

The Application of Activity Based Costing System and Company's Financial Performance

"A Case study of" A " Manufacturing Company"

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المستخلص

في بيئة العمل التنافسية اليوم ، تكلفة العمل المباشر أصبحت لا تمثل جزءاً كبيراً من التكلفة الكلية للمنتجات أو الخدمات للعديد من الشركات. العمل المباشر لا يعتبر اساس مناسب لتحميل المصروفات غير المباشرة على المنتجات . لذلك فان أنظمة التكاليف التقليدية التي تستخدم محرك تكلفة واحد وهو العمل المباشر او اى اساس آخر لتخصيص المصروفات غير المباشرة على المنتجات يشوه التكاليف، مما يؤدي الى قرارات غير جيدة تمنع أداء العمل الأفضل. بدلاً عن ذلك، فان نظام التكلفة على اساس النشاط (ABC) هو نظام تكاليف جديد يخصص المصروفات غير المباشرة على المنتجات باستخدام محركات تكلفة متعددة ، الأمر الذي يحسن من دقة معلومات التكاليف ويعطى فرص جيدة لتحسين الأداء. تمثلت مشكلة الدراسة في أن غالبية الشركات الصناعية ما زالت تستخدم نفس الانظمة التقليدية التي تعطى معلومات غير دقيقة عن تكلفة المنتجات أو الخدمات، وأن نظام (ABC) لم يطبق حتى الآن في العديد من الشركات. لذلك هدفت الدراسة إلى بحث العلاقة بين تطبيق نظام (ABC) والأداء المالى. بيانات التكاليف لشركة صناعية واحدة ("A Company") استخدمت لتطبيق نظام (ABC) بناءً على نموذج (Cooper's two –stages). النتائج أظهرت ان تطبيق نظام (ABC) يحدد تكلفة المنتجات أكثر دقة ، يخفض التكلفة ويزيد الأرباح للعديد من المنتجات مقارنة مع نظام تكاليف المطبق بالشركة "A" . بالإضافة الى ذلك، فأن نظام (ABC) يعطى معلومات تفصيلية عن تكاليف الانشطة ومحركات التكلفة الأمر الذى يؤثر ايجابا على تحسين أداء الشركة ككل.

ABSTRACT

In today's business competitive manufacturing environment, direct labour costs have become insignificant portion of total product costs of products or services. Direct labour was being no longer a suitable base for assigning overhead to products or services. Therefore, traditional costing systems which allocate overhead by using a single cost driver with an allocation base of direct labour, or any single allocation base may seriously distort product costs. This will lead to bad management decisions which prevent better business performance. Instead, activity-based costing (ABC) is a new costing system which allocate overhead based on multiple cost drivers, hence improves the accuracy of product costs, and gives better opportunities for performance improvement. The problem of this study indicated that a majority of manufacturing companies still using the same traditional costing systems which provide inaccurate product cost; and ABC system is not being applied by many companies yet. Thus, the study aimed to examine the relationship between application of ABC system and financial performance. Archive costs data of one manufacturing company ("A" Company) were used to apply ABC system based on (Cooper's two –stages model). The results showed that the application of ABC system in "A" Company determined products costs more accurately; reduces cost; and increases the profit of many products than existing costing system.

In addition, ABC system provides detailed information on activities costs and related cost drivers which will affect positively on company "A" performance as a whole.

KEYWORDS: *Activity based costing, Traditional costing systems, Financial performance*

