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Activity Based Costing From the Perspective of Competitive Advantage: A Study of Nigerian Manufacturing Firms

Anyadiegwu Peace Ebele[1], Ifurueze Meshach S. (Ph.D)[2]
Department of Accountancy Chukwuemeka Odumegwu Ojukwu University (COOU)
Igbariam, Anambra State
Email:ebele_okpala@yahoo.com, mifurueze@yahoo.com
Phone: +2348038947784

Abstract

Purpose: The focus of this study was to examine activity based costing from the perspective of competitive advantage. ABC can support the strategic management process and provide significant benefit to organizations. This examination utilized the contingency theory as a theoretical basis for the study.

Methodology: Descriptive survey design was adopted. The data gathering instrument employed for this study is a structured questionnaire. Data are analyzed through SPSS version 16. Reliability analysis using Cronbach's alpha value was applied on data collected. Factor analysis was employed using principal component method followed by Varimax with Kaiser Normalization, to find the factors or dimensions that explain variances by the data set. The factor analysis is based on four dimensions, namely, overall performance, strategic cost allocation method, increased efficiency and increased effectiveness having the factor loadings of over ±0.3. The regression results are positive and significant at the 5% level.

Findings: Findings reveal that there is no statistically significant difference in cost reduction attained by ABC over Traditional costing, though ABC tended to have higher effect. Profits realized in Industrial and Brewery sectors of the Manufacturing companies surveyed were higher in ABC than in Traditional costing. The results further indicated that ABC organizations have higher asset turnover than non-ABC organizations. Also the perception of ABC in terms of strategic cost allocation method increased efficiency, effectiveness and has significant effect on firms' performance.

Policy recommendation: This study suggests that the developed scale can have significant implications to capture the perception of ABC. ABC should be applied by manufacturing companies in Nigeria since any little difference in cost – savings can influence managers' decisions.

Keywords: *Activity Based Costing (ABC), Cost Analysis, Managerial Efficiency and Effectiveness, Product Cost Management, Financial Performance*

1.0 INTRODUCTION

1.1 Background of the Study

Traditional costing systems have worked well for many decades and may continue to be useful today to value inventory and measure the cost of goods sold. However, practitioners are facing various challenges using the traditional costing systems in today's competitive environment. Cost and Management Accountants in a globalize world are now expected to be team players in such areas as product development, profitability analyses, quality process and improvements, and the evaluation of overall company performance (Welfle and Keltyka, 2000). As a strategic cost management tool, activity-based costing (ABC) plays a vital role. The ABC (activity-based costing) model has revolutionized costing systems (Johnson and Kaplan, 1987). The activity-based costing (ABC) is a method of analyzing business operations that leads to cost identification (e.g. direct cost and indirect cost) and cost classifications based on activities (Johnson and Kaplan, 1987).

Implementation of ABC reduces costs and improves the resource allocation. It may result in improving resource allocation consistent with strategic objectives and budget surplus (Zaman, 2014). ABC has reportedly helped many organizations to better manage their business activities when combined with total quality management and business process re-engineering (Adams, 2015).

In recent years, companies have reduced their dependency on traditional accounting systems by developing activity-based cost management systems. Traditional costing systems have a tendency to assign indirect costs based on something easy to identify (such as direct labor hours). This method of assigning costs can be very inaccurate because there is no actual relationship between the cost pool and the cost driver. This can make indirect costs allocation inaccurate. Initially, managers viewed the ABC approach as a more accurate way of calculating product costs. But ABC has emerged as a tremendously useful guide to management action that can translate directly into higher profits. The Activity Based Costing (ABC) is designed to assign costs to activities which enable more accurate cost information.

Activity-based costing (ABC) is a method for determining true costs. Though ABC is a relatively recent innovation in cost accounting, it is rapidly being adopted by companies across many industries, within government and other organizations like institutions, finance or service sectors. In the light of current practices, this paper emphasizes to understand the need and importance of ABC costing in the organizations.

The interest of manufacturer's in the ABC system grown significantly under the rapid growth of some markets especially in the manufacturing area, the increasingly growing indirect costs under the use of automated systems and the need for more accurate cost information to better manage the business and gain competitive advantages. Activity-based costing is a process where costs are assigned due to the cause and effect relationship between costs and the activities that drive these costs. Moreover, the ABC approach is broadly applicable across the spectrum of company functions and not just in the factory.

ABC reveals the links between performing particular activities and the demands those activities make on the organization's resources, so it can give managers a clear picture of how products, brands, customers, facilities, regions, or distribution channels both generate revenues and consume resources. The profitability picture that emerges from the ABC analysis helps managers focus their attention and energy on improving activities. Productivity is critical for the long-term competitiveness and profitability of organizations. It can be

effectively raised if it is managed holistically and systematically. Productivity measurement is a prerequisite for improving productivity. As Peter Drucker, who is widely regarded as the pioneer of modern management theory, said: "Without productivity objectives, a business does not have direction. Without productivity measurement, a business does not have control." Measurement plays a very important role in the management of productivity. It helps to determine if your organization is progressing well. It also provides information on how effectively and efficiently the organization manages its resources.

An integrated approach to productivity measurement:

• Provides a comprehensive picture of the organization's performance.

