

Using Time Driven Activity Based Costing (TDABC) in Measuring the Cost of Bank Service (Applied Study in Al-Rafidain Bank)

Zina Mohammed Sabti Najim Al Askary^a, Hayder Oudah Kadhim^b, Alyaa Hussein Mohmmmed Ali Alesaa^c, ^aTechnical University of Al Furat Al Awsat Technical Institute / Karbala, ^bDepartment of Accounting College of Management and Economics University of Al-Qadisiyah, Iraq, ^cCollege of Veterinary Medicine Department of Public Health University of Al-Qadisiyah, Iraq, Email: Zena_zena@kit.edu.iq, hadier.saidy@gu.edg.ig, Alyaaalesi@qiu.edu.iq

The current research aims to explain the knowledge bases of time driven activity based costing (TDABC) by examining the concept of this approach, its importance, cost drivers, time equations, the steps of applying this approach in the economic units, as well as the role of this approach in measuring the cost of the bank service. This is to determine the real amount of net profit. TDABC was developed in 2003 in order to treat the practical problems faced by economic units when using activity-based costing (ABC). The TDABC approach to the treatment of the problems and shortcomings of ABC, and the introduction of the optimal time approach of the cost with activity based costing, has overcome problems and shortcomings of ABC. The TDABC approach is less costly, faster to implement and easier to use. It also helps in determining the cost rates based on the actual capacity to supply resources.

Key words: *Time Driven Activity Based Costing (TDABC), Cost Measurement, Bank Service*

Introduction

Cost systems have undergone many developments, which have resulted in many approaches to cost measurement, which have been influenced by technological changes and rapid developments in the modern business environment. This is a reflection on accounting ideas and

its ability to provide the required information. ABC is one of the most practical approach applications in the practical life since its birth in 1987 and was developed by Kaplan & Cooper. Their lectures have had a great impact on the adoption of many economic units both public and private in relation to cost approach. The current research explains the knowledge bases of the TDABC approach, in addition to cost drivers and time equations, as well as the bank service and the role of TDABC in measuring the costs of bank service accurately.

Methodology

Research problem

The emergence new costs approaches has become familiar in contemporary accounting, but the continued adoption of these approaches have been accompanied by many problems when the application has become fashionable. In the ABC approach to allocating indirect costs, there much research in support of the application of ABC in this environment, but the entrance to the recent ABC has been criticized for the high costs of access to the appropriate cost guides for various activities and the difficulty of adapting to any change in operations and resource uses. This has led to a shift to the allocation of indirect costs based on TDABC, and to make the latter from the entrance of ABC. The problem of this study is to raise the following research questions:

- 1) What is the time driven activity based costing (TDABC) approach, and can it be applied in service economic units under the changes accompany of the business environment? .
- 2) Can the time driven activity-based costing (TDABC) approach be used in measuring the cost of bank services accurately, and calculating the correct amount of net profit?

Research Objectives

The current research aims to explain the knowledge bases of time driven activity based costing (TDABC) by examining the concept of this approach, its importance, cost drivers, time equations, the steps of applying this approach in the economic units, as well as the role of this approach in measuring the cost of the bank service.

Research Importance

The importance of this research comes from the importance of time driven activity based costing (TDABC), which plays a significant role in the distribution of indirect costs on a cost unit. Thus, it helps to achieve an accurate measurement of cost, which helps the economic unit to determine the real amount of net profit and ensure the achievement of the objectives of the economic unit .

Research Hypothesis

The research is based on a basic hypothesis that: Using of time driven activity-based costing (TDABC) helps the banks in measuring the cost of bank services accurately.

Research Sample

Rafidain Bank was chosen as a sample of the current research for several reasons. The most important is that the bank applied the traditional approach in distributing indirect costs on the cost objectives (units), which led to the failure in distributing the costs fairly on these objectives.

