



The integration time-driven Activity-Based Costing (TDABC) and events approach: Their role in decision-making and their effect on tourism

Mohanad Abdul Rahman
College of Economic Sciences
University Baghdad, Iran
E-mail: hksharaf92@gmail.com

Miaad Hameed Ali
College of Administration and Economics
University of Baghdad, Iran

Ruaa Hussein Abdual Hussein
Madenat Alelem University College, Iran

Abstract

The importance of using modern techniques in providing cost-effective information has been demonstrated. The current study reveals that the administration can trust these techniques via measuring the real-time product costs per each activity achieved. It copes with the problems caused using the ABC system in the treatment of industrial allocation of indirect costs and distribution to the product unit process. Activity-based costing (ABC) is then a costing method that recognizes activities in an organization and allocates the cost of each activity to all products and services according to the actual consumption of each. This model assigns more indirect costs (overhead) into direct costs compared to conventional costing. The price of the product per unit is calculated according to the integration of TDABC and the events approach in a factory. The outcomes of the current research showed that the combination of both an Events approach and Time-Driven Activity-Based Costing have an impact on the economic entity to distribute costs (TDABC). Time driven ABC reduces the amount of data required, and only needs estimates of: (1) the real-world capacity of dedicated resources and their cost, and (2) unit times for accomplishing transactional activities. The cost allocation to activities with higher accurate consequences by relying on the time spent on these activities and the share of each product from the time were studied.

Keywords: Cost-allocation, technology, events, ABC.

Introduction

In the contemporary environment, traditional costing techniques have provided inadequate information and indicators for management to take decisions related to the company's activity because the cost structure has been affected by the modern manufacturing environment, which has increased indirect industrial costs (Spedding *et al.*, 1999; Fullerton *et al.*, 2004). This requires the application of advanced technologies that are characterized by ease and speed of use application, estimation, and the speed of updating it according to the various operations and the quality of resources (Cho, 2006). It also helps in determining the rates of cost turnover based on the actual capacity of the resource supply, which led the owners of tourism and other companies to follow modern techniques in calculating the cost of products, taking into account the actual period of time that the production process took



(Kaplan *et al.*, 2003). This is besides the share of each product of the industrial indirect costs on the basis of that period and the amount of energy consumed (Cleveland *et al.*, 2000). In addition, among these technologies is the TDABC, which is specifically designed to streamline the application and maintenance of cost systems and focuses on eliminating the management's difficulties in implementing ABC by replacing cost-driven engines (activities, resources) based on real-time consumption with the provision of detailed information provided by the events portal in order to access information that enables management to make effective administrative decisions (Cooper *et al.*, 1991). Moreover, in decision-making research, it is, therefore, essential to identify the features of key decision-makers (Adam *et al.*, 2012). The decision-making method, as the concise compilation of data, as well as the tourist, will select one destination from a selection of options, according to the data gathered. Many factors play an essential part in the choices made by tourism, and other sectors are taken into the same consideration (Geldenhuys *et al.*, 2014).

Time- Driven Activity Based Costing (TDABC)

The developments that accompanied the modern manufacturing environment and the emergence of large production and contemporary technologies as well as the need of economic entities for appropriate data related to the costs of their products, led to the necessity of reviewing the techniques used in calculating the costs of the products. It also led to the search for techniques that serve these units and provide more accurate information that contributes to making rational decisions reflected on the performance reality. The economic entity and its position in the labor market, especially as in the changes in the manufacturing environment, led to a shift away from the use of traditional technologies, which became inappropriate and unreliable and the inclination towards the adoption of new technologies serve the entity and provide appropriate information, especially after entering the era of credit and the use of electronic technology in many industries which requires a search for techniques to calculate the cost of products to keep pace with those who change. TDABC is defined as a cost system based on the principle of drag according to two measures (Corina *et al.*, 2008):

- 1- The number of time units required to complete the activity.
- 2- Unit cost of time, while others defined it as an application of the idea that available resources are separate from the consumers of those resources. (Balakrishnan & Sivaramakrishnan, 2012).

Steps of TDABC

The steps of the TDABC implementation can be illustrated by (Everaert *et al.*, 2008; Szychta, 2010).

