



COST CONTROL MEASURES AND OPERATIONAL PERFORMANCE OF PHARMACEUTICAL FIRMS IN NIGERIA: EVIDENCE FROM SELECTED COSTING METHODS

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Abstract

This study examines the relationship between cost control measures and operational performance in Nigerian pharmaceutical firms. Cost control is proxied by three costing methods, namely Activity-Based Costing, Traditional or Full Absorption Costing, and Standard Costing Techniques, while operational performance is proxied by brand loyalty, customer satisfaction, and market share. The investigation responds to a gap in the Nigerian literature, where prior empirical work on cost control has focused on broader manufacturing sectors rather than the pharmaceutical industry, and on financial rather than customer-facing performance dimensions. A cross-sectional survey design was adopted. Structured questionnaires were administered to management-level personnel at three listed pharmaceutical firms, namely Fidson Healthcare Plc, GlaxoSmithKline Consumer Nigeria Plc, and May & Baker Nigeria Plc. Of 150 questionnaires distributed, 142 valid responses were retrieved, giving a response rate of 94.7 per cent. Three simple linear regression models were estimated. The results show that Activity-Based Costing has a statistically significant positive effect on brand loyalty ($\beta = 0.826$, $t = 13.163$, $p < 0.05$), explaining 55.1 per cent of the variance. Traditional or Full Absorption Costing has a significant positive effect on customer satisfaction ($\beta = 0.772$, $t = 11.563$, $p < 0.05$), accounting for 48.7 per cent of the variance. Standard Costing Techniques are significantly and positively associated with market share ($\beta = 0.694$, $t = 10.415$, $p < 0.05$), explaining 44.1 per cent of the variance. The findings indicate that cost control practices function not only as instruments of financial discipline but also as drivers of customer-facing performance outcomes. The study recommends that pharmaceutical firms align their choice of costing system with the operational outcome they most need to improve, and that managerial investment in costing capability be treated as a strategic priority.

Keywords: cost control, activity-based costing, absorption costing, standard costing, operational performance

1. Introduction

Pharmaceutical firms in Nigeria operate in a market that combines persistent cost pressure with elevated public expectations of product quality and availability. Domestic production currently meets only a fraction of national pharmaceutical demand, and the sector remains heavily exposed to imported active ingredients, foreign exchange volatility, and inconsistent power supply (Oinkio, 2023). In this environment, the ability to manage costs without compromising product reliability is closely tied to a firm's broader operational standing, including the trust customers place in its brands, their satisfaction with what is delivered, and the share of the market the firm is able to hold.

Cost control, understood as the systematic regulation of expenditure to align actual costs with planned standards, has long been treated as a routine accounting function. However, contemporary management accounting literature positions cost control as a strategic capability that shapes pricing, product mix, and resource allocation decisions (Rounaghi, Jarrar & Dana, 2021). Three approaches are particularly visible in this literature, and each serve as a proxy of cost control in the present study.

Activity-Based Costing traces overhead to activities and then to products on the basis of the resources each activity consumes, providing a more granular view of profitability than traditional methods (Kaplan & Cooper, 1998). Traditional or Full Absorption Costing allocates direct and indirect production costs to units of output, supporting inventory valuation and external financial reporting (Datar & Rajan, 2021). Standard Costing Techniques establish predetermined cost benchmarks against which actual performance is measured, with variances analysed to drive corrective action (Drury, 2018).

Existing Nigerian studies have examined cost control extensively in manufacturing contexts. Siyanbola and Raji (2013) used a case study of WAPCO Cement; Olagunju, Imeokparia and Afolabi (2014) examined Cadbury, Friesland Wamco and Nestlé; Akpanabia and Ekwutosi (2021) surveyed manufacturing firms in Abia State; Ali-Momoh, Egbekun, Omolorun, Omole and Aruna (2022) drew on quoted manufacturing firms more generally; and Adeniyi (2024) revisited the question across listed manufacturing firms.

The pharmaceutical sector, with its distinct cost structure, regulatory environment, and supply-chain dependencies, has received comparatively limited empirical attention, beyond a small number of studies including Oinkio (2023), which concentrated on cost-variance approaches, and Muoneke and Dandago (2024), which examined Activity-Based Costing in a Nigerian pharmaceutical case study. Other recent contributions, such as Ali-Momoh et al. (2024) and Iwajomo, Akinlabi and Akinrinola (2025), have broadened the evidence base on absorption costing and variance analysis but remain focused on financial outcomes.

