

CORPORATE BOARD DIVERSITY AND FINANCIAL PERFORMANCE OF LISTED INDUSTRIAL GOODS COMPANIES IN NIGERIA: MODERATED MULTIPLE REGRESSION ANALYSIS OF FIRM SIZE

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ABSTRACT

The aim of this study was to examine the effect of corporate board diversity on financial performance of listed industrial goods manufacturing companies in Nigeria. The specific objective was to determine the effect of age diversity, ethnicity diversity and gender diversity on return on assets of listed industrial goods manufacturing companies in Nigeria, with firm size (FSZ) as moderating variable. The study adopted ex-post facto research design on a population of thirteen (13) listed industrial goods manufacturing companies on the Nigerian exchange group. The sample size of eight (8) companies used in the study was determined through purposive sampling. Secondary data were sourced from company's annual reports over a period of eleven (11) years, covering the years 2014 to 2024. The study carried out some preliminary data tests like descriptive statistics, unit root test, and Panel Least Square (PLS) multiple regression analysis using E-view 12 and SPSS v23 for the purpose of Moderated Multiple Regression (MMR) analysis. The findings indicated that, there is no significant effect of age diversity and ethnicity diversity on return on assets of listed industrial goods manufacturing companies in Nigeria, there is a significant effect of gender diversity on return on assets of listed industrial goods manufacturing companies in Nigeria, there is a significant moderating effect of firm size on corporate board diversity and return on assets of listed industrial goods manufacturing companies in Nigeria. The study concludes that, for industrial goods manufacturing companies in Nigeria, age and ethnicity diversity on the board do not directly influence financial performance, whether measured by return on assets. Gender diversity, however, contributes positively to profitability, indicating that the inclusion of women on corporate boards enhances certain performance outcomes. Furthermore, firm size plays a notable role, it does influence how board diversity affects return on assets, implying that larger or smaller firms experience the effects of diversity differently in terms of asset efficiency. It was suggested amongst other that, since gender diversity significantly improves return on assets, firms should increase the representation of women in board positions to leverage diverse perspectives that enhance profitability.

Keyword: Corporate Board Diversity, Age Diversity Ethnicity Diversity, Moderated Multiple Regression Analysis

INTRODUCTION

The board of directors is the highest governing body in a company which protects the interests and assets of the company as well as ensuring profitable investments for investors. Every decision on the operational strategy of an enterprise must originate or be approved by the BOD. The power and role of the BOD has an important impact on the company's activities. Therefore, the appointment of board members who can take on and best fulfill the responsibilities of the Board is a challenge. In Nigeria's dynamic economic environment, industrial goods companies can leverage board diversity to enhance strategic decision-making, drive innovation, and improve firm performance

(Ogbechie & Kouadio, 2022; Akinwumi & Onmonya, 2025). Recognizing the benefits of diversity, the Nigerian government and regulatory agencies, such as the Securities and Exchange Commission (SEC), have incorporated board diversity into corporate governance codes, encouraging firms to adopt inclusive practices to enhance transparency, accountability, and performance. Moreover, international organizations and investors have been advocating for more equitable corporate governance frameworks, urging Nigerian companies to reassess their board compositions (Boloupremo & Umbe, 2024). Board diversity can be influenced by various factors, including age, gender, nationality, academic and professional qualifications, life experiences, attitudes, and personalities. Some scholars argue that diversification among board members offers numerous benefits. For example, it can bring broader perspectives to decision-making through enhanced creativity and innovation, ultimately boosting firm performance. Conversely, it is also argued that board heterogeneity may lead to increased conflict due to differing goals, potentially reducing decision-making effectiveness and being more destructive than beneficial.

Statement of the Problem

The declining financial performance of industrial goods manufacturing firms, particularly their low profitability, has increasingly been linked to inadequacies in board diversity attributes. Given the significant economic role of the industrial goods manufacturing sub-sector, this decline raises concerns and underscores the need for further empirical investigation to enhance the sector's contribution to national development. Although prior studies (Boloupremo & Ayekurobotaregha, 2024; Dancan et al., 2023; Adegboyegun & Igbekoyi, 2022; Assenga, 2021) have examined board diversity, their findings remain inconsistent, largely due to variations in how board diversity is conceptualized and measured. Moreover, extant literature presents mixed evidence regarding the value of board diversity. Scholars such as Igbekoyi et al. (2021), Dancan et al. (2023), and Boloupremo and Ayekurobotaregha (2024) argue that diversity enhances board effectiveness by bringing together a broader range of skills, perspectives, and experiences that promote better resource utilization. Conversely, studies by Adusei and Obeng (2019) and Khaoula and Moez (2019) contend that excessive diversity may increase communication and coordination costs, potentially leading to conflicts that hinder board performance. Furthermore, most Nigerian studies on board diversity have predominantly focused on the banking sector (e.g., Igbekoyi et al., 2021; Aladejebi, 2021), leaving a gap in empirical evidence for the industrial goods manufacturing sector, which contributes substantially to the nation's GDP. Existing research has also tended to examine diversity from a narrow viewpoint, with a strong emphasis on gender (e.g., Igbekoyi et al., 2021; Song et al., 2020; Mohsni et al., 2021), thereby overlooking other relevant dimensions. Given these gaps and inconsistencies, this study seeks to provide more current and comprehensive evidence on the effect of corporate board diversity on financial of listed industrial goods manufacturing companies in Nigeria. The specific objectives of the study are to:

- i. determine the effect of age diversity on return on assets of listed industrial goods manufacturing companies in Nigeria.
- ii. ascertain the effect of ethnicity diversity on return on asset of listed industrial goods manufacturing companies in Nigeria.
- iii. Determine the effect of gender diversity on return on assets of listed industrial goods manufacturing companies in Nigeria.
- iv. Ascertain the moderating effect of firm size on the relationship between corporate board diversity and return on assets of listed industrial goods manufacturing companies in Nigeria.

Hypotheses

- Ho₁: There is no significant effect of age diversity on return on assets of listed industrial goods manufacturing companies in Nigeria
- Ho₂: Ethnicity diversity does not have significant effect on return on assets of listed industrial goods manufacturing companies in Nigeria
- Ho₃: There is no significant effect of gender diversity on return on assets of selected industrial goods manufacturing companies in Nigeria.
- Ho₄: There is no significant moderating effect of firm size on corporate board diversity and return on assets of listed industrial goods manufacturing companies in Nigeria.

REVIEW OF RELATED LITERATURE

Conceptual Framework

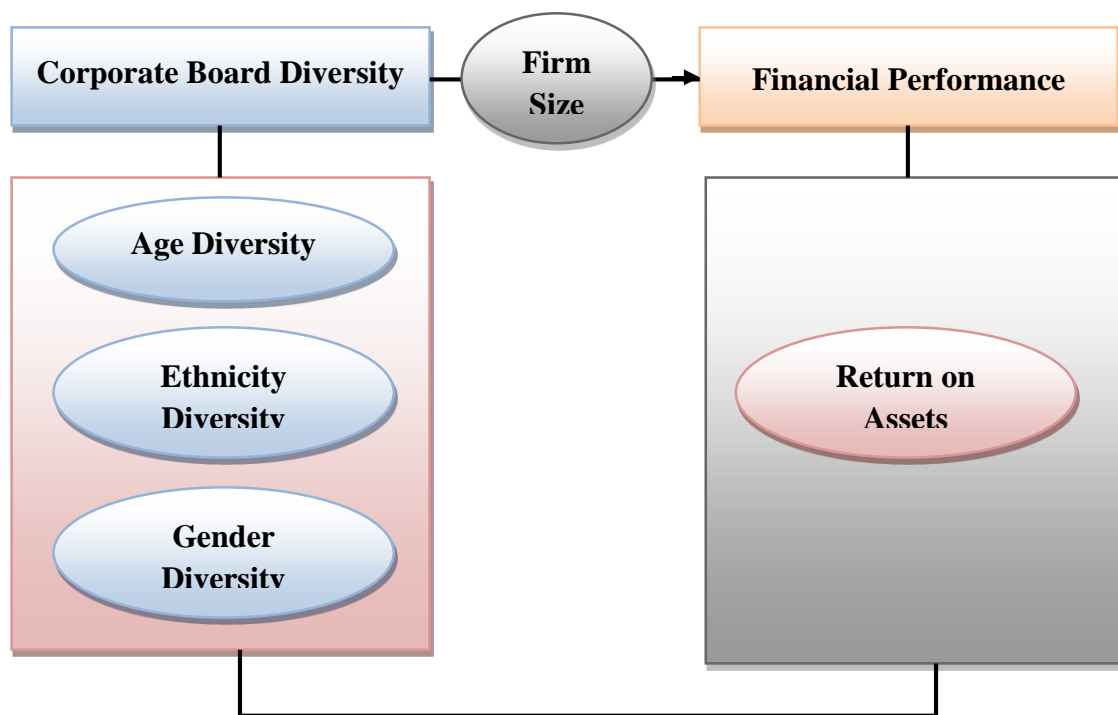


Figure 1: Conceptual framework on the effect of corporate board diversity on financial Performance of listed industrial goods manufacturing companies in Nigeria. Aziekwe and Okegbe (2024), Tsegaye and Bezabih (2023); Owolabi and Adebayo (2023); and the researcher, (2025).

