**Activity Base Costing and Performance of Manufacturing Firms in South-Western Nigeria**

 **By**

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**ABSTRACT**

Activity-Based Costing system is a strategic management accounting technique used to obtain accurate cost information and allocation of overhead cost on the basis of activities. The weakness of the traditional costing systems which have often generated inaccurate cost and profit information, had led to inefficient decision making. This has inadvertently necessitated the need for this study, whose main objective was to investigate the level of adoption and implementation of Activity Based Costing as a veritable alternative to Traditional Costing System and its concomitant effects on performance of manufacturing firms in South-Western Nigeria.

The results of the analysis showed that organizational factors have a significant impact in the adoption and implementation of Activity-Based Costing system by manufacturing firms in South-Western Nigeria as depicted by (p < 0.05). Positive relationship was revealed between Activity Based Costing adoption and reduction in cost of production (p < 0.05), improved accurate cost and profit information (p < 0.05), return on capital employed (p < 0.05) . Results also show a significant relationship between the adoptions of Activity Based Costing system and the performance of manufacturing companies in South-Western Nigeria. This is evidenced by p-value of 0.000.

The study concluded that the adoption and implementation of Activity-Based costing system has improved the overall performance of manufacturing industry in South-Western Nigeria. The study recommends that, in competitive global economy, companies particularly manufacturing firms should continuously improve their costing methods which will help to determine accurate cost and profit.

**Key Words:** Cost drivers, Cost objects, Just-in-Time, Activities, Manufacturing firms, organizational factors, Total Quality Management.

 **1.1 INTRODUCTION**

In recent years, the economy of Nigeria has been opened to competitive business through the economic reforms, particularly privatisation and deregulation. The conventional or Traditional costing systems have been severely criticised by experts (Cooper and Kaplan 1988; Cotton, Jackman and Brown; 2003) since the late 1980s. When conventional or Traditional cost systems were developed, the level of competition was moderate and the cost structure were dominated by direct material and direct labour and in addition there was similarity among products in the consumption pattern. However, since the early 1980s, the competition level has increased and technology has change rapidly. The result of this situation forced managers to change the way their firms operate. In this competitive business environment, an Activity - Based Costing system is quite relevant especially for manufacturing companies operating in deregulated markets. The costs of production have to be effectively managed in order to have reduced product price. The cost of production of goods and services in Nigeria today is quite high and this is due to the large overhead costs that have to be incurred for production purpose, for instance the electricity facilities in our country have been grounded, hence companies generate their power for production.

According to Manufacturers’ Association of Nigeria, between 2000 and 2009, over 834 manufacturing companies’ closed shop as a result of their inability to continue to cope with the challenges posted by harsh operating environment in Nigeria and for the remaining companies, the operations are diminishing due to high production costs. An Activity-Based Costing system can be useful in identification of non- value added activities which consume power, which can be reduced if not eliminated. Wilson (2005), states that the global business environment has changed rapidly in recent years. Some of these changes include increased automation, introduction of new management practices like Just- In –Time (JIT) and Total Quality Management (TQM), and the out sourcing of non-core activities (Sartorious, Eitzen and Kamala, 2007). Also, the levels of completion have been complemented by shortened product life cycles and new kind of consumers that is both is more quality conscious and better informed than consumers were in the past. In this environment product ranges have increased, direct labour costs have decreased and facilities costs have increased (Van Weele, 2005) In this regard, Kaplan and Anderson (2004), state that firms in this environment that continued to use traditional overhead absorption techniques are likely to make erroneous cost management decisions that are potentially devastating.

The importance of this study is underline by the need for manufacturing companies in Nigeria to reduce costs and obtain accurate costs and profit information in new market-led business environment. This means that it is good idea more extensively adoption and implementation of Activity-Based Costing system by manufacturing companies in South-Western Nigeria, in a country which is considered as an economic powerhouse by the rest of Africa. For the purpose of this study Activity-Based Costing system is defined as strategic management accounting technique of obtaining accurate cost information and allocating overhead cost on the basis of activities rather than the labour or machine hours.

