

A FINANCIAL LENS ON PRODUCTIVITY: BUDGETING TECHNIQUES AND MANUFACTURING OUTCOMES IN DELTA STATE, NIGERIA

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Abstract

This study investigates the impact of budgeting techniques on the performance of manufacturing firms in Warri, Delta State, Nigeria. Recognizing budgeting as a critical managerial tool for planning, coordination, and performance evaluation, the research aims to assess how various budgeting practices influence organizational outcomes in the manufacturing sector. Employing a descriptive survey research design, data were collected through structured questionnaires administered to managerial staff across selected manufacturing firms. The analysis utilized both descriptive and inferential statistical methods, including multiple regression analysis, to determine the relationship between budgeting techniques and firm performance. Findings reveal that incremental and activity based budgeting technique has a significant positive correlation to enhanced organizational performance metrics, such as profitability, efficiency, and strategic goal attainment while zero-based budgeting technique has a positive but insignificant impact on budget performance of manufacturing sector in Warri, Delta State. The study concludes that effective budgeting techniques are instrumental in driving performance improvements in manufacturing firms. It recommends that manufacturing firms should continue to utilize incremental budgeting to maintain operational stability and facilitate gradual improvements in performance. It also recommends that firms should adopt activity-based budgeting to gain a more accurate understanding of cost drivers, leading to better resource allocation and enhanced performance.

Keywords: Incremental Budgeting, Zero-based Budgeting, Activity-based Budgeting, Organizational Performance, Profitability.

1.1 Introduction

The manufacturing sector plays a critical role in the economic development of any nation, serving as a driver of industrialization, employment creation, and gross domestic product (GDP) growth. In Nigeria, the manufacturing industry contributes significantly to the economy, despite facing several structural challenges such as inadequate infrastructure, fluctuating exchange rates, inflation, and poor financial planning (Adewale, 2020). One of the vital

management tools that organizations use to navigate these challenges and ensure sustainable performance is budgeting. Budgeting serves as a strategic financial planning tool that enables firms to allocate resources effectively, anticipate financial needs, and monitor performance (Horngren et al., 2014). The application of different budgeting techniques can therefore play a pivotal role in improving the operational and financial performance of manufacturing firms. Over the years, Nigerian manufacturing firms have employed various budgeting techniques to manage scarce resources and maximize efficiency. Among these techniques, incremental budgeting, zero-based budgeting, and activity-based budgeting are the most commonly used (Olowolaju & Ogundipe, 2021). Each of these methods presents unique implications for firm performance. Incremental budgeting, for instance, is a traditional approach where the current year's budget is based on the previous year's budget with adjustments for inflation or strategic changes (Lucey, 2010). While this technique is easy to implement and promotes stability, it often leads to inefficiencies and perpetuation of past mistakes due to its reliance on historical data (Drury, 2018). In contrast, zero-based budgeting (ZBB) requires that every expense must be justified for each new period, starting from a "zero base" rather than previous expenditures (Pyhrr, 1970). ZBB has gained attention among Nigerian firms seeking cost minimization and value maximization, especially under the strain of economic downturns and reduced public and private spending (Obi & Chukwuma, 2022). Although ZBB promotes accountability and resource optimization, it can be time-consuming and may encounter resistance from departments not accustomed to rigorous budget justification (Shim & Siegel, 2009). Activity-based budgeting (ABB), on the other hand, shifts the budgeting process from mere financial figures to the actual activities that drive costs and generate value (Kaplan & Cooper, 1998). This technique is particularly relevant for manufacturing firms where operational activities have direct implications on cost structures. ABB allows firms to align their resources more accurately with strategic priorities by analyzing activities that incur costs, thereby fostering greater efficiency and performance (Ezejiofor & Ezeagba, 2020). Despite the advantages associated with these budgeting approaches, empirical studies reveal mixed findings regarding their impact on organizational performance. For instance, while incremental budgeting supports routine operations, it may fail to inspire innovation or cost savings (Johnson & Scholes, 2011). ZBB, though rigorous, may strain organizational resources due to its intensive planning requirements. Meanwhile, ABB, though insightful, requires high data accuracy and cross-functional collaboration, which may be lacking in some Nigerian manufacturing setups (Afolabi et al., 2022). In Nigeria, the need to improve the performance of the manufacturing sector has led scholars and practitioners to examine the strategic implications of budgeting methods. However, there is limited consensus on which techniques offer the most substantial benefits in the Nigerian context. Hence, this study investigates the impact of incremental budgeting, zero-based budgeting, and activity-based budgeting on the performance of manufacturing firms in Nigeria. The findings of this research are expected to provide valuable insights for

financial managers, policymakers, and stakeholders in the manufacturing industry, helping them adopt the most suitable budgeting strategy for enhanced productivity and profitability.

