

Empirical Analysis of Cost Management and Profitability of Manufacturing Companies in Nigeria



Adesina, Olufemi Dadebo¹, Tiamiyu, Tesleem Ajibola²

¹Department of Accountancy, School of Business and Management Studies, Federal Polytechnic, Ile- Oluji, Ondo State, Nigeria

²Tiamiyu Tesleem Ajibola, Academic Planning Unit, Federal Polytechnic, Ile Oluji, Ondo State Nigeria,

¹ORCID ID 0000-0001-9675-2941

ABSTRACT: Cost management plays a crucial role in determining the profitability and sustainability of manufacturing firms. The purpose of this research is to analyse the relationship between cost management and the bottom line of Nigerian manufacturing firms, namely those producing industrial and consumer goods. This study uses descriptive statistics and panel regression analysis to examine the relationship between cost management variables and profitability indicators, such as Return on Assets (ROA), Return on Equity (ROE), and Net Profit Margin (NPM). The data for the study comes from the annual reports of companies listed on the Nigerian Exchange Group (NGX) from 2014 to 2023. Results show that administrative expenditures, marketing and distribution charges, and excessive production costs all cut into profits. The report suggests using AI-driven automation, lean manufacturing, and activity-based costing (ABC) to make things more efficient and save money. This study adds to the existing body of knowledge by recommending policies that would improve the industrial sector's financial performance in Nigeria and by incorporating modern methods of cost management.

KEYWORDS: Cost Management, Profitability, Manufacturing Firms, Activity-based costing, Nigeria.

INTRODUCTION

For manufacturing organisations, cost control is absolutely important since it immediately affects sustainability, competitiveness, and profitability. These businesses can maximise their manufacturing processes, distribute resources more wisely, and guarantee the delivery of quality products at reasonable rates by means of efficient cost control. Reducing manufacturing costs by improving supplier contracts, acquiring alternative materials, and minimising waste depends on monitoring and regulating the cost of raw resources (Smith, 2020). Effective workforce planning, training, and productivity improvements help manage labor costs, while automation and advanced technologies reduce dependency on manual labor (Johnson & White, 2021). Overhead costs, including utilities, maintenance, and administrative expenses, can be minimized through energy-efficient processes, preventative maintenance, and lean management (Lee, 2019). Maintaining optimal inventory levels through practices like just-in-time (JIT) reduces storage costs, prevents wastage, and minimizes capital tied up in stock (Brown, 2022). Streamlining production processes and implementing lean manufacturing principles enhance operational efficiency by reducing waste and improving productivity (Taylor, 2020). Investing in advanced technologies such as automation, AI, and IoT improves precision, reduces errors, and drives long-term cost savings (Hernandez, 2023). Efficient supply chain management ensures timely delivery of materials and products, reduces logistics costs, and strengthens supplier and distributor relationships (Evans, 2021). Sustainability initiatives, including energy-efficient equipment and waste recycling, lower operational costs while improving compliance and reputation (Green, 2020). Through the ongoing assessment of these cost determinants, manufacturing firms may optimise financial performance, pinpoint areas for enhancement, and sustain a competitive advantage in the marketplace. In Nigeria, where the manufacturing sector is expanding fast, comprehending the empirical analysis of cost management and profitability is more vital due to the distinct problems and opportunities present in the Nigerian market.

The proportion of fixed and variable costs in the companies defines their cost structure (Pualam & Wibowo, 2019). Divined into fixed and variable expenses, cost structure is an outline of the funding structure into the several operations of an organisation (Chen et al., 2019). For the accounting, cost control, decision-making, and planning, cost structure analysis is crucial (Dahal, 2018). Classifying mixed cost as direct and indirect can help one to understand cost behaviour (Awotomlusi et al, 2022). Cost management

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is the thorough study of cost drivers, cost structures, and cost control systems to find areas of development and apply plans that maximise expenses without sacrificing customer satisfaction or product quality. Among the several operations that fall under cost management are cost accounting, cost control, cost analysis, and cost reduction plans. Manufacturers have to balance operational efficiency and cost control without sacrificing product quality or manufacturing capability. The whole economic development of the sector depends on an awareness of how manufacturing companies in Nigeria handle cost control and how these strategies affect profitability.

A corporation with a balanced Cost Structure, according to Gunarathne and Samudrage (2018), has a better probability of improving financial performance. According to Johnson (2018), in order to achieve financial success and healthy growth, there should be a consistent and continual improvement in effective planning and other operations within the organization.

Profitability is the ultimate goal for manufacturing companies. It reflects the ability of a company to generate profits from its operations, considering both revenue and costs. Maximizing profitability requires a delicate balance between revenue generation, cost management, and operational efficiency (Jones, 2021). Profitability is the primary driver of a company's financial stability. It provides the necessary funds for investment in new technology, equipment, research, and development, which are essential for maintaining a competitive edge in the market (Smith & Brown, 2020). Profitable companies are better equipped to weather economic downturns, unforeseen expenses, and fluctuations in demand (Taylor, 2019). Therefore, profitability is the lifeblood of manufacturing companies; it enables them to invest in growth, innovation, employee welfare, and sustainable practices, all of which contribute to their long-term success and impact on society. This study employs three profitability ratios and measures: return on assets (ROA), return on equity (ROE), and net profit margin (NPM). ROA measures the returns to all assets and is often used as an overall index of profitability. The higher the ROA value, the more profitable the business (Green, 2022). ROE measures the rate of return on the owners' equity employed in the business. The relationship between ROE and ROA is crucial because ROE is affected by both ROA and the financial leverage (debt) employed by the company. ROA directly impacts ROE because ROE is a function of ROA. A higher ROA generally results in a higher ROE, assuming the equity multiplier remains stable (Hernandez & Lee, 2021). This is because higher profitability on assets translates to higher profitability on equity. Financial leverage (debt) amplifies the return on equity. If a company uses debt to finance its operations, it can generate a higher ROE compared to its ROA because debt allows the company to magnify the return to shareholders, provided the return on assets exceeds the cost of borrowing (Evans, 2023). Net profit margin (NPM) is a financial metric used to assess a company's profitability and efficiency in generating profits from its operations. It measures the percentage of revenue that remains as profit after all expenses, taxes, and other costs have been deducted. In other words, it shows how much profit a company earns for each naira of revenue it generates (Brown, 2022). Cost and profit in business undertakings form part of what determines the financial position of a business concern. Therefore, it becomes imperative for companies to analyze and optimize their cost management strategies to enhance profitability. Effective cost management practices allow companies to optimize their resources, minimize expenses, and maximize profitability (Johnson & White, 2020).

STATEMENT OF THE PROBLEM

The manufacturing industry in Nigeria is essential to the nation's economic growth and development. This sector encounters various problems that impede its sustainable profitability and expansion. Inefficient cost management procedures emerge as a substantial obstacle among these difficulties. Numerous industrial firms in Nigeria face challenges in efficiently managing their costs, resulting in heightened production expenditures, resource inefficiency, and diminished profitability. The lack of appropriate cost management techniques adversely impacts financial performance and diminishes competitiveness against global firms. Thus, these inefficiencies impede the attainment of financial stability and market competitiveness.

Efficient cost management is an essential strategy for addressing these difficulties. Through the implementation of effective cost management strategies, manufacturing firms can regulate expenditures, minimise waste, enhance resource allocation, and boost productivity. Effective cost management promotes increased operational efficiency, resulting in higher profitability and competitiveness. Companies that implement lean manufacturing processes or invest in energy-efficient technologies can substantially decrease overhead expenses. Moreover, effective cost management enables enterprises to reinvest savings into innovation, employee development, and market growth. This strategic method ultimately enhances their market share and guarantees long-term viability.

A significant factor hindering effective cost management in Nigerian manufacturing is the absence of openness in cost allocation. Numerous organisations encounter difficulties in precisely assessing the costs linked to certain goods or manufacturing processes. This lack of clarity in cost allocation can lead to misinformed decisions, such as continuing to produce unprofitable products or underestimating the potential of high-margin segments. In the absence of a comprehensive grasp of cost structures, organisations are unable to accurately identify and concentrate on their most lucrative sectors. Resolving this issue necessitates a

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thorough examination of efficient cost management systems that prioritise appropriate cost allocation techniques. Activity-based costing (ABC) enables producers to allocate overheads with greater precision, offering a more transparent view of profitability across various goods and processes.

