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Plot 16, Idowu Taylor, Victoria Island, Lagos.

Tel: 234 01-7642294, 7642295

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- (ii) All articles should be typed on A4 paper in not more than 25 pages using 12 points font size Arial Narrow type with double spacing;
- (iii) The title page should include the title and author's contact information;
- (iv) The second page should include the title and abstract of not more than 300 words to capture the main objective, methodology, finding, /contribution to knowledge and recommendation(s) of the articles; and
- (v) The text reference should be author/date (years) type, (e.g. Ajayi (2006)); the reference list should follow the APA style, 6th Edition.

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IMPACT OF ACTIVITY-BASED COSTING IMPLEMENTATION ON PERFORMANCE OF SELECTED MANUFACTURING FIRMS IN KWARA STATE, NIGERIA

Adigbole, Ezekiel .A. and Oludoyi, S.B

Abstract

The implementation of Activity-Based Costing (ABC) by manufacturing firms is relevant for the determination of accurate cost information, attainment of cost advantage and enhancement of performance. The main objective of this study was to investigate the extent of implementation of ABC by manufacturing firms in Kwara State and examine its impact on performance of firms using this technique. A cross-sectional survey design was employed for the study and questionnaire administration was used for data collection. Twenty-eight (28) manufacturing firms in Kwara State formed the sample of the study. The data collected were analysed, using both descriptive statistics and regression analysis. Specifically, the Ordinary Least Square (OLS) method was used in testing the hypotheses formulated. The findings of this study show that ABC is moderately implemented by the manufacturing firms in Kwara State, as only 35% of the sampled firms indicate they are implementing this technique. The testing of hypotheses shows that activity-based costing implementation has a positive impact on accurate cost information and firm performance. The study concludes that when accountants are well trained and work in an improved technology environment, ABC can be effectively implemented and will have a positive impact on its performance. The study recommends that manufacturing firms, that are yet to start the implementation of ABC, should do so, as it can improve their performance where the right environment exists; Accounting professional bodies should improve on the scope of their Mandatory Continuous Professional Education (MCPE) programme to include training on the implementation of modern costing techniques, such as the ABC system; and future research, on the implementation of ABC in service firms, should be conducted to find out, if the findings of this study could hold for them.

Key Words: Activity-based costing, accurate cost information, performance, Accountant competency and Technology growth.

Introduction

Business environment worldwide has changed over the years, as competition among firms has become the order of the day. This has also affected the manufacturing of products to the extent that production activities have become more mechanised and sophisticated, due to improvement in technology. Some of the improvements in manufacturing activities include manufacturing automation, computer aided manufacturing, the use of robots for production and application of just-in-time production systems.

The improvement in manufacturing processes, arising from technological advancement, has led to changes in the production cost structure of manufacturing firms. Before the advancement in production technology, the cost structure of manufacturing firms was dominated by material and direct labour costs but this has changed, as overhead costs now form a major part of manufacturing costs (Blocher, Chen and Lin, 1999). Overhead costs have to increase, due to the use of more machines, leading to increase in depreciation cost, engineering cost, power cost, and data processing cost, etc.

The increase in overhead costs, coupled with firms having diverse product lines and more complex products, demand for more sophisticated costing techniques to generate accurate and credible cost information for effective decision-making. The traditional absorption

costing, which allocates overheads, using just one cost driver or, at most, two cost drivers, could no longer produce the desired results. The traditional costing system was developed when production was more labour-intensive and production overhead costs were minimal. The allocation of overhead costs needs to be focused on, as they will determine the accuracy of cost information and profitability of a firm. The traditional absorption costing could no longer cope with the increase in manufacturing activities and overhead costs. This necessitated a new costing system (activity-based costing) that would provide solutions to cost allocation problems with the use of multiple cost drivers.

In today's global competition, firms cannot afford the risk of making decisions, based on inaccurate cost information from the traditional absorption costing system. The need to obtain accurate information for the enhancement of a firm's performance cannot be satisfactorily met under the traditional costing system. In order for manufacturing firms to make decisions that are right, and which could lead to cost advantage and performance enhancement, accurate and undistorted cost information is required.

