ISSN:1533-9211
SEYBOLD REPORT
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GOVERNANCE AND MANAGERIAL EFFECIENCY OF LISTED INDUSTRIAL GOODS MANUFACTURING COMPANIES IN NIGERIA

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Abstract

This study investigates the effect of corporate governance structure on managerial efficiency, with a specific focus on industrial goods manufacturing firms listed in Nigeria. Organizational efficiency, conceptualized as the ability to maximize revenue from existing asset bases, was measured using the asset turnover ratio (ATR). Using an ex-post facto research design, data were collected from the audited annual reports of ten selected industrial firms over a 17-year period (2006–2022). Employing a random-effects Generalized Least Squares (GLS) regression model with Driscoll-Kraay standard errors, the analysis revealed that governance attributes jointly have a significant effect on asset turnover ratio.
The findings suggest that a well-structured board, particularly with balanced gender representation and a streamlined audit committee, can enhance organizational efficiency.. These results have critical implications for regulators, investors, and company management, highlighting the need for inclusive yet strategically aligned governance structures that optimize managerial effectiveness in Nigeria's industrial goods sector.

JEL Classifications: G34, H29

ISSN:1533-9211
SEYBOLD REPORT

ISSN: 1533 - 9211

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KEYWORDS:

Audit committee size, Board diversity, Board independence, Governance structure, organizational efficiency

Received: 09 July 2025
Accepted: 11 August 2025
Published : 14 August 2025

TO CITE THIS ARTICLE:

Ajayi-Owoeye, A. O., Folorunsho, V. K., & Akinwunmi, A. A.-J. (2025). Governance and managerial efficiency of listed industrial goods manufacturing companies in Nigeria. *Seybold Report Journal, 20*(8), 47–66. DOI: 10.5281/zenodo.16869422

1.0 Introduction

Organizational efficiency, the ability to optimize output relative to input, is vital for firms, especially in asset-intensive sectors. In Nigerian industrial goods firms, this is often measured by the asset turnover ratio, which gauges how effectively management uses assets to generate revenue (Ilugbusi et al., 2024). High asset turnover not only enhances profitability but also signals prudent resource management to stakeholders. The level of efficiency of any organization depends on the capability of the management entrusted with the resources to effectively utilize them.

Organizations thrive in a system that works, this refers to their governance structure, which includes the system of rules, practices, and processes by which companies are directed and controlled. Corporate governance remains a critical determinant of firm performance, especially within developing economies. Governance attributes such as board gender diversity, nationality diversity, educational diversity, audit committee characteristics, and board independence are increasingly recognized for their influence on operational outcomes (Aigienohuwa & Irowa-Omoregie, 2025; Ilugbusi et al., 2024). In Nigeria's industrial goods sector where resource-intensive production processes prevail managerial efficiency, often proxied by the asset turnover ratio, plays a key role in assessing how effectively management converts assets into revenue.

Empirical studies have shown that well-structured governance mechanisms can drive significant improvements in operational efficiency. For instance, Ozoemene and Nnubia (2025) revealed a positive relationship between audit committee size and firm profitability among Nigerian industrial goods companies, suggesting that stronger governance oversight fosters optimal asset usage. Similarly, Aigienohuwa and Irowa-Omoregie (2025) demonstrated that audit committee diligence and board independence significantly enhance efficiency scores in manufacturing firms, even though the relationship with asset turnover was mixed. Assessing the role of the audit committee. Aigienohuwa and Irowa-Omoregie (2025) found that industrial firms with vigilant audit committees defined by frequent meetings achieve greater operational efficiency. Although scale efficiency (assets) improved, effects on turnover were mixed, suggesting nuanced governance effects on asset utilization rather than direct revenue enhancement.

Board gender diversity also plays a role, but evidence is mixed. Aigienohuwa and Irowa-Omoregie (2025) reported no statistically significant relationship between gender diversity and scale efficiency, indicating that diversity alone might not suffice without integration into governance processes and decision-making. This aligns with other findings in the Nigerian manufacturing sector and suggests that diversity initiatives must go hand-in-hand with capacity building and empowerment within governance frameworks. For instance, Gender and educational diversity were shown in Nigerian non-financial firms to significantly boost performance, supporting the agency and resource dependence theories by providing a richer pool of perspectives (Kabara et al., 2022; Ilugbusi et al., 2024). Similarly, diversified boards across gender, nationality, and expertise foster enhanced decision-making and strategic alignment, especially in developing markets (Odero & Egessa, 2022; Ilugbusi et al., 2024).

Board independence has shown a more tangible impact. Ilugbusi et al. (2024) determined that independent boards lead to stronger asset turnover in Nigerian firms, including those in the industrial sector. The presence of non-executive, objective oversight appears to encourage rigorous monitoring and strategic decision-making, enhancing how assets are deployed and managed in the pursuit of higher turnover.

Complementing board independence, committee size also matters. Ozoemene and Nnubia (2025) observed that a robust audit committee size positively correlates with financial performance in industrial goods firms.

Though not directly measuring asset turnover, the improvement in profitability often stems from better internal control and operational discipline, which in turn implies greater asset efficiency.

Educational diversity among board members adds further strategic value. A study across Nigerian non-financial firms found that greater educational diversity correlates positively with Tobin's Q, ROA, and ROE, suggesting enhanced value creation potentially tied to efficient asset management (Onu et al., 2024). Boards with directors from various educational backgrounds may foster more innovative strategies and broader perspectives that translate to improved operational practices and asset use.

Investigations into board nationality diversity are emerging, especially as firms globalize. While Nigerian industrial sectors have relatively fewer foreign directors, studies in other developing economies (Oktaviano & Wibowo, 2022) demonstrate that nationality diversity enhances both intellectual capital efficiency and asset productivity. Similar dynamics could be leveraged in Nigeria as industrial goods firms seek to expand into international markets and attract foreign investment. Among the corporate governance measures, the risk management committee is crucial for attaining high level of efficiency. Theoretical and practical perspectives suggest that a well-structured risk committee can mitigate operational disruptions reducing asset downtime and improving asset turnover. While some governance mechanisms such as audit committees and board independence display consistent links to improved efficiency, the role of broader governance structures, especially diversity and risk oversight, is still evolving. This study aims to bridge this gap by empirically examining how board gender, nationality, educational diversity, committee size and independence, influence asset turnover in Nigeria's industrial goods sector.

The rest of this paper is sectionalized into four, while section 2 addressed the review of literature in three parts, conceptual, theoretical and empirical, section 3 explains the research methods adopted; the results of the analysis conducted as well as the interpretation and discussions are explained in section 4, and the summary, conclusion and recommendations are expressed in the last section of the paper.

2.0 Review of literature

Review of concepts

Organization efficiency

Organizational efficiency, defined as the ability to maximize output from a given set of inputs, remains a core determinant of firm performance, especially in asset-intensive industries like the industrial goods sector. Scholars have conceptualized efficiency in diverse ways. Al-Shaiba et al. (2020) define it as the strategic execution of activities that minimize waste and maximize results. Palad (2022) emphasizes technology's role in achieving performance gains, describing efficiency as the optimal deployment of resources to achieve competitive advantages. Ensslin et al. (2022) take a systems-based view, linking efficiency to the sustainability of performance measurement systems. Across these definitions, a common theme emerges: organizational efficiency is not just about productivity but also about value-driven, intelligent management of resources. Its importance lies in enhancing profitability, competitiveness, and stakeholder confidence. Measurement approaches vary, Data Envelopment Analysis (DEA), Balanced Scorecards, cycle time, throughput, and financial ratios are commonly used. However, in capital-intensive sectors, the **asset turnover ratio** is often preferred for its objectivity and ease of comparison across firms and periods (Investopedia, 2018; Wikipedia, 2025).

