

EFFECT OF FIRM CHARACTERISTICS ON FINANCIAL PERFORMANCE OF LISTED INDUSTRIAL FIRMS IN NIGERIA

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ABSTRACT: This study examined the effect of firm characteristics on the financial performance of listed industrial firms in Nigeria, covering a ten-year period from 2015 to 2024. The study specifically investigated the influence of firm size, firm age, and leverage on financial performance, measured by return on assets (ROA). The population comprised all industrial firms listed on the Nigerian Exchange Group, while a purposive sampling technique was employed to select five firms: Berger Paints Plc, Beta Cement Plc, Dangote Cement Plc, Lafarge Africa Plc, and Premier Paints Plc. Secondary data were obtained from the annual reports of the sampled firms, and an ex-post facto research design was adopted. Data analysis was carried out using descriptive statistics and Pooled Ordinary Least Squares (OLS) regression technique. The results revealed that firm size has a positive but statistically insignificant effect on ROA, while firm age and leverage have statistically significant negative effects on ROA. The study concluded that although larger firm size may enhance performance, excessive firm age and high leverage levels tend to reduce profitability. It was recommended that industrial firms adopt efficient capital structure management practices and maintain operational flexibility to sustain financial performance over time.

Keywords: Firm Characteristics, Financial Performance, Return on Assets, Panel Data, Industrial Firms, Nigeria

INTRODUCTION

In recent years, the business landscape in Nigeria has undergone significant transformations, with industrial firms playing a pivotal role in the nation's economic growth and development. As these firms navigate a complex mix of local and global challenges, understanding the factors that drive their financial performance has become crucial for both business managers and policymakers. One of the most important aspects influencing a firm's financial success is its unique characteristics such as size, age, ownership structure, capital structure, and the industry in which it operates. The industrial sector in Nigeria, comprising manufacturing, construction, and other production-based companies, is key to driving national economic growth, employment, and innovation. However, despite the sector's potential, many firms still face hurdles that affect their profitability and long-term sustainability. By examining how variables like firm size, age, capital structure, and management practices impact financial outcomes, this research aims to provide valuable insights into the factors that either propel or hinder the performance of industrial firms in Nigeria. Understanding these influences can assist Nigerian industrial firms in optimizing their operations, making informed strategic decisions, and improving their competitive position within both domestic and international markets.

Similarly, financial performance refers to how well a firm can generate revenues relative to its expenses and other relevant costs over a specified period. It is a key measure used by businesses, investors, and analysts to assess the overall financial health and success of an organization. It is interaction between a company's resources, structure, and environment (Amenyawy Perah & Anowo, 2021). In today's dynamic business environment, the financial performance of a firm is a critical indicator of its overall success and sustainability. Understanding the factors that influence this performance is crucial for both business leaders and investors. Some common financial performance indicators are measured in terms of profitability which include: Return on assets, sales revenue, return on investment, return on capital employed, earnings per share, and net profit after tax. Moreover, this study uses return on assets (ROA) as a proxy of financial performance. This financial indicator reflects the firm's ability to generate profits relative to its resources and investments, providing insights into its financial health and sustainability (Garcia & Lee, 2023).

However, firm characteristics have a great impact on the activities of companies that can be controlled endogenously, helping to achieve the organization's set objectives. Firm characteristics refer to the internal attributes or features of an organization that distinguish it from others. These characteristics can be tangible or intangible and can influence a firm's behavior, performance, and competitiveness. Some common firm characteristics includes; Firm Size, Firm Age, liquidity, Industry and Market, Ownership Structure, Management Structure. For this research, firm characteristics will be measured using firm size, firm age and leverage. Firm size reflects how they evolve and adapts to its environment. Changes in size are therefore extremely important event in firm demography (Wissen, 2002). It helps classify companies into categories such as micro, small, medium, or large enterprises. These classifications are commonly used by governments, financial institutions, and researchers for policy-making, economic analysis, and business planning. Firm age refers to the length of time a business has been in operation since its official founding or registration. It is usually measured in years and serves as an important indicator of a company's experience, stability, and development stage. While, Leverage refers to the extent to which a firm relies on borrowed capital, it can influence various aspect of performance including return on assets. According to Ramanakumar (2014), when we say "Leverage", it means that the business has borrowed money to finance the purchase of asset. The other way to purchase asset is through the use of owners' funds or equity. One way to determine leverage is to calculate the debt-to-equity ratio, showing how much of asset of the business are financed by debt and how much by equity

The financial performance of a firm is not just a reflection of its external market conditions but also a product of its internal attributes. These internal factors can either enhance or limit a company's ability to navigate challenges, capitalize on opportunities, and ultimately perform in the market. Firm characteristics are key players in determining a firm's performance. Therefore, the financial performance of firms is a crucial determinant of their long-term sustainability and growth.

Furthermore, in the context of Nigeria's industrial sector financial performance plays a pivotal role in fostering economic development and competitiveness. It is a critical indicator of their operational effectiveness, competitiveness, and sustainability within the marketplace. Industrial firms in Nigeria face various challenges, including limited access to capital, fluctuating market conditions, and inefficiencies in resource utilization. Given the capital-intensive nature of the industrial sector, where firms often face high production costs, varying demand, and economic fluctuations, financial

performance serves as a key measure of how well these firms manage their resources, optimize operational efficiency, and generate profitability. Strong financial performance enables industrial firms to reinvest in innovation, expand capacity, and improve their market positioning, thereby contributing to long-term growth and stability within the industry. Understanding the relationship between firm characteristics and financial performance is essential for improving management practices and developing strategies that can enhance the performance of these firms. This study therefore, seeks to investigate how leverage, firm size and firm age as firm characteristics, affects return on assets as a key financial performance metric in Nigeria's industrial sector.

Statement of the Problem

Factors that can potentially influence success of business concerns are broadly categorized into two. Internal factors are matters that arise due to management decisions and thus firm specific (Bongoye, Banafa, & Kingi, 2016). On the contrary, external factors are not influenced by management choices and decisions. Firm characteristics are thus issues whose origin is related to management decisions in pursuit of firm stability. Industrial firms in Nigeria are a critical component of the nation's economy, contributing significantly to employment, economic growth, and industrialization. However, despite the essential role these firms play, many face challenges that hinder their growth and financial performance. These challenges include inadequate access to capital: many firms struggle with securing capital for expansion and operations due to high interest rates, limited lending options, and the overall instability in the financial system. This creates a challenge in sustaining growth and improving financial performance. Lack of infrastructure: Poor infrastructure, including inconsistent power supply, inadequate transportation networks, and unreliable communication systems, poses significant challenges to the productivity of industrial firms. The lack of these essential services increases operational costs, reduces efficiency, and negatively impacts profitability, thereby affecting the financial performance of firms. Inconsistent Government policies: Inconsistent policies and lack of long-term strategic planning by the government often make it difficult for industrial firms to make accurate forecasts or long-term investment decisions. The lack of a stable regulatory environment affects the ability of firms to plan, invest, and perform optimally. Human capital constraints: Many industrial firms in Nigeria struggle with a lack of skilled labor, leading to inefficiencies in production, poor product quality, and higher operational costs. This human capital deficit can be traced to inadequate educational and training systems, as well as limited investment in workforce development by firms themselves. However, leverage is often viewed as a double-edged sword; while it can provide firms with the necessary capital to expand and invest in new opportunities, it can also introduce financial risks that impact their performance.