A further limitation of the existing literature is its concentration on financial performance indicators such as profit after tax and return on assets, with much less attention to customer-facing outcomes. Brand loyalty, customer satisfaction, and market share matter for pharmaceutical firms because trust, repeat prescribing patterns, and product availability are central to commercial sustainability in the sector. The relationship between specific cost-control approaches and these customer-facing outcomes has not been systematically investigated in the Nigerian pharmaceutical context.

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The broad objective of this study is to examine the effect of cost control measures on the operational performance of Nigerian pharmaceutical firms. The specific objectives are:

- (i) to examine the effect of Activity-Based Costing on the brand loyalty of pharmaceutical firms in Nigeria;
- (ii) to evaluate the effect of Traditional or Full Absorption Costing on the customer satisfaction of pharmaceutical firms in Nigeria; and
- (iii) to assess the effect of Standard Costing Techniques on the market share of pharmaceutical firms in Nigeria.

Consistent with the specific objectives, the following null hypotheses are tested:

H₀₁: Activity-Based Costing has no significant effect on the brand loyalty of pharmaceutical firms in Nigeria.

H₀₂: Traditional or Full Absorption Costing has no significant effect on the customer satisfaction of pharmaceutical firms in Nigeria.

H₀₃: Standard Costing Techniques have no significant effect on the market share of pharmaceutical firms in Nigeria.

The remainder of the paper is structured as follows. Section 2 reviews the relevant conceptual, theoretical, and empirical literature. Section 3 sets out the methodology. Section 4 presents the results and discussion. Section 5 offers conclusions and recommendations.

2. Literature Review

Conceptual Framework

Cost control encompasses the practices through which an organisation regulates expenditure so that actual costs remain consistent with predetermined targets. Three distinct but complementary approaches have been widely adopted in production-oriented firms and serve as the proxies of cost control adopted in this study.

Activity-Based Costing

Activity-Based Costing (ABC) emerged in response to perceived weaknesses in conventional volume-based overhead allocation. Whereas traditional methods spread overhead in proportion to direct labour or machine hours, ABC traces overhead to activities and then to products on the basis of the resources each product consumes (Kaplan & Cooper, 1998). The result is more accurate product-level costing, which in turn supports better-informed pricing and product-mix decisions. Adoption of ABC in Nigerian firms has been uneven; Ali-Momoh and colleagues (2022) report that smaller firms continue to favour simpler costing systems, citing the data and skill requirements of full ABC implementation.

Traditional or Full Absorption Costing

Absorption costing assigns all production costs, both variable and fixed, to units of output. The approach is required for external reporting under most accounting standards and remains the dominant costing method in Nigerian production firms (Olagunju et al., 2014). Its strength lies in its comprehensiveness; its weakness lies in the somewhat

arbitrary nature of overhead allocation, which can distort product profitability when overhead is large relative to direct costs (Datar & Rajan, 2021).

Standard Costing Techniques

Standard costing establishes target costs for materials, labour, and overhead per unit of output. Actual costs are compared against these targets, and the resulting variances are investigated and acted upon. The approach is closely tied to budgetary control and to performance evaluation (Drury, 2018). Akpanabia and Ekwutosi (2021) reported that standard costing was the most prevalent cost-control technique among manufacturing firms in Abia State, although the quality of variance analysis varied considerably across firms.

Operational Performance

Operational performance is a multidimensional construct. For pharmaceutical firms operating in competitive consumer markets, three dimensions are particularly salient and are adopted in this study as the dependent variables. Brand loyalty captures the extent to which customers commit to a firm's products despite the availability of alternatives.

Customer satisfaction reflects the degree to which products and services meet customer expectations across efficacy, availability, affordability, and service. Market share measures a firm's sales as a proportion of total industry sales and serves as a summary indicator of competitive position. Each dimension is shaped by cost-management practices, but the channels through which costing influences these outcomes differ.

Theoretical Framework

This study draws on three complementary theoretical lenses. The Resource-Based View (Barney, 1991; Wernerfelt, 1984) treats internal capabilities as the primary source of competitive advantage. Sophisticated costing systems can be viewed as such a capability when they are difficult to imitate and provide decision-relevant information that competitors cannot easily replicate.

