

Relevance and Applicability of Activity Based Costing: An Appraisal

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Abstract: In today's cutthroat and recurrently changing business environment, firms require to be cautious of the impacts of the changes in the business environment and develop appropriate strategies to survive and flourish. One pioneering costing method designed to deal with dearth of traditional costing systems is Activity Based Costing (ABC). Activity Based Costing can drastically change how managers determine the mix of their product line, price their products, identify the location for sourcing components, and assess new technology. Activity Based Costing is supposed by practitioners and academics as the normative appropriate cost system, and demonstrates its superiority over traditional absorption costing. This study tries to evaluate the relevance and potential applicability of Activity Based Costing (ABC).

Keywords: Activity Based Costing; traditional costing systems.

1. INTRODUCTION:

One pioneering costing method designed to deal with dearth of traditional costing systems is Activity Based Costing (ABC). ABC, pioneered by Robin Cooper, Robert Kaplan and H. Thomas Johnson (Cooper, 1988a, 1988b, 1990; Cooper and Kaplan, 1988), is a costing methodology used to mark out overhead costs directly to cost objects, that is, products, processes, services, or customers and help managers to make the right decisions regarding product mix and competitive strategies. ABC can drastically change how managers determine the mix of their product line, price their products, identify the location for sourcing components, and assess new technology. Activity-based costing is a method that is steadily more used to improve the accuracy of product cost information. Traditional costing systems allocate overhead costs arbitrarily, primarily based on direct labor hours. However, direct labor hours often do not adequately represent the percentage of indirect resources consumed by a certain cost object in a certain period. As a result, product cost distortion occurs. Activity-based costing provides a solution to this problem by viewing the manufacturing system as being composed of activities. It assigns the costs of these activities to cost objects by using cost drivers that represent the consumption of indirect resources by cost objects more accurately than arbitrary allocation bases. Therefore, ABC can be defined as a method of costing activities that are necessary for the production of products or services (i.e. activities being undertaken) (Dandago, 2003).

According to Turney, ABC is a technique of measuring the cost and performance of activities and cost objects. Hence, the system assigns cost to activities based on their use of resources, and assigns cost to objects based on their use of activities. Furthermore, ABC was described as a full absorption costing method that gain more and more ground than conventional methods, due to more correct cost assessments and superb tracing of the costs (Emblemsvag, J., 2001). ABC was also defined (Drive, 2001) as a system that allows organizations to track the cost associated with activities performed to produced products or to deliver services. Activity Based Costing (ABC) is a managerial accounting system which determines the cost of activities without distortion and provides management with relevant and timely information. It does not represent just a new set of overhead allocation rules or techniques to value inventory. ABC represents a way to look at operating costs and provides methods to dissect the underlying activities, which cause costs to exist.

In today's cutthroat and recurrently changing business environment, firms require to be cautious of the impacts of the changes in the business environment and develop appropriate strategies to survive and flourish. Developments in manufacturing and communication technologies have severely changed the ways businesses conduct their activities. Adoption of advanced manufacturing technologies such as robotics and computerized manufacturing have resulted in significant changes in the manufacturing cost structure which have led academics and practitioners to argue that the traditional

costing methods are no longer sufficient within this new manufacturing environment (Johnson and Kaplan, 1987). This had resulted in the change from the traditional volume-based cost model to new costing methods such as Activity Based Costing (ABC). Due to its ability in providing more accurate costing information and enhancing firms' performance, ABC is becoming more and more popular. ABC aims to provide accurate costing information to managers to allocate activity costs to products and services by applying cost drivers. Academicians who advocate ABC, such as, Cooper and Kaplan, and Swenson argue that it provides more accurate cost data needed to make appropriate strategic decisions about product mix, sourcing, pricing, process improvement, and evaluation of business process performance. These claims have led many firms to adopt ABC systems.

