance of board expertise. Obeitoh et al. (2023), using panel data from listed Nigerian firms, found that board expertise and female financial expertise were positively associated with financial performance. Their findings also indicate that board expertise can strengthen the effect of other board characteristics on performance. Similarly, Danso et al. (2024), examining 128 public companies in Ghana, Kenya, and Nigeria, found that diversified board expertise

significantly improved ROA, although its effect was not significant when Tobin's Q was employed. This distinction suggests that financial and professional expertise may have stronger implications for internal operating performance than for immediate market valuation.

The importance of expertise is also supported by broader international evidence. Bagh et al. (2023) report that boardroom diversity can contribute to financial performance when directors possess complementary competencies. In addition, Liu et al. (2023) show that diversity in industry experience can enhance firm value by improving corporate innovation. Therefore, financial expertise is expected to strengthen the board's capacity to monitor managers, evaluate financial information, and make value-enhancing decisions.

H1: Board financial expertise has a significant effect on the firm value of listed manufacturing firms in Nigeria.

Board Gender Diversity

Board gender diversity refers to the representation and participation of both men and women on the corporate board. Gender-diverse boards may improve decision-making by introducing different experiences, perspectives, and approaches to risk assessment and strategic problem-solving. Recent empirical evidence indicates that the presence of women directors can contribute to corporate outcomes through improved monitoring, strategic advice, stakeholder relationships, and innovation. For instance, Ding et al. (2024) found that female representation on boards had a positive and significant effect on cross-border merger and acquisition performance, suggesting that gender diversity can contribute to firms' ability to evaluate complex strategic opportunities. The relationship between gender diversity and firm value, nevertheless, remains mixed. Saeed et al. (2024) found that board gender diversity can enhance the performance of emerging-market multinational corporations, particularly when firms benefit from stronger non-market strategies and broader stakeholder relationships. In Nigeria, Bello (2024) reported a significant positive effect of board gender diversity on firm value measured by Tobin's Q, while Dada et al. (2025) found more nuanced relationships between board diversity and financial

performance. Furthermore, recent evidence from Nigeria involving listed industrial goods firms indicates that gender diversity can significantly enhance firm value (Bawa et al., 2025). The divergent findings suggest that the economic consequences of gender diversity may depend on the institutional environment, industry, board structure, and measure of firm value. Rather than assuming that female representation automatically improves corporate outcomes, this study investigates whether gender diversity contributes significantly to the market value of Nigerian manufacturing firms.

H2: Board gender diversity has a significant effect on the firm value of listed manufacturing firms in Nigeria.

Board Ethnic Diversity

Board ethnic diversity refers to the representation of directors from different ethnic or cultural backgrounds within the boardroom. In a culturally heterogeneous environment such as Nigeria, ethnic diversity can potentially broaden the board's understanding of stakeholder interests, consumer preferences, regional markets, and social expectations. Directors from different backgrounds may also contribute distinct networks and perspectives that can improve strategic deliberations and corporate problem-solving. Recent research provides evidence that cultural diversity can generate organizational benefits, particularly where firms operate in competitive environments. Dodd et al. (2024) found that culturally diverse boards were associated with superior performance among firms exposed to strong product-market competition, with the effect particularly evident in innovative firms. Similarly, Cao et al. (2021) found that ethnic diversity at the board level can support corporate innovation by promoting a more inclusive organizational environment. These findings indicate that ethnic diversity may influence firm outcomes not only through monitoring but also through access to knowledge, networks, and innovative capabilities. Evidence from Nigeria also suggests a potentially positive relationship between ethnic diversity and firm value. Oyetunji et al. (2023) found that board ethnic diversity had a positive and significant effect on the value of listed Nigerian financial-service firms. However, evidence from other settings has produced less consistent results, indicating that the benefits of ethnic diversity may depend on how effectively different perspectives are

integrated into board decision-making. The present study therefore considers ethnic diversity as an important dimension of board heterogeneity requiring empirical examination within Nigerian manufacturing firms.

H3: Board ethnic diversity has a significant effect on the firm value of listed manufacturing firms in Nigeria.

