

Activity-Based Costing and Firm's Value of Manufacturing Companies in Nigeria

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Abstract

This study focuses on Activity-Based Costing (ABC) and firm's value. An ex-post facto research design was employed. Data were collected and statistically analysis using multiple regression. The results show that ABC effectiveness is significantly and positively related to firm's value. The results show that ABC effectiveness is significantly and positively related to firm's value. The result indicates that firms with greater degree of cost accountant competency, corporate resource facilitation, and price competitive force appear to have a higher effect on cost driver fitness, cost calculation accuracy, cost information creditability and cost reporting usefulness. The cost accountant competency, whose knowledge, skill, coordinate, knowledge sharing and competence, is very necessary in organization to ensure that cost accountants can do task in their responsibility completely and to achieve goals. Managers and executives of firms should apply the relationship among ABC effectiveness and firm's value to the actual business situation. Managers should effectively utilize the resource and capability of the firm in order to ABC effectiveness. Clearly understanding of ABC effectiveness can help gain competitive advantages and achieve higher level of firm's value. Importantly, to maximize the benefits of ABC effectiveness, they should provide resources such as cost accountant competency, resource facilitation to support in order to ABC effectiveness and to increase firms' competitive advantage and crucially to gain firm's value.

Keywords: Activity-Based Costing Effectiveness, Cost Calculation Accuracy, Cost Driver Fitness ,Cost Information Creditability, Cost Reporting Usefulness, Firm's value.

1.0 INTRODUCTION

Nowadays, global competition forced manufacturing services and organizations to become more flexible, integrated and highly automated in order to increase their productivity at reduced costs. But it is impossible to sustain competitiveness without an accurate cost calculation mechanism (Ozbayrak, Akgün & Türker, 2004). Proposed by Cooper and Kaplan, (1988), as an alternative method to traditional cost accounting methods, Activity Based Costing (ABC) assigns costs to activities using multiple cost drivers, and then allocates costs to products based on each product's use of these activities (Kim, Park & Kaiser, 1997; Gunasekaran & Sarhadi, 1998). Using multiple activities as cost drivers, it reduces the risk of distortion and provides accurate cost information (Kim, Park, and Kaiser, 1997).

In an Activity Based Costing (ABC) system, the total cost of a product equals the cost of the raw materials plus the sum of the cost of all value adding activities to produce it (Gunasekaran and Sarhadi, 1998). In other words, the ABC method models the usage of the organization resources by the activities performed and links the cost of these activities to outputs, such as products, customers, and services (Ben-Arieh, and Qian, 2003). Each product requires a number of activities such as design, engineering, purchasing, production and quality control. Each activity consumes resources of different categories such as the working time of the manager. Cost drivers are often measures of the activities performed such as number of units produced, labor hours, hours of equipment time, number of orders received, etc.

The role of cost management system is very important that cost management must provide appropriate types of information for decision making (Brain, 2006). In the traditional costing accounting system, factories of the industrial revolution employ large amounts of labour, all business processes and associate costs track direct labour costs. The cost structure promotes tracking indirect costs based on a single driver such as labor hours, machine hours or number of unit products (Gordon and Silvester, 1999). But the traditional costing accounting have provided inadequate cost information (to provide cost information is often late, irrelevant, and misleading in allocating indirect costs) for today's global and technological environment (Cooper and Kaplan, 1991). This method of traditional cost accounting system allocates indirect costs distorts product cost; treatment of indirect costs fails to adequately capture causal relationship between product and cost incurrence (Maelah and Ibrahim, 2006; Qian and Ben-Arieh, 2008) and misleads managers in decision making for product pricing and strategic management (Gupta and Galloway, 2003). Many firms have started to practice improvement of competitiveness. In order to achieve this goal, firms have used advanced process and cost management techniques such as activity-based costing for process improvement and increase the competitiveness of the organizations (Baykasoglu and Kaplanoglu, 2008). Activity based costing (ABC hereafter) helps many firms to improve competitiveness by empowering in managerial decision making (Beheshti, 2004; Nachtmann and Al-Rifai, 2004).