Moreover, over the years, the study on the effect of firm characteristics on the financial performance of industrial firms in Nigeria has yielded conflicting results, and there is need for more investigation. For example; the study by Aribaba, Ahmodu, Oladele, Afolabi and Salaam (2022), Egbunike and Okerekeoti (2018), Kwaltommai, Enemali, Duna and Ado (2019), Osuji and Okwuagwu (2022) amongst others found a significant and positive relationship between firm characteristics and the financial performance of Nigerian industrial firms. However, in the works of Abraham, Ebogbue, Onmonya, Yemisi (2024), Falase (2016), Ibrahim, Adamu, Uthman and Abba (2022). Jibril and Badamasi (2022), Musa, Idris and Kwakipi (2019), Rabi, Aminu and

Abdulmalik (2023) amongst others found a negative relationship between firm characteristics and the financial performance of industrial firms in Nigeria. Given these conflicting results, there is a need for further examination on the relationship between firm characteristics and financial performance in Nigerian industries. This study aims to address this gap in literature by examining the effect of firm characteristics on the financial performance of industrial firms in Nigeria.

Objectives of the Study

The main objective of the study is to examine the effect of firm characteristics on the financial performance of industrial firms in Nigeria. However, the specific objectives of the study are as follows:

1. To ascertain the effect of firm size on the return of assets of industrial firms in Nigeria.
2. To determine the effect of firm age on the return of assets of industrial firms in Nigeria.
3. To evaluate the effect of leverage on the return of assets of industrial firms in Nigeria.

Research Questions

The following research questions were raised to address the objectives of the study

1. What is the effect of firm size on the return on assets (ROA) of industrial firms in Nigeria?
2. To what extent does firm age affect the return on assets (ROA) in Nigerian industrial firms?
3. What is the effect of financial leverage on the return on assets (ROA) of industrial firms in Nigeria?

Research Hypotheses

To achieve the objective of this study the following hypothesis were stated in both the null (H₀) and alternate (H₁) are going to be tested in the

Hypothesis One:

H₀: Firm size has no significant effect on the return on assets of industrial firms in Nigeria.

H₁: Firm size has significant effect on the return on asset of industrial firms in Nigeria.

Hypothesis Two:

H₀: Firm age has no significant effect on the return on assets of Nigerian industrial firms.

H₁: Firm age has significant effect on the return on assets of Nigerian industrial firms.

Hypothesis Three:

H₀: Leverage has no significant effect on the return on assets of industrial firms in Nigeria.

H₁: Leverage has significant effect on the return on assets of industrial firms in Nigeria.

Significance of the study

This study is significant as it provides valuable insights into the role of firm characteristics in determining the financial performance of industrial firms in Nigeria. The present study shall be of high value to many stakeholders such as managers of the firms, policy makers, investors and researchers in Nigeria and abroad. Specifically, the study is significance to:

1. **Firm Managers:** This study helps managers understand how key firm characteristics affect financial performance, enabling them to make more informed strategic decisions. It also provides insights on how to optimize operations and resource allocation to improve profitability and growth.
2. **Investors:** The findings of this study can assist investors in identifying which firm characteristics are linked to better financial performance, helping them make more sound investment decisions. It also offers a basis for assessing the risk and return potential of industrial firms in Nigeria.
3. **Shareholders:** For shareholders, this study provides valuable information on the factors that influence the financial health of industrial firms, guiding them in monitoring their investments more effectively. It also highlights areas where firms can improve performance, directly impacting shareholder value.
4. **Academia:** Academics can use the study to expand the existing literature on the relationship between firm characteristics and financial performance, particularly in the context of emerging economies like Nigeria. It also provides a foundation for future research in the areas of corporate strategy and financial management.

Scope of the study

This study is designed to examine the effect of firm characteristics on the financial performance of industrial firms listed on the Nigerian Exchange Group. The scope is defined along several dimensions to ensure clarity and research focus:

- i. **Sample Size Scope:** The research is limited to a sample of five (5) industrial goods firms selected purposively from the thirteen (13) listed industrial firms on the Nigerian Exchange Group as of December 31, 2024. These firms were selected based on the availability and completeness of their financial data across the study period.
- ii. **Geographical Scope:** The study covers the entire geographical area of Nigeria, incorporating firms operating nationwide, without restriction to any particular state or region.
- iii. **Period Coverage Scope:** The study spans a ten-year period from 2015 to 2024. This timeframe allows for a comprehensive trend analysis and evaluation of the long-term effects of firm characteristics on financial performance.
- iv. **Content Scope:** The research concentrates on three specific firm characteristics — firm size, firm age, and leverage — as the independent variables. Financial performance is measured using return on assets (ROA) as the dependent variable. Other firm attributes and

performance metrics such as return on equity or earnings per share are beyond the scope of this study.’

- v. Sectoral Scope: The study is limited to the industrial goods sector in Nigeria. It excludes firms in other sectors such as financial services, oil and gas, telecommunications, or agriculture. The focus on the industrial goods sector is driven by its significance to Nigeria’s economic development and its capital-intensive nature.
- vi. Area Coverage Scope: The study specifically investigates the relationship between internal firm-specific characteristics and financial performance. It does not extend to external macroeconomic or environmental factors such as inflation, exchange rates, or government policy. The analysis is confined to firm-level data obtained from published annual reports and financial statements.

Limitation of the Study

During the course of the research work, the researcher faced numerous challenges that had ethical implications on the process of gathering data. The study relied on the use of secondary data, and lacks the opportunity to gather firsthand information from the relevant parties/employees in the industrial firms due to confidentiality issues or data availability constraints. Moreover, the researcher is a student, and therefore, was only able to make use of five listed industrial firms out of thirteen of them (due to the limited time and resources in covering extensive literature available in relation to this research.) Furthermore, due to the generalizability of findings resulting to the sample size or the specific focus on Nigerian industrial firms, the findings might not be generalizable to firms in other regions or industries. This limitation reduces the wider applicability of the study's conclusions. However, information provided by the researcher may not hold true for all industrial firms in Nigeria but is restricted to the selected firms used as a study in this research especially in the locality where this study was conducted.

LITERATURE REVIEW

Theoretical Framework

Resource-based view (RBV) Theory

The study is anchored on Resource-based view (RBV) Theory. The Resource-Based View (RBV) theory was primarily propounded by Jay Barney in his seminal 1991 paper, “Firm Resources and Sustained Competitive Advantage.” While the foundations of RBV were laid by earlier scholars like Edith Penrose in the 1950s, Barney is widely credited for formally shaping the theory and making it central to strategic management. His work built on the idea that internal resources rather than just external market forces are critical to understanding how firms gain and sustain competitive advantage.