With respect to the hierarchy of factory operating expenses, four activities are separated in activity-based costing, that is, unit-level activities, batch-level activities, product-sustaining activities, and facility-sustaining activities (Cooper and Kaplan 1991). Firstly, expenses for unit-level activities consist of direct labor, materials, machine costs, energy, and so on. Secondly, expenses for batch-level activities consist of setups, material movements, purchase orders, inspection, and so on. Thirdly, product-sustaining activities consist of process engineering, product specifications, engineering change notices, product enhancement, and so on. Finally, facility-sustaining activities consist of plant management, maintenance of the building and grounds, heating and lighting, and so on. Unit-level activities and batch-level activities could be examined through simulation from among those activities. The procedure of applying fixed costs to products through a cost markup percentage, based on some reasonable measure of activity in a department (machine-hours in fabrication, labor-hours in assembly), had its origins in the financial accounting requirement to allocate all production costs to items produced. This system works well at the aggregate level of financial statements – to obtain values for inventory and cost of sales – and is generally inexpensive to operate. However, the system can produce enormous errors in attributing the consumption of production resources to individual products (Kaplan and Atkinson 1989). In an activity-based system, the cost of a product is the sum of

the cost of all activities required to manufacture and deliver the product. The allocation bases used by activity-based cost systems are termed *cost drivers*. A variety of cost drivers can be used to trace volume-unrelated costs, including:

- ☐ Setup hours.
- ☐ Number of setups.
- ☐ Material handling hours.
- ☐ Number of times handled.
- ☐ Ordering hours.
- ☐ Number of times ordered.
- ☐ Part number administration hours.
- ☐ Number of part numbers maintained.

Managing costs across the firm means managing the costs incurred before the product is manufactured (upstream costs, i.e., research and development, and product design, and so on), while the product is manufactured (manufacturing costs), and after the product is manufactured (downstream costs, i.e., Marketing, distribution, customer service, and so on). Total manufacturing cost is the sum of the cost of materials, labor, and applied overhead. If manufacturing overhead were a negligible portion of total product cost, misapplication of manufacturing overhead would not be a concern. However, in a business environment characterized by high technology manufacturing, overhead cost is a large percentage of total manufacturing cost. While overhead as a percentage of total manufacturing costs has steadily increased, the percentage of direct labor content has decreased (Ruhl and Bailey, 1994).

In view of the above discussion, this study tries to evaluate the relevance and potential applicability of Activity Based Costing (ABC).

2. REVIEW OF LITERATURE:

In this section, selected ABC implementation empirical studies, which spanned 1995-2008 periods, have been outlined. Factors used by previous research to investigate the effect on ABC success implementation are summarized, and stage of ABC implementation also is outlined.

Table: 1: A summary of Literature Review related to ABC Success Implementation

Author	Method	Variable	Stage
Shield (1995)	Survey	Behavioral, organizational, technical	Not specify
Anderson (1995)	Case	Individual, organizational factors, technical, task and so on	All the stages
Innes et al. (1995)	Survey	Behavioral & organizational variables	Adoption
Gosselin	Survey	Structure & strategy	Adoption

(1997)			& Implementation
Norris (1997)	Case	Behavioral & Organizational	Not specify
McGowan & Klammer(1997)	Survey	Behavioral & organizational	Not specify
Brewer (1998)	Case	National culture	Not specify
Krumwiede (1998)	Survey	Contextual & organizational	All the stage
Anderson & Young(1999)	Interview & survey	Organizational & contextual variables	Implementation
Supitcha et al (2001)	Case	National culture	Not specify
Innes et al. (2000)	Survey	Behavioral & organizational variables	Adoption
Sartorius et.al (2000)	Survey	Organizational variables	Not specify
Cotton et.al (2003)	Survey	Behavioral & organizational variables	Adoption
Khalid (2003)	Survey	Size, production, overhead	Adoption
Baird et.al (2004)	Survey	Size, decision usefulness of cost information, culture	Adoption
Ruhanita et al. (2006)	Survey & Case	Cost distortion, decision usefulness, IT, organizational	Adoption
Lana & Fei (2007)	Case	Technical, behavioral, organizational, contextual factors	All the stage
Baird et al. (2007)	Survey	Organizational factors, culture	Implementation
Sartorius et al. (2007)	Survey	Organizational, technical factors	Adoption
Colin et al. (2008)	Survey	Behavioral & organizational	Implementation
Majid et al. (2008)	Case	Behavioral, organizational & technical variables	Adoption & implementation

Source: Adapted from Lana and Fei (2007).

From the review of previous research, this section highlights the gaps from previous research. First, as highlighted by Lana and Fei (2007) a majority of ABC research still was done in developed countries and very little research has been done in developing country, especially in Asian context. Thus, it is necessary to identify whether the Asian culture and way of doing business may have a different impact on the extent of ABC adoption and implementation. Second, a majority of ABC research reviewed adopted the behavioral and organizational variables. Third, few research have examined the effect of corporate culture on ABC success empirically. Forth, very few studies have investigated the effect of national cultural

on ABC. Finally, the selected articles show most of ABC implementation research were conducted using quantitative method such as questionnaire survey, and there are very few research used qualitative method.

