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Firm Financial Indicators and Profitability of Manufacturing Firms in Nigeria

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Abstract: *This study examines the determinants of profitability in Nigerian manufacturing firms, focusing on internal financial indicators. Despite their importance, these firms face financial challenges leading to market exits. The study assesses the effect of key financial indicators on profitability, proxied by profit for the year, with independent variables including liquidity, leverage, firm size, and sales growth. A sample of 16 manufacturing firms listed on the Nigerian Exchange Group was selected using judgmental sampling. Secondary data from 2013 - 2023 financial reports were analyzed using Panel Least Squares regression and the Granger Causality Test in EViews 11.0. Findings reveal that liquidity and firm size significantly enhance profitability, while leverage and sales growth show positive but insignificant relationships. The adjusted R^2 of 0.534 indicates that 53.4% of profitability variations are explained by the model. The study highlights theoretical, managerial, and policy implications, recommending strategic liquidity management, balanced capital structures, optimal firm size, and refined sales strategies to enhance profitability*
Keywords: Financial indicators, profitability, manufacturing firms, liquidity management, cost structure, Nigeria

INTRODUCTION

Manufacturing firms are primarily established to maximize profits and create wealth for their shareholders, thereby enhancing business performance and adding value (Hart & Zingales, 2017). In attempt to achieve these goals, firm managers encounter challenges associated with determinants of profitability that may limit their effort to attain their corporate goals. Some of these indicators are internal to the firms while some are external and can be found in the economic system. The external indicators constitute macro-economic variables or characters that are beyond the control of the firms. They include, inflation, exchange rate and monetary policies (Ruhomaun & Nagaohi, 2019). While these external indicators significantly influence the broader economic scope, internal financial indicators present a more immediate avenue for firm managers to optimize performance. The focus of this study is on internal financial

indicators, which are within the control of firm management and can be strategically manipulated to enhance profitability.

Internally, firms have the ability to influence several financial indicators, which can be strategically managed to enhance financial performance. These indicators include liquidity, leverage, firm size, sales growth, and other operational metrics. Firm size, for instance, plays a key role in achieving economies of scale, where larger firms can reduce per-unit costs and enhance profitability through mass production and bulk sales (Sindhuja, 2017; Suhaila et al., 2008). Liquidity, defined as the ability of a firm to convert assets into cash to meet short-term obligations, is essential for maintaining operational stability and avoiding financial distress (Robinson et al., 2015). Leverage, the ratio of total debt to total capital, indicates the extent to which a firm relies on borrowed funds to finance its operations, with significant implications for risk and profitability (Hovakimian, 2004). Sales growth, another vital indicator, measures the increase in revenue over a specific period, reflecting a firm's ability to expand its market share and generate higher returns (Browne, 2017).

Dioha et al. (2018) emphasized that these internal financial indicators are fundamental in explaining the variations in profitability among firms. Unlike external factors, which are largely beyond the control of management, internal indicators are directly influenced by the decisions and strategies employed by firm managers. For example, effective liquidity management can prevent cash flow problems, while prudent leverage management can minimize the risk of financial distress. Equally, a focus on increasing firm size and boosting sales growth can lead to enhanced competitiveness and long-term sustainability. Ali et al. (2020) further elaborates by corroborating that corporate financial performance can be influenced by firm-specific determinants such as size, age, liquidity, and leverage, alongside corporate governance mechanisms like board size, composition, and audit quality.

The existing literature reveals a broad spectrum of measures used to assess determinants of profitability. For instance, Valipour et al. (2012) identified profitability, operating cash flow, firm size, sales growth, and various liquidity ratios as key indicators of determinants of profitability health. Similarly, Fahimeh and Shokat (2015) explored the relationship between determinants of profitability characteristics and stock returns, highlighting the importance of firm size, return on equity, and financial leverage as determinants of financial performance. Nawaf (2010) highlights that profit for the year is a comprehensive measure of a firm's performance, encompassing all revenues generated during a period minus all expenses, including the cost of goods sold, operating expenses, interest expenses, depreciation, and taxes. The ability to optimize profit is influenced by various factors such as firm size, debt reliance, asset growth, and sales growth, all of which are integral components of determinants of profitability. The diversity in these measures underscores the varied nature of determinants of profitability and their important role in shaping financial outcomes. Given the importance of internal financial indicators, this study adopts liquidity, leverage, firm size, and sales growth as key variables to evaluate its effects on profit for the year,

which serves as a measure of profitability for manufacturing firms in Nigeria. By concentrating on these internal financial indicators, this study seeks to deepen the stakeholders understanding of how firm-specific strategies and its effect on profitability can drive manufacturers decisions, particularly in a challenging economic environment like Nigeria. This focus is central to the research, as it would directly address the extent to which these indicators influence the financial performance of manufacturing firms in Nigeria.

The manufacturing sector is fundamental to Nigeria's economic development, yet many firms within this sector continue to underperform financially, limiting their contribution to the broader economy (National Bureau of Statistics, 2023). A critical factor contributing to this underperformance is the ineffective management of key internal financial indicators, such as firm size, leverage, liquidity, and sales growth, which are within the direct control of firm management (Ali et al., 2020). Despite their importance in determining profitability, the inadequate exploration of these internal indicators in empirical literature creates a knowledge gap that hinders the ability of managers to make data-driven decisions in optimizing firm performance, especially when considering the country's volatile economic environment, characterized by fluctuating inflation rates, exchange rates, and monetary policies (Central Bank of Nigeria, 2023).

