



## BOARD DIVERSITIES AND FIRM VALUE OF MANUFACTURING FIRMS IN NIGERIA

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### Abstract

*The introduction of company income tax necessitated the use of debt capital (leverage) to optimize financial performance given the tax savings. Thus, the study crucially investigated the extent and nature of the association between board directors' financial literacy, board of director's gender, ethnicity of board directors and firm age on firm value of manufacturing firms in Nigeria. The study employed equally two control variables for the robustness of the empirical result. The study period was 15 years (i.e. 2008-2023). The study adopted ex-post facto research design via making use of data already in existence. Diagnostic tests carried out indicated absence of unit roots and multi-collinearity. On the other hand, heteroskedasticity (i.e. presence of non-constant variance) is detected. Panel least squares, specifically, feasible generalized least square (FGLS) regressions were utilized in analysing data collated from the audited financial statements of the manufacturing firms. While board of directors' financial literacy, ethnicity diversity negatively exerted but very strong and significant impact on return on assets, both board of gender directors, firm size and firm age the control variable exhibited significant positive relationship with return on assets. The study suggests a holistic investigation of relationship between various types of board diversities and measures of enhancing the value of manufacturing firms in Nigeria.*

**Keywords:** corporate governance, firm value ROA, ethnicity, Board director's influence

### 1.0 Introduction

One of the vital issues for corporate boards of listed firms is its board composition. Corporate board is considered to be impartial if its board members come from various backdrops, which guarantee better performance and gender consideration put in place. Developing societal, political and cultural views at top-level management are part of demographic diversity. Besides the worldwide yearning of firms is to have better corporate governance (Monks and Minow, 2004; Ugwu et al 2021). In 2008, Nigeria economy was deficiently affected by financial crisis. The reason behind this corporate failure was poor practices of corporate governance among companies (Mitton, 2002; Hassan and Marimuthu, 2015). Diversity and corporate governance have a strong relationship in the context of top-level management. Boards of directors are leaders in the firms and responsible for taking a strategic decision and setting strategic goals. Diverse boards may monitor managers and top management teams in



a better way, owing to the fact that board diversity increases board independence (Carter, Simkins et al., 2003). Demographic diversity has a positive impact on firm performance (Hassan and Marimuthu, 2014). In contrast, researchers found that gender diversity among board members could result in a bad firm performance (Adams and Ferreira, 2009). Women participation at board level has a positive relationship with organizational performance. Ethnic diversity among the board of directors can perform their responsibilities more effectively in (Marimuthu and Kolandaisamy, 2009). There is ambiguity among previous research regarding diversity issue at board level (Hassan, Marimuthu et al., 2015, Hassan, Marimuthu et al., 2015). However, past studies used simple statistical tool and techniques to investigate the diversity issue. There is a need to investigate diversity issue in a more holistic way by using different sample size and sampling techniques (Hassan, Marimuthu et al., 2015). Empirical studies showed that there is a strong correlation between demographic diversity and firm performance (Hassan, Marimuthu et al., 2016). It is keen interest for many researchers to explore demographic diversity with regard to firm performance.

Board of directors and its compositions play a vital role in firms' internal governance because its decisions are directly related to various organizations' favourable outcomes or otherwise. Thus, corporate boards occupy the pinnacle position in ensuring the best corporate governance practices (Gillan, 2006; Jensen, 1993). One aspect of corporate governance that has recorded heating debates and exhibiting a growing body of literature is the boardroom diversity. The effect of board diversity on organizational performance has continued to be given attention by policymakers, non-governmental agencies, and academic communities. Drawing from the corporate governance theories, heterogeneity in terms of gender, age, ethnicity and technical expertise boost board monitoring and assists firms in accessing various resources (Adams & Ferreira, 2009; Abdullahi 2021). In particular, the board diversity as a corporate governance mechanism may control managers from embarking on inefficient investment policy and thus, limiting the scope of their underinvestment behaviour (Jensen, 1986; Li & Zhang, 2019). In this case, improved corporate governance associated with the diversified boards may enhance the corporate disclosure and efficiency management of the entity.

The main objective of this study is to explore the board diversities and firm value of manufacturing firms in Nigeria. The study focused on four key component of board diversity attributes; thus; gender diversity, ethnicity, age and financial expertise. The study is of importance to the management of corporate organizations as well as policy makers in the world of corporate governance because the study seeks to provide



evidence on the impact of diversity within corporate boards on Nigeria manufacturers. Also, the study will focus on manufacturing firms with the scope spanning from 2013 to 2023.