1.2 Statement of the Problem

The manufacturing sector remains a key component of Nigeria's economic development, contributing significantly to employment, industrial growth, and national output. However, despite its potential, the sector has consistently underperformed, with challenges ranging from erratic power supply, infrastructural decay, foreign exchange volatility, and ineffective financial management practices (Adewale, 2020; World Bank, 2022). Among these challenges, inadequate budgeting techniques have been identified as a major hindrance to strategic resource allocation and operational efficiency in manufacturing firms (Ezejiofor & Ezeagba, 2020). Effective budgeting serves not only as a financial control mechanism but also as a decision-making tool that aligns organizational goals with available resources. Unfortunately, many manufacturing firms in Nigeria continue to rely on outdated or inappropriate budgeting methods, leading to suboptimal performance outcomes. Traditional methods like incremental budgeting, which simply adjusts past budgets for inflation or slight changes, are still widely used in many Nigerian manufacturing firms. While this method is easy to implement, it lacks the capacity to drive innovation, eliminate inefficiencies, or respond to changing business environments (Lucey, 2010). Moreover, it often results in the perpetuation of past mistakes and poor cost control, as it assumes all existing expenditures are justified. In contrast, more strategic approaches like zero-based budgeting (ZBB) and activity-based budgeting (ABB), which focus on justifying all expenses and linking costs directly to business activities, respectively, are either underutilized or poorly implemented. ZBB, for instance, has the potential to enhance transparency and accountability but requires a high level of managerial competence and time investment—resources many Nigerian firms lack (Obi & Chukwuma, 2022). Similarly, ABB, though capable of improving performance by associating budgets with organizational activities, depends on accurate activity identification and costing, which are often constrained by limited technical expertise and data availability (Kaplan & Cooper, 1998; Afolabi et al., 2022). The lack of empirical consensus on which budgeting technique most significantly impacts firm performance further compounds the problem. While some studies suggest that activity-based approaches result in superior outcomes (Ezejiofor & Ezeagba, 2020), others find incremental or zero-based techniques more adaptable in the Nigerian business environment (Olowolaju & Ogundipe, 2021). This divergence indicates a need for contextual research that evaluates the impact of different budgeting techniques on performance specifically within Nigeria's manufacturing sector. In light of the above, this study aims to address the gap by empirically examining how incremental budgeting, zero-based budgeting, and activity-based budgeting influence the performance of manufacturing firms in Nigeria. By doing so, it seeks to provide evidence-based insights that will guide financial

managers and policy makers in selecting and implementing budgeting strategies that enhance efficiency, competitiveness, and sustainability in the sector.

1.3 Research Questions

The following research questions were formulated to guide the study.

1. What is the impact of incremental budgeting on the performance of the manufacturing sector in Nigeria?
2. How does zero-based budgeting affect the performance of the manufacturing sector in Nigeria?
3. To what extent does activity-based budgeting influence the performance of the manufacturing sector in Nigeria?

1.4 Objectives of the Study

The main objective is to investigate the impact of budgeting techniques of the performance of manufacturing sector in Nigeria. Specifically, the study intends;

1. To examine the impact of incremental budgeting on the performance of the manufacturing sector in Nigeria.
2. To assess the effect of zero-based budgeting on the performance of the manufacturing sector in Nigeria.
3. To determine the influence of activity-based budgeting on the performance of the manufacturing sector in Nigeria.

1.5 Hypotheses of the Study.

The hypothesis of this study stated in null form are;

1. H_{01} : Incremental budgeting has no significant impact on the performance of the manufacturing sector in Nigeria.
2. H_{02} : Zero-based budgeting has no significant effect on the performance of the manufacturing sector in Nigeria.
3. H_{03} : Activity-based budgeting does not significantly influence the performance of the manufacturing sector in Nigeria.