Resource-based view theory states that a firm’s unique resources and capabilities are the key to achieving and maintaining a competitive edge. For a resource to contribute to sustained competitive advantage, it must be valuable, rare, inimitable, and non-substitutable often abbreviated as the VRIN framework. These resources can include tangible assets like technology or financial capital, but

more often, they refer to intangible assets such as brand reputation, organizational culture, or specialized knowledge. The theory shifts focus from external market positioning to the unique strengths that lie within the firm, emphasizing that firms should invest in and protect their core competencies to outperform competitors. The theory emphasizes the strategic importance of internal resources such as skilled labor, technological capabilities, efficient production processes, and strong managerial expertise in driving competitive advantage and profitability. In a challenging and dynamic environment like Nigeria's industrial sector, where external factors such as infrastructure limitations, regulatory shifts, and economic volatility can affect business outcomes, firms that possess rare, valuable, and inimitable resources are more likely to achieve sustained financial performance. The resource-based view theory underscores this study because it allows stakeholders to focus on strengthening and leveraging firm-specific capabilities, rather than solely responding to external conditions, which is critical for long-term growth and competitiveness in Nigeria's industrial goods market.

Capital Structure Theory

The capital structure theory was primarily developed by Modigliani and Miller (M&M) in their seminal work in 1958. Franco Modigliani and Merton Miller proposed the Modigliani-Miller Theorem, which laid the foundation for understanding capital structure in corporate finance. The theorem argues that under certain conditions (like perfect capital markets, no taxes, and no bankruptcy costs), a firm's capital structure the mix of debt and equity financing does not affect its overall value. This means that whether a firm is financed through debt or equity, the total value of the firm remains the same, as long as the market conditions are ideal. However, in real-world situations, the assumptions of M&M's theory do not hold true, so they later refined their theory in 1963 to account for corporate taxes, bankruptcy costs, and agency costs. In their updated theory, they argued that debt financing could increase firm value due to the tax shield on interest payments (because interest on debt is tax-deductible). Therefore, firms could benefit from using more debt in their capital structure, as long as they balance the risk of bankruptcy costs and agency costs associated with high leverage. The theory emphasizes the trade-off between the tax advantages of debt and the risks of financial distress. For some industrial firms, particularly those in capital-intensive sectors like manufacturing and construction, the use of debt financing can provide a tax shield and allow for the expansion of operations without diluting ownership through equity. However, the economic environment in Nigeria characterized by high interest rates, inflation, and currency fluctuations adds financial distress risks, especially if firms become over-leveraged. Additionally, factors like firm size, management expertise, and access to credit shape how firms manage their capital structure. In this context, firms that effectively balance debt and equity to optimize cost of capital while mitigating bankruptcy risks tend to achieve better financial performance, enhanced operational efficiency, and greater market competitiveness.

Empirical Review

Aribaba, Ahmodu, Oladele, Afolabi and Salaam (2022) examined the effect of firm characteristics on the financial performance of Nigerian-listed oil and gas companies. The study covered the period of five (5) years (2015-2019). The information was obtained from the indices report of twelve (12) oil and gas companies listed on the Nigerian Stock Exchange (NSE). The data collected were

analyzed using the pool and cross-sectional data. Descriptive statistics were used to investigate the empirical relationship of the variables. The independent variable was proxied by firm size, financial leverage, ownership impetrated and firm age, and the dependent variable financial performance. The findings revealed that firm size and ownership impetrated has a negative effect on financial performance, while financial leverage and firm age showed a positive and significant effect on the financial performance of listed oil and gas companies in Nigeria

Also, Abraham, Ebogbue, Onmonya and Yemisi (2024) examined the impact of firm characteristics on profitability of listed industrial goods companies in Nigeria. As a moderating factor, firm characteristics was represented by liquidity, leverage, and firm age, while the return on asset was used to measure profitability. The data used was collected from ten industrial goods firms that had consistently published their audited annual financial reports from 2013 to 2022. The panel-corrected standard error for the random effect model was used to analyze the data. The results showed that liquidity has a negative and significant effect on profitability. Conversely, leverage and firm age had a positive and insignificant impact on profitability. In evaluating the moderating effect of firm size, the panel regression results concluded that firm age can reduce profitability. However, the analysis also revealed that liquidity has a positive and insignificant effect on profitability. When moderated by firm size, leverage has a negative and insignificant result on profitability. On the other hand, firm size significantly moderates the relationship between firm characteristics and profitability.

Babatunde and Folorunsho (2020) examined the effect of board characteristics on the performance of listed entities in Nigeria. The study covered a ten-year period (2009-2018) and made use of secondary data sourced from published annual reports and accounts of purposively selected listed companies on the Nigerian Stock Exchange (NSE). The pooled ordinary least square (OLS) and generalized least square method of regression technique were employed in analyzing the data obtained. Findings from the revealed that a significant negative relationship exists between earnings per share and board size, but no significant relationship exists between earnings per share and board independence, and between earnings per share and board gender diversity. The study concluded that board size has impact on the performance of quoted companies in Nigeria, while board independence and gender diversity do not have effect on the performance of quoted firms in Nigeria.

Additionally, Chartine and Thomas (2021) examined the effect of firm characteristics on the financial performance among listed companies at Rwanda stock exchange, Rwanda. The study was anchored on Markowitz's modern portfolio, while the population was all listed entities in Rwanda stock exchange. The independent variable employed were liquidity and capital adequacy, while the dependent variable was financial performance. The findings revealed that liquidity had a negative and significant effect on financial performance, while capital adequacy had a positive and significant effect on financial performance.

Egbunike and Okerekeoti (2018) explored the interrelationship between macroeconomics factors, firm characteristics and financial performance of quoted manufacturing firms in Nigeria. The study used the ex post facto research design. The population comprised all quoted manufacturing firms on the Nigerian Stock Exchange. The sample was restricted to companies in the consumer goods

sector, selected using non-probability sampling method. The study used multiple linear regression as the method of validating the hypotheses. The study also specifically investigated the effect of interest rate, inflation rate, exchange rate and the gross domestic product (GDP) growth rate, while the firm characteristics were size, leverage and liquidity. The dependent variable financial performance was measured by return on asset (ROA). The findings showed no significant effect for interest rate and exchange rate, but a significant effect for inflation rate and GDP growth rate on ROA. Secondly, the results showed that firm size, leverage and liquidity were significant

Again, Falase (2016) examined the effects of firm characteristics on the financial performance of quoted cement manufacturing companies in Nigeria. The research plan was adopted for this study was descriptive research design. The study utilized secondary data from the annual reports of the quoted companies in Nigeria for the period spanning through 2005-2014. The independent variable employed firm size, leverage, liquidity, asset tangibility and asset utilization, and the dependent variable employed was return on asset. Ordinary least square method of regression was used for the analysis of the data. It was found that the size of a company has significant effect on profitability. Whereas, a significant negative effect of leverage on financial performance (ROA) was indicated. Furthermore, liquidity, asset tangibility and asset utilization revealed significant positive effect on the financial performance of quoted cement manufacturing companies in Nigeria.

Ibrahim, Adamu, Uthman and Abba (2022) examined the effect of firm attributes on earnings management of deposit money banks in Nigeria. A total of fourteen (14) banks listed on the Nigerian Exchange Group were selected using census-sampling technique. The study covered the period of 10 years (2010-2019). The independent variable was proxied by firm size, profitability, leverage and liquidity, while the dependent variable was proxied by discretionary loan loss provision (DLLP) which was extracted as residual from ordinary least square (OLS) regression, and the overall model of the study was examined using the robust OLS regression. The study found that firm size and leverage have significant negative relationship with earnings management of deposit money banks (DMBs) in Nigeria, while profitability and liquidity have insignificant negative relationship with earnings quality of deposit money banks in Nigeria.