## 2. Literature Review and Hypotheses Development

**Board Diversity:** Board diversity refers to the variation present in the makeup of an organization's board (Song et al., 2020). Besides, Ozgur (2020) explained board diversity to be a varied combination of skins, traits, and expertise made accessible by the individuals in the board room as an effort to the decision-making process. A board with diversity can make easy the valuable control of the managers because the varying inputs they seek to provide will make the work more effective (Wahid, 2019). Similarly, the resource dependency theory propounded by Pfeffer and Salancik (1978) maintain that board diversity can equally sharpen the abilities of board members as they can gain from the variety of resources that is embedded in their unique identities. Consequently, they can create stronger networks with the additional opportunity to achieve exceptionally different information critical to the decision-making process.

Extant literature grouped diversity at board level into diverse classes premised on the structures they display in terms of experiences, skills, and demographics (Bernile, Bhagwat & Yonker, 2018; Harjoto, Laksmana & Yang, 2018). In this study, board diversity infers to be heterogeneity that exists within the board premised on the qualities specified above. For this reason, organizations with diversified specialties are more likely to dispense more information which will then alleviate issues arising from information irregularity and agency divergence. Furthermore, this study in conformity with previous literature examines the characteristics of board members on four focal areas which include gender, ethnicity, age and financial expertise.

### **Board of director's financial literacy**

Financial literacy is a skill or competency that is defined as: *The ability to read and understand a set of financial statements that present a breadth and level of complexity of accounting issues that are reasonably comparable to the breadth and complexity of the issues that can reasonably be expected to be raised by the issuer's financial statements.* The need for more financial experts on the boards of directors has been stressed by different searchers and countries due to various accounting scandals (Nga et al., 2012). This will improve a better understanding of analysis of financial statements and should help the board in their oversight role. Accordingly, Sarbanes-Oxley Act 2002 (SOX) makes it a requirement for inclusion of financial experts on boards of public listed firms. Also, Nigeria code of corporate governance, 2018,



likewise the Malaysian Code on Corporate Governance (MCCG) requires that all members of audit committees of listed companies be financially literate and specifically.

Countries all over the world have taken enormous strides to ensure good corporate governance due to the depressing effect of corporate failures on many corporate entities and national institutions, Jonah and Olayinka (2019). Erin et al. (2017), further posit that one of the steps taken is to diversify the board by including directors with financial expertise or background. In Nigeria, a rejoinder has been made by Securities and Exchange Commission (SEC) in alliance with the Corporate Affairs Commission (CAC) by introduction of a Code of Corporate Governance for Nigerian public companies in 2003 and was amended in 2011. One of the core provisions of the code for corporate governance centred on the financial expertise of the board of directors (SEC, 2004). The board is held responsible for all the activities of the company and even for the failure of other elements of the corporate governance chain. The shareholders are helped in this regard by statutory and regulatory provisions and institutions but by far the strength of the internal control mechanism is more germane to the success of the company than all external control measures.

### **Board gender diversity**

In view of the fact that women are more careful and less motivated to bear extreme risks commonly than men, the gender of the firm's directors have been suggested to influence corporate policies and outcomes. Arun, Almahrog and Aribi (2015) declared that firms with female directors have lower absolute discretionary accruals/ earnings management or creative accounting. This is because they tend to be more risk averse/conservative than their male folk (Adams & Ferreira, 2018). This may not be so at all times. Evidently, Croson and Gneezy (2018); Abanum et al (2022), evidenced that that gender diversity of the board of directors' decreases tax optimization. This confirms that, board gender diversity can either reduce or increase tax aggressiveness. Board diversity refers to the variation present in the makeup of an organization's board (Song et al., 2020). Besides, Ozgur (2020) clarify board diversity to be a diverse combine of qualities, and expertise made available by the individuals in the board room as contribution to the decision-making process. A board with diversity can facilitate the effective supervision of the managers because the varying contributions and opinions they seek to provide will make the work more efficient (Wahid, 2019). Consistently, the resource dependency theory as advanced by Preffer and Salancik (1978) confirms that board diversity can equally improve the abilities of board members as they can benefit from the various resources that are entrenched in their unique identities. Accordingly, they can create robust networks with the



further possibility to gain uniquely different information fundamental to the decision-making process, Board diversity captures the variety of entities on boards of organizations comprising diversity in gender, skills, experience, qualifications and ethnicity has been recommended in such standards for the balance and holistic view it tends to bring to the table. In Nigeria, the cultural heritage seems to advocate some imbalance vis-à-vis governance and authority in the society (Okeyide, 2018). Thus, diversity across the terrain like in other parts of the African continent is still largely in its cradle.