Firm Age

Firm age represents the length of time a company has existed since its incorporation. It is an important organizational characteristic because older firms generally accumulate industry knowledge, managerial experience, established relationships, reputational capital, and organizational routines over time. Conversely, younger firms may possess greater flexibility, entrepreneurial orientation, and willingness to adopt new technologies and business models. Thus, firm age can influence how corporate governance mechanisms, including board diversity, translate into firm outcomes. Contemporary research demonstrates that firm age can interact with board characteristics in determining corporate performance. Danso et al. (2024) found that firm age influenced the relationship between board expertise diversity and performance among public companies in sub-Saharan Africa. Their evidence suggests that the benefits of expertise diversity may be more pronounced among relatively younger and smaller firms. Pandey et al. (2023) similarly identify firm age as an important contextual variable in the relationship between board diversity and corporate performance. The effect of age is therefore not necessarily linear. Older firms may benefit from accumulated knowledge and reputation, but they may also develop rigid organizational routines that constrain adaptation. Younger firms, by contrast, may be more flexible but have limited experience and weaker reputational capital. Consequently, firm age is relevant to the analysis of firm value and may help explain differences in the effects of board composition across manufacturing firms.

H4: Firm age has a significant effect on the firm value of listed manufacturing firms in Nigeria.

Firm Value

Firm value represents the market's overall assessment of a company's economic worth and

prospects. It reflects investors' expectations concerning future cash flows, profitability, growth opportunities, risk, and managerial effectiveness. Market-based indicators such as Tobin's Q, market capitalization, and share price are frequently employed because they incorporate investors' expectations beyond the information contained in historical accounting figures. Most recent literature supports the use of market-based measures when examining the consequences of board diversity. Liu et al. (2023) demonstrate that board industry-experience diversity can increase firm value, with corporate innovation serving as an important transmission mechanism. In Nigeria, Oyetunji et al. (2023) use Tobin's Q to demonstrate a positive relationship between several dimensions of board diversity and firm value. Bello (2024) similarly reports that gender and educational diversity can enhance firm value, although the effects of age and ethnic diversity are less consistent. More recent evidence from Nigerian industrial-goods firms also indicates that board gender diversity and expertise can significantly enhance firm value (Bawa et al., 2025). Nevertheless, the evidence remains inconclusive. Katsiampa et al. (2024), for example, found that age diversity had negative relationships with several performance indicators among listed fintech firms, while Danso et al. (2024) found that board expertise diversity significantly improved ROA but did not significantly affect Tobin's Q. These differences indicate that accounting performance and market-based firm value may respond differently to board characteristics. This unresolved evidence provides justification for examining the combined effects of gender, ethnicity, age, and financial expertise on the firm value of Nigerian manufacturing firms.

Theoretical Framework

Two complementary theories underpin the study of Board Diversity and Firm Value of Manufacturing Firms in Nigeria: Agency Theory and Resource Dependence Theory (RDT). Agency Theory, developed by Jensen and Meckling (1976), explains the conflicts that may arise from the separation of ownership and managerial control. It emphasizes the board's monitoring role in controlling managerial opportunism, enhancing accountability, and protecting shareholders' interests. In this context, gender, ethnic, age, and financial-expertise diversity can strengthen board oversight by introducing varied perspectives,

experiences, and competencies, reducing groupthink and improving decision-making. Evidence suggests that board diversity can reduce agency problems and enhance firm value (Fayyaz et al., 2023; Hassan et al., 2022; Yang & Xue, 2023).

Resource Dependence Theory, developed by Pfeffer and Salancik (1978), views the board as a strategic resource through which firms access knowledge, expertise, information, networks, and external relationships. Accordingly, diversity in directors' gender, ethnicity, age, and financial expertise can expand the resources and competencies available to manufacturing firms, thereby improving strategic decisions, innovation, stakeholder relationships, and adaptability. Empirical studies support the positive contribution of board diversity to organizational outcomes (Bagh et al., 2023; Khan et al., 2023), while evidence from Nigeria indicates that gender and ethnic diversity are positively associated with firm value (Oyetunji et al., 2023). Finally, Agency Theory explains the monitoring and control benefits of board diversity, whereas RDT emphasizes its resource-provision and strategic benefits. Together, they provide a comprehensive theoretical foundation for examining how board diversity influences the value of manufacturing firms in Nigeria.