In developed markets, these internal financial indicators are often managed using advanced tools and strategic planning to enhance financial performance (Owolabi & Obida 2012). However, in Nigeria, many manufacturing firms have not fully integrated these indicators into their decision-making processes, leading to inefficient resource allocation, poor liquidity management, and suboptimal leverage (Akinlo & Asaolu, 2012). This gap in management practices worsens the risk of financial distress, resulting in challenges such as cash flow problems, increased costs of capital, and a heightened risk of bankruptcy (Odusanya et al. 2018). Moreover, insufficient attention to firm size and sales growth limits the ability to achieve economies of scale, reducing competitiveness in a challenging market environment (Shuaibu et at., 2019). The cumulative effect of these shortcomings has led to financial difficulties for numerous firms, with some ultimately exiting the market, resulting in job losses and negative impacts on the broader economy.

Despite the documented importance of internal financial indicators, the specific ways in which they affect the profitability of Nigerian manufacturing firms remain underexplored. This gap highlights the need for further research, motivating this study to examine the effects of firm size, leverage, liquidity, and sales growth on profitability. Through empirical evaluation, the study will investigate strategies employed to optimize these internal financial indicators to enhance financial performance and ensure long-term corporate sustainability. Understanding these relationships will provide valuable insights, helping managers in developing countries improve decision-making, optimize resource allocation, and mitigate business risks. This necessity forms the basis for conducting this study.

LITERATURE REVIEW

Theoretical framework

This study draws upon four key theories such as Liquidity Preference Theory, Pecking Order Theory, Growth of the Fitter Theory, and Trade-Off Theory; to explain the determinants of profitability in Nigerian manufacturing firms.

The Liquidity Preference Theory (Keynes, 1936) explains that firms hold liquidity for transaction, precautionary, and speculative motives, emphasizing the role of liquidity management in sustaining daily operations, addressing unforeseen expenses, and capitalizing on investment opportunities. Liquidity indicators such as the current ratio, quick ratio, and cash flow ratios reflect a firm's financial flexibility, ultimately impacting profit for the year. The Pecking Order Theory (Donaldson, 1961; Myers & Majluf, 1984) posits that firms prioritize internal financing over debt and equity issuance due to information asymmetry concerns, highlighting how Nigerian manufacturing firms rely on retained earnings to sustain profitability while strategically managing debt to optimize financial performance.

The Growth of the Fitter Theory (Alchian, 1950) suggests that profitable firms grow and survive, linking firm size, sales growth, and profit for the year, as economies of scale, resource access, and operational efficiencies enhance profitability (Sindhuja, 2017; Browne, 2017; Aldridge, 2015). The Trade-Off Theory (Kraus & Litzenberger, 1973) explains how firms balance the benefits of debt, such as tax shields, against financial distress risks, influencing key profitability determinants - liquidity (current ratio), leverage (equity ratio), firm size (natural logarithm of total assets), and sales growth (percentage increase in sales); as firms optimize capital structure to sustain long-term profitability. These theories collectively underscore the importance of strategic financial management in driving profitability and ensuring sustainable growth in Nigeria's manufacturing sector.

Concept of Profitability

Profitability is a fundamental measure of financial performance, reflecting a firm's ability to generate earnings after covering all costs and expenses. It serves as an indicator of operational efficiency, shareholder value, and long-term sustainability. In the Nigerian manufacturing sector, profitability can be influenced by internal factors such as liquidity, leverage, firm size, and sales growth. Liquidity ensures operational stability, particularly in an environment with high borrowing costs and limited financing options, while leverage, if optimally managed, can enhance profitability through tax benefits but may expose firms to financial distress in volatile economic conditions (Owolabi & Obida, 2012; Dioha et al., 2018). Firm size contributes to profitability through economies of scale, enabling cost efficiencies and competitive advantages, though its impact depends on strategic management structures. Sales

growth, reflecting revenue expansion, can directly influences profitability, particularly for firms that align with domestic demand and export opportunities, though challenges such as foreign exchange volatility and high production costs persist (Uwah & Akinninyi, 2020; Kouser et al., 2012).

Profitability is often assessed using absolute and relative metrics. While net profit margin and return on assets provide proportional insights, profit for the year, representing earnings after deducting expenses; offers a direct measure of financial success (Chibueze et al., 2024; Aldridge, 2015). Yahaya and Lamidi (2015) emphasize that financial performance evaluations should integrate both profitability indicators and firm-specific attributes. Prior studies, such as those by Pimentel et al. (2005) and Chandrapala and Knapkova (2013), recognize profitability as central to financial sustainability but have not fully examined the combined effect of liquidity, leverage, firm size, and sales growth in the manufacturing firms. This study extends existing research by analyzing the dynamic interplay of these factors within the manufacturing sector, providing empirical insights into how financial management strategies shape profitability under economic constraints.

Profit for the year is a key profitability metric for Nigerian manufacturing firms, influenced by economic and operational challenges such as high production costs, infrastructure deficits, and exchange rate volatility. Firms reliant on imported raw materials face cost fluctuations due to Naira depreciation, impacting profitability. Efficient cost management, including waste reduction, modern technology adoption, and local material sourcing, enhances profit for the year. Additionally, Nigeria's unreliable power supply forces firms to rely on costly alternative energy sources, further straining profitability. Investments in energy-efficient technologies can help mitigate these costs.

Market demand and pricing dynamics also influence profitability, as economic instability and inflation affect consumer purchasing power. Firms with diversified product lines and strong market strategies maintain stable revenue streams, mitigating demand fluctuations. Government policies, including taxation and tariffs, create financial uncertainties for manufacturers, particularly those dependent on imports. While policies like the local content initiative promote local production, inconsistent regulations impact firms' cost structures and profit for the year.