The core idea of ABC is the production of products/services generates activities which consume resources. The cost of unit is to focus on the activity necessary to produce products/services.

2.0 Review of related literature

2.1 Conceptual framework

2.1.1 The general structure of the ABC model

Since in the late 1980s, many industries have successfully employed ABC to improve operational performance. ABC has continued to provide relevant and accurate information about cost management. In addition, because the ABC system focuses on activities rather than products, it helps prevent distorted product cost information that can arise from the use of traditional costing systems (Gunasekaran & Singh, 1999; Cooper & Kaplan, 1991). The basic assignments of the ABC model are to identify the activities of an organization, calculate the cost of each activity, and then cost the product based on activity consumption (Gunasekaran & Singh, 1999). Moreover, the ABC approach can be used to allocate various activities to related resources. Costs are appropriately allocated to selected cost objects by using the cost driver of each activity. Therefore, accuracy of product cost is contingent upon both calculations of activity cost and cost driver volume. The structure of the ABC model contains information relevant to organizational resources, activities, and cost objects. The implication is that the cost object is the cause of activities and those resources exist solely to carry out those activities. After the resource costs have been assigned to their respective products. By obtaining these measures, activity drivers become a way of assigning the cost of activities to the actual cost object (Goebel et al., 1998). Hence, in the ABC system, the total cost of a product also includes the cost of all activities required to produce or handle it. In the ABC model, accuracy frequently depends upon the details of the ABC model and the type of activity driver used. There are three types of activity drivers (Cooper, 1990; Sledging & Sun, 1999):

- 1) Transaction drivers, which count each time an activity takes place;
- 2) Duration drivers, which represent the time taken for each activity and also takes into account variation; and
- 3) Intensity drivers which directly cost the resources used each time an activity takes employed all three types of activity drivers.

2.1.2 Activity-Based Costing Effectiveness

ABC has been accepted as more accurate in the costing and pricing of products/services than traditional cost accounting (Kaplan, 1994; Bjoernenak and Mitchell, 2002). ABC is the cost management systems that tell manager what cause cost and how to manage them. Costs are assigned to products/services based on the activities and resources which they consume. Thus, ABC assigns costs to activities and allocates cost to products/services based on each product's/service's use of these activities (Gunasekaran and Sarhadi, 1998). ABC provides timely, accurate and quality cost information (Innes and Mitchell, 1997) to assess continuous improvement and to monitor process performance.

Activity-based costing effectiveness is defined as achievement of allocate indirect costs, to provide cost information creditability and cost reporting usefulness to support management in order to achieve organizational goal. The four components of ABC effectiveness include cost driver fitness, cost calculation accuracy, cost information creditability, and cost reporting usefulness.

1.) Cost Driver Fitness

Cost driver fitness refers to factors used to assign activity costs to products/services, which correlate activities, resources consumption, easy measurement and convenience to actual practice. The objective of ABC provides managers with accurate activity-based cost information by using cost drivers to assign activity costs to products and services. These cost drivers must reflect a cause-and effect relationship between the amount of indirect costs attributed to the product/service and the consumption of resource by that product/service via the activities performed (Mike and Michael, 1989). Cost driver fitness is useful for managers in budgeting and performance measurement as activity-based budgets prepare objectives for each activity and assess future resource needs (Innes and Mitchell, 1995). In addition, cost driver fitness provides activities, resources consumed, and the differences between resource consumption and resource provision (Morrow, 1992).