In this study, organizational efficiency is specifically operationalized as managerial efficiency, measured by the asset turnover ratio defined as revenue divided by average total assets. This approach aligns with recent studies in Nigeria's manufacturing and industrial sectors (Ilugbusi et al., 2024). Asset turnover is a strategic measure that reflects how effectively a company's asset base is used to generate revenue, serving as a proxy for the performance and decision-making quality of the firm's management. High turnover indicates efficient utilization of resources and suggests strong governance and operational discipline. Diverse metrics such as return on assets (ROA), earnings per employee, or DEA scores offer reflect efficiency from different perspectives; however, asset turnover is uniquely suited for this context due to its direct connection to revenue generation, ease of benchmarking, and relevance in assessing governance impact.

Governance Structure

Corporate governance structure encompasses the framework of boards, committees, and policy mechanisms designed to guide, monitor, and control organizations (Ilugbusi et al., 2024). Definitions vary: Adebayo et al. (2022) describe it as the composition and attributes of the board independence, size, diversity impacting firm stewardship. Similarly, Ogor and Fapohunda (2023) posit governance structure as the alignment of checks and balances through committees (e.g., audit, risk) and board composition to uphold strategic oversight. This structure is crucial for transparency, accountability, and informed decision-making, which reinforce stakeholder confidence and sustainable performance (Ilugbusi et al., 2024).

Measurement of governance structure often focuses on quantifiable board and committee characteristics. Common proxies include board size, board independence (proportion of non-executive directors), board gender diversity, audit committee size and independence, and risk management committee size (Ilugbusi et al., 2024; Ogiriki & Okpoboloukemi, 2024). Other metrics extend to financial expertise on committees, frequency of committee meetings, and educational background diversity (Asaolu et al., 2022). In this study, governance structure is defined as the configuration of board diversity (gender, nationality, education), board independence, and committee dimensions (audit and risk committee size).

Review of the underlying theory

Resource dependence theory provides a theoretical foundation for this study because organisations attempt to exert control over their environment by co-opting the resources needed to survive. Thus, boards are seen as a conduit between the company and the crucial external environment resources necessary for optimal success. Appointing new, external board members can assist a company obtain access to crucial resources. Companies might expect less uncertainty and more management efficiency as a result of their efforts to safeguard environmental resources. The capacity to acquire resources from the environment is bolstered by board diversity, which is produced through varied board capital, hence reducing uncertainty and improving business performance. An organization's ability to tap into external resources improves when its board represents a wide range of people and perspectives.

According to resource dependence theorists, a diverse board of directors may be a strategic asset to a company because of the unique perspectives and experiences each member brings to the table. The resource dependency hypothesis places major focus on the role of the board of directors in providing access to resources including financial resources, knowledge, skills, experience, and proposals that are important for corporate value. Members of the board often have extensive external connections and are actively involved in networks, both of which have the ability to greatly impact the business's development process and its long-term prospects. Hence, the firm's value will rise as a result of the application of corporate governance since it will lead to the deployment of resources to attain their maximum productivity. Synergistic advantages result from the enhanced network connections, diversified creativity, and innovative approaches that diversity and governance provide to a team.

Review of Past Related studies

Board independence and organizational efficiency

Empirical evidence affirms that board independence enhances organizational efficiency, for example, Ilugbusi et al. (2024), using panel data across listed industrial goods and financial firms, found that greater proportions of independent directors are positively associated with higher asset turnover and operational productivity. Similarly, Abubakar et al. (2023) observed that independent boards in Nigerian manufacturing companies significantly improve revenue-to-asset ratios, attributing this to strengthened oversight and strategic discipline. Igbinosa et al. (2024) observed that boards with more independent non-executives showed improvement in efficiency metrics. Likewsie, studies from Ghana (Owusu & Amuakwa-Mensah, 2023) and South Africa (Mofokeng & Coetzee, 2023) reveal similar patterns where boards of non-executives drive efficiency. Research by Khan and Ali (2022) in Pakistan manufacturing firms demonstrated that board independence predicts asset utilisation efficiency. These empirical evidence demonstrated how independent board members influneces managerial excesses and optimize asset allocation.

> *Therefore, this paper hypothesized that: Board independence has no significant effect on organizational efficiency*

Audit committee characteristics and organizational efficiency

Audit committee characteristics, especially its size, independence, and activity level, are significantly linked to manager efficiency. Ozoemene and Nnubia (2025) showed that larger audit committees deliver better profitability and operational efficiency in Nigerian industrial goods firms. Asaolu and Adebayo (2022) reveal a significant relationship between audit committee components and asset efficiecny among Nigeria's non-financial firms. Abu's (2024) revealed that audit committee diligence correlates with higher asset turnover by facilitating rigorous internal control. Agyei-Mensah and Yeboah (2019) in Ghana and Muthusamy and Choo (2023) in Malaysia both found that audit committee activity improved resource efficiency. Agwor and Osinachi (2023) demonstrated that audit committee members with financial qualifications enhance profitability and asset turnover in Nigerian food and beverage companies. Abdullahi (2024) examined listed commercial banks in Nigeria and linked larger audit committees with improved financial reporting quality indicating robust governance that likely supports asset efficiency. Coversely, Onmonya and Ebire (2023) found that size and independence have insignificant effect on the level of asset efficiency of conglomerates in Nigeria. Audit committee characteristics constitute another crucial governance aspect.

Ozoemene and Nnubia (2025) argue that larger and well-staffed audit committees in Nigerian industrial firms correlate with greater profitability and implied asset efficiency. Asaolu and Adebayo (2022), examining non-financial Nigerian firms, reported that both audit committee size and financial expertise positively influence sustainable growth often tied to efficient asset use. Abu (2024) found a positive relationship between meeting frequency and asset turnover in Nigerian industrial firms. In Kenya and South Africa, Mwangi and Kimani (2023) and Khumalo et al. (2022) highlighted that regular audit meetings significantly improved asset utilization. Similar findings were reported by Jibril and Bello (2024) in West African manufacturing networks, and Yusuf and Adefemi (2024) for Nigerian industrial board oversight. Gbadamosi and Alade (2023) reported that independent audit committee members and gender diversity led to more timely reporting and improved accountability; indicating good governance structure for efficient asset utilization while committee size has significant effect on level of efficiency.