### **Firm Age**

Age is the length of time during which a being or thing has existed. Firm age is defined as the number of years of incorporation of the company; even though some believe that listing age, should define the age of the company (Shumway, 2001). The age of a company can be determined by the foundation of a company (Paramitha & Rohman, 2020). Firm age is the length of life of a company since it was established until the period of time as long as the company still exists. A long-established company will have more experience in carrying out business activities in its industrial sector and it is better known to the broader community rather than newcomers. According to Yameen, Farhan and Tabash (2019), firm age stands for age of a company at the time period of analysis. In this study, the researcher measured the firm age from difference between the year the study was conducted and the year the company was established. Maintaining the existence of business for long period is hard because the company should maintain the quality of products and there always will be new unit business coming in to the market with their products, so the company should be innovative with the products and technology used to compete with competitors. Firm age signifies reputation of a business for it being capable to acquire experience in doing business. It increases the capacity of business to gain more investment from debt to equity (Ibrahim, 2017). In sum, this can result to the good name a firm has built up over the years. According to Shumway (2001), listing age is more economical since listing is a defining moment in the company' life. Shumway's argument is debunked from the perspective of the company as a legal personality (Waelchi & Pdferer, 2011). As a legal person, a company is born through incorporation Gitzmann, 2008; Pickering, 2011). Hence, our preference for the year of incorporation as the definition of the age of the company.

### **Ethnicity diversity**

Ethnicity diversity donates cultural factors, which includes nationality, regional culture, lineage, religion or language. The ethnic group of directors is one of the main uniqueness of board diversity. The growing internationalization of business leads to



higher demand for directors who possess the required skills in addition to contacts in overseas markets to connect the firm to the disparate backgrounds of the countries in which it functions (Mohsni et al., 2021). The literature recommends that foreign directors go further than financial assistance and widen the provision of supervisory capability and industrial collaborations, rising creativity and improvement. Directors with diverse ethnics initiate variety of ideas, knowledge and points of view (Ezat & El-Masry, 2008). Diversity on boards may reduce information asymmetry and the associated agency costs; improve the financial flexibility of domestic firms by increasing the pool of potential investors and financing opportunities; and expand cross-border flows of knowledge and technology.

### **Board diversity and Firm value**

Maximizing wealth is the company's prime objective (Ahmad et al., 2022; Setiawan et al., 2020). Since maximizing firm value as well requires maximizing shareholder wealth, which is the main objective of the organization, maximizing firm value is indispensable. Bui et al. (2023) posit that Firm value is the market value of outstanding securities and business equity. Firm value is a term used to exemplify how investors view a company's success, and it is often connected to stock prices. The Firm value is similarly high due to high stock prices. A high Firm value will encourage the market to have faith in the company's future potential as well as its present success. Firm value shows the market value and Firm value can provide maximum shareholder affluence if the share price increases; thus ROI, ROE, ROA, Share price index, shareholders' fund and capital structure etc. The higher the share price, the higher the opulence of shareholders. Firm value can also be viewed by examining the market value or book value of the business based on its equity, meaning that the stock price of the company reflects Firm value (Malini et al., 2021; Suhadak et al., 2019). For the reason that the stock market price is a manifestation of the true value of the company's assets, the market price of company shares generated between buyers and sellers when a transaction occurs is called the company's market value.

### **2.2 Theoretical framework**

Board Diversity and Financial Performance Agency theory is related to the theory developed by Jensen and Mecklings (1976). The theory depends on the relationship of the head specialist. Previous agency scholars (Demsets and Len, 1985; Jensen and Meckling, 1976 and Fama and Jensen, 1983) recommends having a viable corporate management framework, including the establishment of a presidency. As Fama and Jensen (1983) show, that the board of directors is one of the few major systems for managing and screening managers and plays an important role in an organization's management strategy. The Supreme Committee plans to handle agency issues



between directors and investors (Dang, Nguyen, VO, 2013). According to agency theory, the board of directors (BOD) interfaces between managers and investors and solves agency problems. Agency theory supports the designation and convergence of controls on the chief board and the use of reward driving forces. The Supreme Committee selects experts through communication and details, research and reviews, code and strategy execution. Agency scholars acknowledge that the essential duty of the board is to choose a director to protect investors from irreconcilable situations (Shleifer and Vishny, 1997). The theory suggests that higher gender diversity improves board freedom and, through a better observational framework, becomes a good management factor between the board and executives. In addition, female directors are not considered tolerant of wise behaviour (Srinidhi, Gul, Tsui, 2011), so female directors further improve the quality of corporate procurement by reducing entrepreneurial income increase. I can do it. Therefore, the gender diversity of the board conveys a positive message to the market that the organization is cantered on business operations; the organization is on track and is working on the situation of the organization. Larkin, Bernardi and Bosco (2012), infers that investor returns are higher and higher as the organization's approval and relationships with various women's board heads are estimated from the market cost of the company's common stock.