**1.2Objectives of the Study**

The main object of this study is underlined by the need for manufacturing companies in Nigeria to reduce costs in the new deregulated market-led environment. Other objects include;

1. To determine the organiastional factors that affect rate of Activity - Based Costing system (ABC) adoption and implementation by manufacturing companies in Lagos and Ogun states Nigeria.
2. To measure the improvement in financial performance (return on capital employed) that is associated with the adoption and application of Activity - based Costing ABC) system **1.3 Research Questions**

This study provides answers to the following questions derived directly from the statement of the problem

1. What are organisational factors that affect the rate of Activity- Based Costing (ABC) system adoption and implementation by manufacturing in Lagos and Ogun states Nigeria?
2. What is the relationship between adoption and application of Activity-Based Costing (ABC) system and improvement in the financial performance (return on capital employed) of manufacturing companies in Lagos and Ogun states Nigeria?

**1.4 Development of Hypotheses**

This study tested the following hypotheses, which have been developed based on review of existing literature in chapter two on the adoption of Activity- Based Costing (ABC) system and its application.

Hypothesis one

H0: There is no significant impact between organisational factors and the level of adoption and implementation rate of Activity Based Costing system adoption by manufacturing companies in South-Western Nigeria.

Hypothesis two

H0: There is no positive association between the extent of adoption and application of Activity -Based Costing systems and relative Improvement in return on Capital employed by manufacturing companies in South-Western Nigeria.

 **2.1 Theoretical Framework and Literature Review**

 This study is based on four major theories, which includes, the theory of innovations by Kwon and Zmud (1987)and Namazi and Heshmati (2009), transaction of cost economic by Roberts and Silvester (1996)and Pike, Mike, Tayles and Naha (2011), theory of constraints by Goldratt ( 1993) and Banker, Bardhan and Chem (2008) and information technology by Dixon (1996) and contingency theory of management accounting by Otley(1980), Haldma and Laats (2002) and Al-Omiri and Drury (2007). Ashford (2011) and Bjornenak (1997) presented a conceptual framework to structure research on the diffusion of accounting innovations such as Activity-Based Costing. In this framework a distinction is made between a supply and a demand side of the diffusion process. The model suggests that Activity- Based Costing implementation stages are influenced by three types of attributes; innovation, contextual and process attributes. Krumwiede, Sussmari and Macdonald (2011) and Anderson (1995), use the information technology implementation model developed by Cooper and Zmud (1998) and Kwon and Zmud (1987), in their studies of the implementation process of Activity-Based Costing.