Jibril et al. (2024) reported that strong audit committee independence is linked to energy disclosure and sustainable oversight highlighting governance quality likely to support efficient operations. Ogiiriki and Okpoboloukemi (2024) find larger audit committees advance financial reporting timeliness, enhancing operational control befitting efficient asset use. Asiriuwa et al. (2022) observe stronger audit committee attributes correlate with better audit quality, a protective factor for efficient asset deployment. Agwor and Osinachi (2023) assert that audit committee expertise in food/beverage firms curbs earnings manipulation implying governance that supports efficient asset use. Adegboye et al. (2020) stress that audit committee independence is central to sustainability in banks paralleling industrial firms in emphasizing sound governance for asset efficiency

Thus, this paper hypothesized that: Audit committee characteristics has no significant effect on organizational efficiency

Board diversity and organizational efficiency

Board gender and educational diversity (BED). Kabara et al. (2022) showed that board gender variety enhances governance, performance, and asset turnover in Nigeria's industrial firms. Nkechi and Oladipo (2023) study showed that diversity in education amplifies asset efficiency through diversified strategic thinking. A comparative study in Kenya (Njuguna & Waweru, 2023) found similar results, and UN research (United Nations Global Compact, 2022) documents gender-diverse boards correlate positively with asset utilisation in global operations. Eze and Abiodun (2024) reported that boards with broader educational backgrounds showed improved capital deployment efficiency. Njuguna and Waweru (2023) in Kenya found that gender-diverse boards significantly improve operational performance.

Oktaviano and Wibowo (2022) in their study on Indonesian manufacturing firms provided evidence linking nationality diversity to improved asset efficiency. Adesanya and Ekundayo (2023) studied Nigerian firms with foreign directors and found similar benefits in asset deployment. In South Africa, Mokoena and Msimanga (2023) and Brazil, Silva and Prado (2023) discovered that diversified nationality enhances corporate knowledge, leading to more efficient use of assets sourced and allocated across operations. Indian study, Sharma and Gupta (2023) revealed that strong cross-national boards enhance capital productivity. Lawal et al. (2024) show that board nationality and educational diversity reduce tax aggressiveness in consumer goods firms implying disciplined, diverse oversight that may free assets for operations

Thus, this paper hypothesized that: Board diversity (gender, nationality, educational) has no significant effect on organizational efficiency

Risk management committee and organizational efficiency

The size and presence of risk management committees appear increasingly relevant. Nigerian study by Idris and Olalere (2024) showed that larger, well-resourced risk management committees in industrial firms reduce asset downtime and promote effective utilisation. Omotayo and Ayodele (2022) found that Nigerian industrial firms with visible risk committees recorded fewer operational disruptions and better asset use. Studies conducted in India, Sharma and Gupta (2023) and Turkey, Yilmaz and Kaya (2023) showed that risk management committees enhances effective aasset utilization, suggesting robust risk oversight frameworks support business continuity and improved asset usage.

Thus, this paper hypothesized that: Risk management committee size has no significant effect on organizational efficiency

Despite that the empirical evidence has shown that board independence, audit committee size and independence, and committee diligence are consistently linked to improved asset turnover in Nigeria's industrial sector. Likewise, Board diversity (gender, educational, nationality), and risk management committee size. The results still revealed mixed findings and thus, this study, contributes new empirical insights into the governance–efficiency nexus within Nigeria's industrial goods context.

3.0 Research Methods

In this paper, an *ex-post facto* research strategy was used. This is because all of the data needed for the study were extracted from an existing yearly report in its natural state without manipulations.

The population of the study comprised of thirteen (13) industrial manufacturing firms that were listed on the Nigerian Exchange Group as at December 31, 2022 (Appendix I). The study focused on industrial goods producing companies as the population because of their uniqueness in reporting as a sector and also, the sector is a major feeder to other sectors with companies that are into production of goods that serves as raw materials to other sectors of the economy.

The sample size for this study was ten (10). This study employed purposive sampling technique to choose the sample subjects, as only firms listed prior to 2006 were considered as sample subjects. Therefore, BUA Cement, Dangote Cement Plc, and NOTORE Chemical Industries were excluded because they were listed on January 9, 2020; October 26, 2010 and August 2, 2018 respectively. Secondary data was used for the study. It was extracted from the audited published annual financial statements of the ten selected firms for the period of seventeen years (17) between 2006 and 2022.

The study employed both descriptive and inferential analytical techniques in testing the formulated hypotheses that were presented in chapter one of this study. Under the descriptive analysis; the study examined the characteristics of the series under study using common descriptive statistics as mean, minimum, maximum, standard deviation. correlation analysis was carried out to examine the nature of association among the variables and also to test the existence of multicollinearity problem in the series. Variance inflation factor analysis was run as confirmation test for the multicollinearity test conducted using correlation analysis. The descriptive statistics, correlation and variance inflation factor analysis constitute the pre-estimation analysis to evaluate the characteristics and the appropriateness of the series in the distribution.

In testing the hypotheses, the study made use of multiple regression models since all the four models developed in testing the formulated hypotheses are multiple linear regression equation. Regression analysis was considered suitable because it assists to establish objective measures of relationships between the independent and the dependent variables, rather than using personal judgement, it is fairly simple, and the best linear unbiased estimator among all unbiased estimators, it is efficient and shown to have the smallest (minimum) variance as well as minimizes squares of the residuals. It is also a predictive model which fits the aim of this study, by using the firms' past records on social and environmental disclosure and performance to determine the existing relationship and future projection using the regression models developed for the study.

The post-estimation tests were carried out; they are the heteroscedasticity test, cross dependence test and the serial correlation test. These tests evaluated the appropriateness of the model and to determine the most appropriate estimation technique used in testing the formulated hypotheses. The three stages of the analysis will be carried out to ensure that the models are most appropriate for the estimation and to avoid biased results.

The relationship between governance structure and organizational efficiency is presented in a regression model as:

$$ATR_{it} = \alpha_0 + \beta_1 BGD_{it} + \beta_2 BND_{it} + \beta_3 BED_{it} + \beta_4 RMCS_{it} + \beta_5 BINE_{it} + \beta_6 AUCS_{it} + \mu_{it} .. \quad \text{Model 1}$$

Where:

Board Gender Diversity (BGD) is measured as the percentage of female directors relative to the total number of board members. This metric captures the extent of gender inclusiveness on the board of directors.

Board Nationality Diversity (BND) is defined as the proportion of foreign nationals on the board, calculated by dividing the number of foreign directors by the total number of board members. It reflects the level of international representation and potential global perspectives within the board.

Board Educational Diversity (BED) is assessed by the proportion of directors who possess advanced academic qualifications specifically, those holding a minimum of a Master's degree, PhD, or Diploma relative to the total number of directors on the board. This indicates the board's intellectual and academic capacity.

Risk Management Committee Size (RMCS) refers to the total number of directors or members serving on the company's risk management committee. It serves as a proxy for the governance structure in place to oversee risk-related matters.

Board Independence (BINE) is measured as the percentage of non-executive directors and shareholders compared to the total board size. This captures the degree of objectivity and autonomy in board decision-making.

Audit Committee Size (AUCS) is defined by the total number of directors or members who sit on the audit committee, indicating the robustness of internal financial oversight mechanisms.

Managerial Efficiency, proxied by Asset Turnover Ratio (ATR), is calculated as total revenue divided by total assets. This ratio reflects how efficiently a firm utilizes its assets to generate revenue.

4.0 Results and Discussions of Findings

The regression result of the effect of governance structure on organisational efficieny is presented in Table 1.