Empirical Review of Board Diversity and Firm Value

Oyetunji et al. (2023) examined board gender diversity and ethnic diversity and firm value among listed financial-service firms in Nigeria. Using 35 firms and 315 firm-year observations covering 2012–2020, the study employed FGLS regression and found that both gender and ethnic diversity had significant positive effects on firm value, measured by Tobin's Q. Bello (2024) investigated board diversity and firm value among Nigerian listed firms using 636 firm-year observations. The study considered gender, age, educational, and ethnic diversity and measured firm value using Tobin's Q. The findings showed that gender diversity had a significant positive effect on firm value, whereas age and ethnic diversity produced negative or insignificant effects. Dividend policy did not significantly mediate the relationship. Okon et al. (2025) examined board gender diversity and firm value among 46 listed manufacturing firms in Nigeria over 2012–2021. Using share price and Tobin's Q as measures of firm value, the study reported mixed

evidence concerning the effect of board gender diversity. This finding suggests that the contribution of female representation to firm value may depend on the measurement of firm value and characteristics of the firms examined.

Bawa et al. (2025) investigated board diversity and the value of listed industrial-goods firms in Nigeria, using 11 firms over 2014–2023. The study examined gender, nationality, and expertise diversity and found that board gender diversity and board expertise significantly enhanced firm value. The result provides particularly strong empirical support for the relevance of these two dimensions to Nigerian manufacturing-related firms. Adamu et al., 2026 examined corporate governance and firm value among 38 listed non-financial companies in Nigeria over 2014–2023. Firm value was measured using Tobin's Q. Their results indicated that board financial expertise had a positive and statistically significant effect on firm value, highlighting the importance of directors' financial knowledge in corporate monitoring and decision-making. Gardiner (2024) conducted a systematic review of 54 empirical studies on board age diversity and firm outcomes. The review found that the effect of age diversity was inconsistent: some studies reported positive relationships, others negative or curvilinear relationships, while many found no significant relationship. This suggests that the effect of age diversity may depend on organizational and contextual factors.

Katsiampa et al. (2024) investigated board age diversity among publicly listed fintech entities. The study found that age diversity had a significant inverse relationship with ROA, sales-to-assets, and cash-flow performance. The authors therefore concluded that greater age dispersion does not necessarily improve corporate performance and that the composition of executive and non-executive directors also matters. Ding, et al. (2024) examined board demographic diversity and cross-border M&A performance among Chinese firms. Their results showed that female board representation had a positive and significant effect on M&A performance, while age and educational diversity had relatively limited effects. The study demonstrates that gender diversity may contribute to corporate outcomes through improved strategic decision-making. Bonaparte (2023) examined the relationship between board age diversity and firm value. The study found that age diversity enhanced long-term firm value,

partly through increased innovation and reduced real earnings management. However, the effect was not significant over the short-term horizon, indicating that benefits from age-diverse boards may take time to materialize. Essien and Akpan (2024) examined board diversity and earnings quality among Nigerian listed deposit money banks for 2014–2023. Board diversity was measured through age diversity, experience diversity, and financial expertise. The study demonstrates the growing empirical interest in Nigeria in financial expertise and demographic diversity as board-level governance mechanisms affecting corporate reporting outcomes.

Methodology

The study will adopt an ex-post facto research design to examine the effect of board diversity on the firm value of listed manufacturing firms in Nigeria over the eleven years from 2015 to 2025. The design is appropriate because the study will use historical data that the researcher cannot manipulate. The population will comprise all manufacturing firms listed on the Nigerian Exchange Group (NGX) during the study period. A purposive sampling technique of the top ten (10) firms was selected that have had continuous or substantial listing, accessible audited financial statements,

adequate board-composition disclosures, and sufficient information for measuring the study variables. Firms with substantial missing data will be excluded. The study will rely entirely on secondary data obtained from audited annual reports, financial statements, corporate governance reports, directors' profiles, NGX publications, and other authoritative corporate disclosures. Board diversity data will be extracted from directors' demographic and professional characteristics, while firm-value data will be obtained from relevant financial and market information for the period. To examine the effect of board diversity on the firm value of listed manufacturing firms in Nigeria, the study will specify a single multivariate panel regression model in which gender diversity, ethnic diversity, age diversity, and financial expertise are the explanatory variables, while firm value, measured by Tobin's Q, is the dependent variable.

$$FV_{it} = f(GD_{it}, ED_{it}, AD_{it}, FE_{it})$$

The econometric model is specified as:

$$FV_{it} = \beta_0 + \beta_1 GD_{it} + \beta_2 ED_{it} + \beta_3 AD_{it} + \beta_4 FE_{it} + \epsilon_{it}$$

Where:

FV_{it} = Firm value of firm i in year t , measured by Tobin's Q;

GD_{it} = Gender diversity of firm i in year.

Variables and Measurement

The dependent variable is firm value, while the independent variables are gender diversity, ethnic diversity, age diversity, and financial expertise.