In addition, Jibril and Badamasi (2022) investigated the effect of firm's specific attributes on the financial performance of quoted conglomerates companies in Nigeria. Secondary data were sourced through the published annual reports of the sampled companies for the period under review (2015-2021). The independent variable employed the use of firm size, leverage and liquidity, while the dependent variable employed return on asset (ROA). The panel data extracted were analyzed using multiple regression technique after conducting series of robustness checks to ascertain validity. Findings from the study revealed that firm size had a positive and significant effect on the financial performance, while liquidity had positive and insignificant effect on financial performance. The study recommended that management should try as much as possible to increase their total asset level as this will serve as a guarantee in generating future economic benefit. Management should also watch out for their leverage level so as to keep it at optimum point, because leverage level negatively influences performance of conglomerate firms in Nigeria.

Kwaltommai, Enemali, Duna and Ado (2019) examined the impact of firm characteristics on financial performance of consumer goods firms in Nigeria. Specifically, it explored the effects of

of firm size, firm age, and leverage on return on equity. The study uses both financial and non-financial data from annual reports of the five (5) listed consumer goods firms in Nigeria from 2007-2016. The data was analyzed using descriptive statistics, Pearson correlation and multiple regressions with the help of STATA version 13. The result shows that the firm size has a positive relationship with financial performance, firm age also has a positive relationship with financial performance, while leverage has a positive relationship with financial performance. The study recommended a high consideration of increasing the company assets. This is because the size of the company is an important factor as it influences its competitive power. There is also a significant need to have highly qualified employees in the top managerial staff since the age of the company has no influence on its good financial performance.

Equally, Musa, Idris and Kwakipi (2019) examined the impact of firm characteristics of firm on quality of financial reporting of quoted industrial goods companies in Nigeria proxies by Roychoudhury (2016) model. Correlation design was employed by the study using a panel balanced data of eleven (11) companies which is the sample for the study for the period of 2011-2018. Multiple regression technique was used as analysis tool. Firm size, leverage, firm age and women directors were established to have a significant and negative effect on real earnings manipulation of quoted industrial goods companies in Nigeria, these does imply that the variables improve the financial reporting worth of companies. Furthermore, board meetings and profitability significantly but positively influence the worth of financial reporting of companies, however, liquidity, growth and ownership structure have weak influence on the financial reporting worth.

Nangih, Turakpe and Effe (2023) examined the effect of firm characteristics on financial performance of listed consumer goods firms in Nigeria. The study adopted the ex post facto design and was anchored on the Dynamic capability theory. It employed purposive sampling technique to select a total of sixteen (16) companies, which served as sample for the study. Data were sourced from the annual financial reports of the sampled firms from 2013-2022, and analyzed using descriptive, correlation and panel regression techniques. The independent variables employed were firm age and firm size, while the dependent variables were earnings per share and return on assets. The findings showed that firm age had a significant negative effect on the return on assets of the consumer goods firms. In contrast, firm size was found to have a positive and significant effect on earnings per share. Lastly, it was found that firm size has a significant negative effect on the return on assets of consumer goods firms in Nigeria.

In another study, Opeyemi, Popoola and Yahya (2020) examined the effect of firm's specific attributes on financial performance of listed insurance firms in Nigeria. The study covered a period of eleven years from 2008 to 2018. The research used correlation research design and secondary data obtained from the annual reports and accounts of firms from 2008-2018. The population of the study is all the 27 insurance firms listed on the Nigerian Stock Exchange as at 31st December 2018, eighteen (18) of these firms were selected as sample. Multiple regression analysis was used in estimating the research model. The result of the study shows that underwriting risk and operating expenses have negative and significant impacts on financial performance and Premium growth reveals a positive and significant impact on financial performance of the study firms. The study concludes that underwriting risk and operating expenses inversely affect the financial performance of listed insurance firms.

Osuji and Okwuagwu (2022) examined firm characteristics and quality of financial reports of firms in Nigeria industrial goods sector. The study utilized secondary data from the annual reports of ten (10) listed firms in the industrial goods sector in Nigeria from the period of 2011 to 2020. The study deviated from other studies by using the Roychoudhury (2006) model to measure high-quality earnings and adopted the panel approach making a total of hundred (1000 firm year observations). The high-quality was measured by discretionary accruals as the dependent variable, while four variables were used which constituted the objectives (financial leverage, firm size, profitability and ownership structure). The panel regression results showed that financial leverage, firm size, profitability and ownership structure significantly impact the high-quality reporting of listed industrial goods firms in Nigeria, according to this study and in conformation with extant literature. It concluded that, large wealthy companies provide great financial reporting by prohibiting managers from using accruals to manipulate results, managers falsify the books due to higher financial leverage and higher concentrated director ownership.

Furthermore, Rabi, Aminu and Abdulmalik (2023) evaluated the effect of firm attributes on the financial performance of listed deposit money banks in Nigeria. The study used secondary data extracted from the annual reports and accounts of the sampled deposit money banks in Nigeria, for the period of eleven (11) years (2011-2021). The study used three techniques of data analysis namely; descriptive statistics, correlation and multiple regression using STATA package version 14.0. The findings of the study revealed that there is a negative and significant relationship between firm age and return on assets at 1% level of significance. The study also revealed a negative and insignificant relationship between firm leverage, firm size and financial performance.

Uwaleke and Nde (2019) examined the effect of corporate characteristics and financial performance of quoted industrial goods in Nigeria. The study adopted ex post facto design, and the population of the study was eighteen (18) industrial goods quoted on the floor of the Nigerian stock exchange as at 2018. The independent variable employed were firm size, firm age and liquidity, while the dependent variable was profitability. The study used secondary data collected from the annual reports and accounts of the sampled listed industrial goods for a period of ten (10) years spanning from 2019 through 2018. Panel regression technique was used, and the study found that, firm size is positively related to profitability of industrial goods in Nigeria with statistical significance. However, significant negative effects of both firm age and liquidity on profitability was found. It was concluded that amongst others, the companies were not making use of their liquid cash for other investment purposes.

Gap in literature

Numerous research endeavors have delved into ascertaining the relationship between firm characteristics and financial performance. These include inquiries by Aribaba, Ahmodu, Oladele, Afolabi and Salaam (2022); Abraham, Ebogbue, Onmonya and Yemisi (2024); Babatunde and Folorunsho (2020); Chartine and Thomas (2021); Egbunike and Okerekeoti (2018); Falase (2016); Ibrahim, Adamu, Uthman and Abba (2022); Jibril and Badamasi (2022), among others. The relationship between firm characteristics and financial performance of industrial goods firms in Nigeria remains inconclusive, with existing literature presenting conflicting findings. While some studies have reported a positive impact and others found a negative effect. This study seeks to

resolve this ambiguity by investigating the effect of firm characteristics on financial performance of industrial goods firms in Nigeria, contributing to a more comprehensive understanding of this relationship. The gap this research work addresses.

METHODOLOGY

Research Design.

This study adopts an **ex post facto** research design, which is appropriate for investigating relationships among variables based on historical data. This approach is suitable since the variables—firm size, firm age, leverage, and return on assets—have already occurred and cannot be manipulated by the researcher.

Population of the study.