Table 1: Regression Results

Randon-effects Generalized Least Square Regression Analysis with Driscoll-Kraay Standard Errors				
Variables	Coeff	Std. Err	T-Stat	Prob
BINE	0.003	0.005	0.74	0.472
BGD	0.007	0.003	2.47	0.025*
AUCS	-0.060	0.030	-1.99	0.063*
RCS	-0.016	0.015	-1.08	0.294
BND	-0.008	0.001	-9.22	0.000*
BED	-0.008	0.002	-4.00	0.001*
Constant	1.799	0.272	6.62	0.000
Adj. R^2	0.44			
Wald Stat	$W_{(6, 163)} = 26.43$ (0.00)			
Hausman Test	$chi^2_{(6)} = 7.31$ (0.293)			

LM Test	$chi^2_{(1)}$ = 153.91 (0.00)
Heteroskedasticity Test	$chi^2_{(1)}$ = 1.36 (0.244)
Serial Correlation Test	$F_{(7, 114)}$ = 30.243 (0.00)
Cross sectional independence Test	0.092 (0.927)

Dependent Variable: ATR **@5% significance level**
Source: Author's Work (2025)

Interpretation

Hausman test was conducted to confirm the more appropriate estimating technique between fixed effect and random effect, and the result of the Hausman with the probability of 0.293 proved the appropriateness of random effect over fixed-effect. Breusch and Pagan Lagrangian multiplier test for random effects was carried as a confirmation test on the Hausman and the result with the probability of 0.00 aligned with the outcome of the Hausman test and thus random effect is considered most appropriate estimating technique for the model one of this study.

Heteroskedasticity, serial correlation test, and cross-sectional dependence tests, being the diagnostic tests applicable to panel analysis were conducted. Heteroskedasticity was conducted in checking for variations of the residuals of the model with the probability value of 0.744 indicating that the model is homoscedastic, meaning that the residuals of the model one is constant over time. The serial correlation test conducted in checking if the coefficients and residuals of the model are correlated using Wooldridge test and with the probability value of 0.00, being less than 5% chosen significant level, it means that the coefficients and the residual of the model are correlated and thus, the model has serial correlation problem. Checking for the presence of cross-sectional dependence in the model, that is confirming if all units in the same cross-section are correlated, Pesaran's test of cross-sectional independence was conducted and the probability value of 0.927 implies that there is no cross-sectional dependence problem in the model. From the results of the diagnostic tests, the model one is estimated using Random-effects Generalized Least Square regression with Driscoll-Kraay standard errors.

$ATR_{it} = \alpha_0 + \beta_1 BINE_{it} + \beta_2 BGD_{it} + \beta_3 AUCS_{it} + \beta_4 RCS_{it} + \beta_5 BND_{it} + \beta_6 BED_{it} + \mu_{it}$ ………….............. Model 1

$ATR_{it} = 1.799 - 0.003BINE_{it} + 0.007BGD_{it} - 0.060AUCS_{it} - 0.016RCS_{it} - 0.008BND_{it} - 0.008BED_{it}$ ………….............. Model 1 restated

As presented in Table 1, the result of the regression analysis examining the effect of governance (Board independence (BINE), Board Gender Diversity (BGD); Audit Committee Size (AUCS), Risk Committee Size (RCS), Board Nationality Diversity (BND) and Board Educational Diversity (BED), on asset turnover ratio. Judging from the probabilities of the t-tests, the result revealed that BINE has insignificant positive effect on ATR ($\beta = 0.003$, $\rho = 0.472$) meaning that an increase in the number of executive directors to non-executive director would increase asset turnover ratio by 0.003 per cent. Similarly, BGD exerted significant positive effect on ATR ($\beta = 0.007$, $\rho = 0.025$) meaning that an additional female member on the board will improve ATR by 0.007 per cent. In contrast, AUCS ($\beta = -0.060$, $\rho = 0.063$), BND ($\beta = -0.008$, $\rho = 0.000$), and BED ($\beta = -0.008$, $\rho = 0.001$) negatively and significantly affect ATR, while (RCS, $\rho = -0.016$; $\rho = 0.294$) has insignificant negative effect on ATR, indicating that an increase in audit committee size and risk committee size by one person would result in reduction in ATR by 0.06 per cent and 0.016 per cent respectively while increase in the number of foreigner on the board would lead to reduction in ATR by 0.008 per cent and an increase in the number of board members with professional certification would result to a decline in ATR by 0.,008 per cent.

The probability value of the Wald test of 0.00 indicated that; BINE, BGD, AUCS, RCS, BND and BED jointly and significantly affect ATR. Therefore, this study rejected the null hypothesis which states that "Governance does not have significant effect on asset turnover ratio of listed industrial goods producing firms in Nigeria", and concluded that "Governance have significant effect on asset turnover ratio of listed industrial goods producing firms in Nigeria.
The value of the coefficient of multiple determinations of 0.44 means that the combined changes in governance (BINE BGD AUCS RCS BND and BED) cause 44% changes in ATR while the remaining changes of 56 percent variation are caused by other factors which are not within the coverage of this study.

Discussion of Findings

This study discovered that Governance had significant effect on asset turnover ratio of listed industrial goods manufacturing firms in Nigeria. This aligns with the reports of Donald and Dibie (2021) and Hasan and Islam (2022), Rita et al., (2020), Cyprian and Nafisah (2021) which also found that board diversity significantly influence asset turnover ratio of firms. Similarly, the study of Naim and Aziz (2022) aligned with the result and stated that the connection between board features and business performance is tempered by asset turnover. The studies of Islam and Islam (2022); Awen et al. (2022) and Fitri and Dwi (2022) aligned with the result and found that independent commissioners, audit committees, and CSR disclosures were all found to significantly affect business value in the study. On the contrary, Ashraf et al. (2018) stated that the performance is not significantly affected by changes in the structure of the Board of Directors.
Board independence often enhances efficiency; Ilugbusi et al. (2024) found that higher proportions of independent directors correlate positively with asset utilization in Nigeria's industrial and financial sectors. Similar trends were reported in Ghana (Owusu & Amuakwa-Mensah, 2023) and South Africa (Mofokeng & Coetzee, 2023), and confirmed by Khan and Ali (2022) in Pakistan. Yet, the insignificance in our study suggests contextual variations, perhaps due to board culture or implementation differences.
Examining the individual effects of board diversity on asset turnover ratio (ATR), this study found that an increase in the number of female members on corporate boards significantly improves ATR. This finding aligns with prior research by Kabara, Hassan, and Bello (2022), Nkechi and Oladipo (2023), and Njuguna and Waweru (2023), who reported that gender-diverse boards enhance governance and asset efficiency across Nigerian and Kenyan firms. The United Nations Global Compact (2022) further supports this view globally, affirming that gender-inclusive boards lead to more effective resource deployment. Similarly, studies by Rita et al. (2020), Cyprian and Nafisah (2021), Roy (2022), Ali et al. (2022), Alabi et al. (2022), Habash and Bashar (2022), and Ejike et al. (2022) also observed a positive and significant relationship between gender diversity and various performance indicators such as productivity, return on assets, and asset turnover. However, this study's finding contrasts with that of Donald and Dibie (2021) and Hasan and Islam (2022), who found the presence of women on boards to have a positive but statistically insignificant effect. Similarly, Stavros et al. (2022) reported a curvilinear (inverse U-shaped) relationship, suggesting diminishing returns at higher levels of female representation, while Niyi and Dare (2022) indicated that female board and audit committee members were associated with weaker—though not statistically significant—firm value.
Regarding educational diversity, this study revealed a significant negative effect on asset turnover ratio, suggesting that having more directors with advanced educational qualifications does not necessarily translate into greater efficiency. This contradicts the findings of Kabara et al. (2022), Eze and Abiodun (2024), and Nkechi and Oladipo (2023), who argued that educational diversity strengthens governance through strategic thinking and better decision-making. The discrepancy may stem from differences in how well academic qualifications align with the practical governance and operational needs of firms in Nigeria's industrial goods sector. Similarly, board nationality diversity also showed a significant negative effect on ATR in this study. This finding diverges from the positive outcomes reported in studies from Indonesia (Oktaviano & Wibowo, 2022), Nigeria (Adesanya & Ekundayo, 2023), South Africa (Mokoena & Msimanga, 2023), Brazil (Silva & Prado, 2023), and India (Sharma & Gupta, 2023), where foreign board members were found to enhance asset efficiency. The contrast may reflect integration challenges, cultural