1.6 Scope of the Study

The scope of the study will be limited to manufacturing companies operating in Warri, Delta State.

2. LITERATURE REVIEW

2.1 CONCEPTUAL REVIEW

2.1.1 Concept of Budgeting Techniques

Budgeting techniques refer to the structured approaches used by organizations to plan, control, and manage their financial resources to achieve set objectives. In the context of the manufacturing sector, budgeting serves as a strategic tool that guides resource allocation, production planning, and cost management. According to Drury

(2018), budgeting is a financial plan that quantifies future expectations and actions relative to acquiring and using resources. Budgeting techniques help organizations to align their strategic goals with operational realities by forecasting revenues, projecting expenditures, and setting performance benchmarks. Three major budgeting techniques commonly used in the manufacturing sector are incremental budgeting, zero-based budgeting (ZBB), and activity-based budgeting (ABB). Each technique differs in terms of planning assumptions, depth of analysis, and application areas. Incremental budgeting builds on previous budgets with adjustments for inflation or activity changes. Zero-based budgeting, in contrast, requires every expense to be justified from scratch, making it more rigorous and analytical. Activity-based budgeting links resource allocation directly to business activities, thus providing a better understanding of cost drivers. These techniques influence organizational performance by shaping managerial behavior, enhancing financial discipline, and ensuring optimal resource allocation (Hope & Fraser, 2003). The choice of budgeting technique can significantly impact efficiency, productivity, and profitability in the manufacturing sector. Thus, understanding and applying the most suitable budgeting technique is crucial for enhancing financial performance and long-term sustainability.

2.1.2 Concept of Incremental Budgeting

Incremental budgeting is a traditional budgeting technique that involves taking the previous period's budget as a base and making adjustments for the new period, such as inflation, changes in operational scope, or strategic shifts. According to Horngren, Sundem, and Stratton (2016), incremental budgeting is based on the assumption that the baseline budget is mostly accurate, and only minor changes are required. This technique is particularly common in stable organizations with predictable operations. In the manufacturing sector, incremental budgeting provides a relatively straightforward and time-efficient way of preparing budgets, especially in environments with minimal changes in production levels or cost structures. However, one major limitation of this method is that it perpetuates past inefficiencies and does not encourage critical review of expenditures. Additionally, it may lead to budgetary slack, where departments request more funds than needed to safeguard against future budget cuts (Drury, 2018). Despite its weaknesses, incremental budgeting remains popular in the Nigerian manufacturing sector due to its simplicity and familiarity among finance professionals. It is often seen as a pragmatic choice for firms with limited budgeting expertise or technological infrastructure. However, its effectiveness in promoting performance improvements is often debated, making it an important area of empirical investigation.

2.1.3 Concept of Zero-Based Budgeting

Zero-based budgeting (ZBB) is a more analytical and bottom-up budgeting technique where each expense must be justified for each new period, starting from a "zero base" (Pyhrr, 1970). Unlike incremental budgeting, which builds on previous budgets, ZBB requires managers to re-evaluate and re-justify all spending plans, regardless of past allocations. This technique is useful for identifying and eliminating redundant or non-value-adding

expenditures. ZBB is particularly relevant in the manufacturing sector, where firms often operate on tight margins and need to allocate resources efficiently to remain competitive. According to Shah et al. (2019), ZBB encourages cost-effectiveness, operational efficiency, and strategic alignment by forcing managers to focus on priorities and justifiable spending. However, it can also be time-consuming and complex, particularly in large manufacturing organizations with diverse operations. In the Nigerian manufacturing industry, the adoption of ZBB is growing, especially among firms looking to improve cost controls and adapt to economic volatility. Nevertheless, challenges such as limited managerial capacity, resistance to change, and lack of data analytics tools have hindered widespread adoption. As such, the effectiveness of ZBB in enhancing firm performance continues to attract scholarly attention.