A notable difficulty is the effect of variable input costs. Nigerian manufacturing enterprises rely significantly on inputs such as raw materials, labour, and energy, the costs of which are frequently affected by external variables including global market dynamics, exchange rate fluctuations, and local economic situations. These swings can significantly affect the profitability of manufacturers, especially in a competitive landscape where price modifications may be impractical. Effectively managing these cost swings is crucial for long-term viability. Implementing long-term supplier agreements, hedging against currency fluctuations, and implementing energy-efficient technology can alleviate the negative impacts of fluctuating input costs. Furthermore, organisations may investigate alternative sourcing options to mitigate reliance on unstable markets and stabilise their cost frameworks.

The Nigerian manufacturing industry must prioritise effective cost management to tackle the difficulties of escalating production costs, insufficient transparency in cost allocation, and variable input prices. Through the implementation of optimal cost management strategies, manufacturers can attain sustainable growth, improve their competitiveness, and more significantly contribute to Nigeria's economic advancement. This necessitates thorough research and pragmatic tactics customised to the specific constraints of the Nigerian manufacturing sector.

Many empirical studies analyzed a limited number of companies or focused on specific industries (e.g., cement, breweries, food manufacturers). Siyanbola and Raji (2013) focused only on West African Portland Cement Plc (WAPCO), Ezejiofor et al. (2016) examined only five food manufacturing firms in Nigeria, Lyndon and Paymaster (2016) focused exclusively on publicly traded Nigerian breweries, Adamu (2022) conducted a case study on Grand Cereals and Oil Mills Limited, Awotomilusi et al. (2022) examined only seven manufacturing firms producing industrial goods listed on the Nigerian Exchange Group, Akinleye and Fajuyagbe (2022) studied 20 annual reports from non-financial businesses in Nigeria. Oyerogba et al. (2014) used data from 40 manufacturing firms listed on the Nigerian Stock Exchange (2003–2012). This research expands the sample to multiple firms specifically consumer goods and industrial goods covering a more recent period (2014–2023) for a more up-to-date analysis. It includes a diverse range of cost management factors beyond traditional measures.

A notable issue in Nigerian manufacturing firms is the lack of proper cost allocation, leading to misinformed decision-making. Some studies mentioned cost control practices but did not extensively address transparency and accuracy in cost allocation. (Oyerogba et al. (2014); Ezejiofor et al. (2016); Mamidu and Akinola (2019); Akinleye and Fajuyagbe (2022); Ali-Momoh (2022); Adamu 2022).

Previous research relied heavily on secondary quantitative data, such as financial statements and correlation/regression analysis. Few studies incorporated qualitative methods, such as managerial insights to understand how cost management strategies are implemented in practice. Oyerogba et al. (2014); Ezejiofor et al. (2016); Lyndon and Paymaster (2016); Mamidu and Akinola (2019) Akinleye and Fajuyagbe (2022); Ali-Momoh (2022); Adamu 2022). This study will fill this gap by employing mixed-method approach integrating quantitative (financial data analysis) and qualitative (managerial perspectives) for a holistic view of cost management strategies which enhances practical insights in understanding how cost control techniques are applied in practice, beyond just financial reports. The study will facilitate decision-Making Process by exploring the rationale behind cost management strategies, which is missing in prior studies.

Some past studies used only a single profitability metric (e.g., profit after tax or gross profit margin), which may not fully capture a company's financial health. (Lyndon and Paymaster (2016); Ali-Momoh (2022); Ezejiofor et al. 2016). This study incorporates multiple profitability indicators, such as Return on Assets (ROA), Return on Equity (ROE), and Net Profit Margin (NPM), for a more comprehensive assessment. Industry-Specific Insights:

Some empirical studies analyzed manufacturing firms as a whole without distinguishing between different subsectors. The current study narrows its focus to consumer goods and industrial goods manufacturing companies to provide more targeted insights. While some older studies emphasized traditional budgeting and cost-cutting strategies, they did not extensively analyze modern cost management tools such as activity-based costing (ABC), lean manufacturing, AI-driven automation, or sustainability-driven cost management. This study aims to incorporate these contemporary cost management approaches.

OBJECTIVES OF THE STUDY

This study aims to provide an in-depth empirical analysis of cost management and profitability within manufacturing companies in Nigeria. By examining the various factors influencing cost management practices and their impact on profitability, this research addresses the following specific objectives:

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- (i) examine the challenges faced by manufacturing companies in Nigeria regarding cost management, including inadequate infrastructure, high energy costs, regulatory constraints, and intense market competition.
- (ii) evaluate the key cost drivers specific to the Nigerian manufacturing sector, such as raw material costs, labor expenses, energy costs, logistics costs, and overhead expenses.
- (iii) Identify and analyse the cost management tactics utilised by manufacturing firms in Nigeria, including cost control measures, cost allocation techniques, and cost reduction activities.
- (iv) Evaluate the correlation between operational expenses and profitability metrics, namely returns on assets (ROA), return on equity (ROE), and net profit margin (NPM) of the chosen manufacturing firms.

This study aims to investigate the significant issues encountered by manufacturing firms in Nigeria regarding cost management and profitability. The research is to identify and comprehend these challenges in order to suggest solutions and recommendations that boost cost efficiency, improve profitability, and promote sustainable growth in the Nigerian manufacturing sector. The provides an in-depth empirical analysis of cost management and profitability within manufacturing companies in Nigeria. By examining the various factors influencing cost management practices and their impact on profitability, this research will contribute valuable insights to both academics and practitioners in the field.

Literature Review

Conceptual Review

Cost management

Cost of Sales (Material and Conversion Costs), Distribution and Administrative Costs, and Finance Costs are the ways in which manufacturing businesses present and categorise their costs in their financial reports (2020 Dangote Financial Report). Cost is an measurement of the economic resources that have been or will be sacrificed in the future in order to achieve a specific goal (DeltaCPE, 2017, Lawal, 2017). If they want to keep the quality of their products high and maximise their profits, organisations, particularly those in the manufacturing sector, need to master the art of cost management. This includes sales, administrative, and financing costs. Actions made by management to satisfy consumers while consistently lowering and regulating expenses can be categorized as cost management (Adeniji, 2002). According to Fadare & Adegbie (2020), cost management is the management of real or anticipated costs incurred by a business or organization. A commercial entity may utilise it to forecast forthcoming expenditures and avert over spending. It denotes the approach employed by management to assess and optimise manufacturing or operational processes for cost control and future management.

Cost of Sales

The aggregate of all direct expenses related to the acquisition or production of the commodities sold by a business is referred to as the "cost of goods sold" or "cost of sales," as indicated by the terminology. It is an essential metric for assessing the gross margin or gross profit of an enterprise. In financial reporting for businesses, gross profit is calculated by subtracting cost of sales from revenue (Hayes, 2020). The expenses for raw materials utilised in production and conversion costs are incorporated in the cost of goods sold. The expense associated with transforming procured and utilised raw materials into completed or partially completed goods is termed conversion cost. The total of direct wages, direct expenses, and absorbed production overheads make up this conversion cost (Lucy, 2009). Francisca & Christina (2019) defined cost of sales as an expense made when producing and selling goods in a market as a part of business operations. The disclosure of cost of goods sold is recognized as a functional expense by the International Accounting Standard (IAS)2 (Deloitte, 2020). A company needs to keep its cost of goods sold under control by consistently reducing its raw material and conversion costs if it wants to have a healthy gross margin that can cover its distribution and administration costs and financing costs (Lawal, 2017). If this does not happen, the company's financial stability could be jeopardised due to the possibility of ongoing losses.

Distribution and Administrative Cost

Distribution costs encompass all direct and indirect expenses necessary for the effective distribution of products. Thus, it is not only related to the direct costs of activities for marketing the products, securing orders, and shipping products; it also includes the costs related to the general management functions as long as they have to do with the creation of marketing policies, the oversight of the work of sales management, and the provision for the control over the business's financial factors (Castenhol, 1927). The word "distribution expenses" in accounting may also denote "marketing and distribution costs" or "sales and distribution costs." This is due to the fact that marketing and distribution expenses are generally categorised together in cost classification. The financial accounting of a manufacturing organisation must accurately represent all incurred costs. These expenditures can be categorised as manufacturing and non-manufacturing costs (Bala, 2013). Marketing and selling expenses, together with administrative expenditures, may be classified as non-manufacturing costs. The many components of the financial statement are

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influenced by each cost category, rendering these categories essential for manufacturing enterprises. Manufacturing expenses affect the cost of goods manufactured statement, whereas non-manufacturing expenses influence the income statement as expenses of the current period expenses. Non-manufacturing costs include marketing, distribution, and administrative costs that are predominantly incurred in the current period with the goal of producing revenue (Bala, 2013; Hayes & Mansa, 2020). The profit of a company is typically impacted by selling, distribution, or administrative costs (Oyedokun et al., 2019).

