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EFFECT OF QUALITY COST ON PROFITABILITY OF LISTED HEALTHCARE MANUFACTURING FIRMS IN NIGERIA

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ABSTRACT

The achievement of operational efficiency and profitability in manufacturing firms depends on proper quality cost management techniques. Quality costs made of prevention costs together with appraisal costs and internal failure costs determine financial performance in organizations. The financial consequences of quality cost elements remain unclear because studies about these elements are rare in the Nigerian healthcare manufacturing industry. Several researchers disagree about how much quality cost management affects profitability, which demonstrates the necessity for additional investigations in this field. The research examines how quality costs affect profitability across the Nigerian healthcare manufacturing companies that are listed on the Nigeria Exchange Group from 2012 to 2021. A correlational research approach served the study through the examination of the entire population, which consisted of all healthcare manufacturing firms listed in Nigeria. The researcher utilized stratified sampling to obtain secondary data from audited annual financial reports published on the Nigerian Exchange Group (NGX) website. STATA Version 13 software conducts multiple regression analysis that depends on panel data. Prevention cost demonstrates a positive relationship to profitability while being statistically significant according to the research results, therefore highlighting that strategic quality management investments lead to superior financial outcomes. Profitability demonstrates no significant association with appraisal cost and internal failure cost. Prevention cost emerges as the key element among all quality cost components for achieving profitability in Nigerian listed healthcare manufacturing firms. The findings presented by this research serve to strengthen knowledge about how strategic quality cost management enhances financial outcomes for Nigerian healthcare manufacturing companies.

INTRODUCTION

Profitability is an important measure of business success, which dictates long-term growth and sustainability. Businesses rely on effective cost management practices to optimize financial performance, particularly in competitive industries like healthcare manufacturing. Quality cost management is a critical element in achieving profitability since it ensures product quality while eliminating waste and inefficiencies. The process of globalization motivates companies to distribute their investments toward quality-focused operations, which boost operational efficiency and enhance market capability (Asada, Kumar, & Al-Hubaishi, 2021; Tomov & Velkoska, 2022). Research results about the relationship between profitability and quality cost have been inconsistent since studies demonstrate both positive and negative impacts and no significant relation (Kreem et al., 2020).

There exists expanding research about quality cost management, yet its effects on Nigerian and other developing economies remain an unexplored area. The healthcare manufacturing sector of Nigeria operates as a crucial force in public health development and economic growth, yet research about quality cost implications for profitability remains insufficient. Effective cost management proves vital to sustaining financial stability because it works to decrease expenses in an industry that faces high regulation standards with mounting production costs (Ali & Abbas, 2022; Bakar, Hassan, & Ahmad, 2023).

The research investigates how quality costs affect the profitability of manufacturing healthcare firms listed in Nigeria between 2012 and 2021. Quality cost is categorized under conformance costs (appraisal and prevention) and non-conformance costs (internal failure), while return on assets measures profitability. The panel data method is employed in the

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study of these dynamics. The findings are helpful in guiding quality cost management policy, company decision-making, and subsequent studies. The ensuing sections provide a literature review, methodology, findings, discussion, and conclusion.

LITEREATURE REVIEW

Profits are the primary goal of business. The profitability of a business is determined by its profit margin. The efficiency of the business is higher the bigger the profit volume. By examining the profitability of the investments, the company has made, it is possible to quantify and analyse the profit of the company. The capacity to generate money from every business activity is known as profitability. It shows how effectively an organization's management produces profits by utilizing the resources at its disposal. Profitability, according to (Ho, Ahmad, & Ramayah, 2016), is the link between comprehensive income statement and statement of financial position measure that depicts the relative ability to earn income on employed assets.

Profit refers to the total revenue over expenses generated by the business over the defined time period, whereas profitability relates to the business's operational effectiveness. As correctly noted by (Agus, Krishnan, & Kadir, 2000), profit is an indicator of economic progress, national income generated, and an increase in standard of living for the country. Profit is also a test of efficiency and a measure of control for financial management, a measure of the value of an investment for owners, a margin of safety for creditors, and a measure of taxable capacity for the government.

