ACTIVITY BASED COSTING, ITS ADOPTION AND USEFULNESS IN ELECTRONIC HEALTH RECORDS IMPLEMENTATION: A CASE OF BAREWA CLINICS, KANO, NIGERIA

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1. Introduction

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. In the present globalize world, cost and management accountants are now expected to be team players in key internal decisions in such areas as product development, profitability analyses, improvement in quality of products and processes, and the evaluation of overall company performance (Welfle & Keltyka, 2002).

According to Garisson, Noreen & Brewer (2009) activity costing (ABC) is a costing method that is designed to provide managers with cost information for strategic and other decisions that potentially affect capacity and therefore "fixed" as well as variable costs. It is ordinarily used as a supplement to, rather than as a replacement for a company usual costing system. This infers that most organizations that use ABC have two costing system – the official costing system that is used for preparing external financial reports and the activity based costing that is used for internal decision making and for managing activities. 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). Under ABC, product costs are not strictly isolated to manufacturing costs and are expanded to include non-manufacturing costs such as selling, marketing, distribution, and administrative that can be directly traced to the product through activities (Garrison et al, 2006). This may result in improved resource allocation consistent with strategic objectives and budget surplus (Zaman, 2007). ABC has reportedly helped many organizations to better manage their business activities when combined with total quality management and business process re-engineering (Adams, 1996).

One of the greatest misconceptions about ABC is that the system is not applicable to service organizations (Compton, 1996). On the contrary, the utility of ABC has expanded beyond the manufacturing sector to improve the accuracy of non-manufacturing costs, as well as enabling profitability analysis for customers and other business functions (Chenhall & Langfield, 1999). As a result, the utilization of ABC has been evident in areas such as database marketing (Doyle, 2002) the financial industry (Dodd & Lavelle, 2002) the healthcare industry (Federowics et al, 2010). Telecommunications, transport, wholesale, distribution and Information services sectors (Kennedy & Affleck, 2001). Substantial changes have been witnessed in the services sector within this last two decades. This is due to emergence of new competitors as a result of deregulation, which has also given companies greater freedom in setting prices and determining the mix of products to offer. Well managed services firms with a good understanding of their markets, customer's data base and information technology can become more profitable in a deregulated and more competitive environment (Maiyaki, 2011). This equally applies to the

health sector in which thousands of patient databases must be kept to maintain an updated patient profile. Though ABC is a relatively new phenomenon in the health care sector. It is a comprehensive approach that the health care field can use to analyze the cost-effectiveness of implementing an electronic health record system (Federowics et al, 2010). The total cost to implement an EHR includes obvious costs, such as licensing fees, and hidden costs, such as impact on productivity. Unlike the traditional accounting method, ABC includes all of the organization's expenditures and is less likely to miss hidden costs.

The Nigerian health sector is currently witnessing an upsurge in demand which could be related to a steady rise in population. This is evidenced in the establishment of numerous private health care facilities in order to provide for the shortcoming of limited government owned hospitals that are available. An efficient health services delivery in a modern day's health administration system with a large population of patients would require an electronic health records. Federowics et al. (2010) maintained that there is an empirical evidence that health organizations are more likely to be more productive after the application of ABC to their electronic health records system in that health care managers can benefit by using ABC to analyze the effects of electronic health record investments on productivity and efficiency. However, since the rate of adoption of ABC is still relatively low in the Nigerian business environment, there seems to be lack of evidence on its applicability in the health sector. This paper examine the concept of ABC and its associated benefits in the implementation of an electronic health records within the Nigerian healthcare sector with a specific focus on Barewa clinics in Kano metropolis.

2. Literature Review

2.1. The Need for Activity Based Costing (ABC)

Traditional cost accounting, which mainly allocates overhead cost on the basis of one single cost driver such as direct labor or output volume, systematically distorts product costs in modern manufacturing and service environments in which overhead costs are a significant portion of product costs. Thus, incorrect product cost information can lead to poor decisions (Wang, Du, Lei and Lin, 2010). An alternative managerial philosophy and its associated measurement systems, namely, activity-based costing (ABC), has been offered to overcome some of the failures of standard costing for improving managerial decision making. ABC has been acknowledged to provide cost information for more precise cost allocation (Sheu, Chen and Kovar, 2003).