- Step1:** Determine the resource group that triggers time activity.
- Step2:** Estimate the cost of the resource group that performs the activity.
- Step3:** Estimate energy (process) and not energy (theoretical) for each set of resources.
- Step4:** Calculate the unit cost of total time resources.
- Step5:** Determine the time required for each event in the activity.



Time-Equation

The cost system which is used on the basis of a time-driven activity, has time-dependent cost factors duration drivers such as the time required to run an order from a client, the number of hours needed to process the machines and why this is in the light of complex environments that do not require performing activity every time. Consumption of the same amount of available resources depends on the characteristics of the activity each time the activity is performed. The general equation of time, time = T is required for the event k in Activity j under p of the possible time triggers X . In other words, the time equation is used to express the time it takes for an activity to occur as a function of different properties. The causes of time can be expressed by (Bruggeman et al., 2005) as follows:

$$T_{j,k} = \beta_o + \beta_1 \cdot X_1 + \beta_2 \cdot X_2 + \beta_3 \cdot X_3 + \dots \dots \dots \beta_p \cdot X_p$$

Where:

$T_{j,k}$ The time required to complete event k in activity j .

β_o Standard time for performing the basic operation.

β_1 The estimated time for the incremental activity in an operation.

X_1 The quantity of incremental activity in an operation.

Event approach

This approach is one of the modern approaches to the construction of accounting theory. The differences between the points of view of the committee emerged from the American Association of Certified Public Accountants. Those who support this approach believe that the purpose of accounting is to provide information on appropriate economic events that may be appropriate for decision models (Sorter, 1969). Sorter believes that the event approach requires a database design that supports the dissemination of accounting information from economic entities to users. Indeed, the changing accounting system database becomes possible with advances in database technology, as well as instantaneous receipt of information that can be used to support user decisions led to the use of the changing accounting system database of some economic units (Chan *et al.*, 2007). Events are defined as a phenomenon or process that can be observed (Porwal,, 2001) While others have identified them as a phenomenon that is a source or cause of changes in assets, liabilities and equity (Fargher *et al.*, 2007) , Others go on to define it as an incident or phenomenon that can be described by an unspecified number of characteristics (Johnson,1970).

Objectives of the events approach

Changes in the work environment and technological developments have increased the need for information to be used in a manner that allows for the production of expectations to serve the beneficiaries of that information (Gelinias *et al.*, 2004). The aim of the events portal is to maximize the accuracy of the forecasting of financial reports by focusing on most of the characteristics of events that are appropriate and important to users, especially since the purpose of accounting under the entrance of events is to provide information about economic events that can be modeled for possible decisions as ascertained by Porwal (2001).



Integration Time Driven Activity Based Costing (TDABC)

TDABC and the event approach help in the integration and lead to the provision of detailed financial and non-financial information which depend on the time to distribute the factory overhead costs more accurately, resulting in the cost of the product being more accurate than when using other techniques.

The ABC Activity-based costing (ABC) depending on the time-based activity helps to provide more accurate cost information, rather than that provided by saving the effort of the cost officer needed for providing this information. The system process of getting the information by using an Events Approach will thus save time, as well as efforts. An Events approach provides the specific information required for the daily process of economic entity which is considered as being basic and relied upon by ABC based for Time Driven Activity Based Costing (TDABC). Moreover, by using the exact details provided by an Events approach to assist ABC based on Time Driven Activity Based Costing (TDABC) towards determining the unusable or unemployed resources during the period of activity, this invariably helps to identify deviations and causes, which makes it easier to process.

Since accounting and management of accounting are based on the financial and non-financial information provided by financial accounting in their financial statements, the current research is based on the providing of detailed information on the economic events of the economic entity during a certain period of time through the use of an events approach as outputs which are later used as an inputs in the Costing System based on Time Driven Activity Based Costing (TDABC).

It is known that the value input provides aggregate information, while the event entry provides detailed information about the events (financial and non-financial information) that are useful in integrating TDABC in calculating the cost of the product with near precision. Furthermore, there are great effects on Tourism consumption, usually prices and wages in industries are increased because the impact of tourism. The main reason of this increase is that the products sell directly to tourists (Ngwira & Kankhuni, 2018).

Calculating of product cost

The authors present the data for the production of a particular product in a sewing factory (private sector) which could equally be applied to a hotel or restaurant chain. The indirect industrial costs were collected, and then use of the Events approach in the presentation of these data, which will be used as inputs in the Costing System based on the Time Driven Activity.