Conceptual Review

Corporate Board Diversity

Corporate Board diversity refers to the inclusion of individuals from various backgrounds, experiences, demographics competencies, and skills on a firm’s board of directors (Mukuta, 2021). The goal of board diversity is to make board less homogenous by considering ethnic diversity, age diversity, nationality diversity, gender diversity, among other factors. Board diversity has many benefits some of which includes: more productive discussion, better decision making reducing the risk of group thinking, and improvement to brand and reputation. Corporate board diversity refers to the inclusion of individuals from various backgrounds, genders, ethnicities, ages, educational qualifications, and professional experiences on a company's board of directors (Aziekwe & Okegbe, 2024). Zama and Mazhar (2023) stated that a diverse board is more likely to ensure that different

viewpoints are considered, reducing the risks associated with overly narrow decision-making processes. It enhances transparency and accountability, as board members from different backgrounds are likely to ask critical questions and hold management accountable for a wide range of issues. This, in turn, helps companies avoid governance failures and improve their reputation among stakeholders. However, achieving meaningful diversity on corporate boards is not without challenges. In many industries and regions, including Nigeria, corporate boards remain largely homogeneous, with barriers such as cultural norms, gender biases, and the lack of a broad talent pool hindering progress.

Age Diversity

Board age diversity means having leaders of different age groups within a company. According to PwC's 2017 Annual Corporate Directors Survey, many directors believe that age diversity is one of the most important forms of diversity. It helps organizations better understand and serve a wide range of customers, which can improve satisfaction, loyalty, and ultimately financial performance (Akinwumi & Onmonya, 2025). Research also shows that age differences affect managerial behavior. Boloupremo and Umbe (2024) found that older managers tend to be more risk-averse, while younger managers are more willing to pursue risky strategies. Younger board members are often more flexible, energetic, and better educated. Gardazi (2020) adds that younger directors may be less traditional and more conscious of environmental and sustainability issues. Similarly, Cheng et al. (2010) explain that younger managers are generally more open to new ideas, less accepting of the status quo, and less focused on long-term career stability. For firms to perform effectively and efficiently, it is beneficial to have both younger and older members on the board. Younger directors bring creativity, technological awareness, and a higher risk-taking capacity, while older directors contribute valuable experience and are often better equipped to handle complex or unexpected situations. Without age diversity, firms may struggle to generate fresh and relevant ideas (Akinwumi & Onmonya, 2025).

Ethnicity Diversity

Ethnic diversity in corporate governance refers to including individuals from different ethnic backgrounds on a company's board of directors and key committees. Ogunwande and Akintola (2021) argue that this form of diversity is essential because it introduces a wide range of cultural perspectives, experiences, and insights that can strengthen the decision-making process. When boards reflect the ethnic composition of the communities they serve, they are better positioned to understand and meet the needs of diverse customers, employees, and stakeholders. Ethnically diverse boards contribute varied worldviews and problem-solving styles, which help organizations avoid groupthink and encourage more innovative and effective strategies. In an increasingly globalized market, such diversity also improves a company's ability to operate across different cultural contexts and understand regional differences that may affect business activities. As a result, these boards are more likely to make well-informed decisions that consider the needs of diverse markets and consumers. For companies expanding globally, having directors from varied ethnic backgrounds helps ensure that products and services appeal to a broad range of customer groups. These diverse perspectives can also help identify emerging international trends, enabling firms to remain competitive by being more adaptable and responsive. Furthermore, ethnic diversity leads to more dynamic discussions in the boardroom, where directors question assumptions and introduce new viewpoints (Adetunji & Abimbola, 2020; Fadun & Obasan, 2022).

Gender Diversity

Gender diversity on corporate boards refers not only to the inclusion of women as board members but also to ensuring that female directors remain in their roles long enough to participate meaningfully in decision-making processes (Aziokwe & Okegbe, 2024). Traditionally, boardrooms

have been dominated by men, often overlooking the valuable contributions women can make when appointed to top leadership positions. Lincoln and Adedoyin, in a study conducted for the International Finance Corporation (IFC, 2019), note that gender inequality in board representation is largely driven by societal expectations, cultural biases, and discriminatory traditions that reinforce stereotypical roles for men and women. These practices typically position men as natural leaders and limit women's access to senior decision-making roles. Such marginalization of women from mainstream economic activities results in a significant waste of human resources. As Nighat et al. (2016) argue, when women's talents and capabilities are excluded or underutilized, organizations—and society as a whole—lose opportunities for enhanced economic and social development. Embracing gender diversity therefore supports more equitable leadership and contributes positively to overall organizational and societal wellbeing.

Financial Performance

Financial performance refers to a company's ability to achieve strong outcomes such as high profits, quality products, a large market share, solid financial results, and long-term sustainability. Achieving these outcomes requires the implementation of appropriate and effective strategies (Aggreh et al., 2023). Firm performance can also be understood as the extent to which an organization meets the needs of its stakeholders while simultaneously fulfilling its own requirements for survival and growth (Nworie et al., 2023). According to Camisón and Villar-López (2012), traditional financial indicators remain the most widely used measures of organizational performance in academic research. Performance is ultimately demonstrated through the ability of an organization's employees to efficiently and effectively carry out their tasks.