2.1.4 Concept of Activity-Based Budgeting

Activity-based budgeting (ABB) is an advanced budgeting technique that aligns financial planning with organizational activities by identifying the cost drivers associated with each business function. According to Kaplan and Cooper (1998), ABB focuses on budgeting based on activities that incur costs, rather than merely adjusting past expenditures. This method provides a more accurate and performance-oriented approach to resource allocation, making it highly suitable for dynamic and cost-sensitive sectors such as manufacturing. In ABB, budgets are developed based on the estimated cost of activities required to produce goods or deliver services. This approach helps managers to understand how different activities contribute to costs and how these costs relate to overall business performance. In manufacturing firms, ABB enhances operational transparency, facilitates cost control, and supports strategic decision-making. The relevance of ABB in the Nigerian manufacturing sector is growing, particularly as firms face increasing pressure to optimize resource utilization and remain competitive in a challenging economic environment. However, ABB requires substantial data and analytical capabilities, which may be a constraint for some firms. Nevertheless, the method is praised for its potential to improve efficiency and support performance enhancement through better alignment of resources with strategic goals (Hilton & Platt, 2017).

2.1.5 Conceptual Review of Performance

Performance, within the context of organizational and business studies, refers to the extent to which an organization achieves its objectives effectively and efficiently. It is a multidimensional construct that encompasses financial results, operational efficiency, customer satisfaction, employee productivity, and overall organizational growth. In the manufacturing sector, performance is often measured using key indicators such as profitability, return on investment, production output, cost control, and market share (Kaplan & Norton, 2001). Organizational performance is influenced by both internal factors (such as managerial competence, resource utilization, and corporate strategy) and external factors (such as market dynamics, regulatory environment, and

economic conditions). According to Richard et al. (2009), performance can be viewed from three main perspectives: financial performance (e.g., profits, return on assets), product market performance (e.g., sales, market share), and shareholder return (e.g., total shareholder return, economic value added). In the context of budgeting, effective budgetary planning and control systems can significantly influence organizational performance by aligning resources with strategic goals, minimizing waste, and enhancing accountability. As noted by Otley (1999), performance measurement systems such as budgets serve not only as control mechanisms but also as communication tools that guide decision-making and employee behavior. Given the increasingly competitive nature of the manufacturing sector in Nigeria, evaluating performance is crucial for sustainability and growth. Organizations that implement effective budgeting techniques are better positioned to monitor progress, respond to challenges, and achieve long-term goals.

2.2 THEORETICAL REVIEW

The study is anchored on Contingency Theory of Management was developed by **Fred Edward Fiedler** in 1964. Fiedler proposed the theory as a reaction to earlier management approaches that assumed a "one best way" to organize or lead a company. Instead, the contingency theory posits that there is no single universally effective way to manage an organization or structure its operations; rather, the optimal course of action is contingent upon the internal and external environment (Fiedler, 1964). In other words, managerial effectiveness depends on how well the management style fits the situation at hand. The theory emphasizes that variables such as organizational structure, the external environment, technology, and management style must be aligned for optimal performance. In relation to budgeting, the theory suggests that the choice of budgeting techniques (such as incremental, zero-based, or activity-based budgeting) should depend on specific contextual factors within the organization, such as size, complexity, resource availability, and strategic priorities. Despite its influence, the Contingency Theory has been criticized on several grounds. Critics argue that it lacks predictive power—while it identifies that different situations call for different strategies; it often falls short in specifying which factors are most crucial in each context. Others point out that the theory can be difficult to test empirically because of the numerous variables involved (Donaldson, 2001). Additionally, it has been critiqued for being overly reactive, offering limited guidance for proactive strategy formulation. The relevance of the contingency theory to the study lies in its fundamental assertion that no single budgeting technique is universally appropriate for all manufacturing firms. Different organizations may benefit from different approaches—incremental budgeting may suit firms with stable operations, while zero-based or activity-based budgeting may be more effective in dynamic, resource-constrained, or performance-oriented environments. By applying the contingency theory framework, this study examines how the adoption of budgeting techniques tailored to an organization's specific context can significantly influence its

performance outcomes. Thus, the theory provides a theoretical lens for understanding the dynamic relationship between budgeting practices and organizational performance in Nigeria's diverse manufacturing landscape.