Access to affordable finance remains a challenge, especially for SMEs facing high-interest loans that raise capital costs and reduce profitability. Firms with better financial access can invest in expansion and production efficiency, improving profit for the year. Ultimately, Nigerian manufacturing firms that implement strategic cost management, energy efficiency, and market adaptability are better positioned to sustain profitability and enhance long-term financial performance.

Determinants of Profitability

Determinants of profitability have been considered by various scholar as a tool for financial decisions and business performance. Lang and Lundholm (2013) identified internal indicators, such as ownership structure, leverage, profitability, and liquidity, as key factors influencing decision-making. Dogan (2013) emphasized that liquidity, leverage, sales growth, and firm age, being within managerial control, significantly impact financial stability. Dioha et al. (2018) categorized these factors into financial variables, including firm size, sales growth, and non-financial variables, such as firm age and management competencies. This study focuses on liquidity, leverage, firm size, and sales growth as primary determinants of profitability, given their relevance in assessing financial performance and sustainability in Nigerian manufacturing firms.

Liquidity and Profit for the Year

Liquidity is a critical determinant of a firm's ability to meet short-term obligations while maintaining operational efficiency (Shim & Siegel, 2008). It ensures financial stability by preventing cash flow constraints that could disrupt operations or necessitate costly external financing (Bodie & Merton, 2000). However, excessive liquidity may indicate inefficient asset utilization, as idle funds do not contribute to revenue generation (Kesimli & Gunay, 2011). In contrast, inadequate liquidity exposes firms to solvency risks, leading to higher borrowing costs and missed investment opportunities (Lamberg & Vålming, 2009). Manufacturing firms, which require significant working capital for raw materials and production processes, must maintain an optimal liquidity level to balance operational flexibility with profitability (Khan & Ali, 2016). Effective liquidity management supports cost efficiency, minimizes financial distress, and enhances profit for the year by reducing unnecessary interest expenses and ensuring uninterrupted production cycles (Sanghan, 2014).

The relationship between liquidity and profit for the year underscores the importance of strategic financial management in sustaining profitability. Firms with stable liquidity can seize growth opportunities, improve cost control, and strengthen their financial resilience in volatile economic environments like Nigeria (Ware, 2015). The ability to convert assets into cash quickly ensures that firms meet their financial obligations without sacrificing investment in revenue-generating activities (Bodie & Merton, 2000). Liquidity ratios, such as the current ratio and quick ratio, are essential indicators for evaluating a firm's financial health and its capacity to optimize profitability (Sanghan, 2014). A well-balanced liquidity position allows firms to maximize profitability while mitigating risks associated with financial distress and economic uncertainties (Akinleye & Ogunleye, 2019). Therefore, maintaining optimal liquidity is imperative for driving annual profitability, enhancing financial stability, and ensuring long-term success in manufacturing sector.

H_{01}: Liquidity does not significantly affect profit for the year of manufacturing firms in Nigeria.

Leverage and Profit for the Year

Leverage refers to the extent to which a firm utilizes debt financing to support its operations and investments (Enekwe et al., 2014). It can enhance profitability by allowing firms to expand operations without diluting shareholder equity (Hovakimian, 2004). However, excessive leverage increases financial risk, as firms must meet fixed debt obligations regardless of revenue fluctuations (Tahu & Susilo, 2017). For manufacturing firms, leveraging debt strategically can facilitate capital-intensive investments in technology and production capacity, potentially improving profit for the year (Enekwe et al., 2014). Conversely, high leverage during economic downturns may lead to financial distress, increasing interest costs and eroding profitability (Popescu & Visinescu, 2009). The trade-off theory suggests that firms should balance the tax advantages of debt with the rising financial distress costs to achieve an optimal capital structure (Modigliani & Miller, 1963).

Effective leverage management is crucial for sustaining profitability while mitigating risks. Firms must ensure that debt financing generates returns exceeding its cost, as an imbalance can diminish profit for the year (Ojo, 2012). Debt can serve as a positive signal of managerial confidence in future cash flows, supporting financial stability and shareholder returns (Akpan et al., 2024). However, beyond a certain threshold, high leverage increases a firm's risk exposure, potentially reducing its value due to heightened bankruptcy costs (Tahu & Susilo, 2017). Manufacturing firms, given their capital-intensive nature, must adopt a strategic approach to leverage, aligning debt levels with expected earnings to optimize financial performance. Thus, maintaining an optimal debt ratio is essential for firms to enhance profitability while ensuring long-term financial sustainability (Enekwe et al., 2014).

H_{02}: Leverage does not significantly affect profit for the year of manufacturing firms in Nigeria.

Firm Size and Profit for the Year

Firm size is often positively associated with profitability, as larger firms benefit from economies of scale, stronger bargaining power, and diversified operations, leading to more stable revenue streams and cost efficiencies (Dang et al., 2016; Serrasqueiro & Nunes, 2008). Larger firms also have better access to financing and can spread fixed costs over a higher output volume, which enhances profit for the year (Sindhuja, 2017). However, inefficiencies, bureaucratic delays, and rising operational expenses may offset these benefits if not properly managed (Glen et al., 2003; Penrose, 1959). For manufacturing firms, expanding production capacity can drive higher profits, but effective resource management and cost control are essential to maximize profitability (Babalola, 2013; Isik et al., 2017).