INTRODUCTION

Global competition, technical change, and computerized information system development have changed the profile of company's cost structure. An overhead which is shared by many products and services become more significant dominant portion of total product costs rather than direct labour costs. Therefore, traditional costing systems which use direct labour as a principle cost allocation base, may distort product cost; causing some products to appear to cost more and other to appear to cost less than they actually do. Distorted knowledge of product cost makes it difficult for management to know how to best employ the resources available. Moreover, they lead management to misunderstanding the true cost and profits from particular products or services. Therefore, manufacturing companies in new business environment have a critical need to apply more sophisticated costing system such as activity-based costing (ABC) which was developed to overcome some of the limitations of traditional costing systems and to enhance its usefulness to strategic decision-making. ABC system provides more accurate cost information by assigning indirect costs (overhead) to activities using multiple cost drivers rather than on cost driver, and then allocating costs to products based on each product's use of these activities. The benefits of ABC system and its positive impact on company performance have motivated both practitioners and researchers to investigate various aspects of ABC system such as the practice of ABC system; Factors influence the application of ABC system; Problems and difficulties associated with application of ABC system and reasons for non-application; a comparison between ABC system and traditional costing systems; and association between ABC system and company's performance. Therefore, this study is a step on this direction by investigating the relationship between application of ABC system and Company performance for one Sudanese manufacturing company.

This paper is organized as follows: The first section presents the study's problem, questions, objectives, hypotheses and importance. Second section reviews the literature regarding ABC system and previous studies. Section three presents methodology, and case study. Section four presents results discussion, findings, recommendations and implications for future studies.

The problem of the study:

Despite the benefits of activity based costing system(ABC) over traditional costing systems, a review of recent literature revealed that most of ABC system practices still was done in developed countries and very little has been done in developing countries, especially in Africa context. More specifically, in the Sudan, recent literature revealed that a majority of Sudanese manufacturing companies still using the same traditional costing systems as a product costing that were developed decades ago to serve the accountancy function not the needs of the decision makers; and ABC system is not being applied by many companies yet. This provides a framework for this study which investigates the relationship between application of ABC system and company's financial performance.

The following question may shed some light on the existing problem:

- a. Does application of ABC system enhances financial performance compared with traditional costing system that A company currently used?

The objectives of the Study :

The main objective of this paper is to examine the relationship between application of activity based costing (ABC) and financial performance in “A“ manufacturing company. This objective is divided into the following sub-objectives:

- a. Extending the existing literature on ABC system and increasing the awareness level of the application of ABC system among Sudanese companies.
- b. Comparing the financial performance of ABC system with traditional costing system that “A“ company currently used.

Importance of the Study:

The importance of this study stems from the contribution of this study to the limited available knowledge in the area of application of activity based costing system (ABC), especially in African developing countries such as Sudan. In addition, this study adds further evidence to the value of studying cost and management accounting, and more specifically new changes in cost and management accounting practice. Furthermore, the critical need of industrial sector as one of the main economic sectors in new competitive environment for ABC system to provide more accurate cost information which improves decision making; focuses manager's attention; and improves insights towards activities that have the largest opportunities for performance

improvement.

Related literature Rview and Studies:

Activity based costing (ABC) introduced in 1980s by (Cooper & Kaplan) based on their experiences with Harvard Business School cases as a response to general dissatisfaction with traditional costing systems, seemingly offered a great new opportunity for companies to obtain more accurate costs of their processes, products, and customers (Anderson, (2007). ABC advocates claim that ABC provides detailed information on the value added and non-value added activities performed by the organization, the costs associated with these activities, and the drivers of activity costs. This information allows managers to reduce costs by designing products and processes that consume fewer activity resources, increasing the efficiency of existing activities, eliminating activities that do not add value to customers and improving coordination with customers and suppliers (Larcker, (2002). *An activity* is any event, transaction or work sequence that incurs cost when producing a product or providing a service. *A cost pool* is a distinct type of activity (e.g., ordering materials or setup machines). *A cost driver* is any factor that affects costs such as number of units produced, number of service calls. They identify the linkage between activities and products or services; they serve as quantitative measures of output of activities (Young, (2001). *Value –added activities* are those which increase the perceived worth of a product or service in the hands of its ultimate consumer, whereas, *non-valued added activities* add no such worth and are therefore, arguably, unnecessary (Upchurch, A.,(1998).

The underlying assumptions of ABC system contrast sharply with traditional costing systems assumptions. Traditional costing systems assume that products cause costs. ABC system assumes that activities cause costs, and product (and other cost objects) creates a demand for activities (Vaysman, (2000).