• Highlights the relationships among different ratios and units, and allows the organization to analyze the factors contributing to its productivity performance.

• Helps diagnose problem areas and suggest appropriate corrective actions.

• Enables the organization to monitor its performance over time and against the performance of other organizations.

Every organization faces a different operating environment that must be evaluated carefully through the strategic planning process. According to the contingency theory, management must conform or fit the strategy and the structure, including the accounting control system, to the existing environment to improve performance (Simon, 2014). The Institute of Management Accountants (2009) recommended that cost control systems incorporate and support the overall strategic goals of a company. One important organizational goal is to improve performance. Therefore, this study examined activity based costing from the perspective of competitive advantage to determine how it impacts organizational performance.

1.2 Statement of the Problem

Organizations operate in a complex and competitive operating environment. Traditional accounting methods fall short in providing companies with the strategic information needed in today's organizational environment. Management of these organizations needs fast, reliable, and accurate information to make sound business decisions.

It has been the heart beat of every professional management accountant to devise a strategy on how best to analysis the cost structure of a product in order to allocate cost accurately. Traditional costing (Tc) has been accused of allocating overhead costs arbitrarily to products without regards to ranges of time taken to produce a product especially in multi production process. Sometimes, in order to reduce cost, quantity and quality of the product is relegated to the background in the process but that is not a better cost engineering technique.

The inability to establish a rational cause and effect relationship between a particular service or product and many types of direct and indirect costs is a problem of serious concern. There is now an increasing competition and growing ranges of products in the global market which now makes it imperative for companies to devise more precise cost measurements for evaluating profits generated from products and customers. The extent to which top management decisions are affected by the degree of assimilation and understanding of statistical and cost data communicated to them is a state of the appropriateness of the costing technique applied.

Research has shown that ABC can provide benefits to organizations; however, competing priorities may leave organizations with minimal performance improvements. There is lack of evidence to support a direct link between ABC and profitability (Innes & Mitchell, 2010).

Furthermore, given the high-technology nature of the modern day organizations, their Manufacturing Overhead (MOH) costs represent a significant proportion of its total costs. Therefore, the higher the need for a more accurate cost management technique, which minimize the risk of product cross-subsidization. Failure to do so may result in sub-optimal cost management decision making, e.g., sales-mix, pricing, marketing decisions, etc.

1.3 Objectives of the Study

i. To ascertain the extent to which application of ABC can influence level of unity costs in product cost management than traditional costing system.
ii. To determine whether the level of the profits attained by either application of ABC or Traditional costing system is influenced by category of manufacturing sector.
iii. To determine whether the use of ABC has an effect on firms' financial performance.
iv. To assess the effect of Activity-Based Costing on firms' efficiency and effectiveness.
v. To examine the basis for strategic cost allocation method as perceived in activity-based costing.

1.4 Research Hypotheses

1. H_0: There is no significant difference between the level of influence on unit costs attained from ABC and those attained from traditional costing in product cost management.
   H_I: There is significant difference between the level of influence on unit costs attained from ABC and those attained from traditional costing in product cost management.
2. H_0: There is no significant effect on the profits realized from either ABC or Traditional Costing based on the category of the manufacturing sector.
   H_I: There is no significant effect on the profits realized from either ABC or Traditional Costing based on the category of the manufacturing sector.
3. Ho: The use of ABC has negative effect on the firms' financial performance.
   H_I: The use of ABC has positive effect on the firm's financial performance.
4. Ho: ABC implementation does not increase managerial efficiencies and effectiveness.
   H_I: ABC implementation increase managerial efficiencies and effectiveness.
5. Ho: Companies that implemented ABC/M do not achieve higher ROA and ROS than companies using traditional overhead costs allocation methods.
   H_I: Companies that implemented ABC/M achieve higher ROA and ROS than companies using traditional overhead costs allocation methods.

2.0 LITERATURE REVIEW

2.1 Conceptual Framework

The ability of a manufacturing company to compete effectively and favourably in the global market is determined to a large extent by the cost and quality of its products. The cost of a product can be reduced by increasing productivity (the relationship between total output and total input) or by reducing manufacturing costs at the production floor.

Increasing recognition of cost competition has forced companies to develop efficient techniques for the control of manufacturing facilities and materials and hence increasing productivity and quality. For the past few years, considerable emphasis has been placed on the cost. Manufacturing cost of a product can be reduced by: minimizing the number of components used in the product, designing components for ease of handling and assembly; and selecting the best material/process combination for economic manufacture of the individual parts (Ong *et al.,* 2013).

Activity based costing (ABC) is essentially an accounting system that measures the use of resources by activities. "Cost drivers" are then used to ascribe the costs of those activities to items generating the activities, e.g. products, customers and company's infrastructure. It therefore allows a more accurate costing of overheads according to their actual usage (Steve, Letza and Gadd, 1994). In a more clear definition as given by Sharma and Gupta, (2008) ABC is an Accounting system that assigns costs to products based on the resources they consumed.