The traditional absorption costing system is not able to produce accurate cost information, due to the following reasons: it uses only one cost driver or, at most, two cost drivers, which are also volume-based - typically direct labour hours or machine hours, to allocate overhead costs (Johnson, 1990); absorption costing system distorts product cost information because firms now produce heterogeneous and complex products, which make it difficult for the system to determine the 'true cost' of the product (Akinleye and Adigbole, 2010); and, lastly, the increase in overhead costs over the years has further made it difficult for the traditional costing system to produce accurate cost information, as direct material and direct labour costs no longer form the major components of a product cost (Imeokparia, 2013).

The inability to determine the 'true cost' cost of products by firms can affect the proper and accurate pricing of their products, especially where pricing is based on cost (Hopper and Major, 2007). Without accurate product pricing, there is a tendency for the firm to either loose revenue or loose customers' patronage, due to over-pricing of products. These problems provide the framework for this study.

The main research question that guided the investigation for this study is: What is the current state of the practices of activity-based costing and the impact on firm's performance in the selected manufacturing firms?

The objectives of this study include: to determine the level of adoption of activity-based costing in selected manufacturing firms in Kwara State; to examine the influence of activity-based costing on accurate cost information; to assess the impact of accountant competency and technology growth on implementation of activity-based costing; and to examine the effect of activity-based costing implementation on firms' performance.

The following null hypotheses, formulated from the research question above are tested towards the determination of the findings of this study:

- H_{o1} Activity-based implementation dimensions do not significantly influence the provision of accurate cost information.
- H_{o2} Accountant competency and technology growth do not significantly influence the implementation of activity-based costing.

H₀₃ Activity-based costing implementation does not have any significant impact on firms' performance.

The scope of this study covered the examination of the impact of activity-based costing implementation on the performance of selected manufacturing firms in Kwara State, Nigeria. The data collected were cross-sectional data from the sampled manufacturing firms as at 2015. The rest of this article is divided into: Literature Review; Methodology; Data Analysis, Test of Hypotheses and Discussion of Findings; and Summary, Conclusion and Recommendations.

Literature Review

Conceptual Framework

Activity-Based Costing—Definition and Emergence

Activity-based costing has been defined and described by various authors. According to Hopper and Major (2007), activity-based costing is a method of measuring the cost and performance of activities and cost objects. It assigns cost to activities, based on their use of resources and assigns cost to cost objects, based on their use of activities. Jarvenpaa (2007) describes activity-based costing as a system which provides management with a valuable new tool to assist in determining and allocating product costs more realistically. It also provides the means by which to isolate and account for costs in relation to activities associated with these costs.

Activity-based costing was introduced by Cooper and Kaplan in the late 1980s (Cooper and Kaplan, 1988a). During this period, the limitations of the traditional costing system was becoming obvious, as it had been designed for manufacturing companies many decades before, when there were few products and when direct material and labour costs were dominant parts of factory costs (Drury, 2004).

Activity-based costing was developed in order to overcome the limitations of the traditional costing system (Turney, 1996; Cooper and Kaplan, 1998). These limitations include: traditional absorption costing uses a single cost driver, such as direct labour hour rate or machine hour rates in allocating overheads to products or services; overheads cannot accurately be traced to the cost objects

(Maelah and Ibrahim, 2006); absorption costing assumes that products or services are the real consumers of resources, instead of activities (Blocher, *et al.*, 1999; and Hansen and Mowen, 2000); and it uses a volume-related cost driver, such as plant-wide or departmental rates in the second stage of the two-stage allocation process. The use of volume-related bases for cost assignment does not reflect the true cause and effect relationship between overheads and cost objects; and this will lead to the distortion of product cost information (Cooper and Kaplan, 1988).

Objectives and Modality for Implementation of Activity-Based Costing

Activity-based costing system is meant to achieve certain objectives, such as: to provide accurate product cost information for product costing, setting of selling price, and determining marketing channels (Turney, 1996; Blocher *et al.*, 1999); to provide relevant cost information for strategic cost management purposes, since the system starts with the identification of activities which consume resources; to provide accurate information on activities' costs in order to manage processes and activities, continually increase efficiency of

business operations and enhancement of performance (Cooper & Kaplan, 1999); and, lastly, to provide information for management in formulating and implementing business strategies. The key idea in the implementation of activity-based costing system is that activities consume resources and products consume activities. This system also uses a two-stage allocation process, but, in contrast to the traditional costing system, it first relates the firm's resources consumed to activities performed by these products and then links the cost of these activities to cost objects, such as products or services (Sakurai, 1996).