ABC system methodology offers four procedural and two conceptual differences relative to traditional costing systems. The following are the key changes from a procedural perspective: Use of non-volume-based drivers to allocate costs; Formation of cost pools by activities (that might cut across departments), distinguishing between a cost center and a cost pool; Expansion of the set of resource costs considered to include selling, general and administration (SGA) costs as well as pre-production costs; and Expansion of the set of cost objects considered beyond products to include customers, distribution channels, and so on. The two key conceptual innovations: use of practical capacity rather than budgeted capacity to derive allocation rates; and the use of cost hierarchy (i.e., classifying costs into unit-, batch-, product-, and facility level costs) (Sivaramakrishnan, (2012).

A well-designed ABC system has three strategic objectives. First, is to report accurate costs that can be used to identify the source of firm profits. Second, identifying the cost of activities so that more efficient ways to perform them or produce their outputs can be identified. And final one is to identify the future need for resources so that they can be acquired more efficiently (Slagmulder, (2000).

ABC system allocated overhead costs based on Cooper model in two stages. First, the costs of resources are allocated to the activity cost pools using single cost drivers. Second, the costs of activities are assigned from the activity cost pools to cost objects using multiple cost drivers (Dalci,2010). These two stage divide into four basic steps are: (a) Identifying major activities in the organization; (b) Creating a cost pool (or cost center) for each activity; (c) Identifying measures of activities- the cost drivers; (d) Assigning the costs of activities to products according to the products demand for activities¹.

The ABC system provides many benefits are as follow: (a) More accurate costing information of products / services, customers, and distributing channels; (b) Identifying the most and least profitable products and customers; (c) Accurately tracking costs of activities and processes; (d) Equipping managers with cost intelligence to drive continuous improvement; (e) Facilitating better marketing mix; and (f) Identifying waste and non-value-added activities (Jiambalvo,J., (2004).

In general, organizations which were expected to benefit most from ABC system are those with a high frequency of different cost objects (this presumption is valid for either production companies, or for service or trading companies) those with a large portion of indirect and supporting costs; and those with a great number of processes and activities (Hall, J.A., (2011).

Despite the advantages of ABC system over traditional costing system, there are some limitations: (a) ABC system can be expensive and complex to use: many companies are discouraged from using ABC system by the increased cost of identifying multiple activities and applying numerous cost drivers (Popesko, B.,(2010), (b) Some arbitrary allocations continue: even though more overhead can be assigned directly to products through ABC's multiple activity cost pool, certain overhead remain to be allocated by means of some arbitrary volume-based cost driver such as labour or machine hours (Anderson, (2004).

Several previous studies have provided evidence that modern costing systems such as ABC system obtain benefits that have direct or indirect impact on company's performance. For example, *Cagwin, & Bouwman*, explored the association between ABC system use and the improvement in financial performance in USA. The findings showed a positive association between ABC system and improvement in financial performance (ROI) when ABC system is used concurrently with strategic initiatives, when implemented in complex and diverse firm, when used in environment where costs relatively important, and when there are limited numbers of intra-company transactions (Bouwman, (2000). *Kennedy, & Affleck-Graves*, investigated the impact of ABC system on firm's performance in UK. The results showed that the adoption of ABC system significantly improves a firm's relative performance in terms of both market and accounting-based measures and the ABC system firms clearly outperform matched counterparts by approximately 27% over the three years beginning in which the ABC systems are first implemented in UK; also further analysis suggests that ABC system adds to firm value through better cost controls and asset utilization, coupled with greater use of financial leverage (Affleck-Graves,(2001). *AL-Kadash, & Ferdium*, investigated the link between the practice of strategic initiatives (ABC, JIT, and TQM) and the improvement in corporate financial performance of industrial shareholding companies in Jordan. They found strong evidence that there is a positive association between using (ABC, JIT and TQM) and improvement in financial performance

(ROA) (Feridum, (2006). *El shesheni*, studied the relationship between the level of management accounting practices and company's performance. The results showed a positive relationship between management accounting practices (e.g., ABC) and company's performance measured by net profit average (Hughes, A., (2009). *Hughes*, conducted a case study on ABC/M as a model for profitability. The results revealed that ABC system is much more profitable than traditional costing systems (H.M.A., (2008).