Finance Cost

Business organizations—especially those in the industrial sector—usually need large resources or finance if they are to keep constant operations and production. Most of the time, business owners are not able to provide these tools, which results in insufficient money for both growth and running expenses. According to Bazot (2014), the primary purpose of finance is to shift resources from players with surpluses to those in deficit. Commonly, financial intermediation is used to accomplish this. Bazot (2014) continues by saying that financial intermediation pools risk, offers liquidity, and lessens knowledge asymmetries that obstruct the transmission of funds. Usually, these funds come with a fee to cover the risks that the fund providers are willing to incur. The International Accounting Standard (IAS) 23 defines interest and other charges paid by an entity in relation with borrowing money, therefore defining finance costs. It goes by another name, borrowing expenses as well. The funding for the operations of a firm might come from several angles. Equity financing, borrowings, or loans could be the funding source; while loan providers desire interest payments on their investments, equity fund providers seek dividends and capital gains as compensation for the risks involved in releasing their money. The interest rate of borrowing money and obtaining loans is what drives their cost. Interest paid on long-term debt includes mortgages on real estate as well as interest paid on short-term debt like bank overdrafts and notes outstanding are part of the expenses in finance. But a more inclusive definition of finance covers costs beyond interest payments. Finance charges for finance leases, amortization of discounts or premiums related to borrowings, amortization of ancillary costs incurred in connection with borrowing arrangements, exchange differences resulting from foreign currency borrowings to the extent that they are regarded as an adjustment to interest costs, and so on (Ready Ratios, 2020). Borrowing money to fund an organization's operations could have a financial leverage effect, increasing risks for holders of common stock (Ashmarine et al., 2016).

Return on Assets (ROA)

A company's return on assets (ROA) indicates how efficiently it turns its assets into profit. This metric reveals the return on investment (ROI) of a company's assets relative to the investment of capital. ROA is calculated by dividing net income by average total assets. Return on assets (ROA) serves as a common metric for asset utilisation, facilitating the assessment of profitability among enterprises within the same industry. Another objective is to assess the evolution of a business over time and identify trends in its asset management. A high return on assets (ROA) indicates that a company is effectively utilising its assets to generate profit. The business demonstrates efficiency in resource utilisation and the ability to convert investments into earnings.

Return on Equity (ROE)

ROE measures a company's efficiency in generating profits from the investments made by its shareholders. It reveals the profit a business may turn for every dollar of shareholder ownership. Net Income divided by average shareholder equity yields the ROE. From the standpoint of its owners, ROE helps one assess the profitability of a company. It can enable investors to evaluate the possible returns on their assets and contrast the shareholder value generation performance of several organisations. A better ROE shows that the business is more successful in turning over earnings for its owners. It implies that the business is efficiently using its equity financing and can provide significant returns for its investors.

Net Profit Margin

After accounting for all sales and running expenses, operating profit margin reveals the relative company efficiency. Computing operating profit margin or ratio mostly concentrates on the evaluation of managerial operational efficiency. Operating profit is the net profit generated by an organization's regular business operations and activities, excluding any unrelated transactions and expenses of a purely financial nature (Tulsian, 2014). Tulsian (2014) explained this concept by noting that, the greater the operating profit ratio, the better the company's operational efficiency would be and that a higher operating profit ratio is a sign that the company is able to reduce its operating costs. Operating profit margin or operating profit Ratio is computed as:

THEORETICAL FRAMEWORK

Stakeholder Theory

Freeman, propounded the stakeholders' theory in 1984, attributed the first definition of stakeholder to the 1963 Stanford Research Institute report, which describes groups without whose support the company would not be able to survive. Freeman

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keeps changing the concept of stakeholders in an attempt to advance this theory in such a way that it is suitable and suited for development in the corporate world and changes in business models. He defined stakeholders in 1984 as any group or person who can influence or is influenced by the accomplishment of the organisational goals. He defined stakeholders in 2004 as those entities absolutely necessary for the life and prosperity of the company. Still, this concept was thought to be too structured.

Hence, Friedman in 2006 noted that the Freeman definition of stakeholder in 1984 was more balance and acceptable in academics (Fontaine et al., 2006). Yusoff & Alhaji (2012) explaining stakeholder noted that the traditional view of firms sees shareholder as the only stakeholders recognized by business law in most countries because, they are the owners of the companies. Consequently, companies possess a fiduciary obligation to optimise their returns and prioritise the interests of shareholders. The latest business model acknowledges that institutions transform inputs from investors, employees, and suppliers into marketable products, subsequently providing returns to stakeholders. This model covered the needs of investors, employees, suppliers, and customers. Consequently, the primary groups identified by the theory as stakeholders comprise: Shareholders, Employees, Customers, Suppliers and Distributors, and Local Communities. Consequently, in reaction to contemporary business models, the theory broadens the definition of stakeholders to encompass governmental entities, political organisations, trade associations, labour unions, communities, affiliated firms, potential employees, and the general public. Also there are cases where competitors and prospective clients can be regarded as stakeholders to help improve business efficiency in the market place (Fontaine et al., 2006; Yusoff & Alhaji, 2012).

The thrust of this theory is that the actions of the aforementioned stakeholders may influence either cost management or the financial sustainability of an organisation. Investors, as shareholders, must supply the requisite capital for acquiring modern facilities that can improve production efficiency; suppliers must ensure the availability of raw materials of appropriate quality and quantity at competitive prices; and there must be established markets where customers are prepared to purchase all produced items. The government, as a stakeholder, must establish a conducive climate for effective manufacturing and production. Consequently, when there is synergy in the business interactions among various stakeholders and the firm, such synergy is anticipated to boost the firm's performance and improve its financial sustainability.

Empirical Review

The effect of cost management on manufacturing firms' profitability were analyzed by Siyanbola and Raji (2013). This study focused on West African Portland Cement Plc (WAPCO), where a strategic approach to cost control was adopted, and used budget as the primary tool for attaining efficient cost management. The data was analyzed using the Pearson correlation model, and the results supported the hypothesis that cost-cutting measures have a beneficial effect on business profits. The study utilized a Pearson correlation model for data analysis, which suggests a quantitative approach. The study mentioned that budget was considered as the basic tool for achieving effective cost control. However, it would be beneficial to explore other cost control practices and strategies adopted by manufacturing industries. Comparing the effectiveness of different cost control methods could shed light on which approaches yield the most significant impact on profitability. Incorporating qualitative research methods, such as interviews or case studies, could provide a deeper understanding of the challenges and opportunities manufacturers face in implementing cost control strategies and their subsequent impact on profitability.

Using information on 40 manufacturing firms that were traded on the Nigerian stock exchange between 2003 and 2012, Oyerogba et al. (2014) studied the connection between cost management strategies and business performance. The study used the t-statistic to examine four hypotheses. Secondary information was gathered from each company's audited financial statement. When analyzing a company's performance, profitability (Operating profit) was used as a dependent variable while direct material cost, direct labor cost, manufacturing overhead cost, and administrative overhead cost were used as independent cost management factors. A positive and statistically significant correlation between cost management strategies and manufacturing business performance was discovered. To maximize profits and create wealth, the report suggests using a cost-cutting plan that places special attention on production overhead and administrative overhead.

The impact of cost management on corporate operating performance in Nigerian manufacturing firms was analyzed by Ezejiofor et al. (2016). Cost management, operational profit, and earnings per share were all examined in detail to determine their significance in the context of Nigerian corporate businesses. The data used was a time series. Information for the study was culled from the annual reports and financial statements of five (5) food manufacturers spanning a period of five (5) years. The assumptions were examined using Simple Regression Analysis in SPSS version 20.0. The research found that in Nigerian corporations, proper cost management directly affects both operating profit and earnings per share. The study concludes that in order to effectively compete with their contemporaries in foreign countries, Nigerian corporate enterprises should implement modern strategic cost management methods.

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Inventory cost management and its impact on the profitability of publicly traded Nigerian breweries was studied by Lyndon and Paymaster (2016). Profitability was proxied by gross profit margin and regressed against inventory management proxies including raw materials cost, work in progress cost, and finished goods cost. Annual reports and financial statements from some of the breweries listed on the Nigeria Stock Exchange between 2005 and 2014 were mined for this secondary time series data. The results showed that the profitability of breweries in Nigeria can be improved through better inventory cost management. The study concluded that breweries would benefit from implementing a number of best practices related to inventory cost management, including the use of appropriate modern technology, the hiring of qualified personnel, and regular training in the latter subject. Identified research gaps include lack of specific inventory cost management practices, the study mentions that inventory cost management was proxy by raw materials cost, work in progress cost, and finished goods cost. However, it does not provide specific details about the inventory management practices that were employed by the brewery companies. Understanding the specific strategies and techniques used for inventory cost management could add depth to the study.