Cost driver fitness analyses the indirect costs to discover the activities that cause those costs and links to the different activities such as the amount of time spent performing activities how process, activities, and decision actually creates costs. Importantly, the cost driver fitness is the key to achieving the benefits of this ABC (Schniederjans and Garvin, 1997). Cost driver fitness elicits information about cost components and activities in process that affects cost occurring and leading to be able to separate value added activities and non-value added (Ittner, 1999). Non-value added activities are eliminated to those reduce costs and increase value creation to customers. Indeed, firms perceive value added or non value added of activities for products/services (Chung, Schoch and Teoh, 1997) and improve the efficiencies of existing process (Carolfi, 1996) to ensure quality, quantity, and price to satisfy customer needs which leads to competitive advantage.

2.) Cost Calculation Accuracy

Cost calculation Accuracy refers to the ability of the firms to allocate indirect costs of product/service based on the activities performs and uses multiple cost drivers. ABC focuses on the calculation of costs by linking expenditure to activities. The usage of multiple cost drivers in ABC brings the advantage of detail cost estimation (Baykasoglu and Kaplanoglu, 2008). Moreover, using multiple cost drivers for cost calculation, this reduces the risk of distortion and provides cost calculation accuracy (Kim, Park & Kaiser, 1997). The accuracy of products/services costing assists managers in understanding how resources are used across a firm's value-chain to deliver strategic outcomes. That is attractive to firms in competitive environments that demand accurate cost (Al-Omiri & Drury, 2007).

3.) Cost Information Creditability

Cost information creditability refers to valuable cost information that attributes accuracy, relevance, reliability, frequency, accessible, timeliness, understanding, up-to-datedness, and thoroughness for decision making purpose. Cost information creditability helps managers to identify potential problems as well as opportunities in time and make more well informed and effective decisions. ABC cost information creditability enables managers to oversee activities and business process by giving a cross-functional and integrate view of the firm and support both strategic and operational decisions in such diverse factions as product lines, market segments, customer relationship and process improvement (Cooper & Kaplan, 1988).

ABC provides accurate, reliable and relevant cost information needed to make appropriate strategic decisions in terms of product mix, sourcing, pricing, process improvement, and evaluation of business process performance (Swenson, 1995; Cooper & Kaplan, 1992). ABC gives management the necessary information to identify opportunities for process improvement and cost reduction by using ABC information. Moreover, cost information creditability is important for compete successfully pricing in the market. The manager can observe the cost of each major overhead activity perform in business unit separately, and can make a more informative decision. Indeed, ABC provides the accurate and reliability cost information to identify the component of indirect costs more precisely and contributes to a better understanding of the way these cost products/service affect firm performance. The frequency of cost reporting helps managers to identify potential problems as well as opportunities in time and make more well-informed and effective decisions, which in turn lead to better firm performance.

4.) Cost Reporting Usefulness

Cost reporting usefulness refers to use cost information for decision making, planning, controlling and operating in order to enhance job performance. ABC cost reporting is used by users in understanding, evaluating and improving job performance, better decision making, and gain advantage over competitors (Pizzini, 2006). The cost reporting of ABC ability to promote and enhance understanding of the activity performed and to contribute to improving performance (McGowan, 1998). Moreover, the usefulness of cost reporting in terms of monitoring the organizational activities, such as planning and scheduling of work activities, assigning tasks, clarifying objectives and priorities, directing and coordinating activities, dealing with day-to-day operational problems, evaluating of managers' efficiency, recognizing of non value adding activities, valuating of inventories, analyzing of customers' profitability, and designing of production and sales strategy (Hoque, 2000), which are valuable ultimately to firms (Gupta & Gunasekaran, 2005).

