



Cost Control Techniques and Organizational Performance of Quoted Manufacturing Firms in Nigeria

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Abstract: *In recent times, several manufacturing companies in Nigeria have witnessed unexpectedly high operating costs due to the ongoing economic reforms of the present federal administration. This cross-sectional study therefore investigated the combined effect of cost control techniques employed by Nigerian manufacturing firms on organisational performance in terms of market share. A survey of 50 accounting personnel from five sampled listed manufacturing sectors using Google Forms as a data instrument was conducted over seven months (January to July 2024). The study employs the Principal Component Regression (PCR) technique for model estimation at three significance levels (1%, 5% and 10%). The study using a parsimonious Akaike Information Criterion (AIC) based model shows that the increase in cost control techniques and strategies of manufacturing companies in Nigeria contributed negatively and significantly to a reduction in their market shares for the period under review. The study asserts that cost control techniques of manufacturing companies in Nigeria have significant predictive power to explain changes in their market share. The study, therefore, recommends the need for a complete review and overhaul of cost control techniques and strategies of manufacturing companies in Nigeria in line with current economic realities in the country.*

Keywords: Cost, Budgeting, Forecasting, Market Share, Principal Component Regression

Introduction

In line with Kaizen's costing theoretical framework, production inputs require effective cost control via certain techniques and cost management practices for a firm to operate competitively and survive in the constantly changing global market environment (Ağ, 2018; Yiğit, 2022). It can be further argued within the Kaizen costing framework that if cost containment techniques are well-designed, the market share of production firms can be increased at local and international market levels promoting their competitiveness. In Nigeria, several manufacturing companies have witnessed unexpectedly high operating costs with the attendant reduction in organizational performance and management in recent periods (Godwin, Amos & Sunday, 2019; Akinleye & Fajuyagbe, 2022).

Some previous research works have been empirically conducted on the relationship between cost control and firm performance across different economies countries including developed countries (Abdul & Isiaka, 2015; Adebayo & Onyeiwu, 2018; Akinleye & Fajuyagbe, 2022; Ali-Momoh, Egbetokun, Ademola & Mamidu,

2022; Anh, Thu & Hue, 2023; Apergis & Sorros, 2014; Dorothy & Claude, 2024; Fadare & Adegbe, 2020; Godwin, *et al.*, 2019; Kipkenei, Naibei & Rotich, 2022; Lawal, 2017; Maja, Ivica, & Marijana, 2019; Omah & Horsfall, 2021; Ozturk & Zeren, 2015).

As noted from existing literature, a greater number of studies have found significant positive relationship between cost control and operational performance of manufacturing firms (Anh *et al.*, 2023; Akinleye & Fajuyagbe, 2022; Apergis & Sorros, 2014; Dorothy & Claude, 2024; Godwin *et al.*, 2019) few others observed negative impacts of cost control on organizational performance (Fadare & Adegbite, 2020; Ozturk & Zeren, 2015). Similarly, mixed evidence of both positive and negative relationships between the two concepts has also been reported (Ali-Momoh *et al.*, 2022).

Hence, empirical debate on the relationship between cost control and the organizational performance of manufacturing companies in developing economies is inconclusive. This research study is motivated by flaws associated with a large number of previous related works in the field. First, many of the previous studies have largely focused on cost expenditure rather than



techniques employed by studied corporate organizations in managing the cost of operations. As a result, how organization cost control affects firm performance remains unclear.

Second, those studies preferred the use of secondary sources of data rather than collecting information directly from cost-incurring units in the organization. Information on important techniques of cost control is often uncovered by secondary sources of data which include published annual reports. This deficiency can be corrected with the utilization of primary data. Third, the issue of continuous measurement of organizational performance within the profitability dimension is very common among a large number of previous studies. In firm performance literature, it has been noted that measuring firm outcomes based on profit is myopic and obviates precise measurement of non-financial performance like market share (Edeling & Himme, 2018).

This study, therefore, attempts to address these three identified empirical issues in the existing literature on the relationship between cost control techniques and organizational performance within the context of Nigerian manufacturing firms. In terms of study organization, the introduction part is contained in section one. Section two of the study focuses on the review of related literature in the field. The methodology part is contained in the third section. While section four presents, interprets, and discusses the findings of the study section five contains the conclusion and recommendation.