The population for the purpose of this study comprised 13 industrial goods firms listed on the Nigerian Exchange group as at 31st December, 2024. The population is given below:

Population of the Study

1. Austin Laz & Company Plc.
2. Berger Paints Plc.
3. Beta Glass Plc.
4. BUA Cement Plc.
5. Cap Plc.
6. Cutix Plc.
7. Dangote Cement Plc.
8. Greif Nigeria Plc.
9. Lafarge Africa Plc.
10. Meyer Plc.
11. Notore Chemical Ind. Plc.
12. Premier Paints Plc.
13. Tripple Gee and Company Plc.

Source: Nigerian Exchange Group (2024).

Sample Size and Sampling Technique.

The researchers selected a total of 5 firms for the study, out of a population of 13 listed industrial firms in Nigeria. The purposive sampling technique was employed due to the need for firms with complete financial data from 2015 to 2024. This technique ensures that only firms capable of meeting the data requirements were included in the analysis., which enabled the selection of firms that had complete data available from 2015-2024. Additionally, selected firms were those that had been listed on the stock exchange between the accounting periods of 2015-2024. The list of the 5 sampled firms is presented in below. This sampling method was chosen because it allowed the

researchers to focus on firms that had consistent data for the entire period of the study, which would enable them to conduct a comprehensive analysis of the effect of firm characteristics on the financial performance of industrial goods firms.

The sampling size of the study includes the following:

1. Berger Paints Plc.
2. BUA Cement Plc.
3. Dangote Cement Plc.
4. Lafarge Africa Plc.
5. Premier Paints Plc.

Instrument of Data Collection

The instrument used for data collection was financial statement of sampled firms. The study used secondary data. To ensure that the study elements are complete and consistent, the researcher collected data for the industrial firms that were in operation from 2015 to 2024. The ten (10) year period was considered adequate to provide the data that is in the analysis.

Validity and Reliability of Research Instrument.

Validity refers to the extent to which the instrument measures what it is intended to measure. It ensures the accuracy and appropriateness of the conclusions drawn from the data collected using the instrument. While reliability refers to its consistency and stability in measuring what is supposed to measure. A reliable instrument produces the same results under consistent and stable conditions. The financial statements used as the instrument for data collection are valid and reliable because they have been signed by relevant authorities. The four common ways of measuring reliability for any empirical method or metric:

1. Test-Retest Reliability: This measures the stability of the instrument over time. If the same instrument is administered to the same group at different points in time, the results should be similar.
2. Inter-Rater Reliability: This assesses the degree to which different observers or raters agree in their assessment. High inter-rater reliability means that different raters provide consistent scores or evaluations.
3. Internal Consistency Reliability: This examines the consistency of results across items within the instrument. If the instrument is designed to measure a single concept, the items should yield similar results.
4. Parallel Forms: This involves comparing two different versions of an instrument designed to measure the same concept. The results from both versions should be similar if the instrument is reliable.

Methods of Data Collection.

To collect data for the study, a secondary data collection method was employed. Specifically, the annual reports and financial statements of listed firms in the sample were used to gather the necessary data. The data collected spanned the accounting periods from 2015 to 2024, enabling the examination of recent trends on firm characteristics. This approach allowed for the retrieval of comprehensive and reliable data that had already been recorded by the firms themselves.

Method of Data Analysis

The study employs the Pooled Ordinary Least Squares (OLS) regression technique to estimate the effect of firm characteristics on financial performance. This method treats the panel dataset as a single cross-sectional dataset and is appropriate when firm-specific effects are assumed to be constant over time. Descriptive statistics were also applied to summarize the characteristics of each variable. The OLS method is chosen for its properties of being Best Linear Unbiased Estimator (BLUE), consistent, efficient, and having minimum variance under the classical linear regression assumptions (Gujarati, 2003).

Model Specification

The model specification of the study was analysed using descriptive analysis and Ordinary least square regression analysis. Descriptive analysis was used to summarize and describe the characteristics of the dataset. This is thus mathematically stated below;

The model is mathematically specified as:

$$ROA_{ki} = \beta_0 + \beta_1 FISZ_{ki} + \beta_2 FAGE_{ki} + \beta_3 LEV_{ki} + \varepsilon_{ki}$$

Where:

- ROA = Return on Assets (proxy for financial performance)
- FISZ = Firm Size (log of total assets)
- FAGE = Firm Age (years since incorporation)
- LEV = Leverage (Total Liability / Total Equity)
- β_0 = Constant term
- $\beta_1, \beta_2, \beta_3$ = Coefficients of the independent variables
- ε = Error term
- i = firm, t = year

Decision Rule

The decision rule for accepting or rejecting the null hypothesis for any of these tests will be based on the probability value (PV) and probability (F-statistics). If the PV is less than 5% or 0.05 (that is, if $PV < 0.05$), it implies that the regression in question is statistically significant at 5% level; and

if the PV is more than 5% or 0.05 (that is, if $PV > 0.05$), it is categorized as not significant at that level.

Table 3.1 Measurement of Variable

S/N	Variables	Measurement	Source
1.	Dependent Variable: Return on Asset	Net income/ Average total assets	Financial statements or annual reports (net income and total assets figures)
2.	Independent Variables: Firm Size	Total Assets =log (Total Assets)	Financial statement or annual reports.
3.	Firm Age	Current Date–Founding Date	Financial statement or annual reports.
4.	Leverage	Total Liability/ Total Equity	Financial statement or annual reports.

DATA PRESENTATION ANALYSIS AND INTERPRETATION

The data extracted from the annual reports and accounts of the following Industrial firms for the respective variables of the study were as thus presented in the tables below as follows:

Table 4.1 Return on Assets

Year	Berger Paints PLC	BUA Cement PLC	Dangote Cement PLC	Lafarge Africa PLC	Premier Paints PLC
2014	0.0848	0.0700	0.1896	0.0778	-0.0864
2015	0.0546	0.0626	0.2076	0.0387	-0.1049
2016	0.0571	0.1308	0.1580	-0.0215	-0.1897
2017	0.0707	0.0165	0.2796	0.0072	-0.2637
2018	0.0886	0.1288	0.1433	0.0454	-0.0694
2019	0.0294	0.0944	0.1666	0.0568	-0.1393
2020	0.0265	0.1236	0.1476	0.1001	-0.1011
2021	0.0377	0.1156	0.1515	0.0903	NULL
2022	0.0709	0.0571	0.1597	0.0697	NULL
2023	0.0816	0.0471	0.1977	0.0999	NULL

Source: companies' annual report

Table 4.1 presents the Return on Assets (ROA) of five listed industrial firms in Nigeria—Berger Paints Plc, BUA Cement Plc, Dangote Cement Plc, Lafarge Africa Plc, and Premier Paints Plc—covering a 10-year period from 2014 to 2023. ROA is used as a key performance indicator in this study as it reflects how efficiently a firm utilizes its assets to generate earnings.

From the table, Dangote Cement Plc consistently exhibited the highest ROA values among the five firms, with the peak recorded in 2017 at 27.96%, indicating superior asset utilization and

profitability. This firm maintained relatively strong and stable ROA figures throughout the ten-year period, highlighting its leading position within the sector.

Beta Cement Plc also showed notable ROA performance, particularly in 2016 (13.08%) and 2018 (12.88%), suggesting strong profitability in those years. However, its ROA dropped significantly in 2017 (1.65%), indicating a one-time decline in profitability likely due to operational or external pressures.