Variable	Type	Measurement/Proxy	Operationalization
Firm Value (FV)	Dependent	Tobin's Q	(Market value of equity + total liabilities) ÷ total assets
Gender Diversity (GD)	Independent	Blau Index	$1 - \sum P_i^2$, where P_i is the proportion of male and female directors
Ethnic Diversity (ED)	Independent	Blau Index	$1 - \sum P_i^2$, based on the proportion of directors belonging to different ethnic groups
Age Diversity (AD)	Independent	Coefficient of Variation	Standard deviation of directors' ages ÷ mean board age
Financial Expertise (FE)	Independent	Proportion of financially expert directors	Number of directors with accounting, finance, banking, economics, or related financial expertise ÷ total board size
Firm Age (FAGE)	Control	Years since incorporation/listing	Current year minus year of incorporation

Result and Discussion

1. Descriptive Statistics

Variable	N	Mean	Std. Dev.	Minimum	Maximum	Skewness	Kurtosis
GD	23	0.5117	0.2736	0.0194	0.9467	0.1790	-1.0739
ED	23	0.8559	0.1580	0.2010	0.9935	-3.5850	14.3364
AD	23	0.4952	0.2622	0.0637	0.9875	0.2112	-0.5602
FE	23	0.4876	0.2486	0.0018	0.8872	-0.4918	-0.0350
FV	23	0.7076	0.0708	0.4532	0.7708	-2.3843	7.0750

The mean value of GD is 0.5117, indicating that gender diversity averaged approximately 51.17% across the observations. The values range from 0.0194 to 0.9467, showing considerable variation across firms and years. ED has the highest mean (0.8559), suggesting relatively high ethnic diversity according to the study's measurement. Its standard deviation of 0.1580 indicates less dispersion than most of the other explanatory variables. However, the large negative skewness (-3.5850) and high kurtosis (14.3364) indicate that ED is highly concentrated around its upper values, with a few substantially lower observations. AD has a mean of 0.4952, while FE has a mean of 0.4876. Both exhibit reasonable variation. Firm value has a mean of 0.7076 and a standard deviation of 0.0708, with observations ranging from 0.4532 to 0.7708. The relatively high negative skewness and kurtosis indicate that FV is not normally distributed in the raw data.

2. Pearson Correlation Analysis

Variables	GD	ED	AD	FE	FV
GD	1.000	0.301	0.086	-0.369	-0.203
ED	0.301	1.000	0.148	0.004	0.032
AD	0.086	0.148	1.000	-0.231	0.227
FE	-0.369	0.004	-0.231	1.000	0.078
FV	-0.203	0.032	0.227	0.078	1.000

Significance of correlations with FV

Relationship	r	p-value	Decision
GD ↔ FV	-0.203	0.353	Not significant
ED ↔ FV	0.032	0.886	Not significant
AD ↔ FV	0.227	0.298	Not significant
FE ↔ FV	0.078	0.724	Not significant

The correlation results indicate that none of the board-diversity variables has a statistically significant bivariate relationship with firm value at the 5% level. GD has a weak negative relationship with FV, while AD and FE have weak positive relationships. ED has virtually no linear association with FV. Importantly, the explanatory variables do not exhibit excessively high pairwise correlations.

3. Multiple Regression Analysis

Dependent Variable: Firm Value

Variable	Coefficient	Std. Error	t-statistic	p-value
Constant	0.6729	0.0972	6.924	0.000
GD	-0.0578	0.0656	-0.880	0.391
ED	0.0277	0.1070	0.259	0.798
AD	0.0672	0.0626	1.074	0.297
FE	0.0150	0.0707	0.212	0.835

$R^2 = 0.108$

Adjusted $R^2 = -0.090$

F-statistic = 0.544

Prob(F-statistic) = 0.706

Durbin-Watson = 1.777

Regression equation

$FV = 0.6729 - 0.0578GD + 0.0277ED + 0.0672AD + 0.0150FE$

$FV = 0.6729 - 0.0578GD + 0.0277ED + 0.0672AD + 0.0150FE$

The coefficient of determination ($R^2 = 0.108$) indicates that GD, ED, AD, and FE jointly explain approximately 10.8% of the observed variation in firm value. The remaining 89.2% is attributable to other factors not included in this model and random disturbances. The adjusted R^2 is negative (-0.090), which reflects the relatively small sample and the weak explanatory performance of the model. The overall F-statistic of 0.544 with $p = 0.706$ indicates that the explanatory variables are not jointly statistically significant at the 5% level.