Moreover, According to Dang et al. (2019) profitability of a firm can simply be ascertained by dividing profit before interest and tax by total assets. Although, profitability analysis is quantitative in nature and disregards the value of managerial abilities that effectively forecast and plan for profitability, manual effectiveness and efforts that significantly contribute to achieving the predicted level of profits, and external factors like market circumstances, product demand, business cycle, and the like. That which cannot be described in monetary terms is not depicted.

Quality is a relatively recent management idea that is based on a company strategy that emphasizes creativity, continuous improvement, and invention while also preventing the waste of human and financial resources to satisfy beneficiaries. Due to its critical role in ongoing improvement, the concept of quality has grown to be very important to stakeholders.

Quality is frequently emphasized by businesses as the core customer value and is seen as essential to achieving competitiveness. The cost of the quality approach is not fully understood by businesses, despite the fact that quality is now thought to be a crucial success factor for gaining competitiveness. The idea that the ideal level of quality must be below perfection has been greatly influenced by the model's inherent quality-cost trade-off. Every program aimed at enhancing quality should therefore seek to identify the level of quality (defect rate) that lowers the overall cost of quality (Vaxevanidis & Petropoulos, 2008). According Sadiq, Alamgir, and Ali (2020), three components must be integrated for a product to be successfully marketed. They talk about the cost, the quality, and how long it took to develop the product. Therefore, any meaningful endeavour to increase quality must take into consideration the costs of generating it. Quality pricing is a subject that is becoming more and more important in the conversation about quality. Productivity can be improved by quantifying certain quality levels with the use of quality costs.

The "low quality cost" is the gap between an organization's actual operating costs and what they would be if its systems were trustworthy and their employees didn't make mistakes (Modhiya & Desai, 2016). Quality cost, which is a measurement of costs explicitly connected to the achievement or non-accomplishment of product or service quality, is determined by the product or service requirements specified by the company and its contracts with customers and society, The American Society for Quality Control claims that (ASQC), the total cost of developing, putting into practice, maintaining, and improving the quality management system, as well as the cost of resources used for value-added tasks, expenses associated with product failure, system costs, and all other relevant costs (Sower & Quarles, 2022). It would show the difference between the cost of a good or service at its full price and the discounted price if there were no possibility of poor service, faulty goods, or manufacturing flaws (Lindsay, et al., 2011).

The price of non-conformance is paid to avoid shoddy workmanship. On the other hand, conformation cost otherwise known as compliance costs are the cost incurred to avoid poor quality caused by the product failing to meet client requirements (Mantri & Jaju, 2017). The total expense that businesses incur to prevent defective output, complete tasks correctly the first time, and not ensure quality is therefore referred to as the quality cost.

The aforementioned suggests that the quality costs include all costs incurred to ensure the products' quality and conformity to the established requirements, as well as all costs paid when these criteria are not reached.

Empirical Review

According to James and Luke (2014) in their study on effect of quality cost management on firms profitability, with the aim of maximizing profit at long run. Secondary source of data were employed and correlational analysis was used with the aid of SPSS 20 version to analyse the extracted data. It was discovered that there is a positive and significant effect between preventive cost and profitability. In a related study conducted by Yang, Duan, and Lin (2020) on impact quality cost management and quality management on firm performance evidence on China. It was discovered that preventive cost has a significant influence on the financial performance of the organisations.

Accoding to Sharma (2022), a prevention cost is any company spending intended to reduce the number of errors in products or services. Prevention costs can range from spending more to increase the quality of raw materials to increasing finances allocated for employee training. When assessing the value of prevention costs, you compare the projected value of improvements against the total prevention costs. Aim of investigating the environmental cost and profitability of oil and gas companies in Niger Delta region of Nigeria, where a primary data was employed based on a survey research design.