Return on Assets

Return on Assets (ROA) is an important financial indicator that measures how efficiently a company uses its assets to generate profit. It is calculated by dividing net income by total assets and is expressed as a percentage. ROA helps investors and analysts evaluate how effectively a firm converts its resources into earnings. According to Karam and Jamali (2022), a higher ROA reflects stronger profitability per dollar of assets, indicating effective management and sound operational performance. ROA is especially useful for comparing companies within the same industry because it adjusts for differences in firm size and asset structure. Asset-intensive industries, such as manufacturing and utilities, often report lower ROA values due to substantial investments in fixed assets. In contrast, service-based industries typically show higher ROA because they depend less on physical assets. Therefore, understanding industry context is essential when interpreting ROA figures, as performance benchmarks differ across sectors. Several factors contribute to a firm's ROA, including revenue generation, cost control, and the efficient use of assets. Companies that successfully boost sales while managing expenses tend to achieve stronger ROA. Effective asset management such as improving inventory turnover, eliminating idle assets, and regularly reviewing the asset base can further enhance performance. Firms that optimize their asset portfolios are better positioned to convert assets into revenue (Wanyama & Nyangweso, 2020).

Firm size

Firm size is a critical factor that influences various aspects of a company's operations, performance, and strategic decision-making. It generally refers to the scale of a company, often measured by metrics such as total assets, revenue, number of employees, or market capitalization. Ujunwa (2012) stated that the size of a firm can significantly impact its competitive advantage, operational efficiency, and market positioning. Larger firms typically benefit from economies of scale, allowing them to reduce costs per unit as production increases, which can enhance profitability and market share. Additionally, larger firms often have greater access to capital markets, enabling them to raise funds more easily and invest in research and development, technology, and expansion opportunities.

This financial flexibility can position larger companies favorably against smaller competitors, especially in industries that require significant upfront investment. The ability to leverage resources effectively often leads to a wider range of products and services, enabling larger firms to cater to diverse customer needs (Abid & Bouslama, 2022). However, the size of a firm also brings challenges, particularly in terms of management complexity and organizational structure. As firms grow, they may encounter bureaucratic hurdles that can slow decision-making processes and hinder agility. This complexity can lead to difficulties in maintaining effective communication and coordination across different departments or geographic locations. Consequently, large firms must develop robust management practices to ensure that they remain responsive to market changes and customer demands.

Theoretical Review

This study is grounded in two theoretical frameworks: agency theory and resource dependence theory. According to agency theory, the board of directors plays a key role in addressing conflicts of interest between managers and shareholders (Dang et al., 2013). From this perspective, the inclusion of women and foreign directors can strengthen board effectiveness and enhance firm performance. The central idea is that diversity reduces the risk of groupthink among board members (Ujunwa et al., 2012). Agency theorists further argue that women, ethnic minorities, and foreign directors—often positioned as external stakeholders—can introduce fresh perspectives and innovative solutions to complex organizational issues (Francoeur et al., 2008). For example, female directors may be more diligent in monitoring management by asking critical questions and offering alternative viewpoints (Dang et al., 2013). Diversity also promotes board independence, as individuals from varied gender, ethnic, and cultural backgrounds may raise concerns or insights that homogeneous boards might overlook (Carter et al., 2013). The study also draws on resource dependence theory, which posits that board diversity serves as an important mechanism for securing essential resources (Johnson et al., 2016). Each director brings unique attributes—such as specialized expertise, skills, information, and networks—that can enhance a firm's access to valuable external resources (Hillman et al., 2009). Resource dependence theorists assume that organizations operate within an interconnected corporate environment, where their success is influenced by the actions and inaction of other firms. Thus, diverse boards improve a company's ability to manage these interdependencies and adapt to external demands.

Empirical Review

Akinwumi and Onmonya (2025) examined the influence of some specific board characteristics on the financial performance of listed deposit money banks (DMBs) in Nigeria, incorporating audit quality as a control variable. The study was underpinned by the resource dependence theory, owing to the relationship between board characteristics and returns on equity which the study uses to proxy financial performance. Utilizing secondary data from thirteen listed deposit money banks in Nigeria, covering 2014 to 2023, the study employed a robust pooled regression for data analysis. The findings indicate that both board size and board independence exert a significant positive influence on the financial performance of Nigerian deposit money banks. Additionally, audit quality is found to have a significant positive effect on financial performance of deposit money banks in Nigeria. However, gender diversity does not have any effect on the financial performance of these banks. The findings of this study suggest that the ratio of independent directors to the total board size should be enhanced as a policy guideline to be instituted by the Central Bank of Nigeria. The findings also suggest that the regulator should mandate adequate board sizes to be maintained by banks. Furthermore, the findings suggest urging the shareholders to mandate a higher number of independent directors on boards during their annual general meetings.

Boloupremo and Umbe (2024) examined the impact of board diversity on the financial performance of quoted manufacturing companies in Nigeria. Taking into consideration the statement of the

problems, objectives of the study, and research questions, a review of the literature and secondary data were used in line with the objectives of the study to elicit relevant data from the firms' published financials collected from the firms website with the focus on a 5-year time series data on age diversity, gender diversity, educational diversity, nationality diversity and financial performance from 2018 to 2022 respectively. Findings revealed that there is a significant relationship between age diversity, gender diversity, national diversity, educational diversity, and firms' financial performance, with all the independent variables positively affecting the return on total assets of the surveyed listed manufacturing firms in Nigeria. The conclusion was made that findings not only affirm the value of diversity in enhancing corporate governance and performance but also offer practical insights for companies seeking to optimize their financial outcomes through strategic diversity management. However, it was recommended that the firms should implement and enforce policies that promote gender equality within their boards.