Activity-based costing is implemented through a two-stage allocation process. Drury (2004) summarised the steps involved in activity-based costing system into four main stages, examined below:

The first stage in activity-based costing is determining the activities required to be performed to produce a product. Activities are made up of a combination of works or tasks and are described by verbs associated with tasks (Cooper & Kaplan, 1998).

The second stage is to identify costs of activities and then assign them to these activities. The classified costs, according to activities, are called activity cost pool (Garrison & Noreen, 2000). Overhead costs can be collected from the accounting records of the organisation and then assigned to activity cost pool, according to the actual usage of resources by activities (Hasen & Mowen, 2000).

The third stage involves the selection of appropriate cost drivers for the assignment of activity cost to products or services (cost objects). A cost driver is a characteristic of an activity or event that results in the incurrence of costs by that activity or events (Hilton, 2002). In order to assign the costs attached to each activity cost centre to product or service, a cost driver has to be selected for each activity centre (Drury, 2004; Cooper & Kaplan, 1998).

The fourth stage, which is the final stage in the implementation of the activity-based costing system, entails linking the activity costs to the cost objects (products, services or consumers) which are the ultimate consumers of activities, using appropriate cost drivers. Drury (2004) suggests that cost drivers to be used must be measurable in a way that enables it to be identified with individual products.

The Concept of Firm Performance

Performance is the output or result of an organisation, measured in financial or non-financial, or quantitative or non-quantitative terms. Performance is one type of effectiveness indicator. In relating performance to organisation, Yamin Gunasekruan and Mavondo (1999) describe organisational performance as the extent to which an organisation achieves its market-oriented and financial goals. They note that a broader conceptualisation of business performance is to emphasise on indicators of operational performance (i.e., non-financial) in addition to indicators of financial performance. Hassan, Shaukat, Naivaz, and Naz (2013) classify organisational performance into financial performance, innovative performance, marketing performance and production performance.

Singh, Sandhu, Metri and Kaur (2010) observe that, in performance measurement in any organisation, focus should be on two factors: those that relate to results and those which relate to the determinants of the results.

The Impact of Activity-based Costing on Performance

The role of activity-based costing in enhancing performance in an organisation was, for a long time, not supported with empirical evidence (Innes and Mitchell, 1990; Mc Gowan, 1998).

However, today, it has been demonstrated empirically that activity-based costing has a positive impact on a firm's performance, either directly or indirectly. Ebben and Johnson (2005) and Reed and Sclar (2005) provide evidence that reducing unnecessary costs can improve a company's performance. The firm offering high quality products from production process efficiency, which activity-based costing facilitates, can charge premium prices and increase profit margin on sales and returns on investments (Rattanaphaphtham & Ussahawanitchakit 2010). Besides, it has been noted by Camal, Acar and Tanriverdi (2006) that increase in competitive advantages, due to cost advantages derivable from activity-based costing, encourages firms to achieve high financial performance. Activity-based costing also facilitates the enhancement of customer's value, which can lead to customer's satisfaction and increase in patronage that could translate into increase in sales and profits.

Theoretical Framework

This study used the blending of the resources-based view and the contingency theory to explain the impact of activity-based costing on performance of selected manufacturing firms. These two theories are examined as follows:

Resources-Based View

Teeche, Pinsno and Shuen (1991) posit that the basis of resources-based view theory is that successful firms will realise their future competitiveness on the development of distinctive and unique capabilities, which may be tangible or intangible in nature. According to Barney (1991), the resources-based view defines firm resources as all assets, capabilities, organisational processes, firm attributes, and information knowledge, controlled by a firm. It proposes that a firm has a competitive advantage when it creates a successful strategy, based on its resource that cannot be duplicated by a current or potential competitor. The theory further states that the resources and capability must be rare, valuable, non-imitable, non-substitutable and non-transferable. Tontiset and Ussahawanitchakit (2009) note that the bundles of resources are heterogeneously distributed across firms, and that the resource differences persist over time. According to Grant (2001), resources are inputs into the production process; they are the basic units of analysis; the individual resources of the firms include items of capital equipment, skills of individual employees, patents, brand name, finance, and so on. In identifying the resources of the firm, Grant (2001) further provides the six major categories of resources of the firm as: financial resources, physical resources, human resources, technological resources, reputation and organisational resources.