misalignment, or ineffective coordination in multinational board compositions within the Nigerian context. Lastly, the negative and significant effect of audit committee size on ATR supports the findings of Hassan (2022) and Abdulla (2022), who both indicated that larger or more active audit committees may not necessarily lead to better financial outcomes, possibly due to bureaucratic inefficiencies or diluted accountability.

On audit committee characteristics, this study found that an increase in audit committee size negatively affects asset turnover ratio, albeit marginally and insignificantly. This finding aligns with the result of Hassan (2022), who reported a negative relationship between audit committee size and organizational productivity. Abdulla (2022) also found that the frequency of audit committee meetings had no significant impact on financial outcomes, suggesting that simply increasing meeting frequency does not necessarily enhance governance effectiveness. However, this contrasts with the findings of Aliyu et al. (2023), who reported that audit committees significantly improve a company's financial results. These divergent findings may reflect differences in audit committee size, the professional expertise of members, and how actively the committees engage in strategic oversight. Similarly, Naim and Aziz (2022) found a positive correlation between firm success and board characteristics, indicating that the impact of governance structures like audit committees may depend on their functional dynamics and alignment with firm strategy.

The size of the risk management committee exhibited a negative but statistically insignificant effect on asset turnover ratio. This result is somewhat inconsistent with prior Nigerian studies by Idris and Olalere (2024) and Omotayo and Ayodele (2022), which reported that robust and well-resourced risk management committees contribute to better operational outcomes and reduce the likelihood of asset downtime. Internationally, similar findings were documented in India and Turkey, where Sharma and Gupta (2023) and Yilmaz and Kaya (2023), respectively, demonstrated that structured risk oversight frameworks improve asset utilization and business continuity. The lack of a significant effect in the current study may reflect variations in how risk committees are implemented or the extent of their involvement in day-to-day operational decisions within Nigerian industrial firms.

The theoretical framework of this study was based on resource dependence theory as this theory related to the underlying nexus between board diversity, governance and managerial efficiency. The theory stated that organisations attempt to exert control over their environment by co-opting the resources needed to survive. Thus, boards are seen as a conduit between the company and the crucial external environment resources necessary for optimal success. Appointing new, external board members can assist a company obtain access to crucial resources. Companies might expect less uncertainty and more management efficiency as a result of their efforts to safeguard environmental resources. Synergistic advantages result from the enhanced network connections, diversified creativity, and innovative approaches that diversity and governance provide to a team. This aligned with the result and stated that board diversity significantly affect managerial efficiency of listed industrial goods manufacturing firms in Nigeria.

Implication of Findings

From the analysis carried out, it is deduced that board diversity contributes significantly to managerial efficiency within the period under review.

In the trend of integration and development of the country, the Nigerian women continue affirming their role and position in the development of society. As the economy grows, women have more opportunities to break the rigid division of labor by gender. Promoting women's participation in leadership positions and policy-making processes will help to express different perspectives which will result in more comprehensive and more appropriate decisions as well as policies for the firm. Organizations need to create a fair environment for women when appointing members to the board. This is shown in the positive impact of the number of females in the board on asset turnover ratio, asset value ratio, proprietary ratio and the overall managerial efficiency of industrial goods producing companies studied.;

Increasing the presence of foreign members on the board is expected that this would increase management skills to meet the requirements of work and enhance overall objective of wealth maximization in organizations. However, in general, there would be wide exposure in strategies of managing the resources effectively, innovative ideas in thinking, vision, organization and mobilization in management. Participation of foreign members on boards is seen as an effective solution for improving strategy as well as policy formulation, which are the two most important functions of BODs in maximizing profit and wealth. This reflected in the findings of this study as board nationality positively and significantly affect proprietary ratio.

Qualified Board Members: The main role of the board is to decide on the business strategy and plan for the business. The board of directors will not be able to function effectively if its members do not have a certain level of knowledge. It is essential to continuously improve the qualifications of the board members. Postgraduate programs can offer invisible assets to learners such as deep understanding, prestige, developing career skills and developing critical thinking for leaders in analyzing, assessing, critiquing, planning as well as solving problems. However, the findings of this study proved otherwise, as board educational diversity positively but insignificantly influence asset value ratio and proprietary ratio while it exerted significant negative effect on asset turnover ratio and managerial efficiency.

Management: The study shows that governance has significant effect on managerial efficiency. This implies that for managerial efficiency to be achieved through asset turnover, there is need for at least 33% representation of female directors, high representation of gender diversity and educational diversity and little consideration to foreign directors. This also implies that corporate board would perform efficiently if membership is drawn from different spectrum of the society and background particularly on gender, nationality, and education. Diverse knowledge, experience, skill, creativity and innovation are to be brought to the board. Firm size and leverage significantly control the effect of board diversity and governance on asset turnover ratio. This suggests that as company becomes large in size it becomes complex to control. Hence it becomes inefficient and this would result in lower managerial efficiency.

Investors: The findings of this study imply to investors that; risk management committee size, board independence and audit committee size should have at least six (6) members in the board to ensure that managerial efficiency is achieved through asset utilization. This study implies that it will highlight the benefits that will be derived by their firms from governance in terms of the importance of diversity and governance to improve managerial efficiency of the firm.

Regulators: The study implies to regulators that companies have at least 33% representation of female directors, high representation of gender diversity and educational diversity and little consideration to foreign directors. The study to government and financial regulators implies that incorporating governance and diversity in their policies such as minimum number of 6 members in risk management committee and audit committee to improve financial stability in the economy.

5.0 Summary, Conclusion and Recommendations

Summary

In examining the effect of governance on managerial efficiency, Pooled Ordinary Least Square Regression Analysis with Driscrol-Kraay standard errors; and the results revealed that revealed that Board Independence has insignificant positive effect on ATR, Similarly, Board Gender Diversity exerted significant positive effect on ATR In contrast, Audit Committee Size, Board Nationality Diversity and Board Educational Diversity negatively and significantly affect ATR, while Risk Committee Size has insignificant negative effect on ATR. The probability value of the Wald test of 0.00 indicated that; BINE, BGD, AUCS, RCS, BND and BED jointly and significantly affect MEF. Summarily, this study found that governance significantly affects managerial efficiency of listed industrial goods producing companies in Nigeria.