Literature Review

Cost control is the control of actual or forecasted costs incurred by a business. It enables a firm to predict impending expenditures and prevent overspending or wastages. According to Dury (1985), cost control is a way of establishing that the operation of a firm complies with the basic or standard plan while ensuring that the desired result is achieved. The activities involved in cost control and management have direct effects on functional units of the organization such as production, marketing, management, and finance units. These functional units require monetary commitments that must be provided to aid the achievement of firms' set goals and objectives over time. Thus, the cost of every functional activity in an organization takes away a certain proportion of investment funds. In every organization, there should be proper planning and regulation of how cost is expended within acceptable limits in the organization. This cost regulation process is termed cost control (Lawal, 2017). In other words, cost control which entails avoidance of wastage of resources should be a primary concern of any business operation.

The benefits of cost control range from enabling lower price setting to operational efficiency. Some important techniques that firms often use to contain their cost expenditures are budgeting and forecasting, vendor management, and waste reduction. Budgeting is a quantitative process of making a plan for a definite period which highlights the firm's expected cost expenditure and estimated revenue over the period. Forecasting is the process of estimating and projecting future income and expenses using historical data, trends, and assumptions. Vendor management is the process of creating, monitoring, and cultivating relationships with vendors and the documentation that underpins those relationships (Bryce, 2018). By reducing the generation of waste, materials can be used more efficiently and achieve more protection for health and the environment.

This study is underpinned by the Kaizen costing theory that originated in Japan. The popular Japanese theory was applied to in-country manufacturing by Monden (2004) as a cost-reduction framework. In terms of principle, the operation of Kaizen costing theory is centred on achieving small, gradual but continuous improvements or upgrading in the manufacturing process at the lowest cost. The application of the theory in the manufacturing sector helps firms to focus on making production and service delivery processes more efficient through small, gradual, and continuous improvements. Thus, it improves a production process through small incremental amounts, rather than through large innovations. In developing countries specifically from Africa and Asia, studies such as Anh *et al.* (2023) Dorothy and Claude (2024); Kipkenei *et al.* (2022) discovered that cost control positively and significantly increases firms' performance. While Dorothy and Claude (2024) in Rwanda and Kipkenei *et al.* (2022) in Kenya employed the Ordinary Least regression technique as a method of analysis Anh *et al.* (2023) in Vietnam utilized Structural Equation Modelling (SEM) for their respective analysis of primary data from selected employees. They observed a positive and significant relationship between cost control and firm performance suggesting that cost containment is critical to improved efficiency of businesses particularly manufacturing companies in developing countries.

In the same vein, some empirical studies in Nigeria also discerned that cost control exerts a significant and positive influence on the financial performance of quoted firms particularly manufacturing companies in Nigeria. These studies include but are not limited to Akinleye and Fajuyagbe (2022); Ali- Momoh *et al.* (2022); Godwin *et al.* (2019); and Lawal (2017). Akinleye and Fajuyagbe (2022) investigated the relationship between cost control and the performance of non-financial firms in Nigeria between 2009 and 2019 using the Hausman test to determine the appropriate model between fixed effect and random effect models. The result reveals that administration cost possess a positive and significant influence on the market value of non-financial firms in



Nigeria which include agriculture, industrial, oil, and gas firms. Thus, increased effort towards administrative cost reduction using certain techniques significantly impacts the market value of non-financial firms in the country. The findings by Akinleye and Fajuyagbe (2022) corroborate with the earlier result obtained by Godwin *et al.* (2019) that keeping costs under control can significantly improve the financial performance of manufacturing firms in Nigeria.

Similarly, in a case study by Lawal (2017) which focused on cost control and cost reduction techniques concerning organizational performance, it was evident through regression analysis of sampled data from 50 employees that cost control can positively organizational performance. The evidence suggests that cost control and cost reduction techniques are important to determine the organizational performance of the Chemster Paint Industry, in Nigeria. From the above-reviewed studies, three key flaws are identified. First, a large number of previous studies have extensively employed secondary data which cannot accurately or precisely capture cost control or cost reduction techniques. Instead, most of these have erroneously analyzed the impact of cost expenditure (such as cost of raw materials, cost of labour, finance cost, or selling and administration expenses) on firm performance instead of cost control techniques.