The resources-based view emphasises that a firm's resources are the most important determinants of its competitive advantage and performance. The resources-based view variable, used in this study to explain the relationship between activity-based costing implementation and performance, is accountant competency.

This study, therefore, proposes accountant competency as resource and capability to create and sustain competitive advantage that can enhance firm performance.

Contingency Theory

The contingency theory of management accounting refers to the premise that there is no universally appropriate accounting system equally applicable to all organisations in all circumstances; instead, accounting systems are shaped by environmental and organisational factors (Otley, 1980 & 1994; Harrison, 1992; Chenhall and Morris, 1986). These factors are

considered to be contingent factors. The argument of the contingent theorists is that management accounting systems are functions of certain contingent factors. Therefore, management accountants can follow this mantra and then design a suitable accounting system, instead of believing in one best system, which is available everywhere for everybody (Wickramasinghe and Alawattage, 2007). Contingency theory suggests that the need for efficient organisational structures, processes and competent management accounting systems is contingent on organisational and environmental characteristics. These variables influence changes in the structure and sophistication of a cost management system or advanced cost accounting techniques (Cogwin and Bouwinman, 2002; Drury and Tayles, 2005). The theory focusses on contingent factors associated with the circumstances of a business and their relationships with organisational systems and effectiveness. Chenhall (2003) classifies contingency factors that have a major effect on management accounting practices into five main elements: environment, technology, organisational size, structure, strategy and national culture.

In the light of the foregoing discussion, this study posits that the following contingency factors: top management support, technology growth, and competitive volatility will influence the implementation of activity-based costing system to achieve a satisfactory organisational performance.

Review of Empirical Studies

Kennedy and Affleck-Graves (2001) studied the impact of activity-based costing technique on firm performance, using a sample of 47 UK firms that had adopted activity-based costing and another sample of 183 firms that had not adopted activity-based costing. Mailed survey questionnaires were used in collecting data for the study. The study showed that firms that had adopted activity-based costing, were 27% better, in terms of performance, than firms that had not adopted activity-based costing.

Itner, Lanen and Larcker (2002) studied the association between activity-based costing (ABC) and manufacturing performance in the United States. The study was conducted, using data from 1997 Price Water House Coopers and Industry Week Annual Census of Manufacturers in the US. It was a survey of US manufacturing companies, using a cross-sectional sample of manufacturing plants. The findings indicate that extensive use of ABC is associated with higher quality levels and greater improvements in cycle time and quality (types of performance measure) and is indirectly associated with manufacturing cost reduction, due to quality and time improvements.

In carrying out a study of activity-based costing, Rattaphaphthan and Ussahawanitchakit (2010) investigated the influence of activity-based costing (ABC) effectiveness on competitive advantage and performance of 521 selected Thai listed firms. The study used the resources-based view and contingency theory to study the variables involved. The questionnaire-mailing method of data collection was employed to collect data from the sampled firms. The ordinary least square (OLS) regression analysis was used to test the hypothesised relationships among the variables examined after carrying out the factor loading of the variables (Aulakh, Kotab and Teegen (2000). The results of the study show that activity-based costing effectiveness significantly and positively influences financial performance. The study only focused on financial performance without including non-financial performance as part of the dependent variable. This current study fills that gap by examining both financial and non-financial measures of performance.