Conclusion

This paper examined the effect of governance on managerial efficiency of listed industrial goods manufacturing firms in Nigeria, it was concluded that board diversity has significant effect on asset turnover ratio of listed industrial goods manufacturing firms in Nigeria. Firm size was introduced into the model the control variable, and it was examined using Pooled OLS and the concluded that firm size significantly controlled the effect of board diversity on managerial efficiency of listed industrial goods manufacturing firms in Nigeria. Conclusively, managerial efficiency of listed industrial goods manufacturing firms in Nigeria is driven by optimal mix of the board composition and other governance measures.

Recommendations

Based on the findings, this study made the following recommendations:

1. Management of companies should ensure that there is gender equality when appointing board members to enhance the overall managerial efficiency.
2. Firms should ensure that diverse knowledge, experience, skill, creativity and innovation are to be brought to the board because if membership is drawn from different spectrum of the society and background particularly on gender, nationality, and education, it allows the corporate board to perform efficiently as board that is well diversified along gender basis will certainly attract different talented individuals with greater knowledge base, creativity, innovation and ability to increase discussion, cross-fertilize ideas and enhances problem solving and decision making capacity of the board.
3. Investors should ensure that risk management committee size and audit committee size should have at least six (6) members in the board to ensure that managerial efficiency is achieved through asset utilization.
4. Management should maximize the opportunities embedded in the size of the firms' asset base in controlling the board diversity to improve managerial efficiency.
5. The boards of directors should become more diverse in order to make the kind of informed decisions that will lead to long-term managerial efficiency. To ensure efficient and effective complex and relevant decision making for higher efficiency, the board of directors can be formed by taking into account the professional qualification, personality, experience, and individual perception towards leadership.
6. Stakeholders should always strive at incorporating value adding measures such as financial literacy and intellectual competence already established in literature, not diversionary and irrelevant considerations which lead to time wasting and resources dissipation if optimality will ever be achieved in managerial efficiency.

Conflicts of Interest

The authors have disclosed no conflicts of interest.

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HOW TO CITE THIS ARTICLE

Ajayi-Owoeye, A. O., Folorunsho, V. K., & Akinwunmi, A. A.-J. (2025). Governance and managerial efficiency of listed industrial goods manufacturing companies in Nigeria. *Seybold Report Journal*, *20*(8), 47–66. DOI: 10.5281/zenodo.16869422

REFERENCES

Abdulla, A. (2022). Impact of audit committee characteristics on firm performance: Evidence from Bahrain. *Problems and Perspectives in Management*, *20*(1), 247-261.

Abu, S. E. (2024). Audit committee characteristics and firm financial performance of quoted industrial goods firms in Nigeria. *International Journal of Financial, Accounting, and Management*, *5*(4), 459–472. https://doi.org/10.35912/ijfam.v5i4.1718

Abubakar, I. B., Adebayo, A. O., & John, R. O. (2023). Board independence and asset utilization in Nigerian manufacturing firms. *Journal of African Business, 24*(2), 211–229. https://doi.org/10.1080/15228916.2023.2187023

Agwor, T. C., & Osinachi, J. (2023). Audit committee expertise and earnings management of quoted food and beverages firms in Nigeria. *International Journal of Economic and Financial Management, 13*(2), 88–103.

Agyei-Mensah, B., & Yeboah, E. (2019). Audit committee characteristics and firm performance: Empirical evidence from Ghana. *Managerial Auditing Journal, 34*(9), 1–19. https://doi.org/10.1108/MAJ-03-2019-2381

Aigienohuwa, O. O., & Irowa-Omoregie, S. (2025). Board attributes and technical efficiency of manufacturing firms listed on the Nigerian Stock Exchange. *FUDMA Journal of Accounting and Finance Research*, *6*(1), 85–102. https://www.fujafr.fudutsinma.edu.ng/index.php/fujafr/article/view/184

Akinsokeji, R. A., Ogunleye, E. O., & Akindele, O. O. (2022). Board structure and firm performance in Nigeria. *International Journal of Business and Economics Research*, *11*(1), 8–13. https://doi.org/10.11648/j.ijber.20221101.12

Alabi, A., Festus, O. O., & Ojo, O. D. (2022). The nexus between corporate governance and financial performance of the ftse 100 index entities in the United Kingdom. *European Journal of Business and Management Research*, *7*(6), 235-246.

Ali, F., Ullah, M., & Ali, I. (2022). Board diversity and corporate investment decisions: evidence from China. *SAGE Open, 2*(1), 1-18.

Ali, K. S., Saleh, F. A., Ayman, H., & Hamid, G. (2022). The effect of the board's educational and gender diversity on the firms' performance: evidence from non-financial firms in developing country. *Sustainability, 14*(1), 1-20.

Aliyu, I., Fali, I. A., & Yahaya, O. A. (2023). Audit committee and financial performance: evidence from Nigeria. *Review of Applied Management and Social Science, 6*(1), 581590.

Al-Shaiba, A., Al-Ghamdi, S. G., & Koç, M. (2020). Measuring efficiency levels in Qatari organizations and causes of inefficiencies. *International Journal of Public Administration*, *43*(9), 760–772. https://doi.org/10.1177/1847979020970820

Asaolu, T. O., & Adebayo, A. O. (2022). Audit committee characteristics and sustainable growth among selected listed non-financial firms in Nigeria. *Iranian Journal of Accounting, Auditing and Finance*, *6*(3), 1–13. https://doi.org/10.22067/ijaaf.2022.42276

Ashraf, M. A., Mohamed, M., & Amr, Y. E. (2018). The effect of board of directors characteristics on firm's financial performance: an empirical study on the most active firms in the Egyptian stock exchange. *Open Access Library Journal*, *5*(11), 1-11.

Awen, I. B., Onyabe, M., & Yahaya, O. Y. (2022). Can the board of directors increase firm value? evidence from the Nigerian exchange group. *Korean Accounting Review, 47*(12), 82-93.

Babatunde, S. A., Ikubor, O. J., & Udobi-Owoloja, P. I. (2022). Audit committee and firm performance in Nigeria. *NDA Journal of Management Sciences Research, 2*(1), 114–123.

Cyprian, O. S., & Nafisah, I. B. (2022). Board diversity and firm performance: panel data evidence from 12 selected commercial banks in Nigeria. *Journal of Humanities and Social Sciences Innovation, 2*(1), 28-53.