Contingency Theory (Otley, 1980) holds that the effectiveness of any management control system depends on its fit with the organisation's environment, technology, and strategy; this perspective explains why no single costing approach is universally optimal. Cost Management Theory provides the operational vocabulary for analysing how costing systems shape decisions on pricing, product mix, and process improvement (Kaplan & Cooper, 1998). Taken together, these three lenses frame cost control as a context-sensitive capability whose value lies in the decisions it enables rather than in the cost reports it produces.

Empirical Review

The empirical review is organised around each independent variable (the cost-control proxy) and its corresponding dependent variable (the operational performance outcome). This structure makes the basis for hypothesis development transparent.

Activity-Based Costing and Brand Loyalty

Evidence on Activity-Based Costing as a driver of customer-facing outcomes is growing, particularly in the Nigerian pharmaceutical context. Muoneke and Dandago (2024), drawing on a mixed-method case study of a Nigerian pharmaceutical manufacturer, find that ABC adoption improves production management efficiency and supports more accurate cost information for pricing and decision-making, which in turn underpin brand positioning.

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In the broader Nigerian setting, Ali-Momoh et al. (2022) show that costing accuracy is positively associated with financial performance, and Adeniyi (2024) extends this to suggest that firms using disciplined cost-control practices, including ABC, achieve cost positions that support brand strength. Rounaghi, Jarrar and Dana (2021) further argue that ABC reduces cost stickiness and supports corporate sustainability, both of which are conducive to durable brand loyalty.

Traditional or Full Absorption Costing and Customer Satisfaction

Absorption costing is the most widely used costing method in Nigerian production firms (Olagunju et al., 2014). Its emphasis on the comprehensive recovery of fixed and variable production costs is associated with consistent pricing and reliable supply, both of which feed directly into customer satisfaction. Akpanabia and Ekwutosi (2021) report that comprehensive costing in manufacturing firms in Abia State was significantly associated with production quality.

Ali-Momoh et al., (2024) provide more recent Nigerian evidence from twenty listed manufacturing firms over the period 2013 to 2023, showing that the allocation of overhead costs under absorption costing has a positive relationship with return on assets, which suggests that the disciplined recovery of overheads through pricing supports operational reliability and downstream customer outcomes. Internationally, Datar and Rajan (2021) note that absorption costing remains the operational anchor for pricing decisions in firms with large fixed-cost bases such as pharmaceuticals.

Standard Costing Techniques and Market Share

Standard costing supports operational efficiency by establishing benchmark costs and using variance analysis to flag deviations. Drury (2018) positions standard costing as a key instrument of budgetary control. Akpanabia and Ekwutosi (2021) find standard costing to be the most prevalent cost-control technique in their Nigerian sample and report a positive association with production quality. Oyerogba et al., (2014), drawing on data from forty quoted Nigerian manufacturing firms over a decade, report a positive overall relationship between cost-management practices and firm performance, lending support to the view that disciplined cost control underpins competitive standing.

Omah and Horsfall (2022) provide complementary evidence from Rivers State, showing that cost-control practices, including standard costing, are positively associated with corporate performance. More recently, Iwajomo et al. (2025) examined variance analysis and operational performance in thirty listed Nigerian manufacturing firms and report that selling price variance has a significant positive effect on return on assets, while production cost variances have significant negative effects, confirming that variance-based control is material for competitive standing.

Pharmaceutical-specific Nigerian evidence remains thin; Oinkio (2023) examined material, labour, and sales variances in seven pharmaceutical firms and reported that sales variance had a significant positive effect on return on investment, while material and labour cost variances were not significant.

Hypotheses Development

Drawing on the theoretical lenses and the empirical evidence reviewed above, three alternative hypotheses are developed. The Resource-Based View suggests that ABC, by

providing more accurate product-level cost information, supports the pricing and product-mix decisions that underpin a strong brand.

Absorption costing, by ensuring that all production costs are recovered, contributes to consistent pricing and reliable supply, which are central to customer satisfaction in the pharmaceutical context. Standard costing, by anchoring performance evaluation in clear cost benchmarks, supports the operational efficiency that enables firms to defend and grow market share.

Each hypothesis is stated in the alternative form for testing:

H₁: Activity-Based Costing has a significant positive effect on brand loyalty in Nigerian pharmaceutical firms.

H₂: Traditional or Full Absorption Costing has a significant positive effect on customer satisfaction in Nigerian pharmaceutical firms.