3. MECHANISM IN ACTIVITY BASED COSTING (ABC) SYSTEM:

ABC is an economic model that identifies the cost pools or activity centers in an organization and assigns costs to cost drivers based on the number of each activity used. In theory, Cooper describes two stages in the ABC model (Cooper, 1987; Cooper, 1987b). In the first stage, costs are

assigned to cost pools within an activity center, based on a cost driver. There is no equivalent step in a traditional costing approach. In the second stage, costs are allocated from the cost pools to a product based on the product's consumption of the activities. Since the cost drivers are related to the activities, they occur on several levels:

- 1) Unit level drivers which assume the increase of the inputs for every unit that is being produced.
- 2) Batch level drivers which assume the variation of the inputs for every batch that is being produced.
- 3) Product level drivers which assume the necessity of the inputs to support the production of each different type of product.
- 4) Facility level drivers are the drivers which are related to the facility's manufacturing process. Users of the ABC system will need to identify the activities which generate cost and then match the activities to the level bases used to assign costs to the products.

While using the ABC system, the activities which generate cost must be determined and then should be matched to the level drivers used to assign costs to the products.

Mechanism in ABC System can be explained with a numerical example. Let us assume that a company produces two products 'X' and 'Y'. Both of these are

produced on the same equipment, and both use the same processes. The products differ by the volumes in which they are sold, and therefore the volumes in which they are produced. Product 'X' is the high volume product and product 'Y' is the low volume item. An ABC system involves the following stages in the process of arriving at the cost of a product.

The implementation of the ABC system has the following steps:

Step-I: Identifying the activities such as engineering, machining, inspection...etc.

Step-II: Determining the activity costs

Step-III: Determining the cost drivers such as machining hours, number of setups, engineering hours...,etc.

Step-IV: Create a cost centre / cost pool for each major activity,

Step-V: Trace the costs of activities to products (goods or services) according to the products demand for or consumption of these activities (Using the extent to which the cost drivers are consumed as a measure of this demand).

Step-VI: Collecting the activity data

Step-VII: Computing the product cost

Details of product inputs and outputs and the costs of activities involved are as follows:-

	Machine hours Per unit	Direct Labour hours Per unit	Annual Output units	Total Machine hours	Total Direct Labour hours	No. Of purchase orders	No. of 'setups'
Product 'X'	4	8	2,000	8000	16,000	160	80
Product 'Y'	4	8	20,000	80000	16,0000	320	120
				88000	176000	480	200

The cost of these activities is as follows:-

	Rs
Volume related	2,20,000.
Purchase related	2,40,000
Set-up related	4,20,000
Total =	8,80,000

Traditional volume based costing system

	Rs
Cost centre allocated costs:	8,80,000
Overhead rate per machine hour	Rs 10 (Rs 8,80,000 / 88000 hrs)

Overhead rate per direct labour hour Rs 5 (Rs 8,80,000/176000hrs)

Cost per unit of 'X' = Rs 40 (4 machines hrs @ Rs 10 or 8 DLH's)

Cost per unit of 'Y' = Rs 40 (at Rs 5 per hour)

Thus total cost allocated to product 'X' = Rs 80,000 (2000 X Rs 40)

And total cost allocated to product 'Y' = Rs 8,00,000 (20,000 X Rs 40)

Activity Based Costing system

Activities			
	Volume related	Purchasing related	Set-up related
Costs traced to activities	Rs 2,20,000	Rs 2,40,000	Rs 4,20,000
Consumption of activities	88000 machine hrs.	480	200 set-ups
Cost per unit of consumption	Rs 5 per machine hr.	Rs 500	Rs 2,100 per set-up
Thus cost traced			

to the product =			
‘X’	Rs 20,000 (4000 X Rs 5)	Rs 80,000 (160 X Rs 500)	Rs1,68,000 (80 X Rs 2,100)
‘Y’	Rs 20,000 (4000 X Rs 5)	Rs160,000 (320 X Rs 500)	Rs2,52,000 (120 X Rs 2,100)

Thus cost per unit under ABC:

Product ‘X’ : (Rs 20,000 + Rs 80,000 + Rs1,68,000) / 2,000 units
=Rs 134.