Theoretical Background

Definition of Activity Based Costing (ABC)

Activity based costing (ABC) is a cost approach. It is designed to provide cost information to managers for strategic decisions and other decisions that are likely to affect production capacity, fixed costs and variable costs . ABC is usually used as a complement to the current cost system in the economic unit and don't have a substitute for it (Garrison,et.al.,2012:522). Horngren, et. al. defined this approach that corrects other cost accounting systems by focusing on individual activities and being the primary cost site (Horngren,et.al.,2012:485). ABC was also defined as an approach of measuring the costs and performance of activities, where costs are allocated to activities based on their use of the cost sources. Therefore, costs are allocated to their objectives based on the extent of their use of activities. ABC explains the causal relationship of costs and activities (James,2016:4).

The problems associated with the practical aspect is the high costs of application. The ABC, in essence, is the linking of resources and the tracking of activities. This is done through interviews with staff, as well as direct observation, which includes the calculation of the time spent by employees for completing the activity, which makes this activity very expensive (Turney,2009:142). Any process of expanding the application of the entry into the whole economic unit is difficult and costly (Kaplan & Anderson,2003:2). The process of interviewing employees to estimate the times of activity in the economic unit involves considerable time waste due to their discussion about the accuracy of the cost driven rates of certain considerations and the natural inclination of the workers to adopt more ideal times (Thomson,2003:30). The problem with application is also the complexity of expanding its application. As a competition among economic units increases, everyone is looking for precision in calculating product costs and for increasing accuracy. Activities should be divided into smaller components, which increases the number of activities and the need for a special computer to store and process the data (Namazi,2009:34). They also don't take into account

that the complexity of the expansion is not able to take into account the complexity of operations by calculating the cost of the transaction concerned with a number of costs drivers (Kaplan & Anderson,2003:4-5). Economic units face problems and difficulties that emerge through the practical application of this approach. In many ways the most important is the following : (Kaplan & Anderson,2007:4)

- 1) Inability to collect the data and information necessary for the application, as well as the lack of a plan to collect and measure the information or choose the right person for it in the process of application.
- 2) Resistance of some parties to the application because its believed that the application of the new portal will harm their personal interests, especially in regard to the incentives related to the profitability of their products.
- 3) Inability of the senior management to bring about developments on the applicable systems.
- 4) Lack of causal relationship between the activities performed and the cost drives distort the cost of the product.

Therefore, to overcome the obstacles and problems encountered by the application of ABC, and based on the secret of the success and superiority of the economic unit, which lies in the ability to manage the cost in a scientific and practical way, a new entrance to overcome obstacles and meet aspirations is needed. TDABC was a new approach based on time indicators in the calculation of activity based cost so that the new entrant could identify cost elements more easily using time equations (Bruggeman,et.al.,2005:11). TDABC's ability contains ABC's strengths and overcomes most of its weaknesses. It has helped the economic unit in distributing the indirect cost to return to the forefront, thus shifting from a complex financial system to a tool that provides useful and accurate information at a lower cost for management (Terungwa,2014:10).

Concept and Importance of Time Driven Activity Based Costing (TDABC)

16 years after the arguments with his colleague (Robin Cooper) regarding ABC and its entrance, which suffered from failure in many respects, Kaplen has clearly abandoned the important basics of ABC. The TDABC approach emerged in 2003 to treat some of the practical problems faced by the economic units in using ABC (Namazi,2009:34). The TDABC approach treated the problems and shortcomings of the ABC approach (Terungwa,2014:8). The activity based costing approach has overcome defects and criticisms in and of ABC. TDABC is less expensive, faster in practice, easier to use and helps economic units in determining the cost rates based on the actual capacity to supply resources. TDABC has an integrated system of benefits that qualify it to contain the constraints that plagued traditional ABC. The literature has provided a set of advantages and benefits to this approach, as follows : (Kaplan &

Anderson,2003:7-9), (Bruggeman,et.al.:9), (Namazi,2009:5), (Kaplan & Anderson, 2007:4-7), (Stout & Propri,2012:8-9)