And discovered that preventive cost management has a significant influence on profitability as far as Nigerian oil and gas firms are concern. On this note, the following hypothesis was proposed:

Ho1: *Preventive cost has no significant effect on the profitability of listed healthcare manufacturing firms in Nigeria*

James and Luke (2014) in their effort to investigate the link between quality cost management and profitability using secondary data. A correlation analysis was conducted to ascertain the relationship between appraisal cost and profitability. And it was that appraisal cost has a positive link with profitability significantly. Meanwhile, it was recommended that management should strengthen their effort towards maintain a good appraisal cost in order to improve profitability. Also using a simulation to examine the influence on profits, Sadiq, Alamgir, and Ali (2020) presented a methodology for studying the relationship between service quality improvements and profits. They demonstrated how the behavioural impact resulting from service quality affects profitability and other financial outcomes. The study has found a strong connection between efforts to improve quality and a company's capacity for profit. Likewise, the study of Ghasghaee and Asada, Kumar, and Al-Hubaishi (2021) documented the existence of a direct relationship between the costs of quality is the company's performance. Such a relationship exists between the elements of quality costs similar relationships have been with the company's performance in terms of profitability. Therefore, it is safe to say that quality cost has a role to play—no matter how big or small.

In a study conducted on environmental cost and profitability of oil and gas companies in Niger Delta region of Nigeria. A survey research design was adopted where 270 questionnaires were distributed to 398 staff oil and gas firms. A confirmatory facto analysis was employed to determine the validity and reliability of the instruments of the study. The outcome of the study revealed that the appraisal cost has a significant effect on profitability of the oil and gas firms. In view of this, hypothesis there by proposed:

Ho2: *Appraisal cost has no significant effect on the profitability of listed healthcare manufacturing firms in Nigeria*

Despite the assertions made by some few scholars on the existence of relationship between all qualities related cost and profitability, Alsyouf (2007) emphasized that there is no link or connection between internal failure cost and profitability. In an attempt to maximize profitability James and Luke (2014) came up with a study on effect of quality cost management on firms profitability based on secondary data using SPSS to conduct a correlation test between quality cost and profitability and found that internal failure has a negative and significant influence on firms profitability. On the other hand, Maiga and Christian (2015) found that quality cost represented by internal and external failure cost correlate significantly firm profitability. However, the outcome of the study conducted by Kiran (2017) affirmed that internal failure cost such as fines, penalties and legal fees in order to improve profitability. This indicates that internal failure cost influences profitability positively. Based on this, the followed hypothesis was put further.

Ho3: *Internal failure cost has no significant effect on the profitability of listed healthcare manufacturing firms in Nigeria*

Theoretical Review

Resource-Based Theory (RBT) has been considered suitable for the study, being one of the popular theories used among researchers as far as social and management sciences are concern. The theory focus on an organisation strength and leverage towards having a competitive advantage over another organisations that basically attributed and premised on internal resources based on information, standards, internal audits among others. Meanwhile, this study is anchored by the RBT as an underpinning theory.

MATERIAL AND METHODS

A correlational research designs is considered suitable to achieve the objective of this study, which enables the researcher examines the link between the explanatory and the explained variable of the study. And some listed healthcare manufacturing firms were considered as the population of the study during the periods of 2013-2021. A stratified sampling technique is employed using filter based on the following criteria:

- All listed manufacturing firms under Nigerian healthcare sectors were selected.
- Only financial year of operation identified with a complete range of related data were considered for extraction, from the audited financial statement of the Nigerian listed manufacturing healthcare firms.

A multiple regression technique is employed to analyse the unbalanced panel extracted data of the study with the aid of STATA 13 version software been a tool the analysis.