Similarly, from the agency theory point of view, directors and managers have very essential task to guarantee that they manage the company in the best wellbeing of business investors and owners of the business. Consequently, the measure by which the firm value is determined in this instance simply means how the management has multiplied the shareholders' fund (shareholder equity) of the firm (Martins, 1996; Bohrem and Staubo, 2010). Shareholders' equity also known as the company's net worth is equal to a firm's total assets less the firm's total liabilities (Kothari, Leone & Wasley, 2005; Smith, Smith & Verner, 2005). It can also be determined when all reserves (capital reserves, revenue reserves, share premium and retained earnings) are added to the ordinary share capital (Ahern & Ditton, 2012). Apart from the theoretical consideration, this measure of firm value was adopted for two major reasons. First, shareholders' fund is mostly the accounting indicator applied by the ratio analysts in determining the financial well-being of a firm. Shareholders' equity is a representation of a firm's net value. In other word, it is the amount that goes back to the shareholders during dissolution where all the firm's assets will be liquidated and all debts settled.



### 2.3 Empirical review

Shamsul and Ku Nor Izah (2013), explored Gender, Ethnic and Age Diversity of the Boards of Large Malaysian Firms and Performance. Under the system, board appointments are usually controlled by the firm's substantial shareholders, and as a result, directors are chosen based on "the old-boy" network or "people like us", who are typically middle-aged males and from similar ethnicity which could lead to "group think". Board diversity ensures breadth and depth of the board's judgments. To this end, this study examines board diversity of the top 100 non-financial Malaysian firms, specifically directors' gender, ethnicity and age and their effects on firm performance. Data are collected from the 2007 annual reports of the sample firms. The evidence indicates the lack of diversity of the Malaysian boards of directors. Results from the multivariate analyses reveal that gender diversity is negatively associated with Tobin's q and ROA. Age diversity is found to be negatively related to ROA. Ethnic diversity, on the other hand, is found to be positively associated with ROA. Hence, findings on the effect of board diversity and firm performance are mixed.

Olaniyi and Ekene(2017) examined the effects of board of directors" characteristics (BC) (i.e. board size [BSIZE] and diversity [BDIV]; managerial ownership [MOWN]; independent director [INDEP] and proportion of non-executive directors to the executive director NEDED on tax avoidance (TA) as measured by the Effective Tax Rate (ETR) of quoted financial service companies in Nigeria The data used were subjected to Hausmans" specification test which results in the supremacy of random effect over fixed effect for interpretation purpose while R2 (0.5467) and Wald Statistics (113.91) attests to the individual and joint significance of the independent variables. The study finds that BDIV, INDEP, MOWN and NEDED are statistically significant at 1% and 5% but the more the BDIV and INDEP on board composition the lower the TA while MOWN and NEDED are positively correlated with TA. BSIZE and the control variables (i.e. return on assets, leverage and firm size) were all insignificant. It was concluded that BC has varying impacts on TA.

Zachariah, Tahir and Mohammed (2020) studied effects of board attributes on tax planning of listed non-financial companies in Nigeria. It aims at finding out using quantitative research method, board attributes that increase tax planning, thus, reducing tax liability of listed non-financial firms in Nigeria. Data for the study were collected from the annual reports and accounts of the sampled companies for a period of ten years (2008 to 2017). The data collected were analysed using descriptive statistics to provide summary statistics for the variables, and correlation analysis was carried out using Pearson product-moment correlation to determine the relationship





between the dependent and independent variables. Regression analysis was also conducted. The study revealed that board independence has a significant negative effect on tax planning; foreign directorship has a non-significant negative effect, while gender diversity, board size, and board meetings have non-significant positive effect on tax planning in listed non-financial companies in Nigeria.

Rayenda, Mohd and Hui Wei You (2017) carried out study on the role of Gender and Ethnic Diversity on the Performance of Malaysian Private Companies. This study is different from other studies because instead of using publicly listed companies, it uses 3,735 private companies over 2009–2014. The findings revealed that gender has no significant effect on the firm performance but firm's characteristics such as firm age, firm's size, liquidity, and leverage have significant effects on the firm performance. It was further indicates that ethnic diversity in the board of directors may give better performance to companies. This research implies two important findings for the policy makers. First, the encouragement of gender equality to private companies by policy maker may fail as it does not have any impact. Second, policy maker should not consider ethnic diversity in the board as part of policy because it may reduce the firm performance.