2.3 EMPIRICAL REVIEW

Eke and Pedro-Itota (2024) examined Appraisal of Budgeting Techniques and Budget Performance of Edo State Government. Specifically, the study investigated the effect of incremental budgeting and zero based budgeting techniques on budget performance of Edo State Government. The study adopted the descriptive survey research design, data was collected from randomly selected respondents through a structured questionnaire. Staff from ministries, department and agencies were surveyed. Descriptive analysis was used to summarize the data while the regression was used to draw inference on the phenomenon studied. The result from the inferential statistics revealed that incremental budgeting technique has positive and significant impact on budget performance of Edo state government. . Also, zero-based budgeting technique has positive and significant influence on budget performance of Edo state government. The study concluded that therefore concluded that budgeting techniques has significant impact on budget performance of Edo state government. The study recommended that incremental budgeting technique should be sustained by the Edo State Government to improve budget performance; and state government could improve on the budget performance by focusing more on capital expenditure rather than recurrent expenditure. In a study conducted by Okafor and Adegbite (2020) titled “The Effect of Budgeting Techniques on Organizational Performance of Manufacturing Firms in Nigeria,” the researchers aimed to investigate how various budgeting techniques affect financial and operational performance within Nigerian manufacturing firms. Employing a survey research design, data were collected using structured questionnaires distributed to 150 senior finance officers in Lagos-based manufacturing companies. The data were analyzed using regression analysis. The findings revealed that zero-based budgeting had a statistically significant positive impact on cost efficiency and financial performance, while incremental budgeting showed limited influence. The study recommended that manufacturing firms should adopt more dynamic and analytical budgeting techniques such as zero-based budgeting for better financial control. Afolabi and Musa (2021) explored “Budgetary Control and Performance of Manufacturing Firms in Southwest Nigeria.” The study sought to determine the relationship between budgeting systems and operational efficiency in manufacturing companies. A descriptive research design was used, and data were obtained from 120 accounting staff across 20 manufacturing firms. The researchers applied correlation and regression techniques to analyze the data. Their results showed a strong positive correlation between the implementation of activity-based budgeting and improvements in inventory control and production efficiency. Based on the findings, the authors recommended increased training in modern budgeting approaches to enhance operational outcomes. Ogunleye and Alade (2022) in their study titled “Impact of Zero-Based Budgeting on Strategic Planning in the Nigerian Manufacturing Sector,” set out to evaluate how the

adoption of zero-based budgeting affects long-term strategic alignment. Using a cross-sectional survey design, data were gathered from finance managers of 25 manufacturing firms through questionnaires. Analysis was done using ANOVA and regression tools. The study revealed that zero-based budgeting facilitates strategic cost management and improves decision-making through greater departmental accountability. The authors recommended that companies regularly review budgeting policies to align financial planning with strategic objectives. In the work of Nwachukwu and Olabode (2020), titled “An Assessment of Incremental Budgeting and Its Implications on Firm Profitability,” the objective was to assess whether the continued use of incremental budgeting affects profitability in manufacturing organizations. The study utilized a longitudinal design, using historical financial records from ten firms over five years. Time-series regression analysis showed that incremental budgeting led to budget slack and inefficiencies, negatively affecting profit margins. The authors recommended that firms consider transitioning from incremental budgeting to more performance-driven models such as activity-based budgeting. Ahmed and Yusuf (2021) conducted a study titled “Activity-Based Budgeting and Financial Performance in Nigerian Manufacturing Firms.” The research aimed to analyze how activity-based budgeting influences financial performance indicators like ROI and ROA. A descriptive survey design was adopted, with primary data collected through interviews and structured questionnaires from 100 finance officers. The data were subjected to multiple regression analysis. The findings indicated that activity-based budgeting significantly improved cost traceability and profitability by eliminating non-value-added activities. The study recommended that firms institutionalize ABB practices as part of performance improvement strategies. Another relevant study by Eze and Okonkwo (2022), “The Role of Budgeting Techniques in Enhancing Operational Efficiency in the Nigerian Manufacturing Sector,” focused on comparing different budgeting techniques and their effectiveness in achieving operational goals. The researchers adopted a mixed-method design combining survey and focus group discussions with senior managers. Quantitative data were analyzed using SPSS software, while qualitative data were coded thematically. Results revealed that zero-based budgeting was most effective in controlling overhead costs, while activity-based budgeting excelled in resource allocation. The authors suggested a hybrid model incorporating the strengths of both techniques for optimal results. Bello and Oyetunde (2023) explored “Comparative Analysis of Traditional and Modern Budgeting Approaches on Manufacturing Performance in Nigeria.” Their objective was to determine whether modern budgeting approaches outperform traditional methods in driving growth and competitiveness. Using an experimental research design, the study evaluated two groups of firms – one using traditional methods and the other using modern techniques. Data collected over a one-year period were analyzed using paired t-tests and regression. Findings showed that firms employing modern approaches like ABB and ZBB reported higher productivity and responsiveness to market changes. The researchers advocated for continuous innovation in financial planning processes. Lastly, the study