Model Specification:

$Prof_{it} = \beta 0 + \beta_1 PVC_{it} + \beta_2 APC_{it} + \beta_3 IFC_{it} + \varepsilon_{it}$

Where:

Prof = Profitability (Dependent variable)

i = Firms

t = Time

β_0 = Intercept

β_1 - β_3 = Coefficients or parameters

PVC = Preventive cost

APC = Appraisal cost
Ɛ = Error term

Table 1. Variable Measurement and Sources

Variable	Symbol	Measurement	Sources
Dependent variables			
Profitability	ROA	Profit before Interest and Tax/ Total Assets	Dang et al. (2019)
Independent variables			
Prevention Cost	PVC	Training fees + Professional fees + Maintenance fee	James and Luke (2014) and Yang, Duan, and Lin (2020)
Appraisal Cost	APC	Audit fees	James and Luke (2014)
Internal factor failure	IFC	Fines, Penalties and Legal fees	James and Luke (2014) and Kiran (2017)

Source: STATA output from authors compiled data, 2024

RESULTS AND DISCUSSIONS

This section presents the results of data analysis including descriptive statistics, correlation matrix and regression results below.

Table 2. Descriptive statistic of the variables

Variable	Min	Max	Mean	Std. Dev.
ROA	-0.159	0.143	0.034	0.072
PVC	1,851	500.000	1.33	1.6
APC	704	14,000	9.910	3.251
IFC	430	34,431	2.497	2.511

Source: STATA output from authors compiled data, 2024

Table 2 describe the characteristics of the variables employed in the study that comprise of Profitability (ROA), Prevention cost (PVC), Appraisal cost (APC) and Internal failure cost (IFC). This revealed that profitability ranges from the minimum value -0.159 and maximum value of 0.143 with the mean and standard deviation value of 0.034 and 0.072 respectively. Also, prevention cost maintained a mean value of 1.33 that further ranges between the minimum value of ₦1851.000 and maximum value of ₦5000.0000. On the other hand, appraisal cost shows an average value of 9.9103 with a corresponding standard deviation of 3.2506 which spans between the minimum and maximum values of ₦704.000 and ₦1400.0000 respectively. On the other hand, internal failure which comprises of fines, penalties and legal fees as far as Nigerian listed manufacturing healthcare firms are concern maintained a normal value of 2.4966 and a standard deviation value of 2.5112 with minimum and maximum values of ₦ 430.000 and ₦ 3443.1000.

Table 3. Correlation Matrix

Variables	1	2	3	4
ROA	1			
PVC	0.6188	1		
APC	0.6297	0.7702	1	
IFC	0.2831	0.2091	0.481	1

Source: STATA output from authors compiled data, 2024

Table 3 shows the correlations between ROA with PVC and APC were significant and positively weak at coefficient value of 0.6188 and 0.6297 respectively. But, the relationship between ROA and IFC was week and insignificant at coefficient value of 0.2831. While, the correlation among the explanatory variables were weak and significant, except the relationship between PVC and IFC which was not significant.

Table 4. Regression Results

Variables	Coefficient	T- values	P-Values	VIF	Tolerance Value
PVC	1.56	1.92	0.07	2.68	0.3729
APV	5.32	1.57	0.13	3.34	0.2997
IFC	3.68	0.39	0.70	1.42	0.7045
R^2	0.44				
F- Start	5.55				
F- Sig	0.0058				

Source: STATA output from authors compiled data, 2024

Table 4 revealed a summary of robust ordinary least square regression result as the outcome of the study which is interpreted on the basis of “BLUE” drawn from the post estimation test that suggested for OLS robust test following the Hausman specification and L.M test conducted test respectively, considering the presence of Heteroskedasticity from the outcome out study.

Also, in the table there is a Variance Inflation Factor (VIF) that constantly shown a smaller value than ten (10) with the corresponding Tolerance Value that constantly showing smaller value than one (1) which indicate absence of multicollinearity effect within the explanatory variables of the study.

The model maintained a cumulative R- Squared (R^2) value of 0.44% as multiple coefficient of determination, representing total variation of explanatory variable in the explained variable, being the percentage at which profitability is explained by the prevention cost, appraisal cost and internal failure cost respectively. This suggested that the remaining 56% of the variation in dependent variable is cause by other factors not considered or captured in the model. Meanwhile, the outcome has been supported by the F- Stat and F- Sig values of (5.55) and (0.0058) which indicate the fitness of the model at 1% significant level.