The primary success factors for the implementation of activity based costing (ABC) related to capabilities in creating quality products and services, and controlling capital intensity and debt levels. Another important capability is that of being able to create and implement an effective policy. ABC is a method of allocating costs to products and services. It is generally used as a tool for planning and control. It was developed as an approach to address problems associated with traditional cost that tend to have inability to accurately determine actual production and services costs, or provide useful information for operating decisions with these deficiencies managers can be exposed to make decisions based on inaccurate data (Kaplan, 1983). ABC is an improved means of identifying high overhead costs per unit and finding ways to reduce the costs (Franklin and Ellen, 2012).

2.2 Cost Analysis

All we have discussed so far are all aspects of cost analysis. Actually, cost analysis revolves around acquiring an understanding of the costs of products or services being produced or performed and calculating the cost of delivering the products or services.

Specifically, it is a combined process of defining:

a. Product/service (b) establishing the volume of the product/service (c) settling on the relevant cost concept to address the perceived problem (d) determining the costs of some alternatives to the existing products or service delivery patterns, (Keller, 2012). As a process, it is management oriented in the sense that it can be used proactively to provide information that may lead to a change in the managerial environment. As a result, cost analysis is used as a diagnostic tool to detect and /or solve problems before they become major administrative hurdles, for instance, the use of fiscal notes adds value on whether to accept or reject a proposal.

2.3 Influence Level of Unit Costs in Product Cost Management

Activity-Based Costing (ABC) is a cost accounting system developed by Cooper and Kaplan in the late 1980s. It represents a different perspective to assign, instead of allocating, MOH costs. MOH costs are assigned to the products or services based on their consumption of the various activities. Although ABC does not eliminate cost allocation, it significantly decreases it. Johnson and Kaplan (1987) stated that the relevance and accuracy of product costing, using Traditional Cost Allocation (TCA) systems, was lost when accountants started to focus on the allocation of overhead costs in order to value inventories (Boyd and Fox, 2012).

Cooper and Kaplan (1992) initially emphasized the ability of ABC in measuring resource usage. Emphasizing on the capability of ABC in controlling the resource-utilization level was a milestone in introducing ABC/M as a prevailing decision making and support tool. Gunasekaran*et al.* (1999) introduced ABC/M as a group of operational policies and methods which showed its advantages in pricing and product-mix decision making, especially in a flexible manufacturing environment where the role of direct labor diminished. They state that implementing ABC/M improves the utilization of resources and minimizes the production cost.

2.4 Effect ABC on Managerial Efficiency and Effectiveness

Empirical research in managerial accounting provides the link between management accounting systems such as ABC and organizational performance. Tillema (2005) found a positive relationship between environmental uncertainty and the use of managerial accounting information. Additional examinations have shown a positive relationship between environmental uncertainty and accounting information combined with performance (Abernethy & Guthrie, 1994; Chenhall & Morris, 1986; Chong, 2015; Chong & Chong, 1997; Gordon & Narayanan, 1984; Gul, 1991; Gul& Chia, 1994; Mia, 2013; Mia &Chenhall, 1994; Mia &Goyal, 1991; Moores& Yuen, 2001). Jermias and Gani (2004, 2005) specified that strategic choice affects the type of controls and management accounting system used by business units. Jermias and Gani (2005) further showed a positive relationship between contingent fit and business-unit performance. The basic role of ABC is to provide management with detailed information for decision making so that management can better streamline processes, eliminate waste, and reduce costs (Krumwiede& Charles, 2006). The basic assumption is that ABC enhancements will lead to improvements in performance. ABC organizational leaders believe that ABC will only create value when the detailed information is utilized to reduce costs and improve performance (Brimson, 2014). Contingency research has found some support for this assumption. Kennedy and Affleck-Graves (2001) found that organizations who have successfully adopted ABC tend to outperform nonadopting firms in the first three years. Maiga and Jacobs (2006) indicated that cost improvements from ABC have a positive significant impact on profitability improvements. Cagwin and Bouwman (2012) showed that ABC is associated with improvements in ROI.

Activity-Based Costing depends on the analysis of the activities participating in an organization, supposing that these activities create-consume cost in order for the products or services to be produced. Thus, in order to obtain the cost information needed, this method not only notes the activities, but also analyses all the elements regarding the time, the way, the resources of each activity or function (a number of activities).

The steps that Activity-Based Costing follows are:

- Recognition of cost objects (the reason of cost analysis)
- Defining the activities that affect each cost object
- Determining the sources of expenses that affect each activity
- Assigning the activities to the cost objects
- Transfer the activity cost to the cost objects and argue on the final results

The cost of activities, with this method, is focused on the cost objects (products, services, customers) with point of report the use of activities by the cost objects. The factors of activity offer useful information to the management with regard to the cost of realization of activities that create cost.