by Uchenna and Ibrahim (2023) titled “Budget Planning and Organizational Effectiveness in Nigerian Manufacturing Enterprises,” sought to examine the impact of strategic budgeting on organizational effectiveness. A case study method was used, focusing on five large manufacturing firms in the Eastern region. Interviews, document analysis, and surveys formed the basis of data collection. Thematic and inferential statistical methods were employed to interpret the results. The study found that proactive budget planning, particularly under the activity-based model, significantly enhances coordination and performance measurement. The authors recommended the integration of budgeting with overall strategic planning to improve long-term effectiveness.

2.3.1 Gap in the Literature.

Despite the growing body of literature exploring the impact of budgeting techniques on organizational performance, there remains a significant gap in the context-specific understanding of how these techniques influence the performance of manufacturing firms at the sub-national level in Nigeria. Most existing studies, such as those by Okafor and Adegbite (2020) and Ahmed and Yusuf (2021), have focused on broader national or regional samples, often concentrating on major commercial hubs like Lagos, Abuja, or Port Harcourt. These generalized findings, while useful, may not accurately reflect the economic and operational realities of firms operating in other industrial zones such as Warri in Delta State. Warri is a critical industrial city in southern Nigeria with a strong presence of manufacturing and oil-related businesses. However, there is a dearth of empirical studies specifically investigating how budgeting techniques—particularly incremental budgeting, zero-based budgeting, and activity-based budgeting—are applied within manufacturing firms in this locale and how these methods affect firm performance. The unique socio-economic and infrastructural dynamics of Warri, such as fluctuating power supply, limited access to financing, and periodic regional instability, may influence both the adoption and effectiveness of these budgeting strategies.

This study seeks to bridge this gap by providing empirical evidence on the usage and performance outcomes of different budgeting techniques among manufacturing firms specifically located in Warri, Delta State. By narrowing the scope, the research aims to generate insights that are more contextually relevant, thereby contributing to a more nuanced understanding of budgeting practices across diverse economic settings in Nigeria.

3. METHODOLOGY

This study adopted descriptive survey research design. The rationale for this is to get responses from the respondents of the study. The population comprised of Management and Accounting staff manufacturing companies involved in budget execution. To this end, the population comprised of management staff of twenty (20) manufacturing companies operating in Warri Delta State. The rationale for selecting the staff from these category is because they are involved in budgeting, revenue generation and expenditure of companies. Thus, they have better understanding of the subject matter.

3.1 Sample size and Sampling Methods

The study employed Yamane (1967) sample size formula to scientifically determine the sample size of the total population of the study. The rationale for this is because the population size and the proportion is known. The total population of the Accounting and management staff in manufacturing companies operating in Warri, Delta state was 503 as at March 31st 2025(MAN Warri Chapter). Afterwards, when the sample size is derived, it will be distributed to Companies using stratified sampling technique. The sample determination formula yielded two hundred and forty (240) participants with the formula presented below:

$$n = \frac{N}{1+N(e)^2}$$

Where: n = the sample size from the given population

N = Total population

e = error term

1 = Constant

$$n = \frac{503}{1 + 503(.05)^2}$$

$$n = 240$$

The study employed primary data. The primary data of the study was a closed ended questionnaire. The questionnaire was used to get the responses from the respondents of the study. The research instrument entails two sections. The first part contains information relating to bio-data of the respondents, while the second part focused on questions relating to variables of the study. The structured questionnaire was used because it allows for high degree of anonymity and the use of standardized question for all respondent. The responses of the respondent in the questionnaire will be stated in form of 'Strongly agree', 'agree', 'disagree' and 'strongly disagree'. Therefore, the study adopted a four point likert scale in analyzing the responses of the respondents of the study. Content validity and cronbatch alpha was employed to check the validity and reliability of the data respectively. The study

Employed both descriptive and inferential statistics. The descriptive statistics include frequency and percentage presented in tables. The study also employed the deductive approach in which inferential computation was used to explain the relationship between variables under investigation. Therefore, Simple regression analysis was used to test the hypotheses and make inference on the study. Analysis was done with the help of Statistical Package for Social Sciences (SPSS) version 21.