Augustine et al (2018) examined corporate board diversity and firm performance: evidence from Nigeria. This study investigated the impact of corporate board diversity on the financial performance of Nigerian quoted firms using a panel data of 122 quoted Nigerian firms. The aspects of board diversity studied comprise board nationality, board gender and board ethnicity. The Fixed Effect Generalised Least Square Regression is used to examine the impact of board diversity on firm performance for the period: 2008-2018. The results show that gender diversity was negatively associated with firm performance, though board nationality and board ethnicity were positive in predicting firm performance.

Jonah (2019) investigated board financial education and firm performance: evidence from the healthcare sector in Nigeria. The study examines the relationship between board financial education and firm performance of companies operating in the healthcare sector in Nigeria. The study investigates six (6) listed firms in the healthcare sector for the period from 2011 to 2017. Board financial education variables were proxy by bachelor's degree in finance related courses (BScFin), a postgraduate degree in finance related courses (PGFin) and professional qualification in finance related courses (POFin) while the study controlled for other variable which is the firm size (FMZ). Firm performance was measured using the return on assets (ROA). The fixed effect model of the multiple regression analysis was adopted in



testing the three hypotheses developed in this study. The empirical result revealed that all the explanatory variables have a positive and significant relationship with firm performance. This result emphasizes the relevance of financial education for board members irrespective of their educational background. We, therefore, concluded that financial literacy should be considered as a primary pre-requisite for appointments to corporate boards. Also, basic financial training should be a top priority for all firms to assure optimum financial performance.

Liliana, Ştefan and Ziad (2022), examined Does board gender diversity affect firm performance The essence of this study is to investigated the influence of the board gender diversity on firms' accounting and market-based performance using a sample of Standard & Poor's 500 companies belonging to the information technology sector over 12 years. Using the pooled ordinary least squares (OLS) method, the outcomes provide evidence for a positive influence of women on corporate boards on both measures of company performance, except for the percentage of female executives in the case of return on assets (ROA). After estimating the fixed effects and random-effects through panel data, the econometric outcomes show no statistically significant association among board gender diversity and ROA but a positive influence of the number and percentage of women on board on price-to-earnings ratio.

Salihu and Kawi (2021) investigated the relationship between the board's attributes and corporate tax avoidance. They used a qualitative strand in providing explanations to the mixed findings in addition to the quantitative strand. The quantitative data came from the annual reports of the top 100 Malaysian companies based on FTSE tradable index. The panel data were analysed using the system Generalized Methods of Moment (GMM). The findings were used to develop a semi-structured instrument for further qualitative inquiry through personal interview sessions with ten tax auditors of the Inland Revenue Board of Malaysia (IRBM). The quantitative analysis shows board effectiveness to be negatively related to corporate tax avoidance. However, board independence and board members' financial literacy were not significant. The analysis of the interview responses shows that the members of the board have little influence on the choice of the company's tax management strategy. Nevertheless, the findings are relevant for the revision of the guidelines on the appointment and oversight roles of directors in the Malaysian Codes of Corporate Governance (MCCG).

Onatuyeh and Odu, (2019), examined the association between corporate board characteristics and tax aggressiveness. This study therefore seeks to provide empirical evidence on whether corporate board characteristics such as board size,



board gender diversity, and board independence are significantly associated with tax aggressiveness amongst manufacturing firms in Nigeria. Leaning on the agency theory and to achieve the above objective, a sample of forty-nine (49) manufacturing firms listed on the Nigeria Stock Exchange (NSE) as at December 2016 was examined. Data for the study were obtained solely from annual financial statements of the studied firms for the period 2011 to 2016. The econometric model adopted for the study was estimated using panel data regression approach with a preference for the fixed effect model based on the result of the Hausman test. Results of the study show that both board size and board independence exert negative and significant impacts on tax aggressiveness in manufacturing firms in Nigeria, while board gender exerts no significant effects. The insufficient women corporate board membership in the firms is assumed to be a plausible reason for this outcome.