- 1) TDABC provides a more accurate estimate of cost than ABC, where the practical examination of the required time for operation data in the economic unit .
- 2) Ease of development, accuracy in estimating the cost. This approach is characterized by validity and continuity.
- 3) This approach provides clear information during the operation, or after the completion of work. In addition to it is easy and fast in the practical application, easy to update, quick to develop, and operates at a lower cost.
- 4) Estimating the practical capacity of allocated resources and their costs allocated to activities, products and customers. They form a separate item that affects the financial results for the period .
- 5) Drawing the attention of the management to the calculation of profits and the value of shares rather than a system of accounting techniques that consume a lot of time and effort.
- 6) Helping the economic units to estimating the demand of resources for process, product, service, and customers. It takes into account the required time to complete the activities and the time unit cost.

To successfully implement TDABC and use the information generated from the approach effectively and efficiently, it is necessary to integrate it with other operational data, supply systems, information systems and data warehouses that may have system problems as the system is inefficient and ineffective (Coners & Hardit,2004:109) .

Comparison between ABC and TDABC

There are many differences between the two approaches, which are related to capacity, short term pricing, updates, accurate, expansion and reports. These differences made the ABC approach unsuitable for the requirements of the modern business environment. The comparison between ABC and TDABC can be explain in the following table:

Table 1: Comparison between ABC and TDABC

NO.	Comparison	ABC	TDABC
1	Capacity	Depends on the concept of total capacity, the products are loaded by the costs of the utilization & idle capacity	Depends on the concept of practical capacity, the products are loaded by the costs of actual capacity
2	Short term pricing	Increasing the volume of work leads to a change in the unit cost, thus increasing the price of the product	Increasing the volume of work leads to the reduction of untapped resources & their transformation into exploited resources
3	Update	Difficulty of update	Easy of update
4	Accurate	Less accurate in cost measurement	More accurate in cost measurement
5	Expansion	Difficulty of operations expanding	Easy of expanding operations
6	Reports	Preparing annual or semi-annual reports	Preparing reports when needed

Source: (Kaplan,et.al.,2012:225) .

The table above shows TDABC is based on the concept of practical capacity, that is to say, the products are loaded with actual capacity costs, and increasing the volume of work leads to the reduction of untapped resources and their transformation into exploited resources, consequently not affect the pricing of the product. It is easy of update, more accurate in cost measurement, facilitates the expanding of operations and the preparation of reports when needed (primrose,2015:129) .

Cost Drivers and Time Equations

Cost drivers are an activity or variable that underlies the cost of an economic unit (Kaplan,et.al.,2012:227) . Horngren et. al. argue that cost drivers are the main factor causing the increase or decrease in cost, and any change in it will be reflected in the unit cost in economic unit (Horngren,et.al.,2012:485) . Neumann et. al. refers to cost drivers as the first link to the activity-based costing approach to link consumption of resources and activities. The cost consumption has an element to predict the cause and effect relationship. Time drivers are variables or characteristics that determine the required time to conduct an activity. The variables causes of time take three forms: (Barfield, et.al.,2003:214)

- 1) Continuous time variables, such as weight, distance in kilometres, etc.
- 2) Separate time variables, such as the number of orders, production lines, credit checks, bills of payment, etc.

- 3) Time variables which taking a zero or one image, such as the type of customer (old, new), type of order (normal, urgent), etc.