According to Jing, Dumitu, Dumitrana and Vielpoi (2010) and Johnson and Kaplan (1987), although costing systems were developed in the twentieth century, they did not change the 70s and 80s, they could not keep pace with the changes of business environments Kaplan and Cooper (2001), state that since the middle of 70’s due to global competition and technological innovations, the changes in business resulted in outstanding results in using financial and non-financial information of organisations. The global competition forced manufacturing and other organisations to become more flexible, integrated and highly automated to increased increase their productivity at reduced costs. Wang, Du and Lin (2010) state that it is impossible to sustain competitiveness without an accurate cost calculation mechanism. Drury (2001), Glad and Becker and Stene (2003) consider the definition of activity as the starting point of an Activity-Based Costing implementation Christensen (2010), states that the origin of Activity Based Costing dates back to 1983-1984 although the term “Activity-Based Costing” was not coined yet. Krumwiede, Sussmari and Macdonald (2011) studied U.S manufacturing companies to examine how contextual factors, such as cost distortion, size of firms, and organisational factors such as top management support, training or non-accounting ownership, affect each stage of the Activity Based Costing implementation process. He found that different factors affected the various stages of implementation of Activity Based Costing and the degree of importance of each factor varies according to the stage of implementation. For example, a company’s potential for cost distortions(a contextual factor) is a highly important factor in its decision to adopt and implement an Activity Based Costing system, and top management support, non accounting ownership and implementation training (organisational factors) can lead to reaching the highest stage of implementation of Activity Based Costing. Soin et al. (2002) used institutional theory to interpret the role of activity based costing in organisational change. The study reports on a longitudinal empirical case study of the implementation of Activity Based Costing in the clearing department of a UK-based multinational bank. They identified tensions between the need to establish activity based costing as an organisational routine, thereby ensuring its reproduction, with the less routine but more revolutionary aspiration of ABM. Their case suggested that the ABC team succeeded in institutionalising a version of ABC that revealed new links between costs and products but did not transform the strategic thinking of the banks senior management. Soin et al. (2002) argue that there is a need for future longitudinal case study research on activity based costing, with particular emphasis on a procession interpretation of the activity based costing/ ABM relationship that further explores the trade-off between strategic capability and the establishment of management accounting routines. Kaplan and Anderson (2007a) in a survey of Activity- Based Costing management practices of 177 UK's largest companies had assessed the changes that had occurred in the Activity- Based Costing adoption status over a five-year period. The Activity-Based Costing adoption / under consideration rate has fallen to 17.5% and 20.3% from 21% and 29.5% respectively. The highest adoption rate is in the financial sector. In terms of scale, the median Activity-Based Costing accounting systems design included 40 (1994: 14) cost objects, 52 (1994: 25) activities, 22 (1994: 10) cost pools and 14 (1994: 10) cost drivers. The Activity Based Costing rejection rate has increased from 13.3% to 15.3% during this period. Cost reduction, pricing, performance measurement / improvement and cost modelling continued to be the most commonly used areas for activity-based costing. The top management support of the Activity Based Costing implementation initiative and to a lesser extent, with its use to support quality initiative determined its success.

In a survey of 132 US companies, Foster and Swanson (1997), found that all of them were using activity-based cost management system. The decision to use Activity- Based Costing Method and the overall net benefits as success measure yields the highest explanatory power. Groot (1999), survey of US food and beverages industry found that 18% of the respondents had implemented Activity Based Costing and 58% were considering its implementation. Javad, Ghasem, Umar and Meheri (2012) and Joshi (2001), in a survey of 60 large and medium-sized manufacturing companies in India shows adoption rate of 20% for Activity-Based Costing, 13% for Activity-Based Management, and 7% for Activity-Based Budgeting. The size in terms of total assets has been found to be significant factor in adoption of these contemporary management accounting techniques. The traditional management accounting techniques have been emphasized more vis-à-vis contemporary techniques because of higher perceived benefit.

 **3.1 METHODOLOGY**

In this study, the research instrument used is the cross-sectional survey and exploratory method. The cross-sectional survey strategy is considered because it allows for the collection of quantitative data which can be analysed quantitatively using descriptive and inferential statistics. In addition, although not without limitations the questionnaire method was selected for this study in order to test the hypotheses developed in chapter one. The use of questionnaire allows distribution to wider number of companies enabling a more indicative view of the use and non- use of Activity - Based Costing system by manufacturing industry in South - Western Nigeria. This study is therefore a survey work combined with prior set of hypotheses. The manufacturing companies selected for the study must be;

1. listed on the Nigerian Stock Exchange
2. registered with Manufacturers’ Association of Nigeria
3. employing at least 500 employees

. The manufacturing industry was chosen because it is probably the industry that has the most developed costing system and it is the industry that is often mentioned in Activity Based Costing system literatures (Christensen 2010). The manufacturing industry is often associated with classical Activity Based Costing problems such as diversity in volume, size and complexity (Baird, Harrison and Reeve; 2007).

The sample frame for this study consists of most manufacturing industries located in Ogun and Lagos states. be willing to participate in questionnaire survey.

The minimum sample size is calculated based on the Yaro Yamani’s formula (cited in Okolie et al, 2010) for sample size determination for estimating proportion in a finite population.