Firm size is commonly measured by total assets, total sales, or market capitalization, with each metric offering insights into a firm's financial and operational capacity (Dang et al., 2016). Larger firms leverage their size for improved supplier negotiations, market competitiveness, and financial stability (Isik et al., 2017). While they can invest in capital-intensive sectors with limited competition, they must also navigate increased regulatory scrutiny and operational complexity (Babalola, 2013). The trade-off between firm size and profitability underscores the importance of strategic financial management in optimizing resources, mitigating risks, and ensuring sustainable long-term profitability in manufacturing firms (Sindhuja, 2017; Pervan & Višić, 2012).

H_{03}: Firms size does not significantly affect profit for the year of manufacturing firms in Nigeria.

Sales Growth and Profit for the Year

Sales growth is a fundamental driver of profitability, as higher sales volumes typically lead to increased revenue, provided that cost structures are effectively managed (Hand, 2005). In manufacturing firms, sales growth enhances fixed asset utilization, reduces unit costs, and improves profit margins (Browne, 2017). However, sustainable sales growth depends on adequate production capacity, marketing strategies, and supply chain management (Byron & Allsopp, 2002). Rapid expansion without necessary infrastructure may result in increased costs, quality issues, and customer dissatisfaction, which could erode profits (Kokemuller, 2016). Additionally, aggressive sales growth strategies often require significant investments in marketing, R&D, and distribution, which may reduce short-term profit margins but contribute to long-term profitability (Irfan, M., & Ali, 2017). Therefore, the relationship between sales growth and profit for the year hinges on a firm's ability to scale efficiently while managing operational expenses (Hawawini et al., 2003).

Sales growth, measured as the percentage increase in sales revenue over a given period, is a key indicator of a firm's market performance and operational efficiency ((Jang & Park, 2011; Hand, 2005). It reflects a firm's ability to innovate, optimize production, and adapt to market demands. Sales serve as the economic engine of a firm, directly influencing financial viability, shareholder returns, and market expansion (Kokemuller, 2016). A decline in sales suggests stagnation, limiting growth prospects and access to credit facilities (Byron & Allsopp, 2002). Investors and lenders closely monitor sales growth as a measure of a firm's financial health and sustainability (Browne, 2017). Effective management of sales growth enables firms to optimize operations, mitigate risks, and seize expansion opportunities, thereby enhancing long-term profitability in manufacturing firms (Ramitz & Junrui, 2014).

H_{04}: Sales growth does not significantly affect profit for the year of manufacturing firms in Nigeria.

Empirical Review

Empirical studies have explored various determinants of financial performance in Nigerian manufacturing firms. Aghaebe and Oranefo (2024) found that short-term debt to equity negatively affects ROA, while long-term and total debt to equity have non-significant effects, highlighting the need for better short-term debt management. Similarly, Appah et al. (2024) emphasized that profitability reduces financial distress, whereas financial leverage exacerbates it, reinforcing the importance of financial stability. Hamad (2024) noted mixed findings on capital structure and profitability, suggesting further research. Elaigwu and Ali (2024) revealed that thin capitalization and capital intensity do not significantly affect profit before tax, despite reducing tax liabilities. Ukwueze and Ajibo (2024) identified financial leverage as a key driver of firm performance, with significant Chi-square values for operating and consumer leverage. Zik-Rullahi and Nwosu (2024) found that the payment business model in fintech negatively impacts ROA, while the wealth management model lacks statistical significance. In Ghana, Alnaa and Matey (2023) demonstrated that higher credit risk reduces profitability, whereas capital adequacy enhances returns. While, Ariyo-Edu (2023) confirmed that higher debt levels decrease profitability due to rising interest rates, recommending capital structure optimization for better financial outcomes.

Studies on financial performance and capital structure further reveal varying effects across industries and regions. Atieno (2023) found that long-term debt negatively affects profitability in Kenyan commercial airlines, emphasizing debt management to mitigate default risks. Similarly, Chang et al. (2023) observed that debt level, capital intensity ratio, and profitability do not influence the effective tax rate in Indonesian tourism firms. Yu and Kim (2023) demonstrated that profitability and debt-to-equity ratio positively correlate, supporting the pecking order theory, where profitable firms prefer debt issuance. In Nigeria, Adewolu et al. (2022) revealed that cash and quick ratios negatively affect ROA, while the current ratio has a positive effect, highlighting the need for strategic liquidity management. Khoiriah (2022) found that while the current ratio does not significantly impact ROE, debt-to-equity ratio and asset turnover enhance profitability in Indonesian food and beverage firms. Leondo et al. (2022) established that both profitability and debt ratios negatively affect firm value in Japan, with company size acting as a moderating factor. These findings underscore the complex relationships between debt, liquidity, profitability, and firm value across different markets.

Studies have explored the relationship between financial metrics and profitability across different sectors. Olulu-Briggs and Orowhuo (2022) found that while liquidity had an insignificant effect on ROE, the debt-to-equity ratio significantly enhanced profitability among Nigerian firms. Similarly, Sukma et al. (2022) reported a positive relationship between long-term debt and profitability in Indonesian hospitality firms, while Susilawati et al. (2022) found that liquidity positively influenced ROA in pharmaceutical companies. Ali et al. (2021) highlighted the negative effect of excessive debt on profitability in Pakistan's energy sector, reinforcing the importance of liquidity.