According to time equations, they are considered as one of the steps based on time driven activity based costing, which is used to express the time of completion of the activity or the event using the time drivers, which is the forced representation used to predict the required time to process the activity or event according to specific orders that correspond to the characteristics of the activity (Kaplan, et.al., 2012:425). The general formula for the time equation is as follows: (Bruggeman, et.al., 2007:12)

$$T_{jk} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n$$

Where :

- T_{jk} = The Required Time to Complete Event (k) in Activity (j) .
 β_0 = The Fixed Amount of Time for the Future Activity (j) of the Event Properties (k) .
 β_1 = The Consumed Time for a Unit of the First Time Causative .
 β_2 = The Consumed Time for a Unit of the Second Time Causative .
 β_3 = The Consumed Time for a Unit of the Third Time Causative .
 X_1 = Time Causative of First Activity .
 X_2 = Time Causative of Second Activity .
 X_3 = Time Causative of Third Activity .
 X_n = Time Causative of Last Activity .
 n = Number of Time Causative that Determine the Required Time of Completed Activity .

The cost of the activity is calculated as follows :

Activity Cost = Required Time for Activity \times Cost Per Unit
 Required Time for Activity = Required Time for each Event (k) of Activity
 The Cost of Event (k) for Activity (j) = $T_{jk} \times C_i$

Where :

- T_{jk} = Time Spent on operation (k) in Activity (j) .
 C_i = Time Cost Unit of Resource Group (i) .

Total cost of cost objectives is calculated as follows :

$$\text{Total Cost of Cost Objectives} = \sum_{i=1}^n \sum_{j=1}^m \sum_{k=1}^i T_{kj} C_i$$

Where :

C_i = The Consuming Time cost Unit of Resource Group (i) .

T_{jk} = The Spent Time on Operation (k) in Activity (j) .

n = Number of Resource Pools .

m = Number of Activities .

i = Number of Consumed Activity Times .

Applying Steps of Time Driven Activity Based Costing (TDABC)

The main reason for the implementation of the TDABC are the problems that accompanied the application of ABC. TDABC is based on two phases, as follows: (Atkinson,et.al., 2004:112)

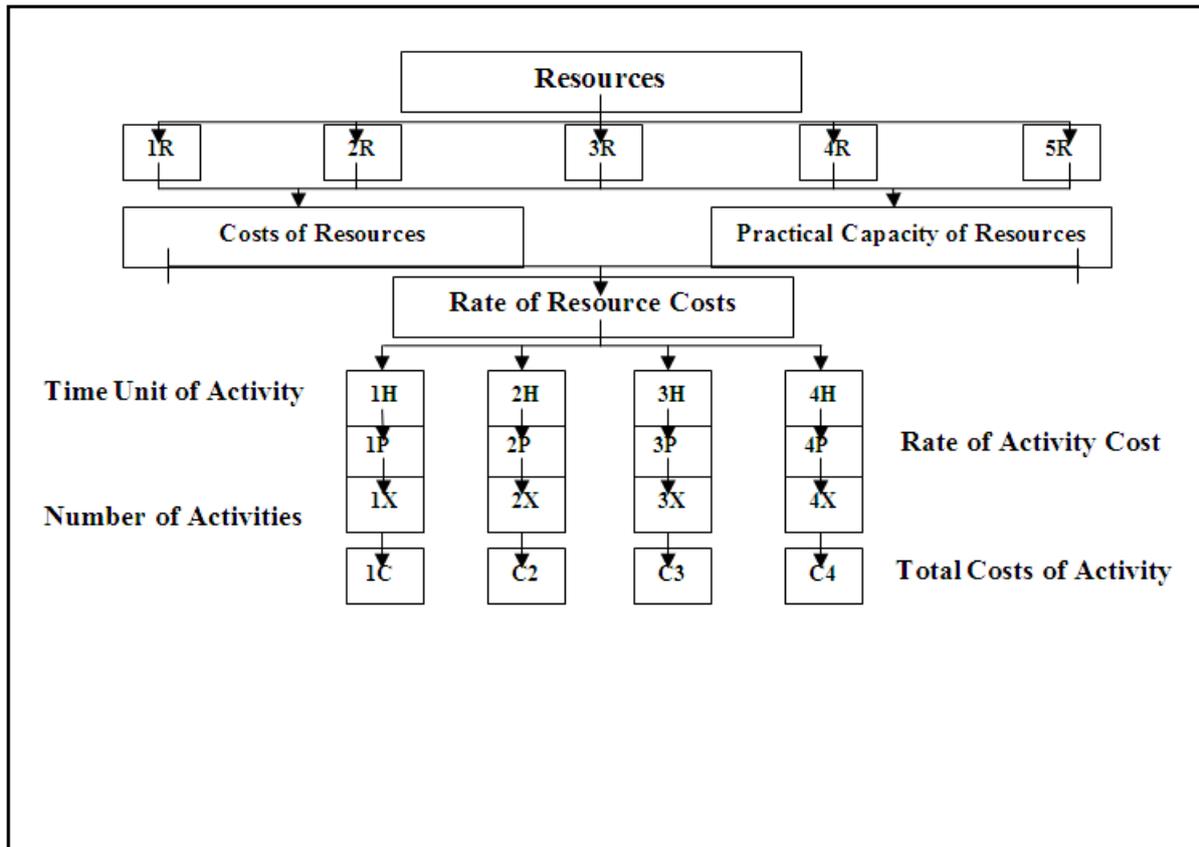
- 1) First Phase: Determining the actual capacity and cost of each resource as a basis for calculating the cost to avoid excesses of cost as a result of loading unused capacity.
- 2) Second Phase: Estimating the required time to perform each activity. TDABC is based on the estimated required time for each operation or event of a single activity that is in turn based on the multiple characteristics of the activity.