Ibrahim Aramide Salihu and Farahiyah Kawi (2021) examined Board attributes and corporate tax avoidance: An explanatory mixed method investigation. The study on the board's attributes and corporate tax avoidance has documented mixed findings. Since these studies are predominantly quantitative, the present study uses a qualitative strand in providing explanations to the mixed findings in addition to the quantitative strand. The quantitative data came from the annual reports of the top 100 Malaysian companies based on FTSE tradable index. The panel data were analysed using the system Generalized Methods of Moment (GMM). The findings were used to develop a semi-structured instrument for further qualitative inquiry through personal interview sessions with ten tax auditors of the Inland Revenue Board of Malaysia (IRBM). The quantitative analysis shows board effectiveness to be negatively related to corporate tax avoidance but documented that board independence and board members' financial literacy were not significant. The analysis of the interview responses shows that the members of the board have little influence on the choice of the company's tax management strategy.

### **Control Variable:**

The study also employs control variables, firm size, firm age and leverage, in order to contain their possible effect on the result of the study as they (firm size, firm age and leverage) could lead to differences in the banks' ROA since they constitute factors that determine many of the banks' operational decisions, including those that relate to their investment, credit, training, etc. Supporting the use of control variable in impact study, Saunders et al. (2012) contend that control variables are required in the analysis of relationship between certain variables, the failure of which could bias the result of the study. The control variables employed in this study are measured as presented in the table below:



**Methodology**

The study employed the *expo facto* research design. This is as a result of the fact that it involves historical events. The study was carried out in Nigeria, the study covered (2013-2023) manufacturing firms on the floor of the Nigerian Stock Group. The study population covered ten top manufacturing firms that stratified sampling was adopted. *Note that panel least squares regression analysis, specifically, ADF Test for Unit Root, Autoregressive test for normality was employed in analysing the data and testing the hypothetical statements.* Considering the underlying objectives of the study, the model for this study is specified as;

$$ROA_{it} = \beta_0 + \beta_1 BDF_{it} + \beta_2 BGD_{it} + \beta_3 FA_{it} + \beta_4 ED_{it} + \beta_5 LEV_{it} + \beta_6 \epsilon_{it} \dots\dots\dots (2)$$

Where;

Where *ROA = return on assets*

BDFL = Board of director’s financial literacy

BGD = Board of gender diversity

FA = Firm age

ED = Ethnicity diversity

FS= Firm size= Total size of the firm

Lev= Leverage

$\beta_0$  = intercept

$\beta_1$  = parameter estimate

$\beta_0$  is the constant term or intercept for firm *i* in the year *t*.  $\beta_1, \beta_2,$  and  $\beta_3$  are linear regression coefficients to be estimated.  $c_{it}$  is the non-observable individual effect while  $\epsilon_{it}$  is the disturbance or error term for firm *i* in the year *t*.

**Table 1: Operationalization of Variables**

|                 |                    |
|-----------------|--------------------|
| <b>Variable</b> | <b>Measurement</b> |
|-----------------|--------------------|

**Independent Variables**

BODF = Proportion of BODF members who has certificate in accounting/ finance or business management

BGD = No of women on board/Total number of Directors on Board of Directors

Firm age= subtract year of incorporation from each sequential year in the study

BOD= Board ethnicity diversity taking values of firm *i* in year *t*

EOD= Total board members/Ethnic diversity



Dependent Variable

ROA = Return on Assets = Profit for the Year / Total Assets

**Control variables**

Firm Size = natural log of the book value of total assets as it is believed that total asset increases as firm value improves.

Leverage= Total long term debt divided by total assets

**4.0 Results**

**Descriptive statistics**

| Var      | ROA      | BDFL      | BGD      | FA        | EOD       | FS        | LEV       |
|----------|----------|-----------|----------|-----------|-----------|-----------|-----------|
| MAX      | .998513  | .99896    | .99855   | .88721    | .99925    | 1.012939  | .99896    |
| MIN      | .000424  | .00437    | .00559   | .001762   | .009216   | .004848   | .003514   |
| SD       | .2907272 | .2711455  | .2778429 | .1978878  | .3068973  | .1885589  | .3036307  |
| MEAN     | .4665135 | .7816209  | .5407265 | .5398159  | .5781009  | .7231073  | .5707215  |
| SE(MEAN) | .0186887 | .0174299  | .0178604 | .0127207  | .0197281  | .012121   | .0195181  |
| SKEWNESS | .0659516 | -1.676266 | -.170568 | -1.148588 | -.3416863 | -1.703518 | -.3317463 |
| kurtosis | 1.788334 | 4.373602  | 1.879114 | 3.78072   | 1.747082  | 6.860761  | 1.830504  |
| variance | .0845223 | .0735199  | .0771967 | .0391596  | .094186   | .0355545  | .0921916  |

**Source: Author’s computation 2024**

Table 1 above illustrated that the mean is an approximate measure of the accurate population i.e. all listed manufacturing firms in Nigeria). It became evident as the standard errors of all entered variables are far smaller in comparison to their respective means. Mostly, the standard errors are relatively small and align to theory that it becomes smaller as a normal sample approaches the true population. On the other hand, the standard deviations of the same variables seemed to be larger than their respective means not including skewness and kurtosis. This confirmed its weakness to intense values be common in various populations. Apart from for variance, the probabilities of both moments for the remaining independent variables are below 0.1%. The range (difference between maximum and minimum values) is rising and falling for the relevant period. That is, they are approximately normally spread.