Formula:

 **n =** $\frac{N}{1+N (e)^{2}}$

Where

n=Sample size

N=Population of the study

e=Tolerable error (5%)

The minimum sample size therefore is:

**n = 958**

 **1+958(0.05)2**

 **= 958**

 **1 + 2.395**

 **= 958**

 **3.395**

 **= 282.2**

 **= 282 companies**

**Administration of Instrument or Questionnaire**

Five hundred and sixty-four **(564)** copies of the questionnaire for this study were distributed to 262 manufacturing companies in South- Western Nigeria located in Lagos Oyo, Osun , Ondo Ekiti and Ogun states that are listed in Nigerian Stock Exchange and those that are registered with the Manufacturers’ Association of Nigeria. Thirty Research Assistants who are in their final level (PE2) of the Institute of Chartered Accountants of Nigeria professional examination were used to administer the questionnaire. They made personal visits to the companies selected for this study. A total of three hundred and fifty-nine (359) copies from 262 companies were completed and returned. Twenty (20) companies did not respond and two hundred and five copies of the questionnaire were not returned.

**4.1 DATA PRESENTATION AND ANALYSIS**

**Test of Hypotheses**

**Hypothesis One**

$H\_{0}$ - There is no significant impact between organisational factors and the adoption and implementation of activity based costing by manufacturing companies in Lagos and Ogun states

$H\_{1 }$ - There is a significant impact between organisational factors and the adoption and implementation of activity based costing by manufacturing companies in Lagos and Ogun states.

Table 4. Result of regression test from hypothesis one

| **Model Summary** |
| --- |
|  Model R | R Square | Adjusted R Square | Std. Error of the Estimate |
| .319a | .102 | -.198 | 1.73043 |
| a. Predictors: (Constant), Companies response |

Table 4..2

| **ANOVAb** |
| --- |
| Model R | Sum of Squares | Df | Mean Square | F | Sig. |
|  | Regression | 1.017 | 1 | 1.017 | .340 | .601a |
| Residual | 8.983 | 3 | 2.994 |  |  |
| Total | 10.000 | 4 |  |  |  |
| a. Predictors: (Constant), Companies response |
| b. Dependent Variable: Levels of adoption |

Table 4..3

| **Coefficientsa** |
| --- |
| Model | Unstandardized Coefficients | Standardized Coefficients | T | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | 3.614 | 1.308 |  | 2.764 | .070 |
| Companies response | -.011 | .018 | -.319 | -.583 | .601 |
| a. Dependent Variable: Level of adoption |

**Interpretation of Parameter Values**

**Test of Significance**

Probability value is the most efficient test of significance. If probability value is greater than 0.05(p>0.05), then it is insignificant. The decision is to reject H1 and not to reject Ho. On the other hand if probability value is less than 0.05 (p<0.05), this shows significance. The decision is to reject Ho and not reject H1

From the result, ABC adoption probability is 0.601 which is far greater than 0.05. The decision therefore is to accept Ho.

**Hypotheses Two**

$H\_{0}$ - There is no significant relationship between the adoption and implementation of activity – based costing systems and improvement in return on capital employed by manufacturing companies in Ogun and Lagos states Nigeria.

$H\_{1 }$ - There is significant relationship between the adoption and implementation of activity – based costing systems and improvement in return on capital employed by manufacturing companies in Ogun and Lagos states Nigeria.

 IFP= F (ABC)

The equation above establishes the linear relationship between the estimation commands (ABC and IFP) as generated by SPSS. The estimation equation states that IFP is linearly related to Adoption of activity based costing. C (1) is the constant that is the value of cost improved financial Performance if activity based costing is not adopted or considered at all. C (2) is the slope; it gives the value of IFP when ABC increases. The slope measures the rate of change in IFP for a unit change in ABC. Allowing for the influence of all other variables affecting IFP in a stochastic variable *u*, the equation becomes

 IFP = C (1) +C (2)\*ABC + *u*

Where *u* represents the random error term or simply the error term. Here u represents all those factors (asides Adoption of activity based costing) that affect IFP (Improved Financial Performance) but are not explicitly introduced in the model, as well as purely random forces.