2.2. Benefits of Activity Based Costing

The benefits associated with the adoption of activity based costing could be explained as diverse and enormous. For instance the costing methodology known as ABC yields cost information that may be significantly different than what is provided when the traditional absorption cost method is used. According to Chea (2011) ABC analysis enables managers to slice into the business many different ways by product or group of similar products, by individual customer or client group, or by distribution channel and gives them a close-up view of whatever slice they are considering. It also give exact information on what activities are associated with specific part of business and how those activities are linked to the generation of revenues and

the consumption of resources. By high-lighting those relationships, ABC helps managers understand precisely where to take actions that will drive profits (Cooper and Kaplan, 1991). In addition, managers can use ABC to analyze many other aspects of their company's operations. They can compare the profits that various customers, product lines, brands, divisions or regions generate and thus use this as a basis of taking critical internal decisions, spanning across functional areas that involve not only products, but also distribution and customer related decisions related to selling price and production. Performance improvement, which can be seen in terms of time, cost, and quality has been shown to be having close relationship with activity based costing in that ABC has a moderate impact on time, a significant impact on quality, and a substantial impact on cost (Gering, 1999). Bidanda et al. (2003) pointed that most companies do not recognize that their traditional costing systems provide unreliable and distorted cost information until their profitability and competitiveness have deteriorated. In other words, the adoption of activity based costing offers many advantages over the traditional means of costing.

3. Examples of Companies that have successfully Adopted and Implemented Activity Based Costing

Insteel industries manufactures a range of products such as concrete reinforcing steel, industrial wires and bulk nails for the construction, home furnishing, appliances and tire manufacturing industries. The company implemented an activity based costing system at its manufacturing plant in Andrew South Carolina, USA and immediately began using activity based costing to make strategic and operating decisions. In term of strategic decision, Insteel dropped some unprofitable products, raised prices on others and in some case even discontinued relationship with some unprofitable customers and later realized that taking such simple actions does not improve profit. It can either redeploy its freed up capacity to increase sales or eliminate its freed up capacity to reduce costs. Insteel chooses to redeploy its freed up capacity and used its activity based costing system to identify which new business opportunities to pursue. In term of operational improvement, insteel revealed that its 20 most expensive activities consumed 87 percent of the plant $21.4 million in costs. Almost $4.9 million was being consumed by non-value adding activities. Teams were formed to reduce costs on this activity and within one year, overall non value adding activities costs have dropped from 23 percent to 17 percent of total cost. This signifies a drop of $2.5 million in total cost.

Kemp LLC, headquartered in Minneapolis, Minnesota, produces dairy products such as milk, yogurt, and ice cream. The company implemented an ABC system that helped managers understand the impact of product and customer diversity on profit margin. The ABC model captured differences in how the company entered orders from customer, how it packaged orders, how it delivered orders and the time spent by each drivers at each customer's location. Kemp ABC system helped the company acquire a large national customer because it identified the specific manufacturing, distribution and order handling costs associated with serving this customer. The ability to provide the customer with accurate cost information built a trusting relationship that distinguishes Kemps from other competitors. Kemp also used its ABC data to transform unprofitable customers into profitable ones. For instance one customer agreed to accept a 13 percent price increase to eliminate two low volume products and to begin placing

full truckload orders rather than requiring partial truckload shipments thereby lowering Kemp costs by $150,000 per year.

Owen and Minor, a $3billion medical supplies distributor in California offers an activity based billing option to its customers instead of charging a fixed amount for items that are ordered by customers, the charges are based on activities required to fill the order as well as on the cost of the item ordered. This charges encourage customers to reduce their weekend delivery requests and results in decreased cost for Owen & minor which can then be passed on to customers in the form of lower charges for the specific items that are ordered.

Also, Providence Portland medical center (PPMC) used ABC to improve one of the most expensive and error prone processes within its nursing units. Ordering, distributing, and administering medications to patients. To the surprise of everyone involved, the ABC data showed that medications related activities made up 43 percent of the nursing unit's total operating costs. The ABC team members knew that one of the root causes of this time consuming process was the illegibility of physician orders that are faxed to the pharmacy. Replacing the standard fax machine with a much better $5,000 machine virtually eliminated unreadable orders and decreased follow up telephone calls by more than 90 percent thereby saving the hospital $500,000 per year. In total, the ABC team generated improvement ideas that offered $1 million of net saving in redeploy able resources.