In light of the proposals of Kaplan & Anderson, two questions can be answered: (Bruggeman,et.al.,2005:12)

- 1) What is the unit cost of existing resources measured in time? .
- 2) How much time is required for each activity through this resource pools? .

This approach is distinguished from ABC in its ability to use different time drives and is introduced in the equation set to calculate the time of cost for a particular activity (Everett & Bruggeman,2007:16) . If the need to use more than one time drivers is used for each activity for cost accuracy, TDABC can contain it all and ensure a time equation (Bruggeman,et.al.,2005:9). The calculation of the cost of activity using TDABC can be illustrated by figure (1).

Figure 1. Calculate the Cost of the Activity Using TDABC



Source: (Szychta,2010:295)

Role of Time Driven Activity Based Costing (TDABC) in Measuring the Cost of Bank Service

The banking business consists of service activities, whose main function is to accept various bank deposits and then grant them in the form of loans, which means that they are closely related to the acceptance of deposits, in addition to providing services characterized by one bank and another competitive advantage (Udpa,2015:11-12) . The concept of the service refers to a set of activities and processes that are useful in terms of the concrete and intangible elements provided by the bank and which are realized by the beneficiaries through their features and utilitarian value, which are a source to satisfy their current financial and credit needs through the reciprocal relationship between the parties. There are a set of characteristics of bank service, as follows: (Terungwa,2013:5)

- 1) Intangible Products: Bank services are intangible as they don't occupy space, so that banks rely on promotional efforts to explain and clarify the advantages of the services provided.

- 2) Difficulty of quality control: The bank services are consumed during production. The service provider and its recipients are an integral part of the service delivery process, making it difficult in quality control .
- 3) Integration of the Bank Services: The characteristics of the services are characterized by the fact that there is no possibility of separating their production and distribution, which means that the service cannot be produced, stored and sold individually .
- 4) Individual of Marketing System for Bank Services: The bank service is characterized by the adoption of the direct marketing system through the branch network and making the process of performance control easy.
- 5) Difficulty of discrimination in the Bank Services: The bank services provided by banks are not different from each other except in a narrow range. There is a great deal of similarity and is stereotypical .
- 6) Credit Liability: One of the most important responsibilities of any bank is to protect deposits and customer gains, therefore, banking secrecy must be dealt with in the customer's accounts and information submitted to the bank. This obligation extends beyond the end of the customer's dealings with the bank .