Aziekwe and Okegbe (2024) investigated the impact of board diversity on the financial performance of listed consumer goods firms in Nigeria. The study aimed to determine the effects of nationality diversity (BND), gender diversity (BGD), and age diversity (BAD) on the cashflow return on investment (CROI) of these firms, with firm size (FSZ) as a control variable. An ex-post facto research design was adopted, focusing on a population of twenty-one listed consumer goods firms on the Nigerian Exchange Group. A sample of fifteen firms was selected through purposive sampling. Secondary data were collected from the firms' annual reports over a ten-year period (2013 to 2022). Panel-corrected standard errors (PCSE) regression was used to test the hypotheses, revealing the following results: nationality diversity had a negative but insignificant effect on CROI; gender diversity had a positive but nonsignificant effect on CROI; and age diversity had a positive and significant effect on CROI.

Amadi et al. (2023) examined the impact of female representation on boards concerning corporate social responsibility (CSR) practices and firm performance in A-share listed companies in China. The study utilized indicators such as the proportion of female board members, the average age of female board members, the educational background of female directors, TOBIN Q, asset size, and leverage. Using fixed effects estimates and conducting stationarity, stability, cointegration, and Hausman tests, the analysis revealed that the proportion of female directors, their average age, and their educational level significantly influence CSR performance and financial performance. Additionally, CSR performance was found to significantly impact financial performance. The findings suggest that female directors play a strategic role in helping firms manage their social responsibilities ethically and sustainably, which has important policy implications for regulators and stakeholders, especially in emerging societies prone to unethical corporate practices.

Matthew et al. (2023) investigated the impact of gender diversity on the financial performance of listed fast-moving consumer and industrial goods manufacturing companies in Nigeria as of December 2022. Gender diversity was measured by the percentage of women directors on the board, the percentage of women directors on the audit committee, and board independence. The financial performance was proxied by the asset efficiency ratio. The study included a sample of 16 companies from the Nigerian Stock Exchange, and the data were analyzed using robust fixed effect regression. The findings revealed a negative and statistically significant relationship between gender diversity variables and company performance, while board size had a statistically insignificant effect on financial performance. The study concluded that gender diversity on the board and audit committee diminishes the financial performance of listed fast-moving consumer and industrial goods manufacturing companies in Nigeria.

Adegboyegun and Igbekoyi, (2022) examined the effect of board diversity on the financial performance of manufacturing firms in Nigeria. The motivation for the study lies in the increased

quest to establish the most appropriate board with the optimum mix needed to guarantee the absence of corporate failure. The study comprises of 64 listed manufacturing firms as at 31st December 2020, and sample size of 20 listed manufacturing firms were selected using purposive sampling technique. Data were obtained from annual reports of the selected firms from 2011 to 2020. Descriptive statistics and panel regression estimation techniques were used to analyze the data collected. The findings shown that board diversity has an insignificant effect on performance except for financial expertise diversity with a positive effect on financial performance, and there is a presence of long run relationship with firm performance. Based on these findings, the study therefore concludes that diversity on the board in terms of gender, ethnicity and educational background will not really improve or reduce performance of the firms while diversity in terms of financial expertise will do.

METHODOLOGY

This study adopted the analytical cross-sectional research design because of the need to interrogate the associations between corporate board diversity and firm performance. Evidence shows that for studies interested in testing hypotheses or answering the questions, why, and how, the analytical cross-sectional design is preferred over descriptive cross-sectional design. Analytical cross-sectional research design is described as a quantitative non-experimental research design that aims at examining data from a population or selected sample observed at a moment in time. The population of this study considered was thirteen (13) industrial goods manufacturing companies listed in Nigeria and it was sample to eight (8) listed industrial goods manufacturing companies using purposive sampling technique. The source of data collection was secondary data of published financial statements of industrial goods manufacturing companies with time period of 2015-to-2024. The study carried out some preliminary data tests like descriptive statistics, unit root test, and Panel Least Square (PLS) multiple regression analysis using E-view 12 and SPSS v23 for the purpose of Moderated Multiple Regression (MMR) analysis.

Table 1: Measurement of Variables

S/No	Variable	Type of Variables	Measuring
1.	Age diversity	Independent Variable	Blau's Index = $1 - (P^2 + P^2)_2$
2.	Ethnicity diversity	Independent Variable	Blau's Index = $1 - (P^2 + P^2)_2$
3.	Gender Diversity	Independent Variable	Gender diversity is measured by the proportion of female to total number of board directors.
4.	Firm Size	Independent Variable	Firm size is measured as natural logarithm of total asset at the end of each year
5.	Return on Asset	Dependent Variable	Return on asset is measured by net profit before tax divided by total assets

Source: Researcher's computation 2025

Model Specification

The framework shows that financial performance is a function of corporate board diversity. Corporate board diversity is the independent variable while financial performance is dependent variable. Corporate board diversity is proxied by Age diversity (AGD), Ethnicity diversity (ETD) and Gender Diversity (GD) while financial performance is proxied by Return on Assets (ROA).