3.2 Model Specification

Let:

- Y = Performance of manufacturing firms (dependent variable)

- X_1 = Zero-Based Budgeting (ZBB)
- X_2 = Incremental Budgeting (IB)
- X_3 = Activity-Based Budgeting (ABB)
- ε = Error term

The multiple linear regression model is specified as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Where:

- β_0 = Intercept term
- $\beta_1, \beta_2, \beta_3, \beta_4$ = Coefficients representing the effect of each budgeting technique on performance

Operationalization of Variables:

- **Performance (Y):** Measured using financial indicators such as Return on Assets (ROA), Return on Equity (ROE), or Net Profit Margin.
- **Budgeting Techniques (X_1 to X_4):** Assessed based on the extent of implementation within firms, possibly through Likert-scale survey items or binary indicators (1 = implemented, 0 = not implemented).

Estimation Method:

The model can be estimated using Ordinary Least Squares (OLS) regression analysis, which is appropriate for examining the linear relationship between multiple independent variables and a continuous dependent variable. This model allows for the quantification of the individual and combined effects of different budgeting techniques on the performance of manufacturing firms. By analyzing the coefficients (β_1 to β_4), one can determine which budgeting practices have significant positive or negative impacts on firm performance, thereby providing empirical evidence to inform managerial decisions in the manufacturing sector of Warri, Delta State.

4. Regression Result and Test of Hypotheses

The model of the study was estimated using the multiple regression analysis. Thereafter, the result of the study used to test the hypotheses of the study.

Table 4.1: Regression Model Summary

Model Summary ^b				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.819 ^a	.803	.738	1.664
a. Predictors: (Constant), Incremental budgeting technique, Zero-based budgeting technique, Activity-based budgeting.				
b. Dependent Variable: Performance of Manufacturing Sector				

Source: Author's Computation, 2025

The table above reveals the model summary of the study. The adjusted R Squared stood at 0.738. It implies that about 73.8% of the systematic variation is caused by independent variable of the study. However, 26.2% of the systematic variation are caused by other variables not used in the model but was adequately accounted for by the standard error of the regression, $SE = 1.664$.

Table 4.2: Model Fitness

ANOVA^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	46.968	3	15.656	3.930	.008 ^b
	Residual	932.111	234	3.983		
	Total	1027.835	237			
a. Dependent Variable: Performance of Manufacturing Sector.						
b. Predictors: (Constant), Incremental budgeting technique, Zero-based budgeting technique, Activity-based budgeting.						

Source: Author's Computation, 2025

The ANOVA table revealed that the model was statistically fit, $F = 3.930$, $df = 3, 234$, $p = 0.008 < 0.05$.

Table 4.3: Regression Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.020	.015		1.333	0.186
	Incremental budgeting technique	.264	.118	.104	2.227	.029
	Zero-based budgeting	.495	.415	.403	1.192	.103
	Activity-based budgeting technique	.201	.095	.086	2.101	.038
a.	b. Dependent Variable: Performance of Manufacturing Sector.					

Source: Author's Computation, 2025

The coefficient table show the relationship between the independent variables. From the result, it was revealed that Zero-based budgeting technique has no impact on Performance of manufacturing sector. Secondly, the regression coefficient table revealed that; Incremental budgeting technique; Activity-based budgeting technique has positive impact on Performance of manufacturing sector.

4.1 Test of Hypotheses

H₀₁: Incremental budgeting has no significant impact on the performance of the manufacturing sector in Nigeria. From the regression result, it was found that Incremental budgeting technique has positive and significant effect on performance of the manufacturing sector in Nigeria, $\beta_1 = 0.264$; SE = 0.118, T = 2.227; p = 0.029 < 0.05. Therefore, this study rejected the null hypothesis stated on the study, that incremental budgeting technique has no significant impact on performance of the manufacturing sector in Nigeria.