Table 1. cost per hour

Factory overhead Costs	Required Hours	Cost per hour
The fee and indirect salaries	2000 H	2000 D / H
Depreciation	1000 H	3000 D / H
Fuel	80 H	2500 D / H
Work equipment	30 H	1000 D / H



Table 2. Distribution of hours on activities

Activities	Cost type	The time of each activity	The cost of hour
Management	Fee	1000	2000
	Depreciation	750	3000
	Fuel	50	2500
	Equipment	10	1000
Covering	Fee	550	2000
	Depreciation	150	3000
	Fuel	20	2500
	Equipment	11	1000
Quality control	Fee	450	2000
	Depreciation	100	3000
	Fuel	10	2500
	Equipment	9	1000

Table 3. Total costs of production activities used for industrial costs

Activities	Cost type	The costs
Management	Fee	2000000
	Depreciation	2250000
	Fuel	125000
	Equipment	10000
Total		4385000
Covering	Fee	1100000
	Depreciation	450000
	Fuel	50000
	Equipment	11000
Total		1611000
Quality control	Fee	900000
	Depreciation	300000
	Fuel	25000
	Equipment	9000
Total		1234000

Table 4. Determine the hours required to produce required products

Products	Number of the units	Time required of the unit	Total time
The first product	600 Unit	1,5 H	900 H
The second product	900 Unit	2 H	1800 H
The third product	400 Unit	1,25 H	500 H
Total			3200 H



Table 5. Distribution of factory overhead costs on the products

Activities	Products	The cost
Management	The first product	1233281,250
	The second product	2466562,5
	The third product	685156,25
		3200/438500 H
Covering	The first product	453093,75
	The second product	906187,5
	The third product	251718,75
		3200/161100 H
Quality control	The first product	347062,5
	The second product	694125
	The third product	192812,5
		3200/1234000 H

Table 6. The costs charged on products according to TDABC

Product	Type of activity	Cost
The first product	Management	123328,250
	Covering	453093,75
	Quality control	347062,5
		2033437,5
The second product	Management	2466562,5
	Covering	906187,5
	Quality control	694125
		4066875
The third product	Management	685156,25
	Covering	251718,75
	Quality control	192812,5
		1129687,5

The distribution of indirect costs according to the traditional system in the shop as follows:

The first product= 2283158

The second product= 3424737

The third product= 1522105

Conclusions

The current study showed that the Events approach provides an economic entity with financial and non-financial detailed data, which can be used to determine the individual cost accurately. Also, the Events approach could identify deviations and the causes at the same time. Besides, the use of the TDABC precisely helps the economic entity to distribute expenses per unit. Also, TDABC correlation inputs help the financial entity to allocate costs, and the Costing System based on the Events approach activity is by providing the first information that changes the output, which can be used as input to the other system such as tourism industries. Cost accounting is about measuring and reporting financial and nonfinancial information associated with an organization's procurement



or consumption of its resources. It gives us information for both financial and management accounting.

Noone and Griffin (1997) and Mashayekhi and Ara, (2017), state that there are four steps for designing an ABC system in hotels. These steps are: (1) identifying activities, (2) assigning costs to cost pools, (3) selecting appropriate cost drivers for assessing the cost of activities to cost objects, and (4) assigning the cost of the activities to services and to customers. They present the cost drivers and cost pools that could be used by hotels that want to apply the ABC system.

Service companies such as hotels and restaurant chains are ideal candidates for ABC and perhaps even more than manufacturing companies. This is because most of the costs in services organizations are fixed and direct, while hotels for example, can trace important aspects like direct materials and direct labor of cost to distinct products (Kaplan & Cooper, 1998). TBABC delivers not only more comprehensive, but also more accurate information, which helps hotel managers to make more precise and dependable choices. "These decisions may include customer profitability analysis, pricing, and budgeting; as well as strategic investment decisions. Therefore, we suggest implementing ABC in service industries, especially in the hospitality industry" (Mashayekhi & Ara, 2017).

The current study revealed that the integration of both Events approach and TDABC helps the economic entity to distribute costs activity results in cost allocation to activities and the followings with higher accurate consequences by relying on the time spent on these activities and the share of each product from the particular time.

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