Effect of Prevention Cost on Profitability

From table 3 shows a prevention cost with a positive coefficient value of 1.56 and corresponding significant P- value of 0.068 at 10%. This implies that prevention cost has a positive and significant effect on profitability of the listed manufacturing healthcare firms in Nigeria. This means for every ₦1 increase in prevention cost there would be an increase in profitability of listed manufacturing healthcare firms in Nigeria. On this note the null hypothesis which states that prevention cost has no significant effect on profitability of listed manufacturing firms in Nigeria would be rejected. Meanwhile, the outcome of the study is in line with the view of James and Luke (2014), Yang, Duan, and Lin (2020) further validated and justified the underpinning theory of the study.

Effect of Appraisal Cost on Profitability

It is also discovered that appraisal cost has a positive but, insignificantly related to profitability based on a coefficient value of 5.32 with a corresponding insignificant P- value of 0.132 respectively. Hence, an increase in ₦1 of appraisal cost would have no significant influence on profitability as far as Nigerian listed manufacturing healthcare firms are concern. Also, the null hypothesis that states that appraisal cost has no significant influence on profitability of Nigerian listed manufacturing healthcare firms would be accepted, which does not yield any policy implication. Moreover, the outcome is contrary to the outcome of James and Luke (2014),(CFI Team, 2022) and Sadiq, Alamgir, and Ali (2020), But, the outcome contradicted the underpinning theory of the study.

Effect of Internal Failure Cost on Profitability

From the table it can also be seen that internal failure cost has a positive with no significant influence on profitability of listed manufacturing health care firms in Nigeria, based on coefficient and insignificant P- value of 3.68 and 0.70 respectively. This indicate that for every ₦1 increase of internal failure cost there would be no change in the profitability as far as listed Nigerian manufacturing healthcare firms are concern. This would further lead to accepting the null hypothesis which states that internal failure cost has no significant influence on profitability of listed Nigerian manufacturing healthcare firms. Thus, the result disputed the view of Alsyouf (2007) and Kiran (2017). Morso, contradicted the underpinning theory of the study.

CONCLUSIONS

This study examines the effect of quality cost on the profitability of Nigerian-listed healthcare manufacturing firms, considering preventive cost, appraisal cost, and internal failure cost. The results show that preventive cost is positively and significantly related to profitability, while appraisal cost and internal failure cost are positively but insignificantly related to profitability. These findings underscore the critical importance of preventive cost management to enhance profitability, while neither appraisal nor internal failure costs have notable effects on profitability in the Nigerian healthcare manufacturing sector.

This study's original contribution is in the empirical testing of elements of quality cost within the Nigerian manufacturing healthcare sector. From the determination of the kind of relationship existing between profitability and the management of quality cost, the study informs processes of control over costs capable of optimizing financial performance. This conclusion confirms that expenditure on the prevention of quality contributes directly towards the sustainability of a business in the sense that inefficiencies are saved and there is an enhanced product quality.

Theoretically, this study lies within the Resource-Based Theory (RBT), demonstrating that internal resources such as correct cost control can generate a competitive advantage. However, the non-significant effects of appraisal and internal failure costs contradict certain hypotheses of the theory and suggest that there might be an effect of external market conditions and industry-specific drivers on quality cost-effectiveness. Managerially, this study indicates that firms emphasize preventive cost strategies over appraisal and internal failure costs to improve profitability. The regulatory bodies and players in the industry should support policies that will stimulate proactive quality investments to enable sustainable growth within the healthcare manufacturing sector.

There are some limitations to this study despite its contributions. The study is only limited to listed healthcare manufacturing firms in Nigeria, and therefore its generalizability is limited to other sectors or locations. In addition, this research focuses on secondary financial data, which has the drawback of not fully integrating qualitative aspects regarding quality management processes. Future studies should examine the impact of quality cost on profitability across different industries and regions and consider qualitative data from interviews and questionnaires to make the picture more comprehensive in the context of quality cost management in emerging markets.

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