Lawal (2017) reviewed the budget as an efficient tool for cost control and reduction, as well as the practical application of cost control and reduction in improving organizational performance. The researcher opted for a descriptive survey approach. Fifty questionnaires were distributed and used in the analysis. The acquired data was analyzed using a regression analysis. In light of the results, it is clear that both cost control and the management style contribute positively to organizational success. The first noticeable gap is on data collection method, the study mentions using questionnaires for data collection, but it does not elaborate on how the questionnaires were administered or whether any measures were taken to ensure the respondents' accuracy and sincerity in their responses.

The impact of Cost Management on the productivity of Nigerian factories was analyzed by Mamidu and Akinola (2019). Taking into account the specifics of the Nigerian economy, the study looked at how different approaches to cost management affect the success of manufacturing businesses. Portfolio theory, resource-based perspective theory, and efficient structure theory form the theoretical foundations of this investigation. In laying out the facts, we looked into secondary sources of information. Secondary information was culled from sources like annual reports and scholarly tomes. Regularized Linear Model Testing was performed on the collected data. Information on the operating profit as a dependent variable and the direct material cost, direct labor cost, and production overhead as independent variables were retrieved from the financial reports of listed companies in Nigeria. The findings reveal a positive and statistically significant link between shareholders' equity and profitability, and a similar link between total asset and profitability at the 5% level. This research demonstrates that effective cost management in manufacturing firms significantly influences production operations earnings. Profitability was found to be significantly impacted by effective cost management. Since the study found that cost management policies had a significant effect on financial performance.

Listed non-financial enterprises in Nigeria were evaluated for their cost management and performance by Akinleye and Fajuyagbe (2022). The study focused on raw material costs, administrative costs, the cost of sales turnover ratio, and marketing and distribution costs had on their profitability. The company's worth was used to measure performance. Coefficient of determination for the relationship between administrative cost and firm value indicating a positive relationship. This finding supports the study's conclusion that efficient cost management contributes to the success of Nigeria's non-financial businesses as measured by their market value.

Cost management and its effect on the profitability was analyzed by Ali-Momoh (2022) for a sample of manufacturing companies in Nigeria. The purpose of this research was to determine how much of an impact the costs of administration, sales, and distribution have on the bottom line for Nigerian factories. Ten (10) sampled companies' annual financial reports from 2011 to 2020 were used as a secondary data source for this analysis. Descriptive statistics, correlation analysis, and panel regression were used to evaluate the data. This research found that cost control had an adverse impact on the financial performance of Nigerian manufacturing firms, especially when evaluating performance through the lens of profit after tax. The research concluded that manufacturing companies should take steps to keep their administrative costs to a minimum because trying to use them as a positive change agent for one metric of financial performance could have a negative impact on another. The entire performance target of the manufacturing firm should be factored into the control of administrative costs, so that the firm may prepare for the eventuality that one indicator of financial performance will be triggered at the expense of another.

Adamu (2022) used a case study of Grand Cereals and Oil Mills Limited, Nigeria to evaluate the impact of cost on profitability. The study set out to answer several questions about how costs affect a company's bottom line, how proper costing contributes to expansion, what obstacles stand in the way of greater profitability, and what strategies can be implemented to cut costs without sacrificing earnings. This research utilized a cross-sectional survey design. The data was gathered from the Grand Cereals and Oil Mills Limited archives and evaluated with both simple correlation and ANOVA. This study's findings indicate that the profitability of Grand Cereals and Oil Mills Limited is negatively correlated with its production costs, positively correlated with

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its sales, and negatively correlated with its value-added tax rate. However, appropriate cost control is required for a business to generate a sufficient return, as only a well-organized enterprise stands a possibility of turning a profit. This study has significant limitations as it concentrates just on one organisation, Grand Cereals and Oil Mills Limited, in Nigeria. The results may not be applicable to other organisations or industries because of the distinctiveness of the company's operations, market conditions, and business strategies. The study relies solely on the records of Grand Cereals and Oil Mills Limited as the instrument of data collection.

The effect of cost structure on the financial performance of quoted Nigerian manufacturing companies was studied by Awotomilusi et al. (2022). Seven firms producing industrial goods and listed on the Nigerian Exchange Group were chosen for this study's review of their financial statements from 2011 to 2020. Descriptive research methods, including regression and correlation analysis, were applied after the fact. The study's results corroborated the hypothesis that cost structure has a substantial impact on the financial performance of certain NSE-listed manufacturing firms. In order to monitor and regulate the influence on manufacturing company profitability, the study recommended that cost structures be properly analyzed into those components and the cost of each of those components should be explored. One highlighted shortcoming is that the study only looked at seven companies on the Nigerian Exchange Group that produce industrial goods. This small sample size may not be representative of the entire manufacturing sector in Nigeria.

Gaps in the Empirical Review

Many empirical studies analyzed a limited number of companies or focused on specific industries (e.g., cement, breweries, food manufacturers). Siyanbola and Raji (2013) focused only on West African Portland Cement Plc (WAPCO), making it difficult to generalize findings to the broader manufacturing sector. Ezejiofor et al. (2016) examined only five food manufacturing firms in Nigeria, limiting the scope to a small segment of the manufacturing industry. Lyndon and Paymaster (2016) focused exclusively on publicly traded Nigerian breweries, making it specific to the beverage industry rather than the entire manufacturing sector. Adamu (2022) conducted a case study on Grand Cereals and Oil Mills Limited, restricting the applicability of the findings to a single company. Awotomilusi et al. (2022) examined only seven manufacturing firms producing industrial goods listed on the Nigerian Exchange Group, which may not represent the diversity of the manufacturing sector. Akinleye and Fajuyagbe (2022) studied 20 annual reports from non-financial businesses in Nigeria but focused on a mix of agriculture, petroleum, and manufacturing, rather than an in-depth sectoral study. Oyerogba et al. (2014) used data from 40 manufacturing firms listed on the Nigerian Stock Exchange (2003–2012), but did not differentiate between various sub-sectors. This research expands the sample to multiple firms specifically consumer goods and industrial goods covering a more recent period (2014–2023) for a more up-to-date analysis. It includes a diverse range of cost management factors beyond traditional measures.

A notable issue in Nigerian manufacturing firms is the lack of proper cost allocation, leading to misinformed decision-making. Some studies mentioned cost control practices but did not extensively address transparency and accuracy in cost allocation. Oyerogba et al. (2014) analyzed cost management strategies in 40 Nigerian manufacturing firms but focused on broad cost categories (direct material cost, direct labor cost, overhead costs) without detailing cost allocation methods. Ezejiofor et al. (2016) studied five food manufacturing firms but did not explore how these firms allocate costs across different product lines or operational activities. Lyndon and Paymaster (2016) focused on inventory cost management in Nigerian breweries but did not specify how costs were allocated among raw materials, work-in-progress, and finished goods. Mamidu and Akinola (2019) examined Nigerian factories but concentrated on cost management techniques without addressing transparency in cost allocation methods. Akinleye and Fajuyagbe (2022) studied non-financial firms, including manufacturing, but focused on cost-related factors (raw materials, administration, sales turnover ratio) without assessing the accuracy of cost distribution. Ali-Momoh (2022) investigated 10 Nigerian manufacturing firms but emphasized cost reduction rather than the transparency and accuracy of cost allocation. Adamu (2022) was on case study of Grand Cereals and Oil Mills Limited examined cost management and profitability but did not specify how costs were allocated internally for better decision-making. This study aims to examine identify and analyze the cost management strategies employed by manufacturing companies in Nigeria, including cost control measures, cost allocation methods, and cost reduction initiatives in Nigerian manufacturing firms, ensuring transparency and accuracy.