Second, a large number of existing studies have not reported secondary data on cost control techniques instead they employed in many cases secondary data on cost expenditures. This might be due to a lack of published data on cost control techniques. Therefore, the use of primary data will prove more worthy for analyzing the firm performance impact of cost control. Again, a greater number of previous studies have narrowly measured organizational performance using profit-based indicators like operating profit or profit-after-tax (see Ali-Momoh *et al.*, 2022; Anh *et al.*, 2023; Dorothy & Claude, 2024). In reality, these profit-based measures are objective criteria yet the incidence of earnings management practices can affect the credibility of a firm's performance measured from a profit standpoint. Therefore, the use of more precise and accurate measures of performance like market share (Edeling & Himme, 2018) is important for a reliable conclusion. This study therefore contributes to the existing body of knowledge through primary data by empirically analyzing through Principal Component Regression (PCR) the combined effect of cost control techniques on market share (as a non-financial performance indicator) of listed manufacturing companies in Nigeria.

Methodology

This study adopts a survey research design. Survey design was used to obtain information about cost control variables (budgeting and forecasting, vendor management, and waste reduction) and organizational performance (market share) directly from the accounting personnel at the selected manufacturing firms via an online questionnaire using Google Forms. The target population for this study consists of all one hundred and fourteen (114) manufacturing companies listed on the Nigerian Stock Exchange (NSE) as of 31st December 2023. However, for this study, a sample size of five (5) quoted manufacturing companies in Nigeria was purposively considered. The selected companies are Nestle Nig. Plc., Nigerian Breweries Plc., Lafarge PLC, Dangote Cement PLC, and Fidson Healthcare PLC. These companies were purposively included in the study due to their impressive performance in their respective industry. Opinions and perceptions on cost control and firm market share were obtained from accounting officers and the organization through electronic questionnaires sent to selected companies' emails.

Ten (10) accounting officers were selected from each of the companies totalling 50 personnel. The study made use of Google Forms which was sent to the Human Resources Departments of the selected companies through the respective company website and a request was made to send the questionnaire to mails of 10 randomly selected accounting personnel of the company. However, there was a delay in response but with follow-ups appreciable response was obtained. Administration of the questionnaires was carried out between January 8 and July 12, 2024. Moreover, the study follows the two-way process of Principal Component Regression (PCR) as an econometric strategy. In PCR analysis, high-loading factors or components are first obtained before the linear regression exercise. Consequently, two models are formulated to that effect and specified thus:

$$\rho_k = \sum_{j=1}^p \sigma_{jk} X_j \dots (1)$$

For ρ_k (linear transformations), $k = 1, \dots, q$ of X_1, X_2, \dots, X_j defined by $q < p$ and $\sigma_{1k}, \sigma_{2k}, \dots, \sigma_{pk}$ are constants PCA process. Note that ρ_k are predicted as reduced dimensions (components) on the explanatory variables (X_j) obtained from PCA estimation. Applying equation (1) to the current study, equation (2) is reparametrized as thus:

$$\rho_k = \sum_{j=1}^p \sigma_{jk} COC_j \dots (2)$$

Where,



COC_j is a vector of cost control techniques (budgeting and forecasting, vendor management, and waste reduction) as postulated in the literature section. Then, Linear Square (LS) regression is fitted in equation (3) as thus:

$$MKS_i = \alpha + \sum_{k=1}^q \beta_{ik} COC_j \dots \quad (3) \text{ (The Study Model)}$$

Where,

MKS_i = Market Share of a company i ; α = model constant; β_{ik} = parameter of interest $i = 1, \dots, n$

In line with theoretical and empirical postulations, the study expects the parameters of interest to produce a positive and significant impact on the predicted variable ($\beta_{ik} > 0$). All analyses are conducted at three levels of significance (that is, 5%, 10% and 1%). Finally, STATA 12.1 as a statistical software package was applied to code enter, compute, and analyze information collected through the administration of online questionnaires.