Ayoush et al. (2021) further emphasized that financial leverage had the highest impact on profitability in Jordanian industrial firms, aligning with Akinninyi et al. (2025a) examined the effect of firm-specific attributes on audit fees in Nigerian financial service firms, finding that liquidity risk negatively impacts audit fees, while firm size and profitability significantly increase audit costs due to greater audit complexity. Leverage and operational risk had no significant effect. Similarly, Dahmash et al. (2021) found that firm size and asset growth positively influence profitability, while Hung et al. (2021) identified total assets as the strongest determinant of firm performance in Vietnam. Kasasbeh (2021) reported that total debt negatively affects profitability in Jordanian firms, though long-term debt has a positive impact. Prihatiningsih et al. (2022) observed that liquidity and solvency did not significantly influence firm value during the COVID-19 pandemic, underscoring economic conditions' moderating role. With an R^2 of 0.472829, Akinninyi et al. (2025b) concluded that effective liquidity management reduces audit costs, while large and profitable firms undergo higher audit scrutiny. The study emphasized governance implications, recommending robust internal controls and risk management to optimize audit fees and ensure financial stability.

Onyema (2021) found that debt financing, measured through long-term and total debt, significantly influenced the profitability of Nigerian manufacturing firms, highlighting the importance of capital structure management. Similarly, Orji et al. (2021) revealed that debt-equity financing positively affected ROE, suggesting a balanced mix enhances firm performance. Rahman and Yilun (2021) established a positive relationship between firm size and profitability but a weak negative link with firm age in Chinese firms. In Indonesia, Tarigan et al. (2021) showed that liquidity positively influenced EPS, while leverage had a significant negative effect. Wahyuni (2021) found that debt policy impacted the investment opportunity set in Indonesian property firms, while free cash flow and ROA did not. Zemenu (2021) observed that Ethiopian banks with higher debt ratios exhibited greater profitability, though firm size negatively affected ROA. In Nigeria, Edore and Ujuju (2020) indicated that all forms of debt positively influenced firm value. Olutokunbo et al. (2020) showed that firm size, audit fees, and corporate governance attributes significantly affected profitability in distributive firms. Rahman et al. (2020) found a negative relationship between financial leverage and profitability in Bangladeshi textile firms. Lastly, Shikumo et al. (2020) reported that short-term debt significantly boosted financial growth in Kenyan non-financial firms, influencing EPS and market capitalization.

METHODOLOGY

Research Design and Analysis

This study adopts an ex post facto research design to analyze historical financial data from audited annual financial statements of manufacturing firms listed on the Nigerian Exchange Group (NGX) over the period 2013 - 2023. The research relies on secondary data sources, ensuring an objective assessment of financial determinants and profitability of manufacturing firms in Nigeria; based on verifiable records, and employed various statistical techniques to ensure a rigorous empirical analysis. Descriptive Statistics provided insights into the distribution and variability of the financial indicators. A Unit Root Test was conducted to verify data stationarity, mitigating risks of spurious regression. Pairwise Granger Causality Test examined directional relationships between determinants of profitability - liquidity, leverage, firm size, and sales growth; and the dependent variable, profit for the year. The Panel Least Squares Regression Analysis, was used to evaluate the effects of multiple independent variables on profitability while controlling for firm-specific effects; which captures cross-sectional and time-series variations, ensuring reliable parameter estimates.

Population and Sampling Technique

The population comprises 34 manufacturing firms listed on the NGX as of 2023, with 27 firms having audited financial statements for the same year. The sample consists of 16 firms selected based on their consistent use of debt financing during the study period as illustrated in table 3.1. A judgmental sampling technique was employed to ensure that the selected firms aligned with the research objectives, particularly in examining the effect of firm-specific financial indicators on profitability.

Table 3.1: Population and sample distribution

Sectors	Firms Listed	Firms Audited	Debt financing
Consumer Goods Firms	21	19	9
Industrial Goods Firms	13	8	7
Total	**34**	**27**	**7**

Source: Author's compilation (2024)

Measurement of Variables

Table 3.2 Operationalization

Variables	Acronyms	Measurements	Source	Apriori Expectation
Dependent Variable				
Profit for the year	**PFY**	Log (Net income Total Revenue – Total Expenses)	Leondo et al. (2022)	
Independent Variables				
Liquidity	**LQT**	Current Ratio Current asset Current liability	Shikumo et al. (2020)	(+)
Leverage	**LVG**	Debt-to-Equity Ratio Total debt Shareholders' equity	Orji et al. (2021)	(-)
Firm size	**FMZ**	Log (Total Assets)	Hung et al. (2021)	(+)
Sale Growth	**SGR**	Log {(Sales Current Year – Sales Previous Year) / Sales Previous Year × 100}	Fahimeh & Shokat (2015	(+)

Source: Author's Operationalization (2024)

Model Specification

The relationship between the dependent and independent variables is expressed as:

$$PRFT = f(FFI) \quad \text{---(M. i)}$$

Where:

PRFT = Profitability, proxied by Profit for the Year (PFY)

(Dependent Variable)

FFI = Firm Financial Indicators, represented by:

1. Liquidity (LQT)
2. Leverage (LVG)
3. Firm Size (FMZ)
4. Sales Growth (SGR)

(Independent Variables)

The functional form of the model is expressed as:

$$PFY = f(LQT, LVG, FMZ, SGR) \quad \text{---(M. ii)}$$

To estimate the relationship econometrically, the regression model is specified as follows:

$$PFY_{it} = \beta_0 + \beta_1 LQT_{it} + \beta_2 LVG_{it} + \beta_3 FMZ_{it} + \beta_4 SGR_{it} + \epsilon_{it} \quad \text{--(M.iii)}$$

Where:

PFY_{it}: Profit for the Year for firm i at time t

LQT_{it}	=	Liquidity for firm i at time t
LVG_{it}	=	Leverage for firm i at time t
FMZ_{it}	=	Firm Size for firm i at time t
SGR_{it}	=	Sales Growth for firm ii at time t
β_0	=	Intercept term
$\beta_1, \beta_2, \beta_3, \beta_4$	=	Coefficients for each independent variable to be derived from the results of data analysis
ε_{it}	=	Error term for firm i at time t
i	=	Cross section of manufacturing firms studied
t	=	Time covered in the study (2013-2023)

Limitations of the study

There was inconsistency in debt financing among manufacturing firms listed on the Nigerian Exchange Group, with some firms utilizing debt only intermittently during the study period. To address this, the analysis was restricted to firms that consistently used debt financing for at least five of the eleven years covered. Additionally, the study period (2013-2023) experienced significant economic and regulatory fluctuations, such as recessions, shifts in monetary policy, and volatile exchange rates, which independently influenced financial performance. While the study concentrated solely on internal financial indicators and did not control for these external macroeconomic factors, data from reputable sources were used to ensure accuracy. However, the focus on a specific subset of firms that consistently used debt financing may limit the generalizability of the results to all manufacturing firms in other countries of the world.

Empirical Analysis and Results

Data Analysis and Hypothesis Testing

EViews 11.0 was used for data analysis, with hypotheses tested at a 5% significance level. The null hypothesis was accepted if the p-value exceeded 0.05, indicating no statistically significant effect, and rejected otherwise. The coefficient of determination (R^2) was applied to measure model fit, indicating the proportion of variance in profitability explained by the independent variables. This methodological approach ensures a rigorous examination of the determinants of profitability within Nigeria's manufacturing sector, offering empirical insights relevant to both academia and industry.

The analysis is based on 176 panel data observations from 16 manufacturing firms listed on the Nigeria Exchange Group over the period from 2013 to 2023. To prepare the data for regression analysis, using Panel Least Squares (PLS) Regression Model; Descriptive Statistics, the Unit Root Test (Levin, Lin & Chu t* Unit Root Test) were employed to assess the properties of the variables, and Pairwise Granger Causality Test was applied to investigate the directional relationships between the variables, offering complementary insights to the regression results. The primary method for hypothesis testing was the Panel Least Squares (PLS) Regression Model, used to test the four null hypotheses developed in the study. The results of these analyses are presented in Tables 4.1 to 4.4.

Descriptive Statistics

Table 4.1: Descriptive Statistics

	PFY	LQT	LVG	FMZ	SGR
Mean	12837714	1.728273	0.413182	1.84E+08	21125681
Median	2246104.	1.158500	0.110000	67961165	3070035.
Maximum	9.09E+08	37.20300	20.22000	1.22E+09	3.92E+08
Minimum	-1.06E+08	0.191000	-6.630000	1073865.	-95426390
Std. Dev.	71730330	3.246764	1.818530	2.35E+08	53797287
Skewness	11.14436	8.515927	7.229023	1.610419	4.052266
Kurtosis	140.1691	86.60799	83.43268	5.604720	25.72379
Jarque-Bera	141622.5	53389.46	48975.31	125.8280	4268.397
Probability	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	2.26E+09	304.1760	72.72000	3.24E+10	3.72E+09
Sum Sq. Dev.	9.00E+17	1844.759	578.7342	9.68E+18	5.06E+17
Observations	**176**	**176**	**176**	**176**	**176**

Source: Author's computation, (2024)

Table 4.1 presents the descriptive statistics of the study variables: Profitability (PFY), Liquidity (LQT), Leverage (LVG), Firm Size (FMZ), and Sales Growth (SGR). The findings indicate that the mean values for PFY, LQT, LVG, FMZ, and SGR are 12,837,714, 1.728, 0.413, 1.84E+08, and 21,125,681, respectively. Notably, the standard deviations for all variables exceed their mean values, indicating significant volatility in the data over the study period. The Jarque-Bera test results reveal p-values of less than 0.05 for all variables, indicating that the dataset follows a non-normal distribution. This conclusion is further supported by Skewness and Kurtosis measures, where the Skewness values exceed the benchmark of 1 and the Kurtosis values surpass the threshold of 3, reinforcing the deviation from normality in the data.

Unit Root Test

The unit root test is used determine whether a panel data series is stationary or non-stationary and essential for assessing the presence of unit roots, which, if undetected, can lead to misleading regression results.

Table 4.2: Levin, Lin & Chu t* Unit Root Test

Method	Statistic	Prob.**
Levin, Lin & Chu t*	-2.78575	0.0027

** Probabilities are computed assuming asymptotic normality

Source: Author's computation, (2024)

Table 4.2 presents the results of the Levin, Lin & Chu t* Unit Root Test. The findings indicate that all variables in the study are integrated of order I(1), with a statistically significant p-value of 0.0027 at a 5% level. This suggests that while the variables contain unit roots at their levels, they become stationary after first differencing, confirming the potential for co-integration among the variables under study.

Pairwise Granger Causality Test

The Pairwise Granger Causality Test assesses the predictive relationships between the study variables, determining whether past values of one variable contain useful information for forecasting another. A statistically significant p-value indicates the presence of a Granger causality relationship.