Table 4.6.4.1 Result of regression test from hypothesis three

| **Model Summary** |
| --- |
|  Model R | R Square | Adjusted R Square | Std. Error of the Estimate |
|  .917a | .841 | .841 | .76240 |
| a. Predictors: (Constant), ABC |

Table 4..4.

| **ANOVAb** |
| --- |
| Model | Sum of Squares | Df | Mean Square | F | Sig. |
|  | Regression | 801.592 | 1 | 801.592 | 1379.079 | .000a |
| Residual | 151.125 | 260 | .581 |  |  |
| Total | 952.718 | 261 |  |  |  |
| a. Predictors: (Constant), ABC |
| b. Dependent Variable: Financial Performance |

Table 4.3

| **Coefficientsa** |
| --- |
| Model | Unstandardized Coefficients | Standardized Coefficients | T | Sig. |
| B | Std. Error | Beta |
|  | (Constant) | -1.163 | .083 |  | -13.933 | .000 |
| ABC | .971 | .026 | .917 | 37.136 | .000 |
| a. Dependent Variable: Financial Performance |

Table 4.5 Result of Pearson correlation test from hypothesis three

| **Correlations** |
| --- |
|  |  | ABC | Financial Performance |
| ABC | Pearson Correlation | 1 | .917\*\* |
| Sig. (2-tailed) |  | .000 |
| N | 262 | 262 |
| Financial Performance | Pearson Correlation | .917\*\* | 1 |
| Sig. (2-tailed) | .000 |  |
| N | 262 | 262 |
| \*\*. Correlation is significant at the 0.01 level (2-tailed). |

IFP = F (ABC) + *u*

IFP = C (1) +C (2)\*ABC + *u*

IFP = (1.163) + .971ABC + *u*

SE = .083 .026

T- Statistics: (13.933) 37.136

Prob(T- Statistics): .000 .000

R = 0.917 R-Square (R2)= 0.841 Adjusted R-Square (R2) = 0.841

**Interpretation of Parameter Values**

**Test of Significance in t test and F Statistics**

Probability value is the most efficient test of significance. If probability value is greater than 0.05(p>0.05), then it is insignificant. The decision is to reject H1 and not to reject Ho. On the other hand if probability value is less than 0.05 (p<0.05), this shows significance. The decision is to reject Ho and not reject H1.

From the result, CR probability is 0.00 which is less than 0.05. The decision therefore is shows a strong evidence of H1.

**DISCUSSION OF RESULTS**

This research thesis is set out to investigate the rate of Activity-Based Costing System adoption and implementation in manufacturing industry in South-Western Nigeria and its impact on the firms’ financial performance, investment decision, provision of accuratecosts and profit information reduction on the cost of product and increase in sales revenue.

The results of hypothesis one show that organisational factors and the institutional environmental influence affect the decision to adopt and implement Activity Based Costing system by manufacturing industry in South-Western Nigeria. Over the years covered by this study, the Activity Based Costing has displayed both strong economic efficiency argumentation and various organisational factors or influences-.The findings also suggest that the adoption rate of Activity-Based Costing System by manufacturing industry in by Southern-Western Nigeria is 10.2%. This appears to be less than that in majority of the countries surveyed in developed countries of United States of America, United Kingdom, and Germany; but comparable to that in continental Europe and higher than Japan and South-Africa.

The results from second hypothesis, which deals with the relationship between adoption and implementation of Activity-Based Costing System and improvement in return on capital employed added interesting insight into the impact of the adoption and implementation of the system in the manufacturing companies in South-Western Nigeria. The findings of this hypothesis show that the value of r2 is 0.917 and the p value is 0.000. Therefore, there is a positive and significant relationship or association between Activity-Based Costing System and improvement in return capital employed especially for companies with diversity in an environment where costs are relatively important .The findings of the hypothesis also suggest that there is a link between Activity Based Costing system, adoption and implementation and the creation of shareholders value. Return on capital employed is a major indicator of financial performance over time and can be used to evaluate the performance of firm and the management of firm. The findings therefore is important to not only to the management of a company but also to existing and potential shareholders and also the employees of the organization. Yerieli (2009), Hoozee and Bruggeman (2010) and Namazi and Hashmati (2009). The findings provided evidenced supporting previous analytical and theoretical research regarding the condition favourable to obtaining benefits from Activity-Based Costing System.

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