Product ‘Y’ : (Rs 2,00,000 + Rs 1,60,000 + Rs2,52,000) / 2,000 units
=Rs 30.60.

4. IMPLEMENTATION OF ACTIVITY BASED COSTING – A PHASE WISE PLAN

The best way to approach an ABC implementation is as follows:

Phase I - Preparing the company for ABC

- Defining ABC mission
- Determining the technical, organizational, cultural and external impediments to implementing ABC
- Determining training requirements
- Developing innovative cost reports including contribution focused product line P&Ls
- Identifying accounting rules
- Identifying regulatory, statutory, FASB and GAAP conflicts

Phase II - Organizing to implement ABC

- Developing a reasonable implementation plan
- Determining the necessary resources for implementing ABC
- Organizing a cross-functional implementation team
- Analyzing why some ABC implementations fail and how your company can succeed

Phase III - Developing a data integrity process

- Impact of poor data in any cost model
- How to develop a formal data integrity process
- Using Missing Data reports
- Using Cyclic Data Certificate reports
- Executive data integrity monitoring
- Leadership benefits from solving the data integrity problem

Phase IV - Determining the real sources of product cost

- How to define activity centers
- How to identify and differentiate Production Activity Centers (PACs) and Support Activity Centers (SACs)
- How to segment SACs into Factory Support Activity Centers (FSACs) and Business Support Activity Centers (BSACs)
- How to replace cost center, work center, profit center, and department definitions with new activity center definitions

- How to create the necessary general ledger accounts and interfaces

Phase V - Describing the activities performed in each activity center

- How to determine each activity center's resources and create a 'resource schedule'
- How to identify and document significant activities performed in each activity center
- How to develop activity center specific definitions of 'value adding' (VA), 'non-value-adding' (NVA) and 'non-value-adding required' (NVAR)
- How to determine each activity center's 'customers'
- How to determine and document the level of effort required to support each internal 'customer'
- How to use the 'resource schedule' and 'activity analysis' to immediately begin reducing costs
- How to rank and select waste elimination projects using the 22 42 matrix
- How to mobilize employees to eliminate non-value-added activities themselves

Phase VI - Determining the relationships of cost sources

- How to describe the relationships between production and support activity centers
- How to allocate individual cost partitions (instead of total activity center costs)
- How to develop a cost flow map

Phase VII - Developing an 'Activity Center Performance and Cost Diagnostic' (ACP&CD) tool to describe the total costs of each activity center

- How to develop and use cost diagnostic tools
- How to define the sequence of activity centers to analyze
- How to link diagnostic tools and invent new allocations rules
- How support costs can be automatically allocated via an activity model
- How to test diagnostic values by performing a 'slice' analysis

Phase VIII - Calculating other allocation values

- How to develop a Material Acquisition Burden (MAB) diagnostic tool
- How to develop a Product Line Support Overhead (PLSO) diagnostic tool
- How to develop an Unmodelled Overhead (UO) diagnostic tool

Phase IX - Using Activity Based Costing to make decisions

- How to 'roll up' material, labor, burden and overhead into an activity based product line P&L
- How to use ABC within the confines of an existing database
- How to flow cost data into segmented P&Ls
- How to develop a Product Cost Portfolio Report
- How to replace financial reporting with causal metrics.

5. RELEVANCE AND APPLICABILITY:

ABC is supposed by practitioners and academics as the normative appropriate cost system, and demonstrates its superiority over traditional absorption costing. It is intended to support strategic decisions and as Cooper, one of its foremost pioneers, claimed its purpose is merely to focus management attention on resource consumption. Managers at all organizational levels perceive ABC data as more accurate and reliable than those generated by traditional costing and are willing to use them for decision-making and performance evaluation. ABC handles overhead costs, which in most organizations constitute the main operating costs, and addresses marketing, general and administrative costs, as well. Whereas traditional cost systems frequently understate profits on high-volume products and overstate profits on specialty items, ABC reveals the cost of complexity arising from the range of products and variations by allocating all costs to the products or services that consume them. ABC implementation leads to a better understanding of the cost drivers that generate these costs, thereby focusing management attention on the way resources are consumed by activities and supporting effective management of these activities. ABC is suitable for service organizations, while traditional costing is irrelevant for them. Thus, ABC systems have been implemented by banks, healthcare organizations, government organizations, telecommunications organizations and insurance firms.