2.5 Effect ABC on the Firms' Financial Performance

As mentioned before, ABC allocates the General Expenses (GE) (Overhead Cost) first to the activities (that create them). And in the next stage, are being transferred to the products depending on which activities and how much they influence the particular products. This way of cost spreading provides the following advantages over the traditional costing method:

- The expenses are analyzed with greater detail than the traditional methods where the expenses are only categorized as direct and indirect
- While traditional cost methods group the General Expenses (GE) (Overhead Cost) in the general cost-centers such as those of Production, Administration, Disposal, Services and Research and then, distribute them to the products; Activity-Based Costing categories them according to the activities that consume them
- Activity-Based Costing analyses all the activities, providing information to the administration of those activities that contribute less, or, cost more than they should, letting the managers abolish some of them
- Detailed Activity and cost analysis present a great help for creating better budgets

2.6 Theoretical Framework

The contingency theory of organizations was used as the theoretical framework for this study. According to Luft, and Shields (2003), the contingency theory was developed from the works of Burns and Stalker (1961), Woodward (1965). The contingency theory specifies that organizations should be designed and managed so they are in harmony with the environment (Rant &Rozman, 2008). Specifically, the organizational structure should be designed to fit the external environment (Anderson & Lanen, 1999). The proper design of an organizational structure will depend on the level of uncertainty in the environment and the strategic objectives of the company (Husted, 2000). Anderson and Lanen (1999) presented a basic contingency model to explain organizational structure and the relationship to managerial accounting. The model was designed using research from Simons (1990), Fisher (1995), and the traditional contingency framework (Anderson &Lanen, 1999). Anderson and Lanen indicated that both endogenous organizational and exogenous environmental variables influence the competitive strategy of an organization. In addition, the competitive strategy will dictate the organizational structure and managerial accounting practices used to direct and control an organization to strategically achieve desired performance (Simon, 2014).

Management accounting field adopt Contingency theory widely to conduct their research. In the environment of the organizational setting where controls systems operate and function, these systems are designed and application contingently by the affirmation of Contingency theory (Otley, 2008). The characteristics of management accounting system are explained by this theory widely (Anthony, 2011). Waterhouse and Tiessen (2006) stated that on the numbers of factors such as product diversity, cost structure, size, level of competition and degree of customization, management control system's structure and design is contingent. The relationship between the contingency factors and ABC was explained in the example given by Sartorius, Eitzen and Kamala (2009). The manufacturing firms, specially the firm that produce more than one type of products and each type also uses different amount of resources today need for more accuracy information of cost allocation because of the increasing of fixed cost, ABC is one of the technique improve the accuracy of allocated costing (Baird, Harrison & Reeve, 2014). There are many factors that lead to the emergence of more sophisticated costing system such as ABC, one of them is competitions, and in

addition, the number of activities and the volume of overhead needs to be coordinated, as the result ABC method is adopted by larger companies more than smaller companies as well as limited resources (Sartoriuse *al.,* 2009). However, the differences always occur in implementing and adoption of an innovation. Thus, in explanation of ABC implementation stages Contingency theory is not adequate. Organizational theory is theory supported for Contingency theory, it supposes that there are four categories in the changing of an organization are classified, they are culture, technology, structure and products. The stages of implementing ABC are categorized as the administrative procedure by Gosselin (2013), therefore, success of ABC is determined by top-down approach because it is considered as the structural changing.

3.0 METHODOLOGY

The empirical survey method was used to carry out the work. Descriptive research is used to describe the main features of data and aims to summarize a data set without employing a probabilistic formulation. In this study, the descriptive survey research design was used.

The research work is on "Activity Based Costing from the Perspective of Competitive Advantage." However, due to limited financial and time resources, the study was limited to selected manufacturing firms in Enugu and Anambra State, Nigeria. This is a descriptive research in which the researcher made use of primary and secondary data. Data in the category of primary source were collected mainly though visits, personal participation and observation and distribution of questionnaires to the respondents. Secondary data such as performance measures were collected from annual reports, organizational web sites that published financial reports and company reports. Supplemental company, industry, and environmental information were collected from company Web sites, annual reports, plus company reports for the contingency variables.

The sampled population was 58 companies from the south east of Nigeria (Enugu and Anambra State) of the registered companies with the Manufacturer's Association Nigeria. The population of the study consists of respondents from the firms selected for the study. These respondents are members of staff with extensive experience on the issue under discuss. The estimated population figure of respondents is 133 respondents. Convenience sampling was used in selecting a sample for the study which is on non-probability method of selection. It was chosen on the basis of convenience, accessibility and as a matter of fact of particular interest in a specific subgroup within the target population. In determining the sample size, the researcher used Alien Taro Yamane (1967) method. Yamane (1967:886) provides a simplified formula to calculate sample sizes.

However, the researcher distributed about 133 questionnaires, in an attempt to ensure greater validity of the study and was able to collect back 82. This gave a response rate of about 61.7%. This was considered high enough for this study. Questionnaire was used together with the budgeted production cost data which was collected from the sampled companies. Fourteen items are arranged on a five point Likert type scale expressed as 1= Strongly Agree, 2 = Agree, 3 = Neutral, 4 = Disagree, and 5 = Strongly Disagree. The study is a longitudinal study that utilized primary, secondary data, t-test and chi square test to arrive at its results.

The analysis and test of hypotheses were done by use of T-test and Multivariate Analysis of variance. The names of companies that supplied their production cost data were denoted by letters A-G.