H₃: Standard Costing Techniques have a significant positive effect on market share in Nigerian pharmaceutical firms.

3. Methodology

Research Design

The study adopted a cross-sectional survey design. The design was chosen because the study sought to test associations between perceived cost-control practices and reported operational performance at a single point in time, rather than to track change over time or to manipulate variables experimentally. The design supports primary data collection across multiple firms while remaining cost-effective and tractable within the project's resource constraints.

Population and Sample

The target population comprised management-level personnel of pharmaceutical firms listed on the Nigerian Exchange. Three firms were selected purposively: Fidson Healthcare Plc, GlaxoSmithKline Consumer Nigeria Plc, and May & Baker Nigeria Plc. The selection reflects firms with established corporate governance structures, audited financial reporting, and a broad presence across the pharmaceutical product spectrum.

Within each firm, fifty respondents were targeted using stratified random sampling, with strata defined by departmental function (finance and accounting, operations, internal control, quality assurance, marketing, and risk management). Selection criteria required at least three years of service at the firm, a management-level role, and direct involvement with cost-management or operational performance functions. The total target sample was 150 respondents.

Data Collection Instrument

A structured questionnaire was developed and divided into three sections. Section A captured demographic information. Section B measured the three cost-control variables, with five Likert-scaled items per variable covering Activity-Based Costing, Traditional or Full Absorption Costing, and Standard Costing Techniques. Section C measured the three operational performance variables, again with five items per variable covering Brand Loyalty, Customer Satisfaction, and Market Share. All items in Sections B and C used a five-point Likert scale anchored at 1 = Strongly Disagree and 5 = Strongly Agree.

Content validity was established through expert review by academics in management accounting, and the instrument was pilot-tested with thirty respondents drawn

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from outside the final sample. Reliability was assessed using Cronbach's alpha; all six constructs returned coefficients above the conventional 0.70 threshold, confirming the internal consistency of the measures.

Method of Data Analysis

Descriptive statistics summarised respondent demographics and construct-level mean scores. Three simple linear regression models were estimated to test the hypothesised relationships, with each cost-control variable serving as the predictor for one operational performance outcome. The model specifications are:

$BL = \beta_0 + \beta_1 ABC + \varepsilon$(Model 1); $CS = \beta_0 + \beta_1 TC + \varepsilon$(Model 2);

$MS = \beta_0 + \beta_1 SCT + \varepsilon$(Model 3); where BL is Brand Loyalty, CS is Customer Satisfaction, MS is Market Share, ABC is Activity-Based Costing, TC is Traditional or Full Absorption Costing, SCT is Standard Costing Techniques, β_0 is the intercept, β_1 is the slope coefficient, and ε is the error term. Hypotheses were tested at the 5 per cent level. Analyses were conducted using SPSS version 26.

Ethical Considerations

Informed consent was obtained from all participants. Respondents were assured of anonymity and of their right to withdraw at any stage without consequence. No personally identifying information was retained in the final dataset. Data were used solely for the purposes stated in the study and were stored securely in line with established research-data management practices.

4. Results and Discussion

Response Rate and Sample Characteristics

Of the 150 questionnaires distributed, 142 were properly completed and returned, giving a response rate of 94.7 per cent. The high response rate reflects active engagement by the participating firms and supports the reliability of the inferences that follow.

Table 1

Sample Distribution by Organisation

Organisation	Frequency	Per cent	Cumulative
Fidson Healthcare Plc	48	33.8	33.8
GlaxoSmithKline Consumer Nigeria Plc	47	33.1	66.9
May & Baker Nigeria Plc	47	33.1	100.0
Total	142	100.0	

Source: Field Survey (2025)

The sample was approximately balanced across the three firms. Respondents were drawn from finance and accounting (24.6 per cent), operations (19.7 per cent), internal control (17.6 per cent), marketing (15.5 per cent), quality assurance (12.7 per cent), and risk management (9.9 per cent) departments. In terms of experience, 78.2 per cent of respondents had more than five years of service at their current firm, and 70.4 per cent held

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at least a bachelor's degree, with a further 22.5 per cent holding professional certifications. This composition supports the assumption that respondents were sufficiently informed about the cost-management and operational performance practices in their organisations.