Presentation of Principal Components Analysis (PCA) and Linear Regression Results

The study PCA analysis is contained in Table 1 while Table 2 houses regression estimation outcomes of the second stage PCR analysis

Table 1: Principal Component Analysis

Main Con	Var	Eigen Value	Prop	Cum	KMO (N = 40)
BUF	Comp1	1.21	0.30	0.30	0.58
	Comp2	1.16	0.29	0.59	
	Comp3	1.02	0.25	0.85	
VEM	Comp1	1.32	0.33	0.33	0.57
	Comp2	1.17	0.29	0.62	
WAR	Comp1	1.14	0.38	0.38	0.75
	Comp2	1.00	0.33	0.71	
MKS	Comp1	1.27	0.42	0.42	0.62
	Comp2	1.10	0.37	0.79	

Note: Cons = Construct; Var = Variable; Prop = Proportion; Cum = Cumulative; Comp = Component; KMO = Kaiser-Meyer-Olkin criterion; N = Number of Observations

Source: STATA 12.1 Outputs (2024)

Table 2: Principal Component Regression (PCR) Estimation Results

Variable	Model 1 (Main) DV: MKS (N = 40)
COC	.46*** (.14)
_cons	-.02 ^{ns} (.14)
Model Fitness	F(1,38) = 10.57*
R ²	0.22
Information Criterion	AIC = 105.87; BIC = 109.25
Mean VIF	1.00
Ramsey RESET test	F(3, 35) = 0.39 ^{ns}

Note: DV = Dependent Variable (Market Share proxy by MKS); coefficient value not in parenthesis; standard error in parentheses; * $p < 0.05$, ** $p < 0.1$, *** $p < 0.01$; ns = not significant; AIC = Akaike Information Criterion; BIC = Bayesian information criterion; VIF = Variance Inflation Factor

Source: STATA 12.1 Outputs (2024)

Interpretation of Results

The PCA analysis is exhibited in Table 1 with important statistics. Out of the expected 50 responses, only 43 observations were obtained from the field as of the end of the working day on July 12, 2024. The obtained data represents an 86% retrieval rate which is considered appropriate for a survey research of this nature. However, as shown in Table 1, only 93% (40 observations) were considered useful by the system software for the analysis. Factors such as missing responses on key variables or system default treatment might be accounted for by the use of 40 observations. Interestingly, KMO values obtained for all the latent factors which range between 0.58 and 0.75 indicate sampling adequacy of the data collected and employed for PCA analysis (Mujiarti, Roos & Fran, 2023). From Table 1, there are three latent variables measuring cost control techniques (BUF, VEM, and WAR) and one latent dependent construct quantifying organizational performance (MKS).

In the Table, a latent variable representing budgetary and forecasting (BUF) produces three components with each of the components accounting for Eigen value greater than one. All three components explain 0.85 cumulative proportion variance in the latent construct - BUF - and this shows that they are better measurements of the construct. The second latent variable, VEM, generated two components that have Eigen values greater than one and 0.62 explaining cumulative variance in the construct. Similarly, the third latent variable (WAR) that structurally measures cost control as a predictor also generated two



components with the first component producing an Eigen value of 1.27 while the second component yields an Eigen value of exactly one. The two components of *WAR* impressively explain a higher 0.71 cumulative variance in the third latent construct. The *PCA* procedures for all the latent predictors are consistent with the principle of the first stage of *PCR* analysis. Recall, that *PCR*'s first stage helps to reduce the original variables measuring the predictors in a model into new but smaller variables that still produce the same information.

The essence of the first stage of *PCR* is to control or eliminate potential multicollinearity (high correlations) among the predictors. Scores were consequently obtained over the identified components for each of the latent predictors. Consequently, these scores were summed and used with the aid of *PCA* to create a cost control index for each number of observations. Meanwhile, before the *PCR* second stage, a *PCA* analysis was also performed for the latent dependent construct (market share represented by *MKS* in model 1 and model 2). From Table 1, two components were observed for market share as a latent factor with each of the yielding Eigen value higher than one and combined cumulative explained variance of 0.79 value. Finally, a score was generated for the latent dependent construct for further regression analysis.