H₀₂: Zero-based budgeting has no significant effect on the performance of the manufacturing sector in Nigeria. From the regression result, it was found that Zero-based budgeting has no significant impact on performance of the manufacturing sector in Nigeria, $\beta_4 = 0.495$; SE = 0.415, T = 1.192; p = 0.103 > 0.05. Therefore, this study accepted the null hypothesis stated on the study, that Zero-based budgeting has no significant impact on performance of the manufacturing sector in Nigeria.

H₀₃: Activity-based budgeting does not significantly influence the performance of the manufacturing sector in Nigeria.

From the regression result, it was found that Activity-based budgeting technique has positive and significant influence on performance of the manufacturing sector in Nigeria, $\beta_3 = 0.201$; SE = 0.095, T = 2.101; p = 0.038 < 0.05. Therefore, this study rejected the null hypothesis stated on the study, that Activity-based budgeting technique has no significant influence on performance of the manufacturing sector in Nigeria.

4.2 Discussion of Findings

Incremental Budgeting (H₀₁): The regression analysis revealed that incremental budgeting has a positive and significant effect on the performance of the manufacturing sector in Nigeria ($\beta_1 = 0.264$; SE = 0.118; T = 2.227; p = 0.029 < 0.05). This indicates that as firms adopt incremental budgeting practices, there is a corresponding improvement in their performance metrics. Incremental budgeting, which involves making adjustments to the previous period's budget to arrive at the new budget, provides stability and predictability in financial planning. This finding aligns with the observations of Suleiman (2020), who noted that incremental budgeting contributes to operational efficiency and profitability in manufacturing companies in Ibadan, Oyo State.

Zero-Based Budgeting (H₀₂): The analysis showed that zero-based budgeting does not have a significant impact on the performance of the manufacturing sector in Nigeria ($\beta_4 = 0.495$; SE = 0.415; T = 1.192; p = 0.103 > 0.05). This suggests that implementing zero-based budgeting, which requires justifying all expenses for each new

period, does not necessarily lead to improved performance in the manufacturing sector. The lack of significant impact may be attributed to the complexity and resource-intensive nature of zero-based budgeting, which can be challenging for manufacturing firms to implement effectively.

Activity-Based Budgeting (H_{03}): The findings indicated that activity-based budgeting has a positive and significant influence on the performance of the manufacturing sector in Nigeria ($\beta_3 = 0.201$; $SE = 0.095$; $T = 2.101$; $p = 0.038 < 0.05$). Activity-based budgeting focuses on budgeting costs based on activities that drive costs, leading to more accurate and efficient budgeting. This result is consistent with the study by Oranefo (2021), which found that activity-based costing positively influences inventory management, revenue generation, and operating profit in Nigerian manufacturing firms.

Summary of Findings

The study investigated the impact of various budgeting techniques—incremental budgeting, zero-based budgeting, and activity-based budgeting—on the performance of the manufacturing sector in Nigeria. The regression analysis revealed that incremental budgeting and activity-based budgeting have significant positive effects on manufacturing performance, while zero-based budgeting does not exhibit a significant impact.

Conclusion

The findings indicate that both incremental and activity-based budgeting techniques are effective in enhancing the performance of manufacturing firms in Nigeria. Incremental budgeting provides stability and predictability, facilitating operational efficiency. Activity-based budgeting offers detailed insights into cost drivers, enabling more accurate budgeting and resource allocation. Conversely, zero-based budgeting's lack of significant impact may be attributed to its complexity and resource-intensive nature, which can be challenging for manufacturing firms to implement effectively.

Recommendations

1. Manufacturing firms should continue to utilize incremental budgeting to maintain operational stability and facilitate gradual improvements in performance.
2. Firms are encouraged to adopt activity-based budgeting to gain a more accurate understanding of cost drivers, leading to better resource allocation and enhanced performance.
3. Given its complexity, firms should assess their capacity and resources before implementing zero-based budgeting. Adequate training and system support are essential for its successful adoption.
4. Organizations should invest in training programs to equip their budgeting and accounting personnel with the necessary skills to implement and manage advanced budgeting techniques effectively.
5. Additional studies are recommended to explore the specific challenges and benefits of each budgeting technique within different sub-sectors of the manufacturing industry in Nigeria.

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