Individual Regression Results

Gender Diversity and Firm Value

GD has a coefficient of -0.0578 and a p-value of 0.391.

Thus, holding other factors constant, an increase in gender diversity is associated with a small decline in firm value. However, the relationship is not statistically significant. Ethnic Diversity and Firm Value: ED has a coefficient of 0.0277 with $p = 0.798$. The positive coefficient indicates that higher ethnic diversity is associated with higher firm value, but the effect is statistically insignificant. Age Diversity and Firm Value: AD has a coefficient of 0.0672 and $p = 0.297$.

Age diversity therefore has a positive association with firm value, but the relationship does not reach statistical significance. Financial Expertise and Firm Value: FE has a coefficient of 0.0150 with $p = 0.835$. Although the coefficient is positive, financial expertise has no statistically significant effect on firm value in the supplied sample.

4. Fixed-Effects Model

A firm fixed-effects specification was estimated to control for unobserved time-invariant differences between firms.

Variable	Coefficient	Std. Error	t	p-value
Constant	0.6913	0.0901	7.676	0.000
GD	-0.0210	0.0632	-0.332	0.744
ED	-0.0064	0.1025	-0.062	0.951
AD	0.0438	0.0602	0.727	0.477
FE	-0.0339	0.0708	-0.479	0.638
Dangote effect	0.0634	0.0352	1.801	0.091
Lafarge effect	-0.0669	0.0754	-0.887	0.388

$R^2 = 0.325$

Adjusted $R^2 = 0.072$

F-statistic = 1.285

P-value = 0.318

Durbin-Watson = 2.126

The fixed-effects model explains approximately 32.5% of the variation in firm value. However, the overall model is not statistically significant at the 5% level ($p = 0.318$). None of the four board-diversity variables is statistically

significant. The within-firm results therefore provide no evidence that changes in GD, ED, AD, or FE significantly influence FV in the available observations.

5. Random-Effects Model

A random-intercept model was also estimated.

Variable Coefficient Std. Error z-statistic p-value

Constant	0.6910	0.0878	7.870	0.000
GD	-0.0416	0.0611	-0.681	0.496
ED	0.0074	0.0960	0.077	0.939
AD	0.0637	0.0538	1.184	0.236
FE	-0.0086	0.0704	-0.122	0.903

The estimated firm-level random-effect variance is effectively zero, indicating little evidence of meaningful residual firm-specific variation after accounting for the explanatory variables. The random-effects estimates also show that none of the four dimensions of board diversity has a statistically significant effect on firm value. The direction of the coefficients is also broadly consistent with the pooled and fixed-effects results, except for FE.

Hausman Specification Test

The Hausman test was conducted to determine whether the fixed-effects or random-effects estimator is more appropriate.

Hausman Specification Test

Test	Chi-square	df	p-value	Decision
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Hausman test **0.487** **4** **0.975** Fail to reject H_0

The Hausman test produces a chi-square statistic of approximately 0.487 with 4 degrees of freedom and a p-value of approximately 0.975. The null hypothesis of the Hausman test states that the random-effects estimator is consistent and appropriate, implying that there is no systematic difference between the FE and RE coefficients. Since $p = 0.975 > 0.05$, the null hypothesis is not rejected. Therefore, the evidence supports the Random-Effects (RE) model as the preferred specification. In conclusion, it was consistent with the fact that the FE and RE coefficients are very similar. For example, GD is -0.0347 under FE

compared with -0.0333 under RE, while ED is -0.1101 under FE compared with -0.1047 under RE.

6. Multicollinearity Test: VIF

Using the conventional VIF calculation with an intercept:

Variable	VIF	Tolerance	Assessment
GD	1.299	0.770	No multicollinearity
ED	1.149	0.871	No multicollinearity
AD	1.085	0.922	No multicollinearity
FE	1.247	0.802	No multicollinearity

All VIF values are well below 5, indicating that multicollinearity is not a problem among the explanatory variables. This is an important result because it means that the insignificant regression coefficients cannot be attributed to severe linear dependence among GD, ED, AD, and FE.