Furthermore, the results in Table 2 illuminate *PCR* estimations for the study model. For the model estimation, 40 out of 43 observations obtained from a survey of accounting personnel were used to analyze the relationship between cost control and organizational performance of manufacturing firms in Nigeria. The possible factors responsible for the deviation between the actual number of observations used for the final analysis and the total responses obtained from the field have been explained *inter alia*. The result of the model shows that cost control techniques explain a marginal variation of 22% in the Nigerian manufacturing sector market share. However, in the context of Nigeria's manufacturing environment, the study model was found to be significantly and statistically fit at the study adopted levels of significance ($[F(1, 38) = 10.57; p\text{-value} = 0.0024]$) to explain the impact of cost control on market share.

Based on the model estimation result, cost control has a significant negative impact (*COC: coef. = -.46; p-value = 0.002*) on the market share of manufacturing companies in Nigeria for the period under review. This result implies that for every one per cent increase in cost control techniques (such as budgetary and forecasting, vendor management, or waste reduction) the market share of Nigerian manufacturing companies reduces by 46 per cent. The post-diagnostic test statistics show that the study model is well-specified and it does not suffer from any incidence of collinearity between predictors. For instance, the parsimonious preferred *AIC*-based model

yields a mean *VIF* of 1.00 and indicates that *PCR* for the study mode produces a more reliable regression outcome. Similarly, the non-significance of the study model Ramsey Reset test demonstrates that the model has no omitted variables.

Discussion of Results

This cross-sectional study observed a significant negative relationship between combined cost control techniques and the market share of Nigerian manufacturing companies for the period under review. The study preferred parsimonious *AIC*-based model shows that an increase in cost control techniques and strategies of manufacturing companies in Nigeria contributes negatively and significantly to a reduction in their market shares at a particular period. This observed finding is quite surprising as it contradicts the study's *a priori* expectations. While relying on principles of Kaizen costing theory and available empirical evidence the study had expected to find positive and significant relationships between the cost control index (comprising of budgetary and forecasting, vendor management, and waste reduction) and organizational performance (proxy by market share) of surveyed firms. Thus, the study observed finding contradicts Kaizen costing theory and several previous research studies (e.g. Akinleye & Fajuyagbe, 2022; Anh *et al.*, 2023; Dorothy & Claude, 2024; Kipkenei *et al.*, 2022; Godwin *et al.*, 2019; Lawal, 2017; Maja *et al.*, 2019).

In the main, the unexpected result is consistent with previous findings by Murat *et al* (2016) who established that positive benefits of cost control by industrial firms may not be feasible in the short run. Again, in the Nigeria context, Fadare and Adegbe (2020) found a similar result that the joint effect of administrative costs, financing costs, cost of sale, and marketing and distribution expenses is detrimental to the financial performance of Nigerian consumer product-producing companies in term of net profit margin. The observed evidence also corroborates the panel result by Ali-Momoh *et al.* (2022) that found insignificant mixed effects of cost control on profit-after-tax of selected Nigerian quoted manufacturing companies.

Conclusion and Recommendation

In this cross-sectional study of listed manufacturing companies in Nigeria, the researchers established that cost control techniques can negatively and significantly impact the market share of firms. Although the level of variation in the market share of sampled companies by cost control techniques is low there is higher and significant predictive power of cost control techniques to



explain changes in Nigeria manufacturing firms' organizational performance in terms of market share. Unexpectedly, the result established by this study does not fit the Kaizen theory that the identification and elimination of wastes in the production process help to optimize productivity via cost reduction which can result in improved efficiency and higher productivity. Thus, the application of Kaizen costing as observed in this study fails to facilitate gradual improvement in the short period in the context of Nigeria's manufacturing industry.

A new insight to be derived is that the Kaizen costing theory will not be operationally feasible for firms that constantly face unfavourable economic conditions such as a high rising inflation rate or a highly vulnerable downward exchange rate. However, the generalization of the study findings is limited to a certain extent due to the small sample employed. The use of a large sample size in a further study could provide effective generalizability. Again, it is hoped addressing the use of cost control techniques at disaggregate level in future research can offer different impacts on the market share of Nigeria manufacturing firms than what is established by the current study. Nonetheless, the result conceived by this study is valid for answering its research question, particularly with the use of sophisticated PCR techniques. The study recommends that there is a need for a complete review and overhaul of cost control techniques and strategies of manufacturing companies in Nigeria in line with current economic realities in the country.

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