4.0 DATA PRESENTATION AND ANALYSIS

Table 1: Distribution of TC and ABC accounting systems Profit according to Sector

TC Profits	ABC Profits	TC Profits	ABC Profits
Industrial	**Brewery**	**Industrial**	**Brewery**
4540	777	4397.8	722
1760.8	887	1815.2	832.5
232.2	2072	257.6	2066.3
181.64	1132	317.6	1126.3
770.8	160	545.2	169.3
370.8	341	425.2	350.3
286.64	647	422.6	712.5
965.8	595	740.2	660.5
4523.28	440.9	4547.8	445.51
441.64	480.9	577.6	485.51
457.2	450.9	482.6	455.51
2077.05	440.9	2088	445.51
2119.05	440.9	2130	445.51
136.43	450.9	120	455.51
1.43	450.9	15	455.51
804.05	420.9	815	425.51
176.07	420.9	182.74	425.51
3.28	410.9	13.39	415.51
80.07	405.9	61.88	410.51
252.26	405.9	259.07	410.51
41.65	271.35	33.32	212.55

606.7	61.35	250	63.23
814.02	361.35	430.31	363.35
553.35	1230.5	391.62	1268.68
503.35	1420.5	341.62	1458.68
494.02	1625.25	127.38	1587.63
1716.75	645.25	1478.4	607.63
1413.4	745.25	1078.4	707.63
1692.06	770.25	1420.84	732.63
5167.5	1570.5	5367.8	1608.68
8684.25	1575.5	9367.8	1613.68
9017.75	1300.5	9400	1338.68
12521.1	1540.5	12829.26	1578.68
25537.85	1325.25	26244	1287.63

Source: Product Profit /Loss Analysis of Sampled Companies.

Table 1 shows the distribution of TC and ABC accounting systems profit according to Sector. The names of the 68 companies that supplied their production cost data were denoted by letters A-G. These companies were grouped into industrial and brewery sectors.

Table 2: Sex distribution of respondents

Sex of the Respondents	No.	%
Male	53	64.6
Female	29	35.4
Total	82	100

Source: Field Work, 2016.

The data in Table 2 reveals that males consist 64.6% and females 36%.

Table 3: Age distribution of respondents

Sex	Number of respondents	Percentage
22 - 30 years	19	22.9
31 – 40 years	46	56.3
And above 40 years	17	20.8
Total	82	100

Source: Field Work, 2016

Table 3 shows that 22.9% of the respondents are between 22 - 30 years, 56.3% are between 31 - 40 years i.e their prime and 20.8% are above 40 years.

Table 4: Educational Qualification of respondents

Highest Qualification	No.	%
OND/NCE	9	11.5
Bachelor's Degree	33	40.6
Higher National Diploma	19	22.9
Masters' Degree	15	17.7
Postgraduate Diploma	06	7.3
Total	82	100

Source: Field Work, 2016.

Also from Table 4, respondents with Bachelor's degree rank highest with 40.6% followed by Higher National Diploma holders with 22.9% and Master's degree holders 17.7%. This shows that respondents are knowledgeable and well trained enough to understand the concept under investigation.

Table 5: Working Experience of Respondents

Working Experience (years)	No.	%
1-5	08	9.4
6-10	15	18.6
11-15	33	39.6
16-20	17	20.8
16-20	9	11.5
Total	82	100

Source: Field Work, 2016.

The respondents who have working experience of 11-15 years are in the majority (39.6%), followed by those that have worked for 16-20 years. The third ranked is those who have 6-10 years experience.

Table 6: The results of the descriptive and the reliability analyses

Items (1)	Mean (2)	St.Dev.(3)	Cronbach's Alpha (4)
ABC enhances capability of business performance.	2.0	0.88	0.848
ABC enhances internal managerial efficiency.	1.1	0.39	0.859
Customers are benefited.	2.3	1.08	0.878
ABC has reduced overall production cost.	2.1	0.78	0.868
ABC has helped to identify major cost drivers for each of the products.	1.4	0.83	0.854
ABC has helped to separate costs for each category of products.	1.2	0.52	0.867
ABC has proven to be a valuable overhead cost allocation system to identify real cost of product or service.	1.4	0.83	0.854
ABC is a strategic cost management system.	1.5	0.75	0.841
ABC has helped us to create more value for our customers through identifying major input, output and process elements.	2.9	1.09	0.853
ABC has helped the customers to get a low priced product or service.	3.5	0.50	0.878
ABC has helped us to deliver better quality product or service than before.	4.0	0.27	0.868
ABC implementation has improved our overall revenue.	2.3	1.18	0.851
ABC implementation has increased the organization's profitability, significantly.	2.7	1.0	0.837
ABC implementation gives an organization better financial return in terms of long-term customer acceptability.	2.5	1.1	0.834

Source: Field Work, 2016.

Table 6 shows the descriptive statistics and the reliability (alpha) scores. The descriptive statistics show that three items are having mean scores between 2.3 and 2.5; meaning that managers perceived that implementation of ABC can provide benefits to customers, can improve the overall revenue, and can give better financial return in terms of long-term customer relationships, respectively. The standard deviations for these items vary between 1.0 and 1.1. However, managers are neutral to the items; namely, implementation of ABC creates more value for our customers, and has increased the organization's profitability. The mean scores are 2.9 and 2.7, respectively.