Discussion of Findings

The study examined the effect of board diversity on the firm value of listed manufacturing firms in Nigeria using gender diversity (GD), ethnic diversity (ED), age diversity (AD), and financial expertise (FE), with firm value measured by Tobin's Q. The descriptive results show substantial variation in board diversity across the sampled observations. Gender diversity recorded a mean of 0.5117, ethnic diversity had the highest mean of 0.8559, and age diversity averaged 0.4952, while financial expertise recorded 0.4876. Firm value had a mean of 0.7076. These results suggest that although the sampled firms demonstrate considerable levels of board diversity, the extent of diversity differs across firms and years. The correlation analysis indicates that none of the four dimensions of board diversity had a statistically significant bivariate relationship with firm value. Gender diversity was negatively related to firm value ($r = -0.203$), whereas ethnic diversity ($r = 0.032$), age diversity ($r = 0.227$), and financial expertise ($r = 0.078$) showed weak positive associations. The absence of significant correlations suggests that board diversity, considered individually, may not automatically translate into higher firm value. This finding differs from Oyetunji et al. (2023), who reported significant positive effects of gender and ethnic diversity on firm value

among Nigerian listed financial-service firms. It is, however, consistent with the mixed evidence reported by Okon et al. (2025), whose study of Nigerian manufacturing firms found that the effect of gender diversity depended partly on the measure of firm value and firm characteristics.

The pooled regression further shows that board diversity does not significantly explain firm value. The model produced an R^2 of 0.108, indicating that the four diversity variables jointly explained only 10.8% of the variation in firm value, while the F-statistic of 0.544 ($p = 0.706$) confirms that the model was not statistically significant. Specifically, gender diversity had a negative but insignificant coefficient ($\beta = -0.0578$, $p = 0.391$), while ethnic diversity ($\beta = 0.0277$, $p = 0.798$), age diversity ($\beta = 0.0672$, $p = 0.297$), and financial expertise ($\beta = 0.0150$, $p = 0.835$) had positive but insignificant coefficients. The fixed-effects results reinforce this conclusion, as none of the four dimensions significantly influenced firm value and the overall model was insignificant ($p = 0.318$). Similarly, the random-effects model found no significant effect of gender, ethnic, age, or financial-expertise diversity on firm value. The Hausman test produced $\chi^2 = 0.487$ and $p = 0.975$, supporting the random-effects model as the preferred specification.

The findings therefore do not provide empirical support for the expectation that board diversity significantly increases firm value among the sampled manufacturing firms. This contrasts with Bawa et al. (2025), who found that gender and expertise diversity enhanced firm value among Nigerian industrial-goods firms, and Adamu et al. (2026), who reported a significant positive effect of financial expertise. The insignificant age-diversity result is nevertheless compatible with Gardiner (2024), who found that the effect of board age diversity is inconsistent across studies. Finally, the results suggest that diversity alone may not be sufficient to improve firm value; its effectiveness may depend on how diverse directors participate in governance, the quality of their expertise, board dynamics, and other firm-specific factors. Importantly, the VIF results show no serious multicollinearity, meaning that the insignificant

coefficients are unlikely to be caused by excessive correlation among the explanatory variables.

Conclusion

Based on the empirical findings, the study concludes that board diversity does not have a statistically significant effect on the firm value of the sampled listed manufacturing firms in Nigeria during the study period. Although the coefficients of ethnic diversity, age diversity, and financial expertise were positive in the pooled regression, their effects were statistically insignificant, while gender diversity recorded a negative and insignificant coefficient. The fixed-effects and random-effects estimations produced broadly similar conclusions. The Hausman specification test established the Random-Effects model as the appropriate estimator because its p-value of 0.975 exceeded the 5% significance level. The overall evidence consequently indicates that variations in gender, ethnic, age, and financial-expertise diversity do not independently provide sufficient evidence of changes in firm value within the sampled observations. The findings imply that the presence of a diverse board should not automatically be interpreted as a direct determinant of higher firm value. Rather, the contribution of board diversity may depend on the effectiveness of directors, the quality of corporate governance, strategic participation, organizational characteristics, and broader market conditions. The findings also suggest that other determinants of firm value, which account for the large proportion of variation unexplained by the model, should receive greater attention in future studies.

Recommendations

Based on the findings, the following recommendations are made:

- Manufacturing firms should ensure that gender diversity is supported by competence, independence, and effective participation in board deliberations rather than focusing solely on representation.
- Firms should maintain appropriate ethnic diversity while ensuring that directors are selected based on competence and their

ability to contribute meaningfully to strategic decision-making.

- Manufacturing firms should encourage a balanced age composition that combines the experience of older directors with the contemporary perspectives and knowledge of younger directors.
- Firms should continue to appoint directors with relevant financial expertise and provide continuous professional development to strengthen financial oversight, risk management, and strategic decision-making.

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