Function:

$$ROA = f(AGD, ETD, GD) \dots \dots \dots i$$

$$ROA = \beta_0 + \beta_1AGD_{it} + \beta_2ETD_{it} + \beta_3GD_{it} + \mu \dots \dots \dots ii$$

Moderated Multiple Regression

$$ROA = \beta_0 + \beta_1AGD_{it} + \beta_2ETD_{it} + \beta_3GD_{it} + \beta_4FSZ_{it} + \beta_5AGD_{it} * FSZ + \beta_6ETD * FSZ + \beta_7GD * FSZ + \mu \dots \dots \dots$$

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DATA ANALYSIS AND DISCUSSION OF FINDINGS

Data Analysis

The study investigated the empirical effect that exists between corporate board diversity on firm performance of listed industrial goods manufacturing companies in Nigeria for a period of 11 years spanning 2014 to 2024. The study carried out some preliminary data tests like descriptive statistics, unit root test, and Panel Least Square (PLS) multiple regression analysis. The table below shows the descriptive statistics of the eight (8) selected industrial goods companies in Nigeria that make up our sample.

Table 2: Descriptive Statistics of Independent and Dependent Measures

	ROA	AGD	ETD	GD	FS
Mean	0.275267	0.485491	2499.316	0.264943	6.806750
Median	0.105496	0.495000	0.420000	0.266667	6.471880
Maximum	4.061213	0.500000	0.990000	0.500000	8.998971
Minimum	0.000105	0.382200	-9999.000	0.111111	5.481398
Std. Dev.	0.571969	0.020487	4354.758	0.088962	0.878901
Skewness	4.224103	-2.129185	-1.154701	0.192974	1.223093
Kurtosis	24.54446	9.059102	2.333333	2.438978	3.433998
Jarque-Bera	1.600234	201.1036	1.128518	1.700235	22.63133
Probability	0.336366	0.000000	0.100025	0.427365	0.000012
Sum	24.22349	42.72320	-219939.8	23.31498	598.9940
Sum Sq. Dev.	28.46195	0.036516	1.65E+09	0.688538	67.20456
Observations	88	88	88	88	88

Source: E-View 12 Output 2025

Findings show that, return on assets score was used to capture financial performance for the selected firms is 0.275267. Regarding Age diversity (AGD), the result reveals that the majority of the Age diversity (AGD) is between 0.382200 and 0.500000 age recording an average number of ages. Similarly, ethnicity diversity (ETD) expressed in foreign group and Nigeria group reveals that the average ethnicity diversity was 2499.316. It was also discovered that the number of female director's members was up to 0.26% of the board members. This implies that majority of directors members does not consider gender equality in setting up their directors member. Generally, the JB Probability values of 0.336366, 0.000000, 0.100025, 0.427365 and 0.000012 showed that three of the variables (ROA, ETD and GD) are normally distributed at 5% level of significance while three of the variables (AGD and FS) are not normally distributed at 5% level of significance.

Summary of Unit Root Test

The Augmented Dickey-Fuller (ADF) unit root test was conducted for each series, and the results are presented in Table 4.2. The ADF test was done with the following hypothesis: Null hypothesis (Ho): Variable contains unit root and hence is nonstationary. Alternative hypothesis (Hi): Variable does not contain unit root and hence is stationary. The decision rule was to reject the null hypothesis if the calculated ADF Test statistic is greater than test critical values.

Table 3 Unit Root Test

Variable	ADF statistics @ level	ADF critical value @ 0.05 level	ADF Statistics @ 1st difference	ADF critical value @ 0.05 level	Order of integration
ROA	-2.33804	0.0097	-	-	1(0)
AGD	-3.04186	0.0012	-	-	1(0)
ETD	-2.63359	0.0042	-	-	1(0)
GD	-3.67894	0.0001	-	-	1(0)
FS	-3.01647	0.0013	-	-	1(0)

Source: E-View 12 Output 2025

Table 3 shows the summary of the unit root test using augmented dickey fuller (ADF). The result in the table reveals that all the variables ROA, AGD, ETD and FS are stationary at level 1(0).