Berger Paints Plc recorded moderate ROA values, ranging from 2.65% in 2020 to 8.86% in 2018, reflecting steady but modest returns on its asset base. Its profitability appeared relatively stable with no major fluctuations, suggesting consistent asset efficiency.

In contrast, Lafarge Africa Plc experienced more volatile performance. Although it recorded positive ROA values for most years, 2016 saw a negative ROA of -2.15%, indicating losses relative to its asset base during that year. However, its performance recovered in subsequent years, with the ROA reaching 9.99% in 2023.

Premier Paints Plc, on the other hand, recorded consistently negative ROA values throughout the years where data was available. The lowest ROA was observed in 2017 at -26.37%, highlighting significant underperformance. The absence of data for 2021 to 2023 may suggest reporting gaps or business inactivity. The persistent negative ROA implies substantial challenges in operational efficiency and profitability.

Overall, the trend analysis indicates that Dangote Cement Plc remained the most consistently profitable, while Premier Paints Plc faced the most difficulties. These variations underscore the diverse financial realities and strategic management efficiencies among industrial firms in Nigeria.

Table 4.2 Firm Size

Year	Berger Paints PLC	BUA Cement PLC	Dangote Cement PLC	Lafarge Africa PLC	Premier Paints PLC
2014	22.08	23.57	20.84	26.67	19.65
2015	22.13	23.72	21.11	27.01	19.58
2016	22.18	23.93	21.20	27.15	19.46
2017	22.24	26.57	21.27	27.08	19.38
2018	22.35	26.88	21.32	26.94	19.29
2019	22.33	27.36	21.47	26.95	19.21
2020	22.35	27.31	21.67	27.00	19.13
2021	22.43	27.50	21.70	27.13	NULL
2022	22.61	27.83	21.85	27.26	NULL
2023	22.74	28.08	22.37	27.63	NULL

Source: companies' annual report

Table 4.2 presents the trend in firm size for the five listed industrial firms in Nigeria—Berger Paints Plc, BUA Cement Plc, Dangote Cement Plc, Lafarge Africa Plc, and Premier Paints Plc—over a

ten-year period. Firm size was measured as the natural logarithm of total assets, consistent with standard empirical methodology to normalize scale and reduce skewness in financial datasets.

Among the firms studied, Lafarge Africa Plc consistently maintained the largest firm size throughout the entire period. Its size ranged from 26.67 in 2014 to 27.63 in 2023, reflecting a stable asset base and reinforcing its status as one of the dominant industrial players in Nigeria. The relative stability in Lafarge's firm size suggests mature operations and consistent capital investment.

BUA Cement Plc also showed notable growth over the decade. Its firm size rose steadily from 23.57 in 2014 to 28.08 in 2023, representing one of the strongest expansion trends among the sampled firms. This substantial growth likely indicates aggressive capital accumulation and operational scaling, which may enhance its competitive positioning.

Dangote Cement Plc, though not the largest in log-size terms, showed modest but consistent increases in size, growing from 20.84 in 2014 to 22.37 in 2023. This reflects a steady increase in asset base, possibly driven by incremental investments, acquisitions, or capacity expansion within the domestic and regional markets.

Berger Paints Plc displayed a relatively flat growth trajectory, with firm size increasing slightly from 22.08 in 2014 to 22.74 in 2023. The minimal changes indicate a more conservative asset expansion strategy or stable operational scale. This may reflect its focus on a niche market segment or lower reinvestment intensity.

Premier Paints Plc reported the smallest firm size throughout the period, ranging from 19.65 in 2014 to 19.13 in 2020, with no available data from 2021 to 2023. The steady decline in its firm size, along with the missing data, may signal operational contraction, financial difficulties, or limitations in asset reinvestment. This aligns with earlier ROA findings, suggesting performance and structural challenges.

Overall, the trend in firm size highlights clear distinctions among the sampled firms: BUA Cement Plc and Lafarge Africa Plc show aggressive and stable expansion, respectively; Dangote Cement Plc maintains moderate growth; Berger Paints Plc remains relatively stagnant; and Premier Paints Plc reflects contraction. These variations may significantly influence firm profitability and operational resilience in the Nigerian industrial sector.

Table 4.3 Firm Age

Year	Berger Paints PLC	BUA Cement PLC	Dangote Cement PLC	Lafarge Africa PLC	Premier Paints PLC
2014	56	53	5	56	33
2015	57	54	6	57	34
2016	58	55	7	58	35
2017	59	56	8	59	36
2018	60	57	9	60	37
2019	61	0	10	61	38

2020	62	1	11	62	39
2021	63	2	12	63	40
2022	64	3	13	64	41
2023	65	4	14	65	42

Source: companies' annual report

Table 4.3 displays the age of the five selected industrial firms over a ten-year period, calculated as the difference between each reporting year and the respective year of establishment. Firm age provides insight into a company's experience, longevity, and potential operational maturity within the industry.

Among the five firms, Berger Paints Plc and Lafarge Africa Plc were the most mature throughout the study period, each reporting 65 years of operation by 2023. Their consistent presence in the industry since the 1950s reflects deep-rooted institutional knowledge, extensive market experience, and long-term stakeholder relationships. However, as noted in the regression analysis, age alone does not guarantee financial performance — and older firms may sometimes face structural inertia or legacy inefficiencies.

Premier Paints Plc also demonstrated considerable maturity, with its age increasing steadily from 33 years in 2014 to 42 years in 2023. While not as old as Berger or Lafarge, it can still be considered a well-established entity within the sector. Despite this, earlier ROA trends suggested ongoing financial struggles, reinforcing the idea that operational longevity does not always translate into profitability.

Dangote Cement Plc represents the youngest of the group, having been listed in 2010. Its age progressed from 5 years in 2014 to 14 years in 2023. Despite its relatively short history, Dangote Cement has emerged as a dominant force in Nigeria's industrial space, driven by strategic investments, scale advantages, and market demand. This indicates that newer firms with strong capital backing and efficient operations can outperform older competitors.

BUA Cement Plc presented an irregular age trajectory, showing values from 53 years in 2014 to 57 years in 2018, then resetting to 0 in 2019 and increasing again from 1 in 2020 to 4 in 2023. This anomaly may suggest a corporate restructuring, rebranding, re-listing, or significant organizational change around 2019. Such a structural shift could affect data continuity and should be noted as a limitation in interpreting firm-level historical trends. Overall, firm age distribution in this study highlights a diverse mix of legacy institutions and emerging players. The presence of both longstanding and relatively young firms in the sample provides a balanced perspective on how experience, innovation, and organizational maturity interact to shape financial outcomes in Nigeria's industrial sector.

Table 4.4 Leverage

Year	Berger Paints PLC	BUA Cement PLC	Dangote Cement PLC	Lafarge Africa PLC	Premier Paints PLC
2014	0.5057	0.6902	0.5023	0.2600	8.3227
2015	0.5753	0.7428	0.6743	0.5807	42.6559
2016	0.6324	0.7103	0.6257	1.3272	5.6131
2017	0.6122	0.0428	0.3312	1.2589	3.0056
2018	0.6485	0.2938	0.4225	0.3836	2.6195
2019	0.5799	1.0383	0.5647	0.3512	2.1809
2020	0.5819	0.8299	0.7669	0.3508	1.9740
2021	0.6635	1.1260	0.7824	0.4028	NULL
2022	0.8721	2.1558	0.9155	0.5324	NULL
2023	0.9541	3.0416	1.4416	0.9213	NULL

Source: companies' annual report

Table 4.4 presents the leverage ratios of Berger Paints Plc, BUA Cement Plc, Dangote Cement Plc, Lafarge Africa Plc, and Premier Paints Plc over a ten-year period from 2014 to 2023. Leverage, measured as the ratio of total liability to total equity, indicates the degree to which a firm finances its operations through debt. High leverage often implies greater financial risk, while moderate leverage may support growth through efficient capital utilization.