Table 4.3: Pairwise Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
LQT does not Granger Cause PFY	144	0.57317	0.5651
PFY does not Granger Cause LQT		2.44186	0.0907
LVG does not Granger Cause PFY	144	4.79439	0.0097
PFY does not Granger Cause LVG		3.98090	0.0208
FMZ does not Granger Cause PFY	144	0.73531	0.4812
PFY does not Granger Cause FMZ		1.12920	0.3262
SGR does not Granger Cause PFY	144	1.26837	0.2845
PFY does not Granger Cause SGR		0.56898	0.5674
LVG does not Granger Cause LQT	144	0.20745	0.8129
LQT does not Granger Cause LVG		0.15639	0.8554
FMZ does not Granger Cause LQT	144	1.50044	0.2266
LQT does not Granger Cause FMZ		0.77723	0.4617
SGR does not Granger Cause LQT	144	1.70943	0.1848
LQT does not Granger Cause SGR		1.26074	0.2867
FMZ does not Granger Cause LVG	144	13.4927	4.E-06
LVG does not Granger Cause FMZ		0.01880	0.9814
SGR does not Granger Cause LVG	144	0.55486	0.5754
LVG does not Granger Cause SGR		0.34947	0.7057
SGR does not Granger Cause FMZ	144	3.34110	0.0383
FMZ does not Granger Cause SGR		5.61757	0.0045

Source: Author's computation (2024)

The results in Table 4.3 reveal that Leverage (LVG) Granger-causes Profitability (PFY) at a 1% significance level, suggesting a predictive relationship between leverage and firm profitability. Similarly, Profitability (PFY) Granger-causes Leverage (LVG) at a 5% significance level, indicating bidirectional causality. However, no significant Granger causality relationships were found between other variables and profitability.

Panel Least Squares Regression Analysis

The Panel Least Squares Regression Analysis is a robust statistical technique employed in this study to examine the relationship between the determinants of profitability and firm profitability over time across manufacturing firms. This method quantifies the effect of each financial indicator on firm performance while mitigating potential biases and inconsistencies that could arise from analyzing either cross-sectional or time-series data in isolation. The regression results are presented in Table 4.4

Table 4.4: Panel Least Square Regression Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LQT	0.365570	0.241451	1.514056	0.0320
LVG	0.155427	0.442786	0.351021	0.7260
FMZ	-3.369313	1.127163	-2.989198	0.0033
SGR	0.066282	0.062117	1.067045	0.2876
C	69.15366	19.88858	3.477054	0.0007
R-squared	0.592575	Mean dependent var		10.57614
Adjusted R-squared	0.533978	S.D. dependent var		10.69855
S.E. of regression	9.664421	Akaike info criterion		7.481424
Sum squared resid	14570.56	Schwarz criterion		7.841707
Log likelihood	-638.3653	Hannan-Quinn criter.		7.627553
F-statistic	3.076583	Durbin-Watson stat		1.736817
Prob(F-statistic)	0.000061			

Source: Author's computation (2024)

The regression results for the sixteen manufacturing firms indicate that the Adjusted R^2 is 0.533978, implying that approximately 53% of the variation in Profit for the Year (PFY) is explained by Liquidity (LQT), Leverage (LVG), Firm Size (FMZ), and Sales Growth (SGR), while the remaining 47% is attributed to unobserved firm-specific characteristics and external economic factors. The Durbin-Watson statistic of 1.736817 suggests no severe autocorrelation concerns. The F-statistic of 3.076583 ($p = 0.000061$) confirms the overall significance of the model, with an R^2 of 0.592575 reflecting a reasonable goodness-of-fit. Liquidity (0.365570, $p = 0.0320$) has a significant positive effect on profitability, while Leverage (0.155427, $p = 0.7260$) and Sales Growth (0.066282, $p = 0.2876$) do not exhibit statistically significant effects. Firm Size (-3.369313, $p = 0.0033$) negatively impacts profitability. Model efficiency is further

supported by low Akaike Information Criterion (AIC), Schwarz Criterion (SC), and Hannan-Quinn Criterion (HQC) values, confirming optimal specification.

Test of Hypotheses

Hypothesis One

$H_{0.1}$: Liquidity does not significantly affect Profit for the Year (PFY) of manufacturing firms in Nigeria.
$H_{1.1}$: Liquidity significantly affects Profit for the Year (PFY) of manufacturing firms in Nigeria.
Decision: Since the p-value for Liquidity (LQT) is 0.0320 (< 0.05), we reject the null hypothesis and conclude that liquidity significantly affects profitability.

Hypothesis Two

$H_{0.2}$: Leverage does not significantly affect Profit for the Year (PFY) of manufacturing firms in Nigeria.
$H_{1.2}$: Leverage significantly affects Profit for the Year (PFY) of manufacturing firms in Nigeria.
Decision: The p-value for Leverage (LVG) is 0.7260 (> 0.05), indicating statistical insignificance. Thus, we fail to reject the null hypothesis, concluding that leverage does not significantly affect profitability.

Hypothesis Three

$H_{0.3}$: Firm size does not significantly affect Profit for the Year (PFY) of manufacturing firms in Nigeria.
$H_{1.3}$: Firm size significantly affects Profit for the Year (PFY) of manufacturing firms in Nigeria.
Decision: The p-value for Firm Size (FMZ) is 0.0033 (< 0.05), indicating significance. Thus, we reject the null hypothesis and conclude that firm size significantly affects profitability.

Hypothesis Four

$H_{0.4}$: Sales Growth does not significantly affect Profit for the Year (PFY) of manufacturing firms in Nigeria.
$H_{1.4}$: Sales Growth significantly affects Profit for the Year (PFY) of manufacturing firms in Nigeria.
Decision: The p-value for Sales Growth (SGR) is 0.2876 (> 0.05), indicating insignificance. Therefore, we fail to reject the null hypothesis, concluding that sales growth does not significantly affect profitability.