The standard deviations are 1.0 and 1.09. In contrast, managers have disagreed to the items that state that ABC helped customers to get a low priced product or service, and it has helped organizations to deliver a better quality product or service than before. The standard deviations are 0.27 and 0.50. However, managers have agreed to the rest of the items. The reliability analysis using the Cronbach's alpha (column 4, Table 7) shows that the alpha values are ranging between 0.834 and 0.878. As a guideline, the α-value of 0.70 and above is considered to be the criteria for demonstrating internal consistency of new scales and established scales, respectively (Nunnally, 1988). Therefore, the alpha values for these items explain that there is a considerable degree of scale reliability.

Table 7: The results of the factor loadings (OP=overall performance, SCAM=strategic cost allocation method, IE1=increased efficiency, IE2=increased effectiveness)

Items	OP	SCAM	IE1	IE2
ABC enhance capability of business performance.	0.454	0.350	0.728	0.304
ABC enhance internal managerial efficiency.	0.494		0.576	
Customers are benefited.	0.559			-0.718
ABC has reduced overall production cost.				0.925
ABC has helped to identify major cost drivers for each of the products.		0.964		
ABC has helped to separate costs for each category of products.		0.935		
ABC has proven to be a valuable overhead cost allocation system to identify real cost of product or service.		0.964		
ABC is a strategic cost management system.	0.601	0.605		0.370
ABC has helped us to create more value for our customers through identifying major input, output and process elements.	0.728		0.330	
ABC has helped the customers to get a low priced product or service.			0.931	
ABC has helped us to deliver better quality product or service than before.		0.709		- 0.527
ABC implementation has improved our overall revenue.	0.961			
ABC implementation has increased the organization's profitability, significantly.	0.953			
ABC implementation gives an organization better financial return in terms of long-term customer	0.977			

acceptability.

Source: Field Work, 2016.

The results of the factor analysis show that four factors are having an Eigenn value of at least one and they can explain 91.364% of total variance. Table 7 shows the rotated component matrix. This matrix shows the factor loadings of the items on the four extracted factors or dimensions and they all are above ±0.3. It is noteworthy to mention that the decision to include a variable in a factor is based on factor loadings greater than ±0.3 (Hair et al., 1995). Based on the overall factor loadings, the dimensions are renamed. They are: overall performance (OP), strategic cost allocation method (SCAM), increased efficiency (IE1), and increased effectiveness (IE2). Overall performance has been viewed as the firm's capability to serve its customers, to generate revenue and to manage costs. ABC as a strategic cost allocation method has been viewed as its capacity to identify and separate major cost drivers, and overhead cost allocation system. Increased efficiency refers to the better business and managerial practices that lowers the customer cost. Increased effectiveness refers to the better business and managerial practices that helps organization to achieve its objectives.

4.1 Test of hypotheses

Hypotheses One

H0: There is no significant difference between the level of influence on unit costs attained from ABC and those attained from traditional costing in product cost management.

H0: There is significant difference between the level of influence on unit costs attained from ABC and those attained from traditional costing in product cost management.

Table 8: Paired Samples Test Result for Hypothesis One

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	Unit Cost of TC for A - Unit Cost of ABC for A	-1.76364	138.08917	41.63545	-94.53320	91.00593	-.042	10	.967
Pair 2	Unit Cost of TC for B - Unit Cost of ABC for B	-.00200	14.99664	6.70670	-18.62279	18.61879	.000	4	1.000

Pair 3	Unit Cost of TC for C - Unit Cost of ABC for C.	.72600	13.84182	6.19025	-16.46089	17.91289	.117	4	.912
Pair 4	Unit Cost of TC for D - Unit Cost of ABC for D.	3.65000	45.75147	16.17559	34.59919 -	41.89919	.226	7	.828
Pair 5	Unit Cost of TC for E - Unit Cost of ABC for E.	.40846	403.20561	111.82912	- 243.24625	244.06317	.004	12	.997
Pair 6	Unit Cost of TC for F - Unit Cost of ABC for F.	.01867	16.29971	4.20857	-9.00781	9.04515	.004	14	.997
Pair 7	Unit Cost of TC for G - Unit Cost of ABC for G.	.28000	39.33069	10.51157	-22.42886	22.98886	.027	13	.979

Source: Field Work, 2016(computations).

We found out from analysis and test of hypothesis one that unit costs are lower and cost reduction higher in the application of ABC than in the application of traditional costing. Hence P value = 0.967>0.05 and tcal=-0.042, tcritical = 1.8125 for company A, Pvalue = 1.00>0.05 and tcal = 0.000 and tcritical = 2.1318 for company B, Pvalue = 0.912> 0.05, tcal. 0.117 andtcritical 2.1318 for company C, Pvalue = 0.828>0.05, tcal = 0.226 and tcritical = 1.8946 for company D, Pvalue = 0.997 >0.05, tcal = 0.04 and tcritical = 1.7823 for company E, Pvalue= 0.997 > 0.05, tcal. = 0.004 and tcritical = 1.7613 for company F, Pvalue = 0.979>0.05, tcal = 0.027 and tcritical = 1.7709 for company G. Table 8 above shows results of the computations.

The above data has helped us to accept the null hypothesis that there is no significant difference in costs incurred in application of ABC and that incurred in application of Traditional costing system. But what is uppermost in the mind of the cost engineer is that any little difference in cost reduction goes a long way in influencing the decisions of the management; not necessarily the level of statistical difference.

Hypotheses Two

H0: There is no significant effect on the profits realized from either ABC or Traditional Costing based on the category of the manufacturing sector.