Although, some studies have indicated that ABC system can provide significant benefits to company's performance, critics claimed that there is a little evidence that companies consistently acted on the ABC system information improved company's performance. For example, *Innes & Mitchell*, stated that unequivocally that there is no evidence to date that ABC system improves corporate profitabilityⁱⁱ. This view supported by others, for example, *Ittner, et al.*, examine the association between ABC system and manufacturing performance in USA. The results showed that, extensive use of ABC system is *indirectly* associated with manufacturing cost reductions through quality and cycle time improvements and has no significant association with return on assets (ROA) (Mitchell, (1990).

Gaps from previous studies appear in that, despite the great attention pay toward the advantages of ABC system, the results of previous studies about the relationship between ABC system and company performance are mixed; therefore, further investigation is needed by this study. In addition, most of previous studies conducted in Sudan were on the area of the comparison between ABC system and traditional systems; and none of the previous studies examine the relationship between application of ABC system and financial performance. Thus, this study is conducted.

Methodology of the Study

The study uses costs data from one manufacturing company ("A" Company) for one month (February 2012) to apply (ABC) system based on (Cooper's two -stages ABC model). The study uses a case study method because it involved questions of understanding and exploratory depth. The use of new costing system (e.g., ABC) is not widespread among Sudanese companies. Thus, the case study method is becoming more preferable in current study because of the limit application of the phenomena of interest.

Profile of Case study (A Company)

"A" Company is a manufacturing company established in 1960 for manufacturing equipments and spare parts. The company uses traditional costing system which allocates overhead to products based on machine hours as in (table 1) as follows:

Overhead rate = Total Overhead / total machine hours = 27765/121 = 229

Overhead assigned = overhead rate × machine hours

Table 1: Cost per unit under "A" company's costing system

Products	Direct material	Direct labour	overhead assigned	Total costs n	its produce	Total cost per unit
Right- Fax	6	34	2293	2333	5	467
Lsan	17	38	4586	4642	8	580
Left-Fax	7	34	2293	2334	5	467
Kapas	7	42	3057	3106	5	621
Ruler-tathbet	10	46	3784	3840	6	640
Amoud	14	32	516	562	1	562
Trus-lobad	17	75	2522	2614	2	1307
Glbt- Nhas	52	34	650	735	1	735
Kofof- A	7	47	1223	1277	4	319
Kofof- B	7	19	1223	1249	4	312
Gelba-A	70	25	535	630	1	630
Gelba-B	62	12	229	303	1	303
Gelba-C	62	27	573	662	1	662
Gelba-D	52	25	535	612	1	612
Gelba- e	13	17	382	412	1	412
Gelba-f	13	5	115	132	1	132
Gelba-g	9	7	153	169	1	169
Gelba-h	31	22	497	550	1	550
Gelba-i	13	12	268	292	1	292
Gelba-j	13	9	191	213	1	213
Gelba-k	8	5	115	128	1	128
Gelba-l	5	6	115	125	1	125
Gelba-m	5	0	115	120	1	120
Gelba-n	2	6	115	122	1	122
Lsan kamh	22	6	1682	1709	2	854
Total	523	584	27765	28872		

Source: Researcher, "A" Company archive data, 2012.

Application of Activity based costing (ABC) in "A" Company

The application of Activity based costing (ABC) in "A" Company based on Cooper model in two stages which involves the following basic steps which are:

- a. **Identifying the major activities, creating a cost pool for each activity, and identifying measures of activities- the related cost drivers**

The main activities for the company are six: (Cutting, Turnery, Freaz, Freaz CNC, whetting, and Control). The details are in (table 2& 3) as follow:

Table 2: Activities cost pools and cost drivers

Activities	Overhead costs	Cost drivers	Use of cost drivers
Cutting	2534	No. of machine hours	4
Turnery	3439	No. of machine hours	19
Freaz	17238	No. of machine hours	13.5
FreazCNC	595	No. of machine hours	5
whetting	595	No. of machine hours	0.5
Control	3043	No. of check times	171

Source: Researcher, "A" Company archive data, 2012.