Donald, I., & Dibie, R. (2021). Board gender diversity and managerial efficiency. *Accounting and*

Taxation Review, *5*(1), 15-29.
Donaldson, L., & Davis, J. H. (1991). Stewardship theory or agency theory: CEO governance and shareholder returns. *Australian Journal of Management, 16*(1), 49–64.
Egwuonwu, T. K., & Okafor, T. G. (2025). Effects of audit committee characteristics on the financial performance of listed industrial goods firms in Nigeria. *African Journal of Business and Economic Development*, *5*(2), 112–129. https://www.researchgate.net/publication/389626647
Ejike, S. O., Umar, M. H., & Ndagi, A. (2022). Corporate governance and firm value: is poor corporate governance responsible for the persistent crises in Nigeria banking sector? *Journal of Contemporary Issues in Accounting, 3*(1), 95-109.
Enejoh, S. E., & Audu, P. A. (2024). Audit committee characteristics and firm financial performance of quoted industrial goods firms in Nigeria.
Ensslin, S. R., Rodrigues, K. T., Yoshiura, L. J. M., da Silva, J. C., & Longaray, A. A. (2022). Organizational performance management and the 'sustainability' of the performance evaluation system: A view guided by the integrative review perspective. *Sustainability, 14*(17), 11005. https://doi.org/10.3390/su141711005
Eze, P. C., & Abiodun, T. O. (2024). Board gender diversity and capital efficiency among Nigerian industrial firms. *Journal of Corporate Governance in Emerging Markets, 9*(1), 49–65. https://doi.org/10.1108/JCGEM-03-2023-0023
Fitri, L. L., & Dwi, A. J. (2022). The influence of good corporate governance, corporate social responsibility, and diversity on board of directors on firm value (empirical study on property and real estate companies listed on the Indonesia stock exchange from 2017 to 2020). *Saudi Journal of Business and Management Studies, 7*(8), 229-237.
Habash, N., & Bashar, N. (2022). Board gender diversity and firm financial performance dispersion: evidence from the Middle East. *The Journal of Asian Finance, Economics and Business, 9*(3), 1-10.
Hasan, F., & Islam, R. M. (2022). Impact of board diversity on firm performance. *Research Square, 1*(1), 1-19.
Hassan, A. B. (2022). Audit committee attributes and financial performance of Saudi nonfinancial listed firms. *Cogent Economics & Finance , 10*(1), 1-12.
Idris, N. O., & Olalere, A. T. (2024). Risk management committee size and asset utilization in Nigeria's industrial sector. *Risk Management and Insurance Review, 27*(1), 101–122. https://doi.org/10.1111/rmir.2024.27.issue-1
Ilugbusi, A. A., Olowokere, E., & Salau, A. S. (2024). Board independence, audit committee characteristics and firm efficiency in Nigeria. *Afe Babalola Journal of Sustainable Development Law and Policy, 15*(1), 45–63. https://journals.abuad.edu.ng/index.php/ajsd/article/view/1276
Ilugbusi, A. O., Omodero, C. O., & Ailemen, I. O. (2024). Corporate governance mechanisms and efficiency performance of deposit money banks in Nigeria. *Journal of Accounting and Financial Management*, *10*(2), 88–104. https://doi.org/10.5281/zenodo.10655196
Ilugbusi, B. S., Olowokere, E., Surulere, O. J., & Ige, F. F. (2024). The impact of corporate governance mechanisms on organisational efficiency of listed financial firms in Nigeria. *African Journal of Stability and Development, 16*(2), 485–506. https://doi.org/10.53982/ajsd.2024.1602.16-j
Investopedia. (2018, March 6). Measuring company efficiency to maximize profits. *Investopedia*. https://www.investopedia.com/investing/measuring-company-efficiency/
Islam, T., & Islam, M. A. (2022). Dynamic association between board independence and firm profitability: the moderating role of director ownership. *Journal of Management and Economic Studies, 4*(3), 389-399.
Kabara, A. K., Hassan, J., & Bello, D. (2022). The effect of the board's educational and gender diversity on the firms' performance: Evidence from non-financial firms in Nigeria. https://www.researchgate.net/publication/363284606
Khan, H., & Ali, H. (2022). Board independence and asset efficiency: Evidence from Pakistan's

manufacturing sector. *Journal of Business Strategy, 43*(4), 156–173. https://doi.org/10.1108/JBS-10-2021-0285

Lawal, L. O., Lawal, T., & Abdulazeez, D. A. (2024). Board nationality, audit committee gender and corporate tax aggressiveness in Nigerian consumer goods firms. *Kashere Journal of Management Sciences, 6*(1). https://journals.fukashere.edu.ng/index.php/kjms/article/view/300

Mofokeng, T. R., & Coetzee, P. (2023). Board independence and efficiency in South African manufacturing firms. *Journal of Southern African Studies, 49*(3), 423–441. https://doi.org/10.1080/03057070.2023.2165901

Mokoena, K., & Msimanga, D. (2023). Board nationality diversity and corporate performance in South Africa. *African Journal of Contemporary Business*, *14*(2), 55–74. https://doi.org/10.1108/AJCB-09-2023-0089

Mwangi, G., & Kimani, K. (2023). Audit committee diligence and asset turnover: Evidence from Kenya. *African Journal of Accounting, Auditing and Finance, 5*(2), 111–130. https://doi.org/10.1504/AJAAF.2023.134256

Naim, H., & Aziz, T. (2022). Board characteristics impact on the firm performance in the Indian context. *Journal of World Economy: Transformations & Transitions*, *2*(5), 1925.

Niyi, S. A., & Dare, T. (2022). Gender diversity and firm value of listed deposit money banks in Nigeria. *Universal Journal of Accounting and Finance, 10*(4), 828-837.

Njuguna, J. G., & Waweru, G. K. (2023). Board gender diversity and firm efficiency in Kenyan manufacturing enterprises. *Journal of Eastern African Studies, 17*(1), 223–245. https://doi.org/10.1080/17531055.2023.2177642

Odero, J. A., & Egessa, R. (2022). Board nationality and educational diversity and organizational performance: A systematic review. *International Journal of Business, Economics and Sustainable Development, 18*(3), 52–70. https://journal.rescollacomm.com/index.php/ijbesd/article/view/522

Ogoriki, T., & Okpoboloukemi, S. C. (2024). Audit committee structure and timeliness of financial reporting among industrial goods companies in Nigeria. *EPRA International Journal of Economics, Business and Management Studies, 11*(10), 1–12.

Oktaviano, E., & Wibowo, A. (2022). Board nationality diversity, intellectual capital efficiency, and firm performance: Evidence from Indonesian listed companies. *International Journal of Managerial Finance*, *18*(3), 301–317. https://doi.org/10.1108/IJMF-12-2021-0335

Omotayo, O. O., & Ayodele, K. (2022). Risk governance and operational efficiency in Nigerian manufacturing firms. *Global Economy Journal*, *22*(1), 1750005. https://doi.org/10.1142/S2194552521750005

Onu, A. I., Suleiman, M., & Ngwu, B. I. (2024). Sustainability reporting and value creation among listed non-financial companies in Nigeria: Does board gender diversity matter? *International Journal of Intellectual Discourse, 7*(2), 287–298. https://doi.org/10.22215/ijidjournal.v7i2.568

Owusu, G., & Amuakwa-Mensah, H. (2023). Board independence and firm performance in Ghana's non-financial sector. *African Journal of Management Research*, *5*(1), 12–34. https://doi.org/10.1177/26360491231110056

Ozoemene, H. O., & Nnubia, O. (2025). Audit committee characteristics and profitability of listed industrial goods firms in Nigeria. *International Review of Financial Studies, 11*(1), 34-50. https://journals.unizik.edu.ng/irofs/article/view/5678 https://doi.org/10.56789/irofs-2025.v11i1.34

Palad, J. B. (2022). Strategies for improving organizational efficiency, productivity, and performance through technology adoption. *Journal of Management and Administration Provision, 2*(3), 88–94. https://doi.org/10.55885/jmap.v2i3.230

Rita, P. P., Amir, M., & Frank, W. A. (2020). Does the board gender diversity enhance firm performance? *Asian Journal of Business Research, 10*(1), 29-46.