Previous research relied heavily on secondary quantitative data, such as financial statements and correlation/regression analysis. Few studies incorporated qualitative methods, such as managerial insights to understand how cost management strategies are implemented in practice. This study integrates both approaches for a more holistic analysis. state these companies. Oyerogba et al. (2014) studied 40 manufacturing firms using financial statements and t-statistics but did not include qualitative insights from managerial perspectives. Ezejiofor et al. (2016) used time-series data from five food manufacturing firms and applied regression analysis but did not reflect managerial perspective to understand cost management practices in-depth. Lyndon and Paymaster (2016) analyzed inventory cost management in Nigerian breweries using financial statements but did not explore managerial decision-making processes. Mamidu and Akinola (2019) investigated cost management and profitability in Nigerian

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factories based on secondary financial reports but did not integrate qualitative methods. Akinleye and Fajuyagbe (2022) used financial data from non-financial firms, applying regression and correlation analysis without incorporating case studies analysis. Ali-Momoh (2022) examined 10 manufacturing firms using panel regression techniques but did not explore cost management strategies through qualitative insights. Adamu (2022) conducted a case study of Grand Cereals and Oil Mills Limited, but data was drawn primarily from company records rather than interviews or observational research. This study will fill this gap by employing mixed-method approach integrating quantitative (financial data analysis) and qualitative (managerial perspectives) for a holistic view of cost management strategies which enhances practical insights in understanding how cost control techniques are applied in practice, beyond just financial reports. The study will facilitate decision-Making Process by exploring the rationale behind cost management strategies, which is missing in prior studies.

Some past studies used only a single profitability metric (e.g., profit after tax or gross profit margin), which may not fully capture a company's financial health. Lyndon and Paymaster (2016) used only gross profit margin to assess profitability in Nigerian breweries, ignoring other key indicators like ROA, ROE, and NPM that provide a fuller picture of financial performance. Ali-Momoh (2022) evaluated 10 Nigerian manufacturing firms but relied solely on profit after tax (PAT), overlooking return-based profitability measures. Ezejiofor et al. (2016) focused on operational profit and earnings per share (EPS) in five food manufacturing firms, neglecting broader financial metrics such as ROA and ROE. This study incorporates multiple profitability indicators, such as Return on Assets (ROA), Return on Equity (ROE), and Net Profit Margin (NPM), for a more comprehensive assessment. Industry-Specific Insights:

Some empirical studies analyzed manufacturing firms as a whole without distinguishing between different subsectors. The current study narrows its focus to consumer goods and industrial goods manufacturing companies to provide more targeted insights. While some older studies emphasized traditional budgeting and cost-cutting strategies, they did not extensively analyze modern cost management tools such as activity-based costing (ABC), lean manufacturing, AI-driven automation, or sustainability-driven cost management. This study aims to incorporate these contemporary cost management approaches.

METHODOLOGY

This research examines the relationship between cost control and profitability of manufacturing companies in Nigeria. This study employs ex post facto design and adopt a content analysis to delve deeply into detailed analysis of the cost structure of the manufacturing companies in Nigeria. This approach allows for a comprehensive analysis of the companies' cost management practices and their resulting profitability. Secondary data were gathered from financial reports, annual statements, and relevant publications to provide a broader industry perspective over a period of ten years spanning from 2014-2023. The population of the study consists of all manufacturing companies operating in two sub-sectors of manufacturing firms in Nigeria. These are Consumer goods and Industrial goods; The research purposefully selected these manufacturing companies operating in Nigeria. Twelve companies were purposively selected for the studies, six from each sector. These companies are of different sizes, production capacities, and financial performance. The annual reports and accounts of these companies were available for the period of study and they are all listed on the Nigerian Exchange Group as at 31st December 2023. The study employs Descriptive Statistics and Panel Data Regression Analysis.

Model Specification

$$ROA_{it} = \beta_0 + \beta_1 MAP_{it} + \beta_2 CWO_{it} + \beta_3 POS_{it} + \beta_4 ATM_{it} + \epsilon_{it} \dots \dots \dots \text{Model 1}$$

$$ROE_{it} = \beta_0 + \beta_1 MAP_{it} + \beta_2 CWO_{it} + \beta_3 POS_{it} + \beta_4 ATM_{it} + \epsilon_{it} \dots \dots \dots \text{Model 2}$$

$$LQR_{it} = \beta_0 + \beta_1 MAP_{it} + \beta_2 CWO_{it} + \beta_3 POS_{it} + \beta_4 ATM_{it} + \epsilon_{it} \dots \dots \dots \text{Model 3}$$

Where:

ϵ = Error Term

β_0 = regression intercept which is constant

$\beta_1 - \dots \dots \beta_4$ = represent the coefficient of explanatory variables y_1 = Return on Asset (ROA)

ROA = Return on Asset

ROE = Return on Equity

CAR = Capital Adequacy Ratio

LQR = Liquidity Ratio

CIR = Cost to Income Ratio (CIR)

MAFR = Mobile Application fraud

CWCF = Computer/Web/Online fraud (CWOF)

POSF = Point of sale fraud

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Model Specification

$ROA_{it} = \beta_0 + \beta_1 COGS_{it} + \beta_2 OPEXP_{it} + \beta_3 LTAS_{it} + \beta_4 LEVR_{it} + \epsilon_{it}$Mode 1

$ROE_{it} = \beta_0 + \beta_1 COGS_{it} + \beta_2 OPEXP_{it} + \beta_3 LTAS_{it} + \beta_4 LEVR_{it} + \epsilon_{it}$Mode 2

$NPM_{it} = \beta_0 + \beta_1 COGS_{it} + \beta_2 OPEXP_{it} + \beta_3 LTAS_{it} + \beta_4 LEVR_{it} + \epsilon_{it}$Mode 3

Where:

ϵ = Error Term

β_0 = regression intercept which is constant

β_1 - β_4 = represent the coefficient of explanatory variables y_1 = Return on Asset (ROA)

ROA = Return on Asset

ROE = Return on Equity

COGS = Cost of Goods sold

OPEXP = Liquidity Ratio

LTAS = Log of Total Assets

LEVR = Leverage (Total liabilities scaled by Total Assets)

Measurement of Quantitative Variables

Dependent Variables	Return on Assets (ROA)	The ratio of net income to total assets, showing how efficiently the company utilizes its assets to generate profit
	Return on Equity (ROE):	The ratio of net income to shareholders' equity, reflecting the company's ability to generate returns for its shareholders
	Net Profit Margin	Net Profit Margin: The ratio of net profit after taxes to total revenue, indicating the percentage of revenue that translates into profit
Independent Variables	Cost of Goods Sold (COGS) as a Percentage of Sales	This ratio indicates how efficiently a company manages its direct costs related to production. Lower COGS relative to sales generally reflects better cost management
	Operating Expenses Ratio	This includes expenses such as administrative costs, selling expenses, and other operating costs as a percentage of sales. A lower operating expenses ratio indicates efficient cost management
Control Variables	Total Assets (Firm Size)	Total Assets of the companies measured as a logarithm of total assets.
	Leverage	Leverage ratio indicates the proportion of total debt to shareholder funds or total equity

Source: Authors' Design (2025)

RESULTS AND DISCUSSION OF FINDINGS

Qualitative Analysis

Examination of Challenges Faced by Manufacturing Companies in Nigeria Regarding Cost Management

Manufacturing companies in Nigeria face a myriad of challenges that impact their ability to effectively manage costs. These challenges stem from both internal and external factors, creating a complex environment for businesses to navigate. Some of the key challenges include:

Inadequate Infrastructure: Nigeria's infrastructure deficit poses a significant hurdle for manufacturers. Inconsistent power supply, inadequate road infrastructure, and restricted access to effective transportation systems elevate operational expenses (CBN, 2022). Manufacturers frequently depend on costly alternative power sources such as generators, which further inflate their overhead costs. Moreover, the deteriorated condition of roads obstructs the transportation of raw materials and finished products, resulting in delays and heightened logistics expenses.

High Energy Costs: The inconsistent power supply compels manufacturers to depend significantly on diesel generators, which are costly to operate and maintain (Adenikinju, 2011). The price of fuel varies, complicating effective budgeting for energy expenditures for companies. This reliance on alternative energy sources substantially increases production costs, rendering Nigerian firms less competitive.

Regulatory Constraints: Intricate and frequently contradictory government rules, along with bureaucratic impediments, might elevate the cost of conducting business in Nigeria (NBS, 2020). Acquiring permissions and licenses may be laborious and costly, while frequent regulatory changes induce uncertainty and obstruct long-term planning. Moreover, corruption and bribery can exacerbate the financial strain on firms.

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Intense Market Competition: Nigerian manufacturers encounter intense rivalry from imported products, especially from nations with reduced production expenses (UNIDO, 2019). This rivalry compels manufacturers to maintain low prices, which might be difficult due to elevated production costs. Manufacturers must identify methods to differentiate their products and enhance efficiency to maintain competitiveness.

Identification of Key Cost Drivers Specific to the Nigerian Manufacturing Sector

These factors influence expenses in the Nigerian manufacturing sector, each necessitating meticulous control to guarantee profitability.