2.2 Theoretical framework

2.2.1 The theory of constraints

The theory of constraints was developed by Goldratt (1990) as a process of continuous improvement (Malik & Sullivan, 1995). The primary focus of the TOC is managing bottleneck activities that restrict the firm's performance. As noted by Goldratt (1990) any system must have at least one constraint. The TOC consists of a set of focusing procedures for identifying a bottleneck and managing the production system with respect to this constraint, while resources are expended to relieve this limitation on the system. When a bottleneck is relieved, the firm moves to a higher level of goal attainment and one or more new bottlenecks will be encountered. The cycle of managing the firm with respect to the new bottleneck(s) is repeated, leading to successive improvements in the firm's operations and performance. Goldratt, (1990) indicates that many of the assumptions underlying traditional cost-based accounting systems, as well as ABC, are no longer valid and that these systems are leading many companies to disaster. Consequently, he proposes using an alternative measurement system to evaluate the impact of production-related decisions. The TOC is implemented through the global operational measurements of throughput, the rate at which the system generates money through sales; inventory, all money the system invests in purchasing items the system intends to sell; and operating expenses, all money the system spends turning inventory into throughput (Goldratt, 1986). Under this measurement system, direct material is treated as a variable cost. Conversely, labor and overhead are assumed to be resources the firm is committed to acquiring and is unable to influence (Goldratt, 1990). Therefore, the cost of labor and overhead supplied to production is treated as a period expense. Operationally, the TOC involves maximizing throughput subject to the firm's

bottleneck activities. As noted by Goldratt (1990), the use of the TOC represents a paradigm shift from using cost accounting to using the TOC's global operational measures to guide production-related decisions. Advocates of the TOC, questions the usefulness of cost systems such as ABC for allocating labor and overhead to products (Goldratt, 1990) and Kaplan (1992) notes that ABC is not a system for allocating cost to products more accurately. Rather, it attempts to identify factors underlying the production process that cause activities to consume resources and, thereby, incur cost. The use of volume-related cost drivers and non-volume cost drivers, such as product complexity, diversity, and quality, enable ABC to provide a powerful and rich model of the relationship between why costs are incurred in the production process and the products produced. Advocates of the TOC assert that labor and overhead are a committed cost; therefore, tracing the cost of these activities to products is irrelevant for decision making. However, labor and overhead are incurred for a reason and a well-designed activity based cost system can be instrumental in revealing these reasons. Understanding the cost of the resources used to produce a product is crucial for understanding the economics of its production. However, indiscriminate use of ABC or any other cost system can lead to suboptimal decisions. For example, a product whose revenue is less than its activity-based cost may be beneficial for the firm to produce when the firm has excess resources that cannot be terminated or deployed elsewhere in the firms operations. Consequently, an important aspect of using ABC understands the economic conditions under which it leads to optimal resource allocation decisions. An extended discussion of these and related issues is provided in product-level activities, the product-mix decision becomes more complicated and cumbersome to represent.

2.2.2 The contingency theory

The contingency theory to management accounting is based on the premise that there is no universally appropriate management accounting systems that applies equally well to all firms in all circumstances (Emmanuel, Otley & Merchant, 1990). This suggests that the particular features of an appropriate accounting system will depend upon the specific circumstances in which firms must find it. How effective the design of an accounting system is depends on that ability to adapt to changes in external circumstances and internal factors in order to assist manager in achieving goals. Contingency theory suggests that the need for efficient organizational structures, processes and competent management accounting system is contingent on organizational and environmental characteristics. This forces influence changes in the structure, and sophisticated cost management system or advance cost accounting techniques such as ABC leads to enhances firm performance (Cagwin & Bouwman, 2002; Drury & Tayles 2005). Thus, this research indicates the price competitive force that should stress firms to resort for ABC effectiveness in order to gain competitive advantage for organization and increase financial performance.

2.3 Empirical review

Bromwich and Bhimani (1989) observed that though activity-based costing corrects the product-cost distortions but no such study has been done to demonstrate that it increases the profitability of the firm (Shim & Stagliano 1997). Groth and Kinney (1994) observed that success at cost management could have substantial impact on the firm value. Hubbell (1996) argued in favour of integrating activity-based cost management systems with the measures of shareholder value such as economic value added. The resultant integrated cost management systems could provide better governance mechanism for improving processes, optimizing the use of capital and thus create shareholder value.

Gordon and Silvester (1999) examined the performance of ten ABC user firms vis-à-vis their matched size- and industry-controlled counterparts who have not adopted activity-based costing. Though ABC user firms had abnormal returns on the date of announcement but not statistically significantly different from their counterparts. Thus, they questioned the adoption of activity-based costing if it does not lead to creation of firm value.