Another study of the effect of activity-based costing on firm performance was carried out by Fei and Isa (2011) who examined a sample of 1000 listed Chinese manufacturing firms. The study investigated the role of activity-based costing in predicting improvement in firm's performance. The results of the study show that, overall, the successful implementation of activity-based costing can lead to improvement in manufacturing and business performance. Finally, using a cross-sectional survey of manufacturing companies in Nigeria, Imeokparia (2013) examined the adoption of activity-based costing and its impact on manufacturing companies' profits in 262 manufacturing firms in the South West of Nigeria. Data were collected through the instrument of questionnaires, administered to the sampled manufacturing companies. The regression analysis was used in testing the hypotheses formulated in the study. The results of the study indicated that manufacturing companies, that had adopted activity-based costing, achieved increased profitability, measured by return on capital employed (ROCE) and other measures. The study did not show whether or not activity-based costing could improve manufacturing firms' performance indirectly through mediating variables, like: accurate cost information and cost advantage. Moreover, the study did not use the resources-based view factor of accountant competency as a theoretical background. The present study fills that observed gap in the literature reviewed. An attempt was made to replicate a similar study, especially that of Rattaphaphthan and Ussahawanitchakit (2010), with modifications in the Nigerian environment. This study fills the observed gap by examining whether or not activity-based costing can impact on manufacturing firms' performance directly or indirectly through the mediating variable (accurate cost information). This study also integrates two theoretical perspectives of resources-based view and contingency theory to support the antecedent variables (technology growth and accountant competency) and the consequences of activity-based costing implementation (accurate cost information). To the best of the present researchers' knowledge, this is rare in the study of activity-based costing in Nigeria.

Methodology

Sample

This study relied on the survey design, as it is deemed more appropriate, compared with other designs of research, to achieve the objectives of the study. The population of this study covered all manufacturing firms registered with the Manufacturers' Association of Nigeria (MAN), Kwara State branch, and, as at 2015, there were 48 of them. However, only 30 manufacturing firms were still operating as at the time of this survey, hence, this figure was used in determining the sample size. The sample size of this study, calculated scientifically, using the Yaro Yamani formular ($n = \frac{N}{1 + N(e)^2}$) (Okorie, cited in Imeokparia, 2013) is 28 manufacturing firms. The purposeful and convenient sampling method was then used in selecting the firms that form part of the sample.

Questionnaire and Procedure for Data Collection

The questionnaire was designed in such a way that all the data required for the variables used in the study were properly captured. The questionnaire was structured into seven sections as follows: Section 1: Demographic data of the respondents; Section 2: Firms' characteristics; Section 3: Questions on adoption of ABC; Section 4: Questions on the use of cost driver analysis for ABC implementation and the cost allocation effectiveness in the firm; Section 5:

Consequences of ABC implementation – Accurate cost information and Firm performance; Section 6: Questions on Technology growth and Accountant competency in the firm (Contingency theory and Resources-based view factors) that affect the implementation of ABC in the firm.

For the purpose of data collection, a total of 84 copies of the questionnaire were distributed to the target respondents - Financial Accountants, Cost Accountants/ Management Accountants and Chief Accountants/Finance Directors across the 28 sampled manufacturing firms. This translates into three (3) copies of the questionnaire per firm. The target officers of the firm were chosen because they were experts in cost and management accounting techniques and so could give answers to questions on activity-based costing implementation. Out of the 84 copies of questionnaire administered, only 56 copies could be retrieved despite four visits made to the sampled firms. Of the copies received, 2 copies were not properly completed, leaving 54 completed and usable copies of the questionnaire, resulting in a 64.3% retrieval rate – considered quite adequate for the study's analysis.

Variables' Measurement

Dependent Variable: Firm performance

Firm performance is measured in this study, using a five-item performance indicators of profit, return on investment (ROI), cost reduction, sales volume and customer satisfaction, adopted from Aksoylu (2013). Firm performance was assessed by the respondents in two ways as follows: Firstly, the firm was assessed on changes in the five items of firm performance indicators as a result of the implementation of activity-based costing, using a five-point Likert scale; and secondly, the performance of the firm was assessed in comparison with those of the competitors, also using the five items of firm performance indicators, using a five-point Likert scale.

Independent Variables: Cost driver analysis and cost allocation effectiveness

These variables are measured, using a five-point Likert scale. These were adopted from Rattanaphaphtham and Ussahawanitchakit (2010), with some modifications.

Consequence/Mediating Variable: Accurate cost information

The consequence variable in this study is accurate cost information. This can also be regarded as non-financial performance measure. This variable was measured, using a five-point Likert scale.

Antecedent Variables: Accountant competency and Technology growth.