Descriptive Statistics

Table 2 presents the construct-level mean scores and standard deviations for the three cost-control variables and the three operational performance variables. All construct means fall in the upper portion of the five-point scale, indicating that respondents broadly agreed with the descriptive statements, with limited variability around those means.

Table 2

Construct-Level Descriptive Statistics

Construct	N	Mean	SD	Cronbach α
Activity-Based Costing (ABC)	142	3.87	0.68	0.84
Traditional or Full Absorption Costing (TC)	142	3.88	0.69	0.81
Standard Costing Techniques (SCT)	142	3.89	0.72	0.83
Brand Loyalty (BL)	142	3.88	0.71	0.82
Customer Satisfaction (CS)	142	3.97	0.74	0.85
Market Share (MS)	142	3.82	0.76	0.79

Source: Field Survey (2025)

Note: All Cronbach alpha values exceed the conventional 0.70 threshold for internal consistency

Among the cost-control items, the highest-rated statement was that Traditional Costing methods incorporate all production costs into product cost (mean = 4.18). Among the operational performance items, the highest-rated statement was customer satisfaction with product efficacy (mean = 4.22). The lowest-rated item across the full instrument was the perception of consistent market-share growth over the previous three years (mean = 3.58), suggesting that respondents acknowledged challenges in sustaining share even where current standing was viewed positively.

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Hypothesis Testing

Hypothesis 1: Activity-Based Costing and Brand Loyalty

Table 3 presents the regression results for Model 1.

Table 3

Regression Results for Activity-Based Costing on Brand Loyalty

Predictor	B	SE	T	p
Constant	0.692	0.218	3.174	0.002
Activity-Based Costing	0.826	0.063	13.163	0.000

$R = 0.742$; $R^2 = 0.551$; Adjusted $R^2 = 0.548$; $F(1, 140) = 173.258$, $p < 0.001$

Source: SPSS output.

Note: Dependent variable: Brand Loyalty

The coefficient on Activity-Based Costing is positive and statistically significant ($\beta = 0.826$, $t = 13.163$, $p < 0.001$). The model explains 55.1 per cent of the variance in brand loyalty. The null hypothesis is therefore rejected; ABC has a significant positive effect on brand loyalty in the firms studied.

Hypothesis 2: Traditional Costing and Customer Satisfaction

Table 4 reports the results for Model 2.

Table 4

Regression Results for Traditional Costing on Customer Satisfaction

Predictor	B	SE	t	p
Constant	0.984	0.245	4.016	0.000
Traditional Costing	0.772	0.067	11.563	0.000

$R = 0.698$; $R^2 = 0.487$; Adjusted $R^2 = 0.484$; $F(1, 140) = 133.665$, $p < 0.001$

Source: SPSS output

Note: Dependent variable: Customer Satisfaction

Traditional Costing is positively and significantly associated with customer satisfaction ($\beta = 0.772$, $t = 11.563$, $p < 0.001$), explaining 48.7 per cent of the variance. The null hypothesis is therefore rejected.

Hypothesis 3: Standard Costing and Market Share

Table 5 reports the results for Model 3.

Table 5

Regression Results for Standard Costing Techniques on Market Share

Predictor	B	SE	t	p
Constant	1.127	0.268	4.205	0.000
Standard Costing Techniques	0.694	0.067	10.415	0.000

R = 0.664; R² = 0.441; Adjusted R² = 0.437; F(1, 140) = 108.472, p < 0.001

Source: SPSS output

Note: Dependent variable: Market Share

Standard Costing Techniques exert a significant positive effect on market share ($\beta = 0.694$, $t = 10.415$, $p < 0.001$), accounting for 44.1 per cent of the variance. The null hypothesis is therefore rejected.

Discussion of Findings

The three hypotheses are supported, with effect sizes that vary across the cost-control approaches. Activity-Based Costing shows the strongest association with its corresponding outcome, explaining over half of the variance in brand loyalty. This pattern is consistent with the resource-based proposition that more accurate cost information enables sharper pricing and product-mix decisions, both of which support a brand's perceived value. Where ABC reveals which products and customer segments are genuinely profitable, firms can direct marketing investment and service quality improvements more confidently. The finding aligns with the broader literature on ABC as a strategic capability (Kaplan & Cooper, 1998; Rounaghi, Jarrar & Dana, 2021) and extends that literature to the Nigerian pharmaceutical context, where comparable evidence has been scarce.