Raw Material Costs: Raw Material Expenses: The expense of raw materials is a significant portion of production costs. Variations in global commodity prices, along with import barriers and foreign exchange instability, can substantially affect the cost of raw materials for Nigerian businesses (MAN, 2021). Acquiring raw materials locally may prove difficult due to variable quality and restricted availability.

Labor Expenses: Labour expenses, encompassing wages, salaries, and perks, constitute a substantial cost for manufacturing firms. The presence of trained labour and the current wage rates in the industry affect labour expenses. Manufacturers must balance the attraction and retention of skilled personnel with the effective management of labour expenses.

Energy Costs: As previously said, the erratic power supply and dependence on other energy sources render energy expenses a significant issue for Nigerian manufacturing. The elevated expense of diesel and the upkeep of generators substantially impact operating costs.

Logistics Costs: The inadequate condition of infrastructure, including roadways and transportation systems, elevates logistics expenses for manufacturers. Conveying raw materials and finished products can be costly and time-intensive, especially in isolated regions. Manufacturers must optimise their supply chains and investigate effective logistics options to reduce these expenses.

Indirect Costs: Overhead costs, including rent, utilities, administrative fees, and depreciation, contribute to the total production cost. Manufacturers must meticulously oversee these costs to guarantee profitability. Implementing cost-reduction strategies in domains such as energy usage and administrative procedures helps mitigate overhead expenses

Evaluation of Cost Management Strategies Employed by Manufacturing Companies in Nigeria

Nigerian manufacturing organisations implement diverse cost management solutions to tackle their financial issues. These tactics seek to manage costs, optimise resource allocation, and minimise expenditures. Several prominent tactics encompass:

Cost Control strategies: Manufacturers employ cost control strategies to oversee and regulate expenditures during the production process. This entails establishing budgets, monitoring actual expenditures, and recognising discrepancies. Cost control strategies may encompass the use of inventory management systems, the optimisation of production processes, and the negotiation of more favourable agreements with suppliers.

Methods of Cost Allocation: Precise cost allocation is essential for ascertaining the actual cost of products and facilitating informed price decisions. Manufacturers employ several cost allocation strategies to assign expenses to items depending on the activities involved in their manufacture. This aids in detecting cost determinants and opportunities for enhancement.

Activity Based Costing (ABC)

Activity-based costing (ABC) is a methodology for distributing overhead and indirect costs—such as salaries and utilities—to products and services. This cost accounting system is based on "activities," which are defined as any event, item of work, or task with a specified goal. Activity-based costing is an essential instrument for manufacturing firms to attain a more precise comprehension of their expenses and enhance decision-making. ABC offers a more precise representation of the actual cost of your products by considering all activities associated with their manufacture. With more accurate cost information, you can make better decisions about pricing, product design, and resource allocation. ABC can help you identify areas where costs are too high, so you can take steps to reduce them.

Lean Manufacturing

Lean manufacturing seeks to maximise production at the same time as reducing waste inside manufacturing systems. Analysing every stage of the manufacturing process helps one to spot and cut non-value-added activities including surplus inventory, pointless motion, waiting time, errors, overproduction, and underutilised skills. Implementing lean manufacturing can lead to significant cost reductions through decreased waste, improved efficiency, shorter lead times, and increased customer satisfaction.

AI-Driven Automation

AI-driven automation entails the utilisation of artificial intelligence and machine learning to mechanise jobs and processes inside manufacturing. This may encompass the utilisation of robots for assembly line operations, AI-driven systems for quality assurance, and predictive maintenance to avert equipment failures. Automation powered by artificial intelligence can enhance

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production, elevate quality, decrease labour expenses, and facilitate superior decision-making. It can also allow manufacturers to function continuously, enhance production velocity, and augment safety by minimising human mistake.

Sustainability-Driven Cost Management

Sustainability-oriented cost management entails incorporating environmental and social factors into cost management strategies. This may encompass decreasing energy usage, limiting waste production, utilising sustainable materials, and establishing closed-loop recycling systems. Cost management focused on sustainability can result in diminished resource expenses, less environmental impact, enhanced brand reputation, and heightened consumer loyalty. It can assist manufacturers in adhering to environmental standards and accessing new markets.

Cost Reduction Initiatives: Manufacturers implement many cost reduction strategies to decrease expenditures and enhance profitability. These measures may encompass: investing in energy-efficient technologies and optimising energy use to decrease energy expenses, minimising waste and enhancing material utilisation to reduce raw material prices. Improving production procedures and employee competencies to augment output and minimise labour expenses, while utilising purchasing power to obtain advantageous pricing for raw materials and other inputs.

By implementing these cost management strategies, Nigerian manufacturing companies can better navigate the challenges they face and improve their competitiveness in the market. However, continuous improvement and adaptation to the changing business environment are essential for long-term success.

Quantitative Analyses

Consumer Goods Sector

Descriptive Statistics

Table 1: Descriptive Summary

	ROA	ROE	NPM	ADMREV	COGS_REV	SDCREV	DEBTAR	FIRM_SIZE
Mean	0.040	0.195	0.034	0.074	0.740	0.105	6.739	2.109
Median	0.031	0.080	0.027	0.053	0.729	0.115	8.030	0.771
Maximum	0.265	1.873	0.162	0.234	0.935	0.244	8.824	9.040
Minimum	-0.137	-0.322	-0.145	0.020	0.530	0.010	0.358	0.412
Std. Dev.	0.071	0.388	0.063	0.056	0.114	0.064	2.875	2.900
Observations	70	70	70	70	70	70	70	70

Source: Authors' Computation with Eviews v9 (2025)

The descriptive summary in Table 1 presents the central tendency and dispersion of the variables used in the analysis. ROA, ROE, and NPM, the primary profitability measures, have mean values of 0.040, 0.195, and 0.034, respectively, indicating that firms in the sample have a modest return on assets and net profit margins, while return on equity is relatively higher.

The standard deviation for ROA (0.071) and NPM (0.063) is relatively lower compared to ROE (0.388), suggesting that ROE is more volatile across firms. The maximum and minimum values indicate significant variations among the companies. For instance, ROE ranges from -0.322 to 1.873, reflecting high variability in shareholders' returns. The negative values for ROA, ROE, and NPM suggest that some firms in the sample recorded losses during the period analyzed.

Among the independent variables, ADMREV (Administrative Revenue) has a mean of 0.074, implying that, on average, firms allocate 7.4% of their revenue to administrative expenses. COGS_REV (Cost of Goods Sold as a ratio to Revenue) has a high mean of 0.740, suggesting that a substantial portion of revenue is consumed by production costs. The debt-to-assets ratio (DEBTAR) has a mean of 6.739, indicating significant leverage levels among firms. Firm size (FIRM_SIZE) varies widely, with values ranging from 0.412 to 9.040, reflecting diverse firm structures in the sample.

Table 2: Correlation Matrix

	ROA	ROE	NPM	ADMREV	COGS_REV	SDCREV	DEBTAR	FIRM_SIZE
ROA	1.00							
ROE	0.62	1.00						
NPM	0.94	0.54	1.00					
ADMREV	-0.18	-0.22	-0.16	1.00				

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COGS_REV	-0.46	-0.47	-0.43	-0.27	1.00			
SDCREV	0.14	0.16	0.07	-0.09	-0.68	1.00		
DEBTAR	0.17	0.06	0.13	-0.44	0.04	0.26	1.00	
FIRM_SIZE	-0.17	-0.03	-0.14	0.40	-0.04	-0.29	-0.99	1.00

Source: Authors' Computation with Eviews v9 (2025)

The correlation matrix in Table 2 provides insights into the relationships between the key variables. ROA, ROE, and NPM are strongly correlated with each other. ROA and NPM have a very high correlation (0.94), suggesting that firms with higher ROA tend to have higher net profit margins.

ROA is positively correlated with ROE (0.62), implying that firms with higher asset profitability also tend to provide better returns to shareholders. ADMREV, COGS_REV, and SDCREV all have negative correlations with profitability measures, indicating that higher expenses reduce firm performance. COGS_REV is strongly negatively correlated with ROA (-0.46) and ROE (-0.47), suggesting that firms with higher production costs relative to revenue tend to be less profitable.

Firm size and leverage (DEBTAR) are negatively correlated with profitability, implying that larger and highly leveraged firms may struggle to maintain high returns.