These variables are measured, using a five-point Likert scale and adopted from Chanopas*, Krain and Khang (2006); Rattanaphaphthan and Ussahawanitchakit, 2010; Prasad, Ramamurthy and Naidu, (2001) (as cited in Chikanbang *et al.* (2012); Kaneko *et al.*, 2013.

Validity and Reliability

The reliability test was carried out and the results of the cronbach's alpha statistics for all variables vary from 0.923 to 0.986. These results are valid and are very high, which imply an acceptable internal consistency among the variables in the instrument of data collection (Devellis, 1991).

Methods of Data Analysis and Model Specification

The data collected were analysed, using regression analysis. Specifically, the Ordinary least square (OLS) analysis was used in testing the hypotheses formulated for this study. This technique was adopted from a similar study by Rattanaphaphthan and Ussahawanitchakit (2010).

The mode formulated to explain the hypothesised relationships in this study and to achieve the three objectives (2 to 4), are given below:

$$\begin{aligned}\text{Equation. 1a: CDA} &= \beta_{01} + \beta_1 \text{ACOM} + \beta_2 \text{TECG} + \epsilon \\ \text{b: CAE} &= \beta_{02} + \beta_3 \text{ACOM} + \beta_4 \text{TECG} + \epsilon. \\ \text{2: ACI} &= \beta_{03} + \beta_5 \text{CDA} + \beta_6 \text{CAE} + \epsilon \\ \text{3: FP} &= \beta_{04} + \beta_7 \text{CDA} + \beta_8 \text{CAE} + \epsilon\end{aligned}$$

Where: ACI = Accurate Cost Information
CDA = Cost Driver Analysis
CAE = Cost Allocation Effectiveness
FP = Firm Performance
ACOM = Accountant Competency
TECG = Technology Growth
 $\beta_{01}, \beta_{02}, \dots, \beta_{04}$ = Intercept
 $\beta_1, \beta_2, \dots, \beta_8$ = Parameter estimates - independent variables, mediating variables, and antecedent variables.
 ϵ = Error term.

Data Analysis, Test of Hypotheses and Discussions of Results

Data collected for the study were analysed to achieve the research objectives, as follows:

Descriptive analysis

Research objective 1: To determine the extent of adoption of activity-based costing in selected manufacturing firms in Kwara state.

To determine the extent of adoption of activity-based costing in the selected manufacturing firms the respondents were asked to indicate the extent of adoption of ABC in their firms, using five Likart scales that range from: Never used (1), Rarely used (2), Sometimes (3), Most of the time (4) to Always used (5).

Table 1: Statistics on adoption of activity-based costing

Mean	3.2963
Std. Error of Mean	.23291
Std. Deviation	1.71155
Minimum	1.00
Maximum	5.00

Source: Researcher's SPSS Analysis (2015).

The result of the answer to the above question is shown in Table 1. From the Table, the mean of the adoption of ABC is 3.2963. This indicates that manufacturing firms sampled averagely adopt activity-based costing. On the number of the sampled firms practising ABC, 10, out of

28 firms sampled, indicated they were practising this system; this translates to 35.71% rate of implementation.

Regression Analysis of the Models

Research objective 2: To evaluate the influence of activity-based costing implementation on accurate cost information

Model 1: Activity-based costing implementation and Accurate cost information.

Table 2: Model 1 REGRESSION RESULTS SUMMARY

Model 1	Co-efficient	Standard error	t.statistics	Probability	V.I.F
Constant		0.512	1.557	0.126	
Independent					
Variables:					
C.D.A	0.258	0.164	1.73	0.085	1.845
C.A.E	0.482	0.129	3.292	0.002	1.845
R ²	0.467				
Adjusted R ²	0.443				
F-statistics	20.110				
Durbin Watson Statistics	1.949				

Dependent Variable: ACI

Source: Researcher's SPSS Analysis (2015).

Table 2 shows the regression result summary of model 1 that reflects the relationship between ABC implementation dimensions (cost driver analysis and cost allocation effectiveness) and accurate cost information. As contained in the Table, the regression model, computed R², and the adjusted R², are 0.466(46.6 %) and 0.443(44.3%), respectively. This implies that 46.6% variation in accurate cost information is explained by change in cost driver analysis and cost allocation effectiveness.