3.1. Adoption Rate of Activity Based Costing

Although it has been claimed that ABC can reduce the cost allocation inaccuracies associated with traditional costing, as well as providing benefits such as improved performance. The literature however suggests that ABC is still underutilized by firms in the last two decades of its development. According to Armitage and Nicholson (1993) evidence of adoption during the early 1990's indicates an adoption rates ranging from approximately 10 percent of firms in the UK and Ireland to 14 percent in Canada. Later in the same decade, studies suggested that many firms were still using traditional costing systems, and that an approximate 20 percent adoption of ABC was apparent (Sulaiman, Ahmad, & Alwi, 2004). Research in the UK in 1995 and 1999 showed that the consideration of ABC and actual adoption dropped while reported rejections of the concept increased over four years between two studies that looked at ABC adoption (Innes et al, 2000). However in the United States of America (USA), survey results showed that 86 percent were using traditional costing systems in 1996 (Cheatham & Cheatham, 1996) whereas a more recent study (Kiani & Sangaladji, 2003) illustrated that 52 percent of respondents were implementing some stage of ABC. This trend was also evident in Australia, where Chenhall and Langfield (1998) found that an increasing number of firms were adopting ABC. Also Manufacturing firms in France increased their ABC adoption from 15.9 percent in 2002 to 33.3 percent in 2008 (Elhamma, 2012).

In recent years, some studies have been done on the adoption and implementation of the ABC methods in developing countries. For instance Anand et al. (2005) in a survey of 60 large and medium sized manufacturing companies in India found a higher adoption rate of 20 percent for activity-based costing, 13 percent for activity-based management, and 7 percenty for activity-based budgeting. Another study by Chongruksut (2005) in Thailand revealed a 35 percent rate

of adoption while that of Ruhanita (2007) in Malaysia indicated an adoption rate of 36 percent. Another study by Moalla (2007) in Tunisia as cited in Elhamma (2012) revealed an adoption rate of 23.75 percent while in South Africa, Sartorius, Eitzen, & Kamala (2007) found an adoption rate of 12 percent. Also, the study by Ngong (2010) in Cameroun, see: Elhamma (2012) uncovered an adoption rate of 9.3 percent which indicates that the developing countries of Asian pacific region are more diligent in its adoption. Unfortunately, there is unavailability of data on the adoption rate of ABC in Nigeria.

Though ABC rate of adoption is gradually increasing However, it is still apparent that its rate of adoption is surprisingly low given its proposed associated benefits. Some of the reasons given for the low adoption rate according to Garisson, Noreen and Brewer (2009) ranges from the high cost involved in the implementation and maintenance of ABC, the anticipated human resistance that characterized any proposed change program, which limit the support and participation of management, line managers and accountants in any activity based costing initiative, the difficulty associated with the interpretation of ABC data when using it to make decisions, and the ineffectiveness of reports generated from ABC in conforming to generally accepted accounting standard (GAAP). Organizations proposing the implementation of ABC are thus advised to have two costing systems which would include the traditional costing system for making external report and the other for making internal decisions.

3.2. Benefits of ABC in Implementation of Electronic Health Records

Although ABC is a relatively new phenomenon in the health care sector. It is however a comprehensive approach that can be can used to analyze the cost-effectiveness of implementing electronic health records. The total cost to implement an EHR includes obvious costs, such as licensing fees, and hidden costs, such as impact on productivity. Unlike other cost estimating methods, ABC includes all of the organization's expenditures and is less likely to miss hidden costs (Federowics et al, 2010). For example, other cost estimation methods include the costs of training staff members on a new EHR, such as by including the cost of hiring trainers and purchasing training materials. However, ABC goes further and also accounts for the cost of the staff members participating in the training instead of working. Compared with other methods, ABC offers an approach that is less likely to miss costs and thereby more likely to produce an accurate assessment of the cost-effectiveness of implementing an EHR (Federowics et al, 2010).

In a study by Federowics et al. (2010) of a 3 physician clinic in Midwest United States, it was discovered through the use of ABC that the clinic was more productive after implementation of EHR. For the analysis, fiscal year 2006 is a "before" picture of the clinic without the EHR, and fiscal year 2007 is an "after" picture of the clinic with the EHR. All operational activities were divided into seven (7) and classified as personnel, executive management, human resource & finance, building, supplies, electronic health records, and other operating expenses. The EHR expense is found by first dividing the total organization-wide investment cost of the EHR over the period for implementation. This number is then divided by the total number of physicians the EHR intends to support. This number is finally multiplied by the number of full-time equivalent physicians in the clinic.

The table below shows a breakdown of the total cost of all operational activities by categories in year 2006 before EHR implementation and year 2007 after EHR implementation.