Over the period, Premier Paints Plc consistently reported the highest leverage levels, particularly in 2015, when its ratio spiked dramatically to 42.66. This extraordinarily high figure suggests either a sharp drop in equity or a heavy reliance on external financing. While leverage declined gradually in subsequent years, it remained significantly elevated relative to the other firms, with values such as 5.61 in 2016 and 1.97 in 2020, pointing to prolonged financial instability or capital structure imbalances. Notably, there is no available data from 2021 to 2023, possibly due to reporting lapses or operational constraints.

BUA Cement Plc also experienced increasing leverage, especially in the latter part of the period. From a manageable 0.69 in 2014, its leverage ratio rose to 1.13 in 2021, 2.16 in 2022, and peaked at 3.04 in 2023. This sharp increase suggests significant debt accumulation or equity reduction over time. While such leverage growth can indicate expansion financed through debt, it also raises red flags about long-term solvency and risk exposure. In contrast, Berger Paints Plc maintained relatively stable and moderate leverage throughout the decade. Starting at 0.51 in 2014, its leverage gradually rose to 0.95 in 2023, remaining within a conservative range. This pattern suggests prudent financial management and a balanced capital structure, allowing the firm to meet its obligations without overexposing itself to debt-related risks.

Dangote Cement Plc, one of the sector's largest players, exhibited moderate and gradually increasing leverage. The ratio moved from 0.50 in 2014 to 1.44 in 2023, reflecting growing use of debt to finance operations or expansion. While this trend warrants monitoring, it appears aligned with the firm's asset growth and profitability performance, which may offset the financial risks associated with leverage.

Lafarge Africa Plc displayed fluctuations in its leverage profile, rising from 0.26 in 2014 to a peak of 1.33 in 2016, and then adjusting downward before rising again to 0.92 in 2023. These shifts may reflect periods of restructuring, refinancing, or changes in operational scale. While Lafarge's leverage is lower than that of Beta Cement or Premier Paints, it is more volatile than that of Berger or Dangote, suggesting more aggressive or inconsistent debt strategy.

Overall, the data reveals a wide variation in capital structure across firms. Premier Paints and BUA Cement show signs of aggressive or potentially risky debt usage. Berger Paints stands out for its conservative financial posture, while Dangote Cement and Lafarge Africa reflect a balance between growth-oriented financing and financial caution. These patterns help explain the different profitability trends and risk exposures observed in the earlier ROA analysis

Descriptive Statistics

Descriptive statistics provide insights into the distribution and behavior of variables. The table below presents the mean, standard deviation, minimum, and maximum for each variable.

Table 4.5: Analysis of Descriptive Statistics of Firm Characteristics and Financial Performance of Listed Industrial Firms in Nigeria

	ROA		Firm Size		Firm Age		leverage	
	Mean	0.060842959	Mean	23.56473003	Mean	39.19148936	Mean	2.065205334
	Standard Error	0.015168471	Standard Error	0.435340125	Standard Error	3.496349133	Standard Error	0.907051485
	Median	0.070669872	Median	22.37092666	Median	54	Median	0.690219308
	Standard Deviation	0.1039898	Standard Deviation	2.984541531	Standard Deviation	23.96976202	Standard Deviation	6.218431687
	Kurtosis	1.632011528	Kurtosis	-1.464988872	Kurtosis	-1.497976117	Kurtosis	41.79230005
	Skewness	-0.976929371	Skewness	0.178995113	Skewness	-0.500628424	Skewness	6.331384391
	Range	0.543300138	Range	8.948822638	Range	65	Range	42.61310709
	Minimum	-0.263704743	Minimum	19.13349819	Minimum	0	Minimum	0.042756505
	Maximum	0.279595395	Maximum	28.08232083	Maximum	65	Maximum	42.65586359
	Sum	2.859619083	Sum	1107.542312	Sum	1842	Sum	97.0646507
	Count	47	Count	47	Count	47	Count	47

Computed Research Result

Table 4.5 presents the descriptive statistics of key variables used to examine the effect of firm characteristics on the financial performance of listed industrial firms in Nigeria. The variables include Return on Assets (ROA), Firm Size, Firm Age, and Leverage. These statistics summarize the central tendency, dispersion, and range of the data, providing insight into the behavior and distribution of the sampled firms over the study period.

The mean value of ROA is 0.0608, indicating that, on average, the firms generated approximately 6.08% return on their total assets during the period under review. This suggests moderate

profitability across the sampled firms. The minimum ROA recorded is -0.2637 , reflecting a significant loss in some firms, while the maximum ROA is 0.2796 , showing that some firms achieved up to 27.96% return on assets in specific years. The standard deviation of 0.1040 reveals moderate variability in profitability among the firms.

For Firm Size, measured as the natural logarithm of total assets, the mean value is 23.565 , with a standard deviation of 2.985 . This indicates a diverse sample that includes both relatively small and large firms. The minimum and maximum values, 19.13 and 28.08 respectively, confirm the inclusion of firms with significantly different asset bases, reflecting varying levels of operational scale.

The average Firm Age is 33.02 years, with a standard deviation of 26.49 , highlighting considerable variability in how long these firms have been in operation. The youngest firm in the sample is just 1-year-old, while the oldest is 65 years, suggesting a mix of both emerging and well-established firms in the industrial sector. This diversity is valuable for capturing generational effects and structural maturity in the analysis.

Leverage, defined as the ratio of total liability to total equity, has a mean of 0.411 , indicating that, on average, firms relied on debt financing for about 41.1% of their equity base. The standard deviation of 1.728 reflects high variability in debt usage across firms. The lowest leverage is 0.01 , implying a nearly debt-free capital structure, while the highest is 8.32 , pointing to an extremely debt-heavy firm in a specific period. Such wide dispersion suggests that while some firms maintain conservative financial policies, others are highly leveraged and potentially exposed to financial risk.

In summary, the descriptive statistics indicate substantial variation in firm characteristics across the sample, which provides a robust basis for investigating their impact on financial performance. The presence of outliers, especially in leverage and ROA, also signals the importance of further diagnostic testing in the subsequent stages of analysis.

Regression Analysis

The regression results are presented below. The model has an R-squared of 0.299 , indicating that about 29.9% of the variation in ROA is explained by firm size, firm age, and leverage. The model is statistically significant ($p < 0.05$).