Regression Analysis

The study takes into cognizance the non-homogeneity nature of the firms, hence the need for testing its effect on the data. This necessitated the use of Hausman effect test to ascertain which effect to explain. That is whether fixed effect or random effect is to be used in interpreting the regression result. Below is the summary of the Hausman test result:

Table 4: Hausman Effect Tests (ROA)

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	20.594462	4	0.0004

** WARNING: estimated cross-section random effects variance is zero.

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
AGD	2.101305	-2.556119	6.804585	0.0742
ETD	-0.172308	0.000045	0.342576	0.7684
GD	0.415911	0.978197	0.172713	0.1761
FS	-0.761070	-0.144128	0.056416	0.0094

Source: E-View 12 Output 2025

The regression results of corporate board diversity and firm performance of listed industrial goods manufacturing companies in Nigeria are presented and analyzed. In view of the nature of the data, both fixed effect and random effect models were tested. Hausman specification test was then used to decide between the two results. The result from the Hausman test above revealed a Chi2 value of 20.594462 with p-value of 0.0004 which is less than 0.05 that is statistically significant at 5%. This implies that the test considered the fixed effect as the most appropriate estimator and its result is presented in table 5 below

Table 5: Fixed Effect Regression Result of Model

Dependent Variable: ROA
Method: Panel Least Squares
Date: 11/30/25 Time: 04:35
Sample: 2014 2024
Periods included: 11
Cross-sections included: 8
Total panel (balanced) observations: 88

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AGD	1.151093	4.270692	0.269533	0.7884
ETD	-1.175232	0.690409	-1.702227	0.0934
GD	1.986435	0.896372	2.216083	0.0301
FS	0.690266	0.340639	2.026387	0.0468
C	-2937.518	1726.142	-1.701782	0.0935

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.824234	Mean dependent var	5.541669
Adjusted R-squared	0.768308	S.D. dependent var	1.088631
S.E. of regression	0.524006	Akaike info criterion	1.757690
Sum squared resid	18.12241	Schwarz criterion	2.377024
Log likelihood	-55.33834	Hannan-Quinn criter.	2.007204
F-statistic	14.73804	Durbin-Watson stat	1.718330
Prob(F-statistic)	0.000000		

Source: E-View 12 Output 2025

The fixed panel regression outcome above, ascertained that Age diversity (AGD), ethnicity diversity (ETD), and gender diversity (GD) were able to explain 0.82 approximately of total variation in firm performance in term of return on assets (ROA) and after adjustment the variable explained about 82% of the systematic variation in firm performance in term of return on assets (ROA) while about 18% of the systematic variation in firm performance in term of return on assets (ROA) were left unexplained by the model. The estimation shows that there are other variables that also explain the way firm performance can be improved. It can also be ascertained that the model remained statistically significant as the calculated F-value of 14.73804 was noticed to be higher than that of the critical f-value at the level of 5% significance. It therefore means that our model is statistically significant since it Prob value of 0.000000 is less than 0.05.

Testing of Hypotheses

H₀₁: There is no significant effect of age diversity on return on assets of listed industrial goods manufacturing companies in Nigeria.

Decision Rule: Accept H₀ if P > 0.05. Otherwise reject

Decision: The result in the above table 5 shows that age diversity has positive and insignificant effect on net profit margin of listed industrial goods manufacturing companies in Nigeria. This is evidenced in their positive coefficient value of 1.151093, and t -value of 0.269533 such that the more the age diversity is, the increase the financial performance in term of return on assets of listed industrial goods manufacturing companies in Nigeria. Also, the P-value of 0.7884 is greater than at

level of 0.05 significance and this leads to the conclusion that, there is no significant effect of age diversity on return on assets of listed industrial goods manufacturing companies in Nigeria.

Ho₂: Ethnicity diversity does not have significant effect on return on assets of listed industrial goods manufacturing companies in Nigeria.

Decision: The result in the above table 5 shows that ethnicity diversity has negative and insignificant effect on return on assets of listed industrial goods manufacturing companies in Nigeria. This is evidenced in their negative coefficient value of -1.175232, and t -value of -1.702227 such that the more the ethnicity diversity is, the decrease the firm performance in term of return on assets of listed industrial goods manufacturing companies in Nigeria. Also, the P-value of 0.0934 is greater than at level of 0.05 significance and this leads to the conclusion that, ethnicity diversity does not have significant effect on return on assets of listed industrial goods manufacturing companies in Nigeria.

Ho₃: There is no significant effect of gender diversity on return on assets of selected industrial goods manufacturing companies in Nigeria.

Decision: The result in the above table 5 shows that gender diversity has positive and significant effect on return on assets of listed industrial goods manufacturing companies in Nigeria. This is evidenced in their positive coefficient value of 1.986435, and t -value of 2.216083 such that the more the gender diversity is, the increase the firm performance in term of return on assets of listed industrial goods manufacturing companies in Nigeria. Also, the P-value of 0.0301 is less than at level of 0.05 significance and this leads to the conclusion that, there is a significant effect of gender diversity on return on assets of listed industrial goods manufacturing companies in Nigeria.