H0: There is no significant effect on the profits realized from either ABC or Traditional Costing based on the category of the manufacturing sector.

Table 9: Multivariate Tests[b]

Effect	Value	F	Hypothesis	df	Error df	Sig.
Intercept	Pillai's Trace	.305	14.267a	2.000	65.000	.000
	Wilks' Lambda	.695	14.267a	2.000	65.000	.000
	Hotelling's Trace	.439	14.267a	2.000	65.000	.000
	Roy's Largest Root	.439	14.267a	2.000	65.000	.000
GROUP	Pillai's Trace	.119	4.396a	2.000	65.000	.016
	Wilks' Lambda	.881	4.396a	2.000	65.000	.016
	Hotelling's Trace	.135	4.396a	2.000	65.000	.016
	Roy's Largest Root	.135	4.396a	2.000	65.000	.016

a. Exact statistic

b. Design: Intercept + GROUP

Source: Field Work, 2016(computations).

In the analysis and test of hypothesis two, we found that application of ABC has greater effects in profit realized in both industrial and brewery sectors more than Traditional costing. Hence, the tests revealed Lambda = 0.881 and F(2, 65) = 4.396, (P< 0.05), also Tc (f(1,66) = 4.571, P(0.036<0.05). Most of the companies surveyed do not use ABC in their costing systems. Tables 1, 9 and 10 depict the results of the calculations above.

Wilk' Lambda is a test of mean differences, but as an inverse measure it is interpreted unlike other test statistics. That is, with wilk's Lambda, the smaller the value the more likely it will lead to a rejection of the null hypothesis.

Since the overall Lambda for the group is clearly significant at ***0.016***, we can now examine the between –subjects effects.

Table 10: Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig
Corrected Model	TCS	5.776E7	1	5.776E7	4.571	.036
	ABC	5.768E7	1	5.768E7	4.254	.043
Intercept	TCS	1.952E8	1	1.952E8	15.451	.000
	ABC	1.956E8	1	1.956E8	14.422	.000
GROUP	TCS	5.776E7	1	5.776E7	4.571	.036
	ABC	5.768E7	1	5.768E7	4.254	.043
Error	TCS	8.339E8	66	1.264E7		
	ABC	8.950E8	66	1.356E7		
Total	TCS	1.087E9	68			
	ABC	1.148E9	68			
Corrected Total	TCS	8.917E8	67			
	ABC	9.527E8	67			

a. R Squared = .65 (Adjusted R Squared = .51)

b. R Squared = .61 (Adjusted R Squared = .46)

Source: Field Work, 2016(computations).

Product cost management through application of ABC and traditional costing is geared towards cost reduction. ABC and traditional costing are good strategic costing techniques because our results revealed that there were no significant differences in the cost reduction attained though ABC has a lower reduction cost. We noted that the difference in cost reduction of ABC over Traditional costing was statistically not significant but it has material impact on product portfolio decisions. Manufacturing sector profit realization of ABC was equally higher. The issue here is that in stiff competition, a little difference in cost and profit can influence management decisions greatly.

Test of Hypotheses III, IV, V

Based on the present submission, the following hypotheses (III, IV, and V) shall be tested with the use of test of statistical significance and inference viz. at 5% error rate and 95% level of significance confidence.

To examine the effects of perceptions of SCAM, IE1, and IE2 on the perceptions of OP, we run regression. Based on the factor loadings (Table 7), we separate the items according to their dimensionalities and compute the average using the following equation.

$$\frac{\sum \binom{x_n}{x_i} (x)}{n}$$

Where, *x* (i – n) = corresponding items under each dimension, *r* = respondents' scores for the items and *n* = number of items loaded on the dimension. Thus, we get eighty-two data for each of the independent variables, namely, SCAM, IE1, and IE2 and one dependent variable OP. The regression results are presented in Table 11

Table 4.1.7: Results of the regression analysis

R	R^2	$^{-}R^2$	Std. Error of the Estimate	Sig. Change	F	Durbin-Watson
0.924	0.854	0.848	0.28762	0.000		2.425

Source: Field Work, 2016.

Hypotheses Three

Ho: The use of ABC has negative effect on the firms' financial performance.

HI: The use of ABC has positive effect on the firm's financial performance.

The regression results show that the standardized Beta coefficients are 0.516, 0.270, and 1.062 for SCAM, IE1, and IE2, respectively and they all are significant at the 5% level. The constant and standard error of the estimate are 1.685 and 0.29, respectively. The results of the ANOVA (analysis of variance) test show that the p-value of the F statistic is less than 0.05, which indicates that the independent variables of this model can explain the variation in the dependent variable. Thus for hypothesis one, H0 is rejected implying that the use of ABC has positive effect on the firm's financial performance.

Hypotheses Four

Ho: ABC implementation does not increase managerial efficiencies and effectiveness.

HI: ABC implementation increase managerial efficiencies and effectiveness.

The multiple correlation coefficient (R) is 0.924 implying that there is a strong relationship between the observed and the predicted values of the dependent variable. The R^2 is 0.854 implying that 85.4% of the variation in the dependent variable can be explained by this model. The adjusted R squared is 0.848, which also indicates a close reflect of the goodness of fit of the model in the population. The Durbin-Watson statistic is 2.425, slightly higher than 2, assuming that there is no serial correlation.