Malmi (1999) found that firm superior performance subsequent to activity-based costing adoption revealed that the ABC adoption decision was 'rational value-enhancing choice' and it was not a fad or fashion or forced selection. Shield and McEwen (1996) reported that 75% of the ABC users found it financially beneficial decision. The success in ABC implementation is based on top management support, compensation and training (McGowan and Klammer 1997).

Ittner et al. (2002) examined the association between the extensive use of activity-based costing and plant level operational & financial performance indicators such as cycle time, quality, manufacturing cost improvements and return on assets. The quality variable was captured through finished product, first pass quality yield in percentage terms and scrap and rework cost as a percentage of sales. They survey questionnaire was mailed to 25,361 US firms who have subscribed to Industry Week. They received a response from 2789 firms, resulting in a response rate of 11%. They found 26% of the respondents did use activity-based costing extensively. They found moderate evidence that activity-based costing use is positively associated with the manufacturing performance. They demonstrated through path analysis that activity-based costing use has a positive indirect association with manufacturing cost reduction through improvements in quality and cycle time. No significant association with return on assets of activity-based costing use was observed. Kennedy and

Affleck-Graves (2001) examined the link between activity-based costing implementation and creation of shareholder value using Rappaport (1986) framework and event study methodology (Brown & Warner 1980 and 1985). They got responses from 47 ABC users and 187 non-ABC users. They found that choice of management accounting system such as activity based costing for a sample of UK firms had a significant impact on firm value (27% over the three years from the beginning of the year in which activity-based costing was first introduced). The impact of activity-based costing on firm performance may be indirect through the mediating influence of other variable (Shields et al. 2000). Cagwin and Bouwman (2002) in their survey of 210 internal auditors found that the firms with diverse product portfolio and with high proportion of overheads cost when they have adopted activity-based costing along with other strategic initiatives such as JIT and TQM, it resulted in substantial improvement in their return on investments. The other enabling conditions for the efficacy of the ABC in the organizations are sophisticated information technology systems, absence of excess capacity and competitive environment

3.0 Methods and Material

This study employed an ex-post facto research design. Data base were drawn from manufacturing companies listed in the Nigerian Stock. The key participants in this study were accounting director/accounting manager of each sampled firm.

Reliability of the measurements was evaluated by Cronbach Alpha coefficients. In the scale reliability, Cronbach Alpha coefficients are 0.75-0.87 as being greater than 0.70 (Nunnally & Bernstein, 1994; Bessong & Tapang, 2012; Tapang & Bassey, 2017). The scale of all measures is internally consistent results. Factor analysis is employed to test the validity of data in the questionnaire. Items are used to measure each construct that is extracted to be one only principal component. Factor loadings of each construct that present a value higher than 0.5. All factors loadings are 0.60-0.94 as being greater than the 0.4 cut-off and are statistically significant. That is, factor loadings of each construct should not be less than 0.4 (Nunnally & Bernstein, 1994). The scales of all measure are internally consistent results. Hence, these measures are conceived appropriate for further analysis because they revealed an accepted validity and reliability in this study.

The ordinary least squares (OLS) regression analysis as cited in Bessong and Tapang (2012); Tapang and Bassey (2017) is used to test the relationships among ABC effectiveness (cost driver fitness, cost calculation accuracy, cost information credibility, and cost reporting usefulness), and firm's value.