Table 3: Use of cost drivers in each activity for each product

Activities Products	Machine hours					No of checks
	Cutting	Turnery	Freaz	Freaz CNC	Whetting	
Right- Fax	0.33		1.5			15
Lsan	0.17		2			24
Left-Fax	0.33		1.5			15
Kapas	0.33		2			15
Ruler-tathbet	0.33		2		0.25	24
Amoud	0.33	1	0.5		0.25	5
Trus-lobad	0.33	2	3			8
Glbt- Nhas	0.17	2	0.5			4
Kofof- A	0.17			1		12
Kofof- B	0.17			1		12
Gelba-A	0.17	2				3
Gelba-B		0.5	0.33			3
Gelba-C	0.17	2	0.17			4
Gelba-D	0.17	2				3
Gelba- e		1.5				2
Gelba-f		0.5				1
Gelba-g		0.5				2
Gelba-h		2				2
Gelba-i		1				2
Gelba-j		0.17				2
Gelba-k		0.5				1
Gelba-l		0.33				2
Gelba-m		0.33				2
Gelba-n		0.33				2
Lsan kamh	0.5			3		6
Total	4	19	13.5	5	0.5	171

b. Source: Researcher, "A" Company archive data,

Divided overhead on use of cost driver (table 4)

Table 4: Activity overhead cost rate

Activities	Overhead costs (a)	Use of cost drivers (b)	Activity rate (a/b)
Cutting	2534	4	633
Turnery	3439	19	181
Freaz	17238	13.5	1277
FreazCNC	595	5	119
Whetting	595	0.5	1190
Control	3043	171	18

Source: Researcher, "A" Company archive data, 2012.

c. Assigning the overhead of activities to products (table 5) Overhead

assigned = activity rate × use of cost drivers

Table 5: Overhead assigned to products

Products	Overhead assigned	Units produced	Cost per unit
Right- Fax	2391	5	478
Lsan	3089	8	386
Left-Fax	2391	5	478
Kapas	3030	5	606
Ruler-tathbet	3487	6	581
Amoud	1415	1	1415
Trus-lobad	4544	2	2272
Gibt- Nhas	1179	1	1179
Kofof- A	440	4	110
Kofof- B	440	4	110
Gelba-A	523	1	523
Gelba-B	565	1	565
Gelba-C	758	1	758
Gelba-D	523	1	523
Gelba- e	307	1	307
Gelba-f	108	1	108
Gelba-g	126	1	126
Gelba-h	398	1	398
Gelba-i	217	1	217
Gelba-j	66	1	66
Gelba-k	108	1	108
Gelba-l	95	1	95

Gelba-m	95	1	95
Gelba-n	95	1	95
Lsan kamh	<u>780</u>	2	390
Total	27174		

Source: Researcher, "A" Company archive data, 2012.

d. Comparison between "A" Company's traditional costing system and ABC system:

Table 6: Overhead costs assigned under traditional costing system & ABC system

Products	Units produced	Traditional system	ABC system	Difference
Right- Fax	5	459	478	-20
Lsan	8	573	386	187
Left-Fax	5	459	478	-20
Kapas	5	611	606	5
Ruler-tathbet	6	631	581	49
Amoud	1	516	1415	-899
Trus-lobad	2	1261	2272	-1011
Glb- Nhas	1	649	1179	-530
Kofof- A	4	306	110	196
Kofof- B	4	306	110	196
Gelba-a	1	535	523	12
Gelba-b	1	229	565	-336
Gelba-c	1	573	758	-185
Gelba-d	1	535	523	12
Gelba- e	1	382	307	75
Gelba-f	1	115	108	7
Gelba-g	1	153	126	27
Gelba-h	1	497	398	99
Gelba-i	1	267	217	50
Gelba-j	1	191	66	125
Gelba-k	1	115	108	7
Gelba-l	1	115	95	20
Gelba-m	1	115	95	20
Gelba-n	1	115	95	20
Lsan kamh	2	841	390	451