Total Expenses

Activities	Fiscal Year 2006	Fiscal Year 2007
Personnel	$716 755	$702 274
Executive management	$36 806	$38 611
Human resource and finance	$61 344	$64 351
Building	$180 189	$179 294
Supplies	$203 183	$255 927
Electronic health record	----	$24 733
Other operating expenses	$126 749	$124 789
Total expenses	$1 325 027	$1 389 979

The total number of patient appointment for fiscal year 2006 is 3828 while the appointment for fiscal year 2007 is 4168. This as been indicated was taken from the clinic's schedule of records.

Cost Per Appointment

	YEAR 2006	YEAR 2007
Total expenses	$1 325 027	$1 389 979
No. of patient appointments	3828	4168
Cost per appointment	$346.14	$333.49

In determining the effect EHR implementation on cost, the costs per appointment both before and after its implementation were considered. This was done through the following steps.

Step 1: Determining a list of activities into which the total cost of operation will be allocated

Step 2: Allocating the appropriate amount of expenditure into each activity

Step 3: Calculating the total costs for each period. The total cost is the sum of the costs in the expense categories.

Step 4: Determining the number of patient appointments for each period

Step 5: Calculating cost per appointment for each period. This was determined by dividing the total expenses by the number of patient appointments

Step 6: Comparing the total cost per appointment before and after EHR implementation and draw conclusions.

The following equation was used to determine the percentage change in the total cost per appointment after EHR implementation:

% Change in cost per appointment

= (Cost After − Cost Before)/(Cost Before) × 100%

= ($333.49 − $346.14)/($346.14) × 100%

= −3.65%.

The decision rule for this analysis is that if the percentage change in value is positive then the clinic is less productive and if it is negative then the clinic is more productive after the implementation of the electronic health record. Therefore, with a percentage change of –3.65%, the clinic is more productive with the EHR.

4. Methodology

Through the use of non structured qualitative interview, the opinion of staffs of Barewa clinics and maternity were examined. The staff's strength amount to a total of 24 including the medical doctors working on part time basis. The simple random sampling technique was employed to interview 13 staffs including the medical director after the exclusion of staffs such as messengers, securities and cleaners due to the fact that they are not expected to be knowledgeable about ABC as a result of their low level of formal education. The questions asked ranged from if they are currently using ABC, if they had any prior knowledge of ABC, and their general perception of ABC as a costing tool. In addition to all this the medical director of the clinic was asked if the clinic is currently on the use of electronic health records and if the management of the clinic would like to implement some form of electronic health records program in the nearest future.

5. Major Findings and Discussion

A close look at the results obtained from the interview indicates that about 60% or 8 of the subjects interviewed, made up of 3 nurses and midwives, 2 lab technicians, and the rest, general staffs, had no prior knowledge of activity base costing. 3 of the staffs comprising 2 medical doctors and a nurse admitted to a limited prior knowledge of ABC but do not have any knowledge of its usefulness especially in the health sector. Also, the accountant of the clinic admitted to having an above average knowledge of ABC but that the clinic is not currently using it and is not considering its adoption in the nearest future. Reason given for this is lack of management initiative and support. The medical director however admitted to having a prior knowledge of ABC, and equally admitted that the clinic is considering the introduction of an electronic health record system but does not have knowledge of the benefits of application of ABC to health care delivery services or to an electronic health record system. He equally maintained that since their current traditional costing system takes care of all their accounting

system, he does not see a reason why another method of costing whose implementation would result in additional expenditure should be introduced.

6. Conclusion

The findings in this study are pointer to a relatively low knowledge of ABC including its overall usefulness and cost benefits. It can also be concluded that one of the challenges against the initiation or implementation of an activity based costing system is low management support which exists in form of the perceived cost or expenditure associated with its implementation.

7. Recommendations

An activity based costing system is an accounting system that is cost effective and thus can be applied in accounting operations of virtually all manufacturing and services organizations including an electronic health record system in a health care services delivery organizations. When applied appropriately, it creates an avenue for efficient use of organizational resources and thus brings out the best returns. Aside this it help organizations to single out for elimination, unproductive activities thereby resulting in a general reduction of operation cost, and can be use to take critical internal decisions related to pricing and production. It is hereby recommended that:

I. The accountants in health care delivery services must start making attempts to bring to the awareness of management, the enormous benefits associated with efficient implementation of activity based costing program.

II. Though the initial revenue required to implement an ABC program is considerable high however, this enormous investments could be recoup within some few period of time after implementation. Management of health care services are thus advised to lend out full commitment and support to staffs as regards ABC implementation most especially when the organization is currently in use of electronic health record system or considering its implementation. Such support could range from training programs on application and interpretation of ABC data, financial supports and a program of general orientation of staffs about the applicability of ABC and its associated benefits.

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