4.0 Presentation of results and interpretation

Table 4.1: Regression results of Activity Based Costing (ABC) and firm's value

DEPENDENT VARIABLE: Firm's Net Worth(FNW)

VARIABLE	ESTIMATED COEFFICIENTS	STANDARD ERROR	T-Statistic	P- Value
Constant	20.086	2.633	7.629	.000
CDF	.166	.046	3.597	.000
CCA	.369	.068	5.393	.000
CIC	-.086	.045	-1.940	.053
CRU	.269	.066	4.043	.000
R	=	0.815		
R-Square	=	0.706		
Adjusted R-Square	=	0.690		
SEE	=	5.23385		
F – Statistic	=	20.124		
Durbin Watson Statistic	=	2.580		
t-statistics table value	=	1.64		

Source: Researchers Estimation 2015

Based on the analysis and empirical results, the study revealed that all the estimated coefficients of the regression parameters have the right (positive signs) excepts Cost Information Credibility (CIC) which has a negative signs. These thus conform to our economic theory. The implications of these signs are that the dependent variable is positively influenced by activity based costing. This means that an increase in the independent variable will bring about an increase in the dependent variable firm's value mirrored by Firm's Net Worth (FNW). Specifically, a 1% increase or decrease in activity based costing mirrored by CDF, CCA, CRU and CIC would lead to an increase or decrease in the value of the firm with a margin of approximately 0.17, 0.37, 0.27 and -0.09 respectively.

The coefficient of determination R-square of 0.706 implied that 70.6% of the sample variation in the dependent variable corporate performance is explained or caused by the explanatory variable while 29.4% is

unexplained. This remaining 29.4% could be caused by other factors or variables not built into the model. The high value of R-square is an indication of a good relationship between the dependent and independent variables.

The value of the adjusted R^2 is 0.690. This shows that the regression line captures more than 69% of the total variation in corporate productivity caused by variation in the explanatory variables specified in the equation with less than 31% accounting for the error term.

Testing the statistical significant of the overall model, the F-statistic was used. The model is said to be statistically significant at 5% level because the F-statistics computed of 20.124 is greater than the F-statistics table value of 2.60 at $df_1=4$ and $df_2=395$.

The test of autocorrelation using D/W test shows that the D/W value of 2.580 falls within the inconclusive region of D/W partition curve. Hence, we can clearly say that there exists no degree of autocorrelation.

Findings

The study revealed that cost driver fitness and cost reporting usefulness have a significant positive effect on firm's net worth. The cost driver fitness has prompted many firms to reengineer business process by monitoring each process and then, eliminating or improving the processes which are non-value added (Keegan & Eiler, 1994). Additionally, this study is in line with the work of Roberts and Silvester, 1996 who found out that cost driver fitness has a significant relationship with firm's net worth.

The study also revealed that cost reporting usefulness and cost calculation accuracy does significantly affect production process efficiency. This result was supported with the works of Gupta and Galloway, 2003; Gupta and Baxendale, 2008; who found out that there exists a positive relationship between cost reporting usefulness and cost calculation usefulness with firm's net worth.

Finally, the study revealed that cost information credibility does not significantly affect production process efficiency. This result is in line with the work of Pizzini, 2006 who found out that cost calculation usefulness have no relationship with production process efficiency. It is possible that firms will need or use cost driver fitness, cost information credibility and cost reporting usefulness to provide greater firm's net worth.

5.0 Conclusion/Recommendations

The results show that ABC effectiveness is significantly and positively related to firm's value. The result indicates that firms with greater degree of cost accountant competency, corporate resource facilitation, and price competitive force appear to have a higher effect on cost driver fitness, cost calculation accuracy, cost information creditability and cost reporting usefulness. The cost accountant competency, whose knowledge, skill, coordinate, knowledge sharing and competence, is very necessary in organization to ensure that cost accountants can do task in their responsibility completely and to achieve goals

Managers and executives of firms should apply the relationship among ABC effectiveness and firm's value to the actual business situation. Managers should effectively utilize the resource and capability of the firm in order to ABC effectiveness. Clearly understanding of ABC effectiveness can help gain competitive advantages and achieve higher level of firm's value. Importantly, to maximize the benefits of ABC effectiveness, they should provide resources such as cost accountant competency, resource facilitation to support in order to ABC effectiveness and to increase firms' competitive advantage and crucially to gain firm's value.

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