**Table 2: Correlation Matrix with P-values involving 242 observations**

| Var. | roa     | bfl     | bgd     | fa      | etd     |         |        |
|------|---------|---------|---------|---------|---------|---------|--------|
| BDFL | 1.0000  |         |         |         |         |         |        |
| BGD  | -0.0936 | 1.0000  |         |         |         |         |        |
|      | 0.6573  |         |         |         |         |         |        |
| FA   | -0.0994 | 0.0798  | 1.0000  |         |         |         |        |
|      | 0.3459  | 0.4453  |         |         |         |         |        |
| EOD  | -0.0366 | 0.0672  | -0.0734 | 1.0000  |         |         |        |
|      | 0.0000  | 0.4669  |         |         |         |         |        |
| FS   | -0.0961 | 0.0907  | -0.0568 | 0.1370  | 1.0000  |         |        |
|      | -0.0005 | 0.0037  | 0.0000  |         |         |         |        |
| LEV  | 0.1349  | -0.0679 | -0.1602 | 0.2233  | -0.1574 | 1.0000  |        |
|      |         | -0.8762 | -0.0000 | 0.00321 |         |         |        |
| ROA  | -0.0668 | 0.0435  | 0.0725  | -0.0634 | 0.0731  | -0.0786 | 1.0000 |
|      |         |         | 0.66543 | 0.64533 | 0.76453 | 0.56432 |        |

**Source: Authors’ STATA 14.2 Outputs**

Table 2 showcased that one of the independent variables and control variable (leverage) wielded very strong negative effects on the dependent variable. Though, firm age and board gender diversity exhibited statistically positive and insignificant connection to return on assets. There exist perfect relationships between boards of director’s financial literacy, ethnicity of board of directors showing presence of collinearity. It is easily adjusted using collinearity diagnostics given the non-existence of both lagged values and dummy variables.



**Skewness/Kurtosis tests for Normality**

| Variable | Obs | Pr(Skewness) | Pr(Kurtosis) | adj chi2(2) | Prob>chi2 |
|----------|-----|--------------|--------------|-------------|-----------|
| BDF      | 242 | 0.6668       | 0.0000       | .           | 0.0000    |
| BGD      | 242 | 0.0000       | 0.0020       | 54.85       | 0.0000    |
| FA       | 242 | 0.2682       | 0.0000       | 59.12       | 0.0000    |
| EOD      | 242 | 0.0000       | 0.0322       | 33.21       | 0.0000    |
| FS       | 242 | 0.0295       | 0.0000       | .           | 0.0000    |
| LEV      | 242 | 0.0000       | 0.0000       | 68.68       | 0.0000    |
| ROA      | 242 | 0.0343       | 0.0000       | .           | 0.0000    |

The *Skewness, Kurtosis, Shapiro Francia W and Shapiro Wilk W tests* carried out found that the collated data is normally distributed with *p-value < 0.05 for all the variables and control variables* the four scenarios. The diagnostic tests confirm that the variances of the dataset are not statistically constant, that is there is a heteroskedasticity problem with *Prob>Chi<sup>2</sup> at 0.000* It also discovered that the multicollinearity of the data set measured by the variance inflation factor (VIF) ranges from 1.15 to 1.68when board directors financial literacy correlating exceedingly with board of gander directors was detached the mean (VIF) is1.07. This result signifies the absence of multicollinearity. At last, the Durbin-Watson statistics found the absence of positive serial autocorrelation with DW scores of 1.07which is closer to 2 than 1. Hence, panel linear regressions robust standard error model was used to test the hypotheses and correct the heteroskedasticity problem.