Moderated Analysis

Table 6a: Model Summary^c Moderation Analysis of Firm Size in ROA Model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					
					R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.311 ^a	.097	.016	.15136	.097	1.204	4	45	.322	
2	.535 ^b	.286	.147	.14096	.190	2.722	4	41	.042	2.068

a. Predictors: (Constant), AGD, ETD, GD
b. Predictors: (Constant), AGD, ETD, GD, INTAGD, INTETD, INTGD
c. Dependent Variable: ROA

Source: Author Computation using SPSS, 23

Table 6a provides information on the unmoderated and moderated results obtained from return on assets (ROA) model. The Durbin-Watson statistic value 2.068 is within the acceptable range of 1 to 3 specified by Field (2009) and this affirmed that the problem of autocorrelation is unlikely to exist in the series. The unmoderated and moderated R² for the return on assets (ROA) specifications are 0.535 and 0.286 respectively that accounted for 53.5% and 28.6% of the variations in return on assets (ROA) while 46.5% and 71.4% was explained by unknown variables that were not included in the Moderated Multiple Regression model in return on assets (ROA). However, for purposes of testing the set hypothesis on the change statistics and other valuable information resulting from the interaction effect of firm size. The unmoderated and moderated R² for return on assets (ROA) model are 0.535 and 0.286 respectively resulting to R² change of 0.190. This indicated an increase of 19.0% (0.190 x 100) in the variation explained by the addition of the interaction term in the return on assets (ROA) model.

Table 6b Summary of Moderation Analysis of Firm Size in ROA Model

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.734	4	3.683	14.284	.000 ^b
	Residual	11.604	45	.258		
	Total	26.338	49			
2	Regression	21.113	5	4.223	35.556	.000 ^c
	Residual	5.225	44	.119		
	Total	26.338	49			

a. Dependent Variable: ROA

b. Predictors: (Constant), AGD, ETD, GD

c. Predictors: (Constant), AGD, ETD, GD, INTAGD, INTETD, INTGD

Source: Author Computation using SPSS, 23

Table 6b provides information on the unmoderated and moderated results obtained from return in assets (ROA) model. The model has F-statistic values 14.284 and 35.556 in its unmoderated and moderated specifications with respective Prob. ** value 0.000^b and 0.000^c indicated that the unmoderated and moderated models are properly fitted since the Prob. ** value is less than the decision criterion of 5%.

Table 6c Coefficients of Moderation Analysis of Firm Size in ROA Model

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.264	.239		1.104	.275
	AGD	-.035	.025	-.302	-1.420	.163
	ETC	.001	.020	.007	.043	.966
	GD	-.044	.042	-.190	-1.049	.300
2	(Constant)	.442	.367		1.204	.235
	AGD	-.934	.683	-7.990	-1.367	.179
	ETC	.208	.338	1.678	.616	.542
	GD	-.142	.309	-.607	-.459	.649
	INTAGD	.124	.101	6.807	1.225	.228
	INTETC	-.028	.045	-1.928	-.616	.542
	INTGD	.010	.046	.350	.229	.820

a. Dependent Variable: ROA

Based on the results of the F change statistic value 2.722 with Prob. ** value of 0.042 < 5% chosen decision criterion for return on assets (ROA) model. The study to rejected the null hypothesis (**H₀₄**) and concluded that there is a significant moderating effect of firm size on corporate board diversity and return on assets of listed industrial goods manufacturing companies in Nigeria.

Summary of Findings

This study established the effect of corporate board diversity on financial performance of listed industrial goods manufacturing companies in Nigeria. The study age diversity, ethnicity diversity and gender diversity as measures of corporate board diversity while return on assets were used as measure of financial performance. However, based on the data analysis and discussion of findings, the following summary of findings was made;

1. There is no significant effect of age diversity on return on assets of listed industrial goods manufacturing companies in Nigeria.
2. There is no significant effect of ethnicity diversity on return on assets of listed industrial goods manufacturing companies in Nigeria.

3. There is a significant effect of gender diversity on return on assets of listed industrial goods manufacturing companies in Nigeria.
4. There is a significant moderating effect of firm size on corporate board diversity and return on assets of listed industrial goods manufacturing companies in Nigeria

Conclusion

The study concludes that, for industrial goods manufacturing companies in Nigeria, age and ethnicity diversity on the board do not directly influence financial performance, whether measured by return on assets. Gender diversity, however, contributes positively to profitability, indicating that the inclusion of women on corporate boards enhances certain performance outcomes. Furthermore, firm size plays a notable role, it does influence how board diversity affects return on assets, implying that larger or smaller firms experience the effects of diversity differently in terms of asset efficiency. Overall, the results suggest that not all forms of diversity equally drive financial outcomes, and the benefits of board diversity may depend on the specific performance indicator and organizational size.

Recommendations

Based on the study's findings, the following recommendations are proposed:

1. Strengthen gender inclusion on corporate boards. Since gender diversity significantly improves return on assets, firms should increase the representation of women in board positions to leverage diverse perspectives that enhance profitability.
2. Develop targeted diversity strategies. Given that age and ethnic diversity did not significantly influence performance, companies should re-evaluate how these forms of diversity are integrated—possibly focusing on skills, experience, and role clarity to maximize their potential value.
3. Provide training and capacity development for diverse board members. Boards should offer governance and leadership training to ensure that directors from various demographic groups can contribute effectively to firm performance.
4. Consider firm size when designing governance policies. Because firm size moderates the effect of diversity on return on assets, larger firms should adopt diversity policies that specifically enhance asset management efficiency.

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