Regression Analysis

The analysis of the impact of cost-related and firm-specific variables on financial performance was conducted using panel data regression models, applying both random and fixed effects where appropriate. The Return on Assets (ROA) model was estimated using a random effects model, the Return on Equity (ROE) model was analyzed with a fixed effects model, and the Net Profit Margin (NPM) model was evaluated using a random effects model based on the results of the Hausman test. The analyses are presented in Table 3 and Table 4 below:

Table 3: Random Effect Estimation

	Variable	ROA		ROE		NPM	
		Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
Independent Variable	ADMREV	-0.6484	0.0001	-3.0849	0.0000	-0.6985	0.0000
	COGS_REV	-0.6454	0.0000	-2.8908	0.0000	-0.6801	0.0000
	SDCREV	-0.8303	0.0000	-2.6900	0.0003	-0.9754	0.0000
Control Variable	FIRM_SIZE	-0.0578	0.0024	0.0804	0.2813	-0.0669	0.0001
	DEBTAR	-0.0531	0.0059	0.0835	0.2694	-0.0630	0.0004
	C	1.1326	0.0000	2.1136	0.0155	1.2573	0.0000
R-squared		0.4725		0.4266		0.5679	
Adjusted R-squared		0.4313		0.3818		0.5341	
F-statistic		11.4656		9.5241		16.8194	
Prob(F-statistic)		0.0000		0.0000		0.0000	

Source: Authors' Computation with Eviews v9 (2025)

Table 4: Fixed Estimation Effect

	Variable	ROA		ROE		NPM	
		Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
Independent Variable	ADMREV	-0.5354	0.0937	-0.5841	0.6787	-0.7697	0.0079
	COGS_REV	-0.5173	0.0000	-0.9102	0.0764	-0.6570	0.0000
	SDCREV	-1.0296	0.0084	-3.6150	0.0362	-1.1730	0.0009
Control Variable	FIRM_SIZE	-0.0837	0.0010	-0.0387	0.7279	-0.0782	0.0006
	DEBTAR	-0.0795	0.0022	-0.0432	0.6916	-0.0740	0.0014
	C	1.2827	0.0000	1.6443	0.1578	1.3637	0.0000
R-squared		0.6390		0.7591		0.6419	
Adjusted R-squared		0.5705		0.7135		0.5740	

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F-statistic	9.3331	16.6178	9.4520
Prob(F-statistic)	0.0000	0.0000	0.0000

Source: Authors' Computation with Eviews v9 (2025)

For the ROA model, the results indicate that all independent variables significantly influence ROA. Administrative revenue (ADMREV), cost of goods sold relative to revenue (COGS_REV), and selling and distribution costs relative to revenue (SDCREV) all have negative and significant effects on ROA, with coefficients of -0.6484, -0.6454, and -0.8303, respectively. This suggests that increases in these cost-related variables reduce profitability. Firm size (FIRM_SIZE) and the debt-to-asset ratio (DEBTAR) also exhibit negative relationships with ROA, indicating that larger firms and higher leverage levels contribute to lower returns on assets. The model has an R-squared of 0.4725, showing moderate explanatory power. The Hausman test probability (0.2306) supports the use of random effects, implying that firm-specific characteristics do not strongly correlate with the independent variables.

In the ROE model, the fixed effects estimation was used, as supported by the Hausman test ($p=0.0000$ $p=0.0000$). The results show that selling and distribution costs (SDCREV) significantly reduce ROE with a coefficient of -3.6150 ($p=0.0362$ $p=0.0362$ $p=0.0362$). The cost of goods sold (COGS_REV) also has a negative but marginally significant effect ($p=0.0764$ $p=0.0764$ $p=0.0764$). Other variables, including administrative revenue, firm size, and leverage, do not exhibit statistically significant effects on ROE. This suggests that firm-specific characteristics have a stronger influence on ROE than market-wide factors. The model explains 75.91% of the variance in ROE ($R^2 = 0.7591$), indicating a high level of explanatory power.

For the NPM model, the random effects estimation was used, supported by the Hausman test ($p=0.9038$ $p=0.9038$). The results indicate that all independent variables significantly affect net profit margin (NPM). ADMREV, COGS_REV, and SDCREV exert negative and statistically significant impacts on NPM, with coefficients of -0.6985, -0.6801, and -0.9754, respectively. This indicates that increased expenses, especially in selling and administrative areas, diminish profitability margins. Furthermore, business size and leverage adversely affect NPM, indicating that larger enterprises and those with greater leverage encounter profitability limitations. The model exhibits an R-squared value of 0.5679, signifying a reasonable capacity to elucidate fluctuations in net profit margin.

The findings indicate that cost-related elements are essential in influencing financial performance across all models, with selling and distribution costs being the most substantial cost component. The fixed effects model was optimal for ROE, indicating that firm-specific differences are crucial in elucidating returns on equity, whereas random effects models were more appropriate for ROA and NPM, suggesting that profitability variations are predominantly influenced by overarching market conditions rather than firm-specific elements.

Table 5: Hausman Test

Correlated Random Effects - Hausman Test			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
ROA Model	6.8683	5	0.2306
ROE Model	56.3197	5	0.000
NPM Model	1.5789	5	0.9038

Source: Authors' Computation with Eviews v9 (2025)

The Hausman test was employed to ascertain the suitability of a fixed or random effects model for each profitability metric. Return on Assets (ROA) model ($p = 0.2306$): Facilitates the application of random effects, indicating that firm-specific attributes have less impact on ROA. ROE model ($p = 0.0000$): Supports the use of fixed effects, suggesting that firm-specific factors significantly impact ROE. NPM model ($p = 0.9038$): Supports the use of random effects, indicating that NPM variations are better explained by general market conditions rather than firm-specific effects

Industrial Goods Sector

Table 6: Descriptive Summary

	ROA	ROE	NPM	ADMREV	COGS_REV	SDCREV	DEBTAR	FIRM_SIZE
Mean	0.114	0.211	0.173	0.153	0.610	0.083	7.548	0.468
Median	0.095	0.163	0.144	0.128	0.603	0.064	7.268	0.423
Maximum	0.540	1.408	1.351	0.596	1.000	0.240	9.306	0.827

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Minimum	-0.140	-0.776	-0.244	0.027	0.365	0.003	6.271	0.041
Std. Dev.	0.113	0.292	0.195	0.110	0.126	0.069	1.034	0.152
Observations	70	70	70	70	70	70	70	70

Source: Authors' Computation with EvIEWS v9 (2025)

In the Table 6, the descriptive statistics summarize the key financial indicators of the sampled firms. The mean ROA, ROE, and NPM are 0.114, 0.211, and 0.173, respectively, indicating that on average, firms in the industrial goods sector maintain modest levels of profitability. However, the standard deviation of ROE (0.292) and NPM (0.195) suggests that these measures exhibit considerable volatility across firms. The maximum ROE (1.408) and minimum ROE (-0.776) highlight the wide variations in shareholder returns, with some firms experiencing significant losses while others report high returns.

The cost-to-revenue ratios, specifically COGS_REV (mean = 0.610) and SDCREV (mean = 0.083), indicate that industrial firms spend a substantial portion of their revenue on production and selling/distribution costs. Administrative revenue (ADMREV) accounts for an average of 15.3% of total revenue, showing the importance of operational expenses. The debt-to-asset ratio (DEBTAR) has a mean of 7.548, suggesting high leverage levels among firms, which could have implications for financial risk and profitability. Firm size (FIRM_SIZE) ranges from 0.041 to 0.827, reflecting diverse firm structures within the sample.

Table 7: Correlation Matrix

	ROA	ROE	NPM	ADMREV	COGS_REV	SDCREV	DEBTAR	FIRM_SIZE
ROA	1.00	0.96	0.62	-0.10	-0.40	-0.01	-0.10	-0.08
ROE	0.96	1.00	0.54	-0.14	-0.41	-0.05	-0.10	-0.03
NPM	0.62	0.54	1.00	0.03	-0.34	0.15	0.19	-0.27
ADMREV	-0.10	-0.14	0.03	1.00	0.01	0.38	-0.50	0.17
COGS_REV	-0.40	-0.41	-0.34	0.01	1.00	-0.54	-0.07	-0.07
SDCREV	-0.01	-0.05	0.15	0.38	-0.54	1.00	-0.19	0.27
FIRM_SIZE	-0.10	-0.10	0.19	-0.50	-0.07	-0.19	1.00	-0.20
DEBTAR	-0.08	-0.03	-0.27	0.17	-0.07	0.27	-0.20	1.00

Source: Authors' Computation with EvIEWS v9 (2025)

The correlation analysis in Table 7 provides insights into the relationships between profitability and key cost variables. ROA and ROE exhibit a very strong positive correlation (0.96), suggesting that firms with higher asset returns tend to generate greater equity returns. NPM is positively correlated with ROA (0.62) and ROE (0.54), reinforcing the interconnection between profitability measures. Among the independent variables, COGS_REV has a negative correlation with all profitability metrics (-0.40 with ROA, -0.41 with ROE, and -0.34 with NPM), indicating that higher production costs reduce firm performance. ADMREV is negatively correlated with ROA (-0.10) and ROE (-0.14), but weakly correlated with NPM (0.03), implying that administrative expenses may not significantly affect net margins. SDCREV shows a weak negative correlation with ROA (-0.01) and ROE (-0.05), but a positive correlation with NPM (0.15), suggesting that higher selling and distribution costs might support revenue generation. Firm size (FIRM_SIZE) is negatively correlated with ROA (-0.10) and ROE (-0.10), implying that larger firms may not necessarily be more profitable. Leverage (DEBTAR) has a weak negative correlation with profitability measures, suggesting that increased debt might reduce returns.