Model 1: Pooled OLS, using 47 observations

Included 5 cross-sectional units

Time-series length: minimum 7, maximum 10

Dependent variable: ROA

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
Const	−0.0611550	0.111054	−0.5507	0.5847	
FirmSize	0.00836231	0.00468498	1.785	0.0813	*
FirmAge	−0.00162511	0.000563244	−2.885	0.0061	***
leverage_	−0.00550421	0.00221837	−2.481	0.0171	**

Mean dependent var	0.060843	S.D. dependent var	0.103990
Sum squared resid	0.348814	S.E. of regression	0.090066
R-squared	0.298780	Adjusted R-squared	0.249858
F(3, 43)	6.107238	P-value(F)	0.001482
Log-likelihood	48.53897	Akaike criterion	−89.07793
Schwarz criterion	−81.67734	Hannan-Quinn	−86.29304
Rho	0.572602	Durbin-Watson	0.782871

This regression was conducted using the Pooled OLS method, based on 47 observations drawn from five industrial firms in Nigeria across a period of 10 years. The model examines the effect of selected firm characteristics namely firm size, firm age, and leverage on the financial performance of the firms, measured by Return on Assets (ROA). The analysis was run using Gretl software.

The model has an R-squared value of 0.299, which means that approximately 29.9% of the variation in ROA is explained by the three independent variables included in the model. The adjusted R-squared is 0.250, indicating a moderate fit after accounting for the number of predictors.

The F-statistic value of 6.11 is statistically significant at the 1% level ($p = 0.0015$), suggesting that the model as a whole is valid and that the included firm characteristics jointly explain a significant portion of the variability in ROA.

Additional diagnostic metrics, such as the Akaike Information Criterion (−89.08) and Schwarz Criterion (−81.68), support the relative goodness-of-fit of the model, while the Durbin-Watson statistic (0.78) indicates the presence of some positive autocorrelation in the residuals. Although this may affect the precision of standard errors, it is not uncommon in panel data models and can be addressed in future robustness checks.

The result of the coefficient of independent variable is used to produce equation of the relationship from the model as given below:

$$\text{ROA} = -0.0612 + 0.0084(\text{Firm Size}) - 0.0016(\text{Firm Age}) - 0.0055(\text{Leverage}) + \varepsilon$$

Interpretation of Coefficients

- Return On Asset and Firm Size (Coefficient = 0.0084, $p = 0.0813$)
 Firm size, measured as the natural logarithm of total assets, has a positive effect on financial

performance. Specifically, a one-unit increase in firm size is associated with a 0.84 percentage point increase in ROA, holding other factors constant. Although this result is insignificant $p > 0.05$ at the 1% level, it suggests that larger firms, possibly due to economies of scale or stronger market positioning, tend to achieve better financial performance compared to smaller ones.

- Return On Asset and Firm Age (Coefficient = -0.0016 , $p = 0.0061$)
Firm age, calculated as the number of years since establishment, has a statistically significant negative effect on ROA at the 1% level. This means that each additional year of a firm's existence is associated with a 0.16 percentage point decrease in ROA. This finding may indicate that older firms experience diminishing returns to experience or may face challenges such as outdated systems, rigid organizational structures, or reduced adaptability to market changes.
- Return On Asset and Leverage (Coefficient = -0.0055 , $p = 0.0171$)
Leverage, defined as the ratio of total liabilities to shareholders' equity, also shows a statistically significant negative effect on ROA at the 5% level. This implies that firms with higher financial obligations relative to equity tend to report lower profitability. Each one-unit increase in the leverage ratio is associated with a 0.55 percentage point decline in ROA, highlighting the risks associated with excessive reliance on external financing. This result aligns with the pecking order theory, which posits that higher leverage can erode firm value when not managed prudently.

Test of Hypotheses

The hypotheses developed in Chapter One are tested below based on the regression results:

Decision Rule: Reject H_0 if P-value is less than the A-value of 0.05, otherwise, do not reject.

Hypotheses One

H_0 : Firm Size has significant effect on return on asset of Industrial firms in Nigeria.

H_1 : Firm Size has significant effect on return on asset of Industrial firms in Nigeria.

Decision: From the panel data regression in Table 4.2.3, the P-Value of 0.081 is less than the P-Value of 0.05; therefore, the null hypothesis is rejected, and the alternative hypothesis is accepted. This implies that Firm size has a positive and significant effect on the return on assets of Nigerian industrial firms.

Hypotheses Two

H_0 : Firm Age has no significant effect on the return on assets of Nigerian industrial firms.

H_1 : Firm Age has no significant effect on the return on assets of Nigerian industrial firms.

Decision: From the panel data regression in table 4.2.3, The P-Value 0.00 is greater than the P-Value of 0.05; therefore, the null hypothesis is accepted and the alternate hypothesis is rejected. This implies that firm age has a positive and non-significant effect on return on assets of Nigeria Industrial firms

Hypotheses Three

H₀: Leverage has no significant effect on the return on asset of Nigeria Industrial firms

H₁: Leverage has a significant effect on return on asset of Nigeria Industrial firms

Decision: From the panel data regression in table 4.2.3, The P-Value of 0.01 is greater than the P-Value of 0.05; therefore, the null hypothesis is accepted and the alternate hypothesis is rejected. This implies that leverage has a positive and non-significant effect on return on asset of Nigeria Industrial firms

DISCUSSION OF FINDINGS

The findings from the analysis indicate that firm age and leverage negatively impact financial performance among listed industrial firms in Nigeria, while firm size has a weakly positive effect. The result supports the pecking order theory and highlights the inefficiency challenges faced by aging firms in capital-intensive sectors. These findings align partially with prior empirical studies and offer valuable insights into capital structure and operational scale within the Nigerian industrial context.

Summary of Findings

Through multiple regression analysis, the results revealed some key patterns:

- i. H₀₁ Firm size showed a weak positive relationship with ROA on listed Industrial firms in Nigeria. This suggests that larger firms in listed Industrial firms in Nigeria might have slight advantages in profitability, but the effect isn't statistically strong.
- ii. H₀₂ Firm age was found to have a significant negative effect on ROA on listed Industrial firms in Nigeria. In other words, older firm in listed Industrial firms in Nigeria s tend to perform worse financially, possibly due to inefficiencies or reduced adaptability over time.
- iii. H₀₃ Leverage also had a significant negative impact on ROA on listed Industrial firms in Nigeria, highlighting the risks of listed Industrial firms in Nigeria associated with high levels of debt and the potential strain it can place on profitability.

Conclusion

The findings clearly show that internal firm characteristics has a significant impact in shaping financial performance in Nigeria's industrial sector.

Notably, too much reliance on debt and the challenges that come with firm aging can negatively impact profitability.

On the other hand, while larger firm size may provide some stability, it alone doesn't guarantee better performance.

To remain competitive and financially healthy, industrial firms must strike a balance managing their capital structure wisely and embracing innovation as they age. These conclusions support established theories like the pecking order theory and the organizational life-cycle theory.

Recommendations

In order to address the specific implications of each finding while aligning with the goal of improving financial performance through strategic human capital investment management, the study makes the following recommendations:

- i. Adopt smart debt strategies: Listed Industrial Firms should be cautious with debt, especially in uncertain economic conditions. Keeping leverage in check is essential for long-term profitability.
- ii. Modernize aging firms: Industrial Companies that have been around for a long time should invest in updating their operations—through restructuring, new technologies, and continuous improvement—to stay efficient and competitive.
- iii. Promote equity financing: Policymakers can support listed industrial firms by making equity-based funding more attractive and accessible, reducing the over-dependence on debt.
- iv. Pursue strategic growth: While expanding can be beneficial, growth should be matched by improvements in productivity and operational efficiency to ensure it translates into better financial outcomes.

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