**Table 4.4: Breusch-Pagan Test for Heteroskedasticity**

**Breusch-Pagan / Cook-Weisberg test for heteroskedasticity**

Ho: Constant variance

Variables: fitted values of roa

chi2(1) = 0.25

Prob > chi2 = 0.6181

Table 4.4 above depicts the Breusch-Pagan test result for heteroskedasticity for the model specification. The results reveal that the variance of the error term in the model is non – constant. However, the test is statistically significant as the P-value = 0.006 which is less than 1% and indicates the acceptance of the alternate hypothesis (H<sub>A</sub>:



non-constant variance and rejection of null hypothesis (Ho): heteroskedasticity. If this is not corrected, it leads to biased standard errors. It is done through adopting the robust command while executing the regression to arrive at robust standard errors. Montgomery and Peck (2007) acknowledged that these robust standard errors solve the problem of dependent and identically distributed errors. Further, the use of these errors only modifies the standard errors and significance tests and does not change the coefficient estimates provided by the regression equations. In a nutshell, the regression equations must be tuned using robust standard errors.

**Table 4 Test for Model Mis-Specification**  
**For Model Mis-Specification**

Ramsey RESET test using powers of the fitted values of roa

Ho: model has no omitted variables

$$F(3, 232) = 1.96$$

$$\text{Prob} > F = 0.0000$$

**Source: Author’s computation, 2024**

In table above, Ramsey Reset test is used to identify if the wide-ranging model is mis-specified (i.e. under-specified or over fitted). It is done by removing one or more independent variables and re-running the regression. Inspecting the old and new residuals has revealed that the model is not over-fitted. In other words, the P-value = 0.0000 < 0.05 implies rejection of the null hypothesis (H<sub>0</sub>) and accepting H<sub>A</sub>.

**Table 4: Feasible Generalized Least Squares (FGLS) Regression**

| ROA                         | Coef.     | Std. Err. | t                              | P> z  | [95% Conf. Interval] |           |
|-----------------------------|-----------|-----------|--------------------------------|-------|----------------------|-----------|
| BDFL                        | -.1219786 | .0554152  | -2.20                          | 0.628 | -.2305904            | -.0133669 |
| BGD                         | .0431165  | .0629567  | -6.80                          | 0.000 | -.0802764            | .1665094  |
| FA                          | .0034658  | .058058   | 0.06                           | 0.952 | -.1103258            | .1172575  |
| EOD                         | -.0456175 | .0857563  | -0.53                          | 0.595 | -.2136967            | .1224618  |
| FS                          | -.0651013 | 0.574715  | -0.96                          | 0.335 | -.1973429            | .0671404  |
| _cons                       | .6634249  | .1077721  | 6.16                           | 0.000 | .4521954             | .8746543  |
| Number of obs = 242         |           |           | Number of groups = 15          |       |                      |           |
| <u>Wald chi2 (5) = 6.55</u> |           |           | <u>Prob &gt; chi2 = 0.0001</u> |       |                      |           |

**Source: Authors’ STATA 14.2 Outputs**





The table above portrays that the overall influence of the independent variables on the dependent is statistically very significant at P-value = 0.0000. As regards hypothetical statements, the correlation between board director's financial literacy and return on assets (roa) is negative but significant at P-value = 0.628 > 0.05 level of significance and t-statistic = -2.20 < |2|. Likewise, the sensitivity of return on assets to the control variable asset firm size (fs) is statistically positive and insignificant at P-value = 0.502 and t-statistic = 0-0.96 < |2|. Nevertheless, board gender directors exerted very strong influence on return on assets given the P-value = 0.0000 and t-statistic = -6.80 > |2|. Also firm age (fa) exhibited positive and significant relationship with return on assets. Moreover, ethnicity of board showcased both negative and insignificant association with the dependent variable. The **(FGLS) Regression** revealed size of the firm impacts significantly on value of listed manufacturing firms in Nigeria. This is not quite amazing because manufacturing sector is deeply synchronized and monitored by manufacturing Association of Nigeria (MAN)). The coefficients of the independent variables are quite small for both board of director's financial literacy, Board of gender diversity, Ethnicity diversity, firm age and the control variable. It shows that 1% increase in both board of director's financial literacy, Board of gender diversity, Ethnicity diversity, firm age and the control variable increases return on assets by 0.03% and 0.65% in that order. Providentially, the size of the manufacturing firms means a lot to the economy given that 1% increases in firm size of total assets decreases return on assets by 57%.

## 5. Conclusion

The findings of the study highlighted the limitations caused on management of these manufacturing firms by overbearing bottleneck of Nigeria manufacturing Association. Peripheral influence dictates the behaviour/inactions of the management. While board of directors' financial literacy, ethnicity of board directors negatively exerted very strong and significant impact on return on assets, both board of gender directors, firm size and firm age the control variable exhibited significant positive relationship with return on assets. The study suggests a holistic investigation of relationship between various types of board diversities and measures of enhancing the value of manufacturing firms in Nigeria.



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