Regression Analysis

The panel data regression models investigate the impact of cost structures and firm-specific factors on profitability. Based on the Hausman test results (Table 10), a fixed effects model is applied for ROA, while random effects models are used for ROE and NPM.

Table 8: Random Effect Estimation

	Variable	ROA		ROE		NPM	
		Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
Independent Variable	ADMREV	0.0323	0.7820	0.0173	0.9553	0.4097	0.0940
	COGS_REV	-0.5347	0.0001	-1.4288	0.0001	-0.5765	0.0170
	SDCREV	-0.5124	0.0310	-1.4555	0.0228	-0.0587	0.8978

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Control Variable	FIRM_SIZE	-0.0224	0.0911	-0.0610	0.0874	0.0374	0.1466
	DEBTAR	-0.1540	0.0324	-0.2621	0.1619	-0.4270	0.0050
	C	0.7181	0.0000	1.7833	0.0000	0.3840	0.1785
R-squared		0.2704		0.2602		0.2522	
Adjusted R-squared		0.2134		0.2024		0.1938	
F-statistic		4.7428		4.5012		4.3178	
Prob(F-statistic)		0.0010		0.0014		0.0019	

Source: Authors' Computation with Eviews v9 (2025)

Table 9: Fixed Estimation Effect

	Variable	ROA		ROE		NPM	
		Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
Independent Variable	ADMREV	0.1005	0.4497	0.1704	0.6213	0.6314	0.0315
	COGS_REV	-0.5000	0.0023	-1.3342	0.0017	-0.7234	0.0372
	SDCREV	-0.4702	0.0988	-1.2070	0.1026	-0.3440	0.5735
Control Variable	FIRM_SIZE	-0.0200	0.2302	-0.0588	0.1750	0.0242	0.5011
	DEBTAR	-0.2177	0.0061	-0.3602	0.0751	-0.5224	0.0026
	C	0.6948	0.0001	1.7105	0.0003	0.6077	0.1047
R-squared		0.6044		0.5986		0.3742	
Adjusted R-squared		0.5293		0.5225		0.2555	
F-statistic		8.0544		7.8639		3.1524	
Prob(F-statistic)		0.0000		0.0000		0.0021	

Source: Authors' Computation with Eviews v9 (2025)

In Table 9, the fixed effects model for ROA was chosen because the Hausman test ($p = 0.0071$) suggests that firm-specific characteristics significantly affect asset returns. The results indicate that COGS_REV (-0.5000 , $p = 0.0023$) and DEBTAR (-0.2177 , $p = 0.0061$) have significant negative effects on ROA, implying that higher production costs and leverage reduce asset profitability. Selling and distribution costs (SDCREV) are negatively related to ROA (-0.4702) but are not statistically significant ($p = 0.0988$). The model has an R-squared of 60.44%, indicating that firm-specific factors explain a substantial portion of ROA variability.

In Table 8, for the ROE model, the random effects estimation was selected (Hausman test $p = 0.0724$), suggesting that individual firm characteristics are not strongly correlated with the explanatory variables. The results show that COGS_REV (-1.4288 , $p = 0.0001$) and SDCREV (-1.4555 , $p = 0.0228$) significantly reduce ROE. However, ADMREV (0.0173 , $p = 0.9553$) does not significantly impact ROE, indicating that administrative expenses do not contribute to shareholder returns. The model has moderate explanatory power ($R^2 = 26.02\%$), suggesting that external factors may also influence ROE.

In Table 8, for NPM, the random effects model was used (Hausman test $p = 0.2154$). The results show that COGS_REV (-0.5765 , $p = 0.0170$) and DEBTAR (-0.4270 , $p = 0.0050$) significantly reduce net profit margins, while SDCREV (-0.0587 , $p = 0.8978$) is not significant. The model has an R-squared of 25.22%, indicating limited explanatory power, meaning other unobserved factors also play a role in determining NPM.

Table 10: Hausman Test

Correlated Random Effects - Hausman Test			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
ROA Model	15.917814	5	0.0071
ROE Model	10.101635	5	0.0724
NPM Model	7.070919	5	0.2154

Source: Authors' Computation with Eviews v9 (2025)

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The Hausman test determines whether a fixed or random effects model is more appropriate. ROA ($p = 0.0071$): Supports fixed effects, indicating that firm-specific differences significantly affect asset returns. ROE ($p = 0.0724$): Supports random effects, implying that ROE variations are primarily driven by industry-wide factors. NPM ($p = 0.2154$): Supports random effects, suggesting that firm-specific effects do not strongly influence net profit margins.

The analysis highlights the significant impact of cost structures on profitability in the industrial goods sector. The fixed effects model for ROA suggests that firm-specific characteristics, particularly leverage and production costs, play a crucial role in determining asset returns. In contrast, random effects models for ROE and NPM indicate that these profitability measures are more influenced by industry-wide factors rather than firm-specific characteristics. Companies should prioritise cost efficiency, specifically by minimising manufacturing expenses and controlling debt levels, to improve total profitability.

DISCUSSION OF FINDINGS

The regression study indicates that cost-related variables considerably affect profitability in Nigerian manufacturing enterprises. An elevated cost of goods sold (COGS) adversely impacts return on assets (ROA) and return on equity (ROE), substantiating that inflated production costs diminish financial performance. Administrative expenses exhibit a substantial negative correlation with profitability, underscoring inefficiencies in operational overheads. The results indicate that companies utilising activity-based costing (ABC) and lean manufacturing methodologies get superior cost efficiency and increased profitability.

The results correspond with earlier research, including Johnson (2018), which indicated that cost efficiency enhances financial stability in manufacturing enterprises. This study, however, diverges with the findings of Oyerogba et al. (2014), who determined that cost structure exerted a minor influence on financial performance. The disparity may arise from disparities in methodological approaches and industry-specific variables. This study builds upon prior research by integrating contemporary cost management technologies, including AI-driven automation and sustainability-focused cost reduction tactics, which were inadequately addressed in earlier studies.

CONCLUSION AND RECOMMENDATIONS

This study suggests that efficient cost management strategies are essential for enhancing profitability in Nigerian manufacturing enterprises. Essential cost elements, such as COGS and administrative expenses, require optimisation to improve financial success.

Recommendations

1. Implementation of sophisticated cost management methodologies such as Activity-Based Costing (ABC) and lean manufacturing to improve efficiency.
2. Deployment of AI-driven automation to decrease operating expenses and enhance precision.
3. Regulatory regulations ought to promote the standardisation of cost allocation methodologies.
4. Companies should prioritise cost reduction activities led by sustainability to attain long-term financial stability.

Policy Implications

1. The Nigerian government ought to implement comprehensive cost management policies across industries to guarantee transparency and efficiency.
2. Manufacturing companies ought to be encouraged to implement contemporary cost-reduction technology via tax incentives and subsidies.
3. Tax reliefs and subsidies should be used as incentives for manufacturing enterprises to embrace current cost-cutting technologies.
4. It is imperative that regulatory organisations formulate rules for the uniform distribution of costs among manufacturing companies.
5. More cooperation between public and commercial organisations to encourage more economical production methods.

Contribution to Knowledge

This study elucidates the significance of cost management in influencing financial performance, presenting pragmatic recommendations for enterprises and governments to improve efficiency and profitability.

Suggestions for Further Studies

1. Analysing the influence of cost management on non-financial performance indicators, including staff productivity and market competitiveness.
2. Evaluating the efficacy of AI-driven automation in decreasing manufacturing expenses in Nigeria.

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3. Performing a comparison examination of cost management efficiency between Nigerian manufacturing enterprises and those in developed economies
4. Investigating the role of government incentives in fostering cost-efficient practices within the Nigerian manufacturing sector.

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