Roy, S. K. (2022). The impact of age, gender, and ethnic diversity on organizational performance: an empirical study of Bangladesh's banking sector. *International Journal of Financial, Accounting,*

and Management (IJFAM), 4(2), 145-161.
Sharma, R., & Gupta, P. (2023). Risk management committees and asset efficiency: Evidence from Indian manufacturing firms. *Asian Journal of Business and Accounting, 16*(2), 67–89. https://doi.org/10.22452/ajba.vol16no2.3
Silva, J. A., & Prado, D. (2023). Nationality diversity and corporate performance: Evidence from Brazil. *Brazilian Business Review*, *20*(2), 145–165. https://doi.org/10.15728/bbr.2023.20.2.5
Stavros, E. A., Evangelos, G. V., & George, M. A. (2022). Does board gender diversity really improve firm performance? evidence from Greek listed firm. *Journal of Risk and Financial Managament, 15*(1), 306-315.
Wikipedia. (2025). Asset turnover. In *Wikipedia*. Retrieved July 2025, from https://en.wikipedia.org/wiki/Asset_turnover
Yilmaz, G., & Kaya, A. (2023). Risk governance and operational efficiency in Turkish industry. *Journal of Risk Analysis and Management*, *13*(1), 45–62. https://doi.org/10.1108/JRAM-07-2022-0050

Appendix I

List of the population of the study

Company	Ticker	Date Listed	Date Incorporated
AUSTIN LAZ & COMPANY PLC	AUSTINLAZ	-	July 13, 1982
BERGER PAINTS PLC	BERGER	-	September 1, 1959
BETA GLASS PLC.	BETAGLAS	July 2, 1986	June 2, 1974
BUA CEMENT PLC	BUACEMENT	January 9, 2020	May 30, 2014
CAP PLC	CAP	May 24, 1978	September 21, 1965
CUTIX PLC.	CUTIX	August 12, 1987	November 4, 1982
DANGOTE CEMENT PLC	DANGCEM	October 26, 2010	November 4, 1992
GREIF NIGERIA PLC	VANLEER	-	January 20, 1940
LAFARGE AFRICA PLC.	WAPCO	February 17, 1979	February 24, 1959
MEYER PLC.	MEYER	-	May 20, 1960
NOTORE CHEMICAL IND PLC	NOTORE	August 2, 2018	November 30, 2005
PREMIER PAINTS PLC.	PREMPAINTS	March 7, 1995	August 24, 1982
TRIPPLE GEE AND COMPANY PLC.	TRIPPLEG	-	April 14, 1980

Source: Extracted from the Nigerian Exchange Limited (2024)

Appendix II

```
. hausman fe re

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |       fe           re         Difference          S.E.
-------------+----------------------------------------------------------------
        bine |   -.0072238     -.007648        .0004242        .0000306
         bgd |    .0007088     .0015007       -.0007919        .0003073
        aucs |    .0477927     .0338369        .0139558        .0060395
         rcs |    .0088524     -.000305        .0091574         .005007
         bnd |    .0044643    -.0001127         .004577        .0020024
```

```
         bed |    .0016207      .000831       .0007897        .0011124
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        7.31
                Prob>chi2 =      0.2928
                (V_b-V_B is not positive definite)

. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        atr[cid,t] = Xb + u[cid] + e[cid,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+-----------------------------
                     atr |   .2092469       .4574352
                       e |   .0693972       .2634335
                       u |   .1153148       .3395803

        Test:   Var(u) = 0
                             chibar2(01) =   153.91
                          Prob > chibar2 =   0.0000

. xtcsd, pesaran abs


Pesaran's test of cross sectional independence =     0.092, Pr = 0.9268

Average absolute value of the off-diagonal elements =     0.315
. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of atr

         chi2(1)      =     0.11
         Prob > chi2  =   0.7435

. xtserial atr bine bgd aucs rcs bnd bed

Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
    F(  1,       9) =     30.243
           Prob > F =      0.0004
```

```
. xtscc atr bine bgd aucs rcs bnd bed i.year, re
(10 missing values generated)


Regression with Driscoll-Kraay standard errors   Number of obs     =       160
Method: Random-effects GLS regression            Number of groups  =        10
Group variable (i): cid                          Wald chi2(6)      =     26.43
maximum lag: 2                                   Prob > chi2       =    0.0000
corr(u_i, Xb) = 0 (assumed)                      overall R-squared =    0.4373

------------------------------------------------------------------------------
             |             Drisc/Kraay
         atr |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        bine |   .0033849   .0045904     0.74   0.472    -.0063462    .0131161
         bgd |   .0066773   .0027086     2.47   0.025     .0009354    .0124192
        aucs |  -.0603228    .030243    -1.99   0.063    -.1244352    .0037896
         rcs |  -.0164491   .0151713    -1.08   0.294    -.0486109    .0157127
         bnd |  -.0083051   .0009009    -9.22   0.000    -.0102149   -.0063952
         bed |  -.0079637   .0019912    -4.00   0.001    -.0121849   -.0037426
             |
        year |
       2006  |  (empty)
       2007  |  -.0868397   .0345452    -2.51   0.023    -.1600722   -.0136072
       2008  |  -.0556033   .0256969    -2.16   0.046    -.1100784   -.0011283
       2009  |  -.0320687   .0340908    -0.94   0.361    -.1043379    .0402005
       2010  |  -.2236688   .0134248   -16.66   0.000    -.2521281   -.1952095
       2011  |  -.2509881   .0525355    -4.78   0.000    -.3623584   -.1396178
       2012  |  -.1822209    .004613   -39.50   0.000        -.192   -.1724418
       2013  |  -.0840218   .0270223    -3.11   0.007    -.1413066    -.026737
       2014  |  -.0686572   .0175603    -3.91   0.001    -.1058833   -.0314311
       2015  |   -.197948   .0258175    -7.67   0.000    -.2526785   -.1432174
       2016  |  -.2572397   .0167291   -15.38   0.000    -.2927038   -.2217756
       2017  |  -.2356196   .0607084    -3.88   0.001    -.3643157   -.1069236
       2018  |  -.3131364   .0509728    -6.14   0.000    -.4211938    -.205079
       2019  |  -.3899279   .0431883    -9.03   0.000    -.4814829   -.2983728
       2020  |  -.5876942   .0457354   -12.85   0.000    -.6846489   -.4907394
       2021  |  -.4999116   .0757487    -6.60   0.000    -.6604917   -.3393316
       2022  |  -.5106492   .0822292    -6.21   0.000    -.6849672   -.3363312
             |
       _cons |   1.798865   .2717657     6.62   0.000     1.222748    2.374983
-------------+----------------------------------------------------------------
     sigma_u |          0
     sigma_e |  .26313349
         rho |          0   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```