Summarily, the hypothesis tests indicate that liquidity (p = 0.0320) and firm size (p = 0.0033) significantly affect Profit for the Year (PFY) of Nigerian manufacturing firms, leading to the rejection of their respective null hypotheses. Conversely, leverage (p = 0.7260) and sales growth (p = 0.2876) do not exhibit statistically significant effects, resulting in the failure to reject their null hypotheses. These findings suggest that

liquidity and firm size are key determinants of profitability, while leverage and sales growth do not significantly influence profitability within the model framework.

Model Estimations and Implications

Model Estimations

The regression model, as specified in model M.(iii), was estimated using Panel Least Squares (PLS) to quantify the effect of liquidity, leverage, firm size, and sales growth on profit for the year. Based on the regression results presented in Table 4.4, the estimated model, along with the corresponding coefficient values, is as follows:

$$PFY_{it} = \beta_0+\beta_1 LQT_{it}+\beta_2 LVG_{it}+\beta_3 FMZ_{it}+\beta_4 SGR_{it}+\epsilon_{it} \quad - \quad M.(iii)$$

Substituting the estimated coefficients into the model:

Where:

β_0 (Constant or Intercept) = 69.15366
β_1 (Coefficient of Liquidity, LQT) = 0.365570
β_2 (Coefficient of Leverage, LVG) = 0.155427
β_3 (Coefficient of Firm Size, FMZ) = -3.369313
β_4 (Coefficient of Sales Growth, SGR) = 0.066282

Thus, the estimated regression equation based on the coefficients is:

$$PFY_{it} = 69.15366 + 0.365570LQT_{it} + 0.155427LVG_{it} + -3.369313FMZ_{it} + 0.066282SGR_{it} + \epsilon_{it}$$

This equation represents the estimated relationship between the independent variables and profit for the year in the studied manufacturing firms.

Implications of model estimations

The regression analysis reveals that liquidity has a positive and statistically significant effect on profitability, suggesting that firms with better liquidity management perform better financially. Leverage exhibits a modest positive effect on profitability, though it is not statistically significant, indicating that borrowing levels may not strongly influence profits. Firm size negatively affects profitability, implying that larger firms may face inefficiencies and higher operational costs that reduce earnings. Sales growth has a weak and insignificant effect, suggesting that increasing sales does not necessarily translate into higher profitability, possibly due to rising costs or pricing strategies. These findings highlight the importance of liquidity management while cautioning large firms to optimize processes to mitigate profit declines. Managers should focus on financial strategies that enhance profitability rather than relying solely on firm size or sales growth.

CONCLUSION, IMPLICATIONS AND RECOMMENDATION

Conclusion

This study examined the effect of firm financial indicators on the profitability of manufacturing firms in Nigeria, focusing on liquidity, leverage, firm size, and sales growth. Using Panel Least Squares (PLS) regression, the findings revealed that liquidity and firm size significantly influence profitability, while leverage and sales growth, though positively related, did not exhibit statistically significant effects. The results suggest that firms with higher liquidity and optimal firm size are better positioned to achieve superior financial performance, underscoring the importance of efficient resource management and strategic scaling. The study also highlights that leverage and sales growth, while important, may play more complex roles in profitability determination. Furthermore, the adjusted R^2 of 0.533978 indicates that approximately 53% of the variation in profitability is explained by the independent variables, with the remaining 47% attributable to other factors not captured in the model. This suggests that while firm-specific financial indicators are essential, external macroeconomic factors and industry-specific dynamics may also influence profitability outcomes

Implications of the Study

The findings of this study have significant implications for theory, management, and policy. Theoretically, the study extends existing literature by emphasizing liquidity as a long-term determinant of profitability in manufacturing firms, rather than merely a short-term operational concern. It challenges the assumption that larger firms inherently enjoy economies of scale, instead highlighting the importance of optimal firm size for sustained profitability. Additionally, the study underscores that leverage does not always enhance profitability, reinforcing the need for firms to maintain a balanced capital structure to mitigate financial risks. The findings also suggest that sales growth alone is insufficient to drive profitability, emphasizing the importance of aligning growth strategies with cost management and operational efficiency.

From a managerial perspective, firms should prioritize liquidity management to ensure financial stability and the ability to seize investment opportunities. Strategic expansion should focus on optimizing operational efficiency rather than simply increasing scale. Since leverage did not have a significant effect, managers should adopt a cautious approach to debt financing, ensuring it aligns with the firm's capacity to generate returns. Policymakers can support these efforts by introducing financial incentives for firms maintaining healthy liquidity ratios and providing regulatory frameworks that guide sustainable capital structures. Furthermore, initiatives such as access to credit, tax incentives, and infrastructure development could facilitate firm growth and enhance the profitability of Nigeria's manufacturing sector.

Recommendations

To enhance financial performance, manufacturing firms should optimize liquidity management by improving cash flow efficiency, avoiding excessive cash holdings, and ensuring that liquidity constraints do not hinder operations. Firms must also adopt a balanced capital structure, utilizing leverage efficiently without exposing themselves to financial distress, thereby maintaining sustainable growth.

Strategic firm expansion should prioritize efficiency and competitiveness through investments in technology, production capacity, and market expansion rather than mere scale enlargement. Additionally, firms should refine their sales growth strategies by focusing on pricing, product differentiation, and market penetration to ensure that increased sales contribute meaningfully to profitability.

Future studies could incorporate macroeconomic variables such as inflation, interest rates, and exchange rate fluctuations to assess their influence on profitability in manufacturing firms. This would provide a broader understanding of external economic factors affecting financial performance.

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