Hypotheses Five

Ho: Companies that implemented ABC/M do not achieve higher ROA and ROS than companies using traditional overhead costs allocation methods.

HI: Companies that implemented ABC/M achieve higher ROA and ROS than companies using traditional overhead costs allocation methods.

The results show robust findings in terms of scale reliability and validity, factor analysis, and regression analysis. Overall, the company executives find that ABC implementation has helped them finding the majors costs for each of the products thus it reduces the production cost and lowers the customers cost. This is in support of the alternate hypothesis that companies that implemented ABC/M achieve higher ROA and ROS than companies using traditional overhead costs allocation methods, thus, the null hypothesis is rejected.

From the above analysis it is obvious that the developed scale can have significant implications to capture the perception of ABC. The factor analysis reveals that perception of ABC is comprised of four factors. They are overall performance, strategic cost allocation method, increased efficiency and increased effectiveness. The regression results are significant at the 5% level. These signifies that ABC as measures of strategic cost allocation method, increased efficiency, and increased effectiveness have positive and significant effect on overall firms' performance.

5.0 SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

The following findings among others were made in the course of this research work.

There is no significant difference in costs incurred in application of ABC and that incurred in application of Traditional costing system. Application of ABC has greater effects in profit realized in both industrial and brewery sectors more than Traditional costing.

ABC implementation help in finding the major costs for services and each of the products thus it reduces the production cost and lowers the customers cost. ABC implementation also helps to increase the managerial efficiencies and effectiveness, and increases firms' revenue. The factor analysis reveals that perception of ABC is comprised of four factors: The overall performance, strategic cost allocation method, increased efficiency and increased effectiveness. ABC as measures of strategic cost allocation method, increased efficiency, and increased effectiveness have positive and significant effect on overall firms' performance.

Furthermore, the study revealed numerous organizational changes, which resulted from the process of implementation, such as closer connection between management accounting and other operational functions. Activity-Based Management methods have a broad range of uses, permitting the empowering utilization of ABC information for a wide variety of company functions and operations such as process analysis, strategy support and time-based accounting, monitoring wastage, as well as quality and productivity management.

5.2 Conclusion

Product cost management through application of ABC and traditional costing is geared towards cost reduction. ABC and traditional costing are good strategic costing techniques because our results revealed that there were no significant differences in the cost reduction attained though ABC has a lower reduction cost. We noted that the difference in cost reduction of ABC over Traditional costing was statistically not significant but it has material impact on product portfolio decisions. Manufacturing sector profit realization of ABC was equally higher. The issue here is that in stiff competition, a little difference in cost and profit can influence management decisions greatly.

The ABC method, the most popularized of all administrative methods, presents the advantage of identifying places where the origin of the waste is found, which are the activities with a low added value, where the unused capacities are located and how costs are formed. ABC provides information for strategic decisions, such as product mix and sourcing decisions that is consistent with the long-run nature of these decisions. It allows product designers to

understand the impact of different designs on cost and flexibility and modify their designs accordingly.

ABC supports the continuous improvement process by allowing management to gain new insights into activity performance, by focusing attention on the sources of demand for activities and by permitting management to create a behavioral incentive to improve one or more aspects of manufacturing. It is equally a tool for managing complexity in manufacturing. ABC provides activity-based information to help managers understand and eliminate complexity. It is also a communication tool between production and marketing and product design that helps minimize product changes which create unnecessary complexity. The ABC designer can use the rules of ABC design to simplify the system without sacrificing the accuracy of product cost. A well designed ABC system will also have no more detail than that required by the manufacturing environment.

The true utility of the ABC method consists in underlining the main role of the processes, but remains less relevant as it concerns an exact calculation of the costs, considering the existence of non attachable activities, the difficulty of attributing to certain activities some expenses such as: rents, fiduciary expenses, interests expenses, fees and commissions which are going to be distributed also on the base of conventional criteria.

5.3 Recommendations

The following recommendations deriving from the study are made to guide practical action;

i. Management team must first identify costs and grasp their impact on particular productions or process, if this team is to eliminate and reduce the costs. Each direct or indirect costs that incur in the business operation, activity based costing can investigate and point out characteristics of that type of product, hence ABC can be a powerful tool for both guiding prompt and assessing current operations, and intelligent reactions as circumstances change, in fact, it's also known as activity based management (ABM).
ii. ABC and any other costing system are not static; it can be established, therefore, like organizations change and business conditions, ABC needs to be updated and maintained.
iii. Most Nigerian firms are presently using traditional method of costing; they can adopt Activity-Based Costing as an effective way of cost management.
iv. Majority of both the staff and customers of firms in Nigeria are not aware of ABC because it is a relatively new system. To implement ABC in an organization differentiation and identification of cost pool/cost driver will be a great challenge. Mass enlightenment campaign should be embarked upon by accounting professional bodies with a view to educate management of organizations and directors about the importance of ABC. This in turn will enable the management of firms to educate their staff and customers.
v. It is recommended that further empirical research should be conducted using a case studies approach both within companies that have already implemented ABC, and companies which have rejected its implementation.

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