The coefficient estimate of cost driver analysis, calculated at 0.258, shows that a unit change in cost driver analysis will induce 0.258 change in accurate cost information. Also, the co-efficient estimate of 0.482, computed for cost allocation effectiveness, will induce 0.482 unit change in accurate cost information.

Furthermore, the two variables: cost driver analysis and cost allocation effectiveness are statistically significant at 1% and 10%, respectively. The Table also shows that the model is well fitted, as shown by the calculated F-statistic of 20.110 ($p < 0.05$).

The implication of the result of model 1 is that:

Ho1: Activity-based costing implementation dimensions do not significantly influence accurate cost information, is not accepted.

Research objective 3: To determine the influence of technology growth and accountant competency on activity-based costing implementation.

Model 2a: Accountant competency and technology growth and cost driver analysis.

Table 3: Model 2a REGRESSION RESULTS SUMMARY

Model 2(a)	Co-efficient	Standard error	t.statistics	Probability	V.I.F
Constant		.368	4.564	.000	
Independent					
Variables:					
ACOM	.814	.123	5.697	.000	2.037
TECG	-.087	.121	-.606	.548	2.037
R ²	.569				
Adjusted R ²	.549				
F-statistics	28.412				
Durbin Watson	1.256				

Dependent Variable: CDA

Source: Researcher's SPSS Analysis (2015).

Table 3 shows the summary results of the regression 2a model, indicating the relationship between accountant competency and technology growth and cost driver analysis. From the Table, R² and the adjusted R² computed, are 56.9% and 54.9%, respectively. This result shows that 56.9% variation in cost driver analysis can be explained by the change in accountant competency and technology growth.

The co-efficient estimate of accountant competency, calculated at 0.814, shows that a unit change in accountant competency will induce the same rate of change in cost driver analysis. Also, a unit change of -0.087 in cost allocation effectiveness will induce the same negative rate of change in cost driver analysis. In the analysis of the model, accountant competency is significant at 1%, while technology growth is not significant (0.548). Nevertheless, overall, the model is significant, as it shows an F value of 28.412.

Model 2b: Accountant competency and Technology growth and Cost allocation effectiveness.

Table 4: Model 2b REGRESSION RESULTS SUMMARY

Model 2(b)	Co-efficient	Standard error	t. statistics	Probability	V.I.F
Constant		.490	1.507	.139	
Independent					
Variables:					
ACOM	.376	.149	2.575	.013	1.779
TECG	.378	.147	2.592	.013	1.779
R ²	.473				
Adjusted R ²	.449				
F-statistics	19.732				
Durbin Watson Statistics	1.568				

Dependent Variable: CAE5

Source: Researcher's SPSS Analysis (2015).

Table 4 shows the summary results of the regression 2b model, indicating the relationship between accountant competency and technology growth and cost allocation effectiveness. From the Table, the R² and the adjusted R² computed, are 47.3% and 44.9%, respectively. These results show that 47.3% variation in cost allocation effectiveness can be explained by change in accountant competency and technology growth.

The co-efficient estimate of accountant competency, calculated at 0.376, shows that a unit change in accountant competency will induce the same rate of change in cost allocation effectiveness. Also, a unit change of 0.378 in technology growth will induce the same rate of change in cost allocation effectiveness.

The F-statistic, computed at 19.732, is equally significant at 1%, which implies that the model is well fitted.

The implication of the results of the two models- 2a and 2b, put together, is that:

Ho2: Accountant competency and technology growth do not significantly influence activity-based costing implementation, is not accepted.

Research objective 4: To assess the impact of activity-based costing implementation on firm's performance.

Model 3: Activity-based Costing Implementation and Firm's Performance.

Table 5: Model 3 REGRESSION RESULTS SUMMARY

Model 3	Co-efficient	Standard error	t. statistics	probability	VIF
Constant		.470	-.014	.989	
Independent Variables:					
CDA	.113	.182	.855	.397	2.430
CAE	.731	.144	5.511	.000	2.430
R ²	.674				
Adjusted R ²	.660				
sF-statistics	46.574				
Durbin Watson Statistics	1.873				

Dependent Variable: Performance

Source: Researcher's SPSS Analysis (2015).