The analysis of the bank and its division into activities under ABC can identify the characteristics that must be met in the various activities carried out by the bank to bring about continuous development (Samuel,2005:148). In addition, the first step eliminated under TDABC in banking is a necessary and inevitable step, since the nature and cost behaviour of each activity is different from that of other activities and is necessary when allocating costs to different activities in the bank (Rebischke,2005:8) .

Thus, there is possibility of applying the time driven activity based costing (TDABC) in banks by relying on cost drivers and time equations, in order to measure the cost of the bank service accurately, which helps the bank in reaching the real amount of net profit achieved for each department of the bank.

Applied Study

An Overview of Al-Rafidain Bank and its Accounting System

The current research will be applied in Rafidain Bank. The bank is one of the financial institutions in Iraq. The bank was established in 1941, supporting the national economy in the field of commercial banking. It has passed through several stages during its historical journey. It was present as the first national bank to practice commercial banking among many foreign banks, and began gradual expansion within the country and then went through multiple stages of integration until it became the only commercial bank in Iraq until 1988 .

After this year, Al-Rafidain bank witnessed a new development, which has transformed it into a public company wholly owned by the state in order to support the national economy in the field of commercial banking by investing funds and providing financing to various sectors according to national development plans and within the framework of the economic, financial and monetary policies of the country. Funds and cash surpluses in various aspects of investment are in accordance with the law of the state in question.

According to accounting system used in Rafidain Bank, it applies the consolidated accounting system. The consolidated financial statements are prepared in each branch of the bank, as well as the statistics and disclosures for the Central Bank of Iraq and the office of financial control. The implementation of the orders of the ministry to open and close and transfer current government accounts are conducted in the same way.

Applying the Time Driven Activity Based Costing (TDABC) in Al-Rafidain Bank and Using it in Measuring the Cost of Bank Service

To apply the TDABC in Rafidain Bank, it is necessary to collect some data from this bank. This data is related to the credit department. Other related departments are customer service, the treasury, and internal management. The data concerned with a number of employees in the credit department, customer service, treasury and internal management was 20, 8, 10, and 4, respectively. The daily working hours were 7 hours. The numbers of monthly working days was 20 days. The bank has four types of loans: employee loans, company loans, cars loans and building loans. The number of loans was 1427, 364, 928, 32 loans, respectively. The four types of loans and the required time to implement each of them are explained through table (2).

Table 2: The Required Procedures to Implement the Activities and the Required Time for their Procedures in Rafidain Bank

NO.	Activities	Time (In Minute)			
		Emplo yees Loans	Compani es Loans	Cares Loans	Buildin g Loans
1	Reception of Customer	10	20	20	5
2	Collect Information about the Customer	20	330	100	25
3	Receipt Guarantees from the Sponsor	25	45	60	25
4	Review Customer Data Electronically	30	135	120	30
5	Studying Customer Demand	160	280	120	60
6	Raising the Demand to Management	30	60	45	40
7	Assess the Demand to Credit Management	160	280	120	70
8	Acceptance or Rejection the Demand	45	120	280	50
9	Verify from the Conditions	45	120	160	40
10	Check the Demand by Audit Department	160	220	200	140
11	Raising the Demand to Management	50	80	50	50
12	Dispense the Amount to the Customer	15	35	15	20
Total Time (in Minute)		750	1725	1290	555
Total Time (in Hour)		12.5	28.75	21.5	9.25

Source: Preparation by researcher based on data available in Rafidain Bank.

It is a clear from the table above that the required time to carry out the employees loan activity was 750 minutes, equivalent to 12.5 hours, and the required time to carry out the activity of companies loans was 1725 minutes, which is equivalent to 28.75 hours. In terms of car loan activity, the required time to carry out this activity was 1290 minutes, equivalent to 21.5 hours, and the required time to implement the activity of building loans was 555 minutes, which is equivalent to 9.5 hours. The required time for the implementation of the four types of loans (employee, companies, cares and building) can be illustrated in each of the four departments (credit, customer service, treasury and internal management), which can be explained in table (3).