Traditional or Full Absorption Costing is significantly associated with customer satisfaction, although with somewhat lower explanatory power than ABC shows in relation to brand loyalty. The result is consistent with the position that absorption costing, although less granular than ABC, ensures that fixed production costs are systematically recovered through pricing. Reliable recovery of these costs supports stable product availability and consistent quality, both of which feed directly into customer satisfaction. Akpanabia and Ekwutosi (2021), Olagunju, Imeokparia and Afolabi (2014), and Ali-Momoh et al. (2024) reported similar patterns in Nigerian manufacturing firms, where comprehensive overhead allocation was associated with operational reliability and profitability. The present findings extend that pattern to a pharmaceutical sample.

Standard Costing Techniques are significantly associated with market share, although the explained variance is the lowest of the three models. The interpretation is that variance analysis and standard-cost benchmarks provide the operational discipline needed to maintain competitive cost positions, but that market share is determined by a broader set of factors, including marketing effort, distribution reach, regulatory positioning, and brand strength, that lie outside the costing system. The pattern is consistent with Otley's (1980) contingency view that the contribution of any single control system to overall performance is partial and depends on complementary capabilities, and with the more recent Nigerian

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evidence reported by Iwajomo et al. (2025) that variance analysis significantly shapes operational performance.

Taken together, the results suggest that the three costing approaches operate at different points of the value chain and produce their effects through different channels. ABC shapes how firms understand their products; absorption costing shapes how firms recover their costs; standard costing shapes how firms manage their efficiency. Each channel matters, but the priority a firm should place on developing capability in any one of them depends on which operational outcome is most in need of improvement. A firm whose primary challenge is brand erosion has stronger reasons to invest in ABC; a firm whose primary challenge is customer dissatisfaction has stronger reasons to refine its absorption-costing discipline; and a firm seeking to defend market share has stronger reasons to develop its standard-costing capability.

A note of caution applies to the broader generalisability of the findings. Most prior Nigerian studies of cost control have examined manufacturing firms in cement, food and beverages, and consumer goods rather than pharmaceuticals. The present results show that the broad patterns observed in those studies extend to the pharmaceutical context, but the magnitudes may differ. Pharmaceutical firms operate under regulatory regimes such as NAFDAC approvals, Good Manufacturing Practice (GMP) compliance, and pharmacovigilance requirements, all of which impose cost structures unlike those in other manufacturing sub-sectors. Future research using larger samples and longitudinal designs would help to establish whether the relationships documented here are stable over time and across a wider range of pharmaceutical firms.

5. Conclusion and Recommendations

This study examined the effect of three cost-control approaches on three operational performance outcomes in Nigerian pharmaceutical firms. Drawing on a survey of 142 management-level personnel at Fidson Healthcare Plc, GlaxoSmithKline Consumer Nigeria Plc, and May & Baker Nigeria Plc, the study finds that Activity-Based Costing has a significant positive effect on brand loyalty, that Traditional or Full Absorption Costing has a significant positive effect on customer satisfaction, and that Standard Costing Techniques have a significant positive effect on market share. The strongest association is between ABC and brand loyalty, where the costing system explains 55.1 per cent of the variance in the outcome. The findings address a gap in the Nigerian literature, where pharmaceutical-specific evidence on cost control has been limited and where prior studies have concentrated on financial rather than customer-facing performance dimensions.

Three practical recommendations follow. First, pharmaceutical firms whose primary operational concern is brand strength should consider investing in Activity-Based Costing capability, recognising that the value of ABC lies in the decisions it enables on pricing and product mix rather than in the cost reports it produces. Second, firms whose primary concern is customer satisfaction should review their absorption-costing practices to ensure that production costs are recovered consistently and that pricing decisions reflect the full cost of supplying the market. Third, firms seeking to grow or defend market share should develop their standard-costing capability and treat variance analysis as a continuous improvement instrument rather than a periodic compliance exercise.

The study has limitations that point toward further research. The sample, although carefully drawn, comprises only three firms; replication across a larger cross-section of pharmaceutical firms would strengthen external validity. The cross-sectional design captures associations rather than causal effects; longitudinal evidence would help establish whether changes in costing practices precede changes in operational performance. Future research could also examine the moderating role of firm size, technological maturity, and regulatory exposure, and could extend the framework to include hybrid costing approaches that combine elements of ABC, absorption, and standard costing.

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