Activity Based Costing has been extensively used in corporate organizations worldwide, especially in the last decade. Managers need accurate costs for strategic decisions, product design, manufacturing and marketing decisions. These decisions will be influenced by the anticipated cost and anticipated profitability of the product (Cooper and Kaplan, 1988). Conversely, if product profitability drops, the question of its discontinuance will be raised. As per Kaplan (1993), several companies are using forecasts of product volume and mix process efficiencies to obtain estimated spending for the future activities and resources. Used in this way, the ABC model becomes a powerful tool for the budgeting process. In general, Cooper, et al (1992) found that ABC management benefits both strategic and operational decisions. Companies use the information to make major decisions on product lines, market segments, and customer relationships, as well as to stimulate the process improvements and activity management.

The popularity of Activity-Based Costing (ABC) grew rapidly during the 1990s, and, in the following decade,

many surveys reported usage rates of about 50%. Over the past 10 years, there has been debate about the overall relevance of this costing method. The value and usage rate of activity-based costing methods have recently been the subjects of debate among practitioners and academics. Prior surveys indicate that the usage rate of ABC has leveled over the past several years and questions are being raised as to its value relative to its cost of implementation.

During the past several years, consultants, practitioners, and academic investigators have noticed that activity-based costing (ABC) methods, developed to improve decision support and the accuracy of cost- and profit-measurement systems, too often have yielded less than the desired results. Robert S. Kaplan and Steven R. Anderson state, "Many companies abandoned activity-based costing because it did not capture the complexity of their operations, took too long to implement, and was too expensive to build and maintain." Further criticism of ABC appeared elsewhere. "Straightforward in theory, ABC proved disreputably difficult in practice. It involved defining 'activities' and trying to judge (often subjectively) how much overhead each used and it had to be done regularly. Companies got fed up, and many abandoned it.

ABC suffers from the weaknesses that are typical of absorption costing, and may be criticized as follows:

The main distinction between traditional absorption costing and ABC is the number of allocation bases, or cost drivers in ABC terminology. The use of absorption costing requires subjective selection of absorption criteria, allocation criteria, and volume assumptions. ABC creates a more complicated costing system, but not necessarily an accurate or useful one. When the production volumes change, ABC cannot predict profits, therefore it is not adequate for decision-making. Therefore, ABC is based on subjective arbitrary cost allocations.

If there is an internal capacity constraint within the firm, i.e., the demand for its products is greater than its production capacity, the firm should find out the optimal product mix according to each product's contribution per unit of the limited resource. The "costs" of the various products are not relevant for the product mix decision. So, ABC ignores constraints and does not differentiate a bottleneck from resources with excess capacity.

ABC regards the relation between activities and resource consumption as linear, absolute and certain. This means that additional activities result in additional costs, and reduced activity levels imply cost reductions. However, in reality, there are discontinuities of costs. In sum, allocation of all kind is arbitrary, and the use of any method based on full allocation (traditional cost accounting or ABC) may cause a misleading decision-making process. Nevertheless, even though most firms that tried ABC finally decided to discard it, they did seem to regard it favorably, judging by the many case studies and articles in the literature.

6. CONCLUSION:

Effective implementation of an ABC system is not a minor task. It accentuates that the application areas need to be selective as well as the overall project needs to be more carefully managed. Since ABC is not requirement for mandated regulatory reporting, further cost benefits analysis along with its intended objective needs to be carefully reviewed prior to its implementation. ABC includes a new calculation procedure of the calculation cost of products/services, significantly different from those applied by the classical method of calculating costs. The difference is reflected in the conceptual basis of calculating costs and applied basis for allocation of overhead costs. Conceptual basis of the ABC are the different activities carried out within the production and non-production functional areas. Managers often felt that traditional cost accounting is not relevant, and that they "have to do something different". This may explain much of the ABC proliferation during the 1990's. However, it seems that the benefits to the firms generated not from the cost allocation data but rather from the fact that the ABC pilots involved thorough analysis of processes and costs, and drew attention to neglected aspects of organizational activities. This resulted in improvements that were attributed to ABC and thus enhanced its positive image. What ABC actually did was to emphasize the need to focus and to cut down the cost of operational complexity.

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