Table 5 shows the summary results of the regression 3 model, indicating the relationship between activity-based costing implementation on firm's performance. From the Table, the R² and the adjusted R² computed, are 67.4% and 66%, respectively. This result shows that 67.4% variation in firm's performance can be explained by change in ABC implementation (cost driver analysis and cost allocation effectiveness), while 32.6% are explained by the error term. The F-value computed, at 46.574, implies that the model is well fitted. Cost allocation effectiveness is statistically significant but cost driver analysis is not significant. Overall, the model is significant at 1%, as indicated by the F-value.

The implication of the above results of the model is that:

Ho3: Activity based costing implementation does not have significant impact on firm's performance, is not accepted.

Discussion of Findings

The findings of this study are discussed in line with the research questions raised in the study.

Research Question 1: What is the current state of adoption of activity-based costing in the selected firms?

The findings of this study show that activity-based costing practice, among the manufacturing firms sampled, was fairly moderate. This is indicated in Table 1, showing the statistics of the adoption of activity-based costing. The study indicates that most of the sampled firms were not using ABC. This result is not consistent with that of the work of Imeokparia (2013), which found that ABC was mostly used by listed manufacturing companies in Nigeria. One of the reasons could be the size of the firms studied, as most of the firms sampled were medium-scaled companies and were not quoted on the Nigerian Stock Exchange. Another reason could be lack of competent and qualified accountants to install ABC in the sampled firms.

Research Question 2: What is the influence of activity-based costing implementation on accurate cost information?

The findings of this study show that the implementation of activity-based costing has a positive influence on the provision of accurate cost information. It then implies that activity-based costing can determine the quality of cost information. This is so because ABC implementation has a positive correlation with accurate cost information. Activity-based costing is able to produce accurate cost information because of the use of multiple cost drivers in the allocation of overhead cost.

Research Question 3: What is the influence of accountant competency and technology growth on the implementation of activity-based costing implementation?

The findings of this study show that accountant competency is a key factor for the implementation of activity-based costing in manufacturing firms. The result of model 3 shows a very strong co-efficient, implying that accountant competency does influence the implementation of activity-based costing. These findings are in line with those of the study of Rattanaphaphtham and Ussahawanitchakit (2010). The findings of this study also show that technology growth does not positively influence the implementation of activity-based costing. Management of manufacturing firms would then have to focus attention on accountants' training to enhance activity-based costing implementation.

Research Question 4: What is the impact of activity-based costing implementation on firms' performance?

The findings of this study indicate that the successful implementation of activity-based costing can enable a firm to achieve enhanced performance. The results of the analysis of model 4 reveal that cost allocation effectiveness particularly has a strong impact on firm's performance. This implies that the more the effectiveness of a firm's cost allocation system, the more profitable a firm is. Cost driver analysis has little effect on the firm's performance. However, overall, the implementation of activity-based costing has some impact on a firm's performance. The finding of this study is in consonance with those of Kennedy and Affleck-Graves (2001); Rattanaphaphtham and Ussahawanitchakit (2010); and Imeokparia (2013).

Summary, Conclusion and Recommendations

This study focussed on the investigation of the influences of activity-based costing implementation on accurate cost information and firm performance. The result shows that

activity-based costing implementation is significantly and positively related to firm's performance. Furthermore, accountant competency and technology growth have been found to influence the implementation of activity-based costing system. It can be concluded that, with the right training of accountants and improved technology in a firm, ABC can effectively be implemented to achieve accurate cost information and enhanced performance.

In the light of the conclusion of this study, the following recommendations are made:

Firstly, manufacturing firms that have not adopted the use of activity-based costing system should do so, as their performance can be enhanced with the use of this modern costing system.

Secondly, manufacturing firms should regularly train their accountants in activity-based costing as this is essential for its effective implementation.

Thirdly, accounting professional bodies should improve on the scope of their Mandatory Continuous Professional Education (MCPE) programme so that it can include the implementation of modern costing techniques, such as Activity-based costing and Activity-based management in manufacturing companies.

Fourthly, further research, involving larger samples of manufacturing firms, should be carried out in order to confirm or reject the findings of this study. Also, a study could be carried out to find out the appropriateness of the application of ABC in the service industry.

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