Source: Researcher, "A" Company archive data, 2012

Results and Discussion

Based products cost in terms of overhead. ABC system has changed product costs for all products of their hidden completely by the A company' costing system. This difference in product costs leads to the same difference in profit. As indicated above with low production volume, but high cost allocation product real unit cost increased with ABC system for products (Right- Fax, Left- Fax, Amoud, Trus-lobad, Glb- Nhas). However unit cost decreased with ABC system by products (Lsan, Kapas, Ruler-tathbet, Kofof- A, Kofof- B, Gelba-a, Gelba-d, Gelba-e, Gelba-f, Gelba-g, Gelba-h, Gelba-I, Gelba-j, Gelba-k, Gelba-l, Gelba-m, Gelba-n, Lsan kamh) because of low

costs allocation . It's clear that ABC system determined product cost more accurately than company's costing system because it classified the overhead cost on activities and used multiple cost driver rather than one cost driver (machine hours) in traditional costing system. Based on above analysis "A" Company according to product cost under ABC system should concentrate on products (Right- Fax, Left- Fax, Amoud, Trus-lobad, Glibt- Nhas) for cost reduction and control rather than products (Lsan, Kapas, Ruler-tathbet, Kofof- A, Kofof- B, Gelba-a, Gelba-d, Gelba- e, Gelba-f, Gelba-g, Gelba-h, Gelba-I, Gelba-j, Gelba-k, Gelba-l, Gelba-m, Gelba-n, Lsan kamh) as pointed out by "A" company costing system. Also, it's clear that as in (table 6) the costs of many products with ABC system are less than traditional costing system. Consequently, the net profit by ABC system is greater than traditional costing systems. It can be concluded that many products are more profitable by ABC system than traditional costing system by more than half companies. In addition, ABC system provided details information on activities (value added and non value added) which help management to reduce costs by eliminating activities that do not add value and increasing the efficiency of existing activities; controlling costs and enhancing pricing strategy and this ultimately enhance the performance measured by cost and net profit. These results answer the study question and confirm the suggestion that there is a positive relationship between application of ABC system and company' financial performance which confirms what indicated by other studies that ABC system significantly improves company performance in terms of accounting-based measures, for example, *Cagwin, & Bouwman; AL-Kadash, & Ferdium; El shesheni; Hughes.*

Findings

The application of ABC system in "A" Company determines products costs more accurately than existing costing system which distorts product costs information; overcosted high volume products and undercosted low volume products. In addition, ABC system reduces cost; and increases the profit of many products and provides detailed information on activities costs and related cost drivers which gives "A" company good opportunities for improvement and contributes to profitability

Recommendations

According to the study results, the following recommendations are suggested: Applying ABC system as a main product costing by “A” Company to enhance the accuracy of product cost information. Activating the role of the modern costing systems more and train employees with courses to enhance their skills and experiences to meet the requirements of new business environment. Integrating ABC system with other modern costing systems such as total quality management (TQM), Just In Time (JIT), Target costing (TC) in evaluating manufacturing companies performance.

Limitations and implications for future research

There are several important limitations to this study. The foremost limitation of this study is the narrow focus on one organization as unit of analysis. Consequently, this does not allow generalizations to the population from which the unit came. Future research can address this problem by utilizing valid sampling techniques to test specific hypotheses derived from the results of this study. A second issue may be this study is limited to just one modern costing systems (ABC) and ignored other modern cost accounting systems. Furthermore, it was difficult to obtain both large sample sizes and the volume of cost data necessary to adequately measure financial performance. Further research is also required to examine the relationship between ABC system and financial performance on a larger sample and a longer time series.

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