Table 3: Required Time to Implement Activities by Departments in Rafidain Bank

Activity Unite	Time (In Hour)				Total
	Credit Department	Customer Service	Treasury Department	Internal Management	
Employees Loans	6	2	3	1.5	12.5
Companies Loans	15	3.75	7	3	28.75
Cares Loans	10	3	6.5	2	21.5
Building Loans	4	1	3	1.25	9.25
Total	35	9.75	19.5	7.75	72

Source: Preparation by researcher based on data available in Rafidain Bank .

It is a clear from the above table that the required time to carry out activities in the credit department was 35 hours. The required time to carry out the loan activities in the customer service department was 9.75 hours. The treasury department has reached the required time to carry out the activities was 19.5 hours, and the special time for the implementation of the loan activities in the internal management department was 7.75 hours . Therefore, the total time for the activities of the four types of loans is 72 hours.

The data showed that the credit department has 20 employees. The number of employees in the customer service department is 8. The number of employees in the treasury department is 10. There are 4 employees in internal management. The costs of credit, customer service, treasury and internal management departments are shown in table (4).

Table 4: Costs of Credit, Customer Service, Treasury and Internal Management Departments in Rafidain Bank

DETAILS	COST (IN DINNER)			
	Credit Department	Customer Service	Treasury Department	Internal Management
Employees' Salaries	168481000	67274000	7921000	3624000
Furniture Depreciation	6780000	2125000	3422000	1998000
Computers Depreciation	8920000	3420000	2501000	1102000
Stationery and Prints	2422000	426000	1223000	322000
Transfer Expenses	4525000	2712000	3220000	1239000
Maintenance Expenses	985000	396000	416000	215000
Water and Electricity	980000	627000	719000	375000
Internet Fees	720000	450000	532000	350000
Total Costs	193813000	77430000	19776000	9235000

Source: Preparation by researcher based on data available in Rafidain Bank .

It is a clear from the table above that the total cost in the credit department amounted to 193813000 dinars, while the total cost in the customer service department amounted to 77430000 dinars. The total cost in the treasury department amounted to 19776000 dinars, while the total cost in the internal management amounted to 9235000 dinars. Thus, the total costs in the four departments was 300254000 dinars. To calculate the cost per hour, it is necessary to calculate its theoretical capacity, as shown in the following equation :

Theoretical Capacity = Number of employees × Daily working hours × Number of monthly working day × Number of months of the year

Theoretical Capacity of Credit Department = $20 \times 7 \times 20 \times 12 = 33600$ Hour.

Theoretical Capacity of Customer Service Department = $8 \times 7 \times 20 \times 12 = 13440$ Hour.

Theoretical Capacity of Treasury Department = $10 \times 7 \times 20 \times 12 = 16800$ Hour.

Theoretical Capacity of Internal Management Department = $4 \times 7 \times 20 \times 12 = 6720$ Hour.

∴ Total Theoretical Capacity = $33600 + 13440 + 16800 + 6720 = 70560$ Hour.

The cost per hour for each department can be calculated from table (5).

Table 5: Calculate the Cost Per Hour for each Departments in Rafidain Bank

DETAILS	COST PER HOUR (IN DINNER)			
	Credit Department	Customer Service	Treasury Department	Internal Management
Total Costs	193813000	77430000	19776000	9235000
÷	÷	÷	÷	÷
Theoretical Capacity	33600	13440	16800	6720
Cost Per Hour	5768	5761	1177	1374

Source: Preparation by researcher.

It is a clear from the table above that the cost per hour in the credit department amounted to 5768 dinars, while the cost per hour in the customer service department amounted to 5761 dinars. The cost per hour in the treasury department amounted to 1177 dinars, and the cost per hour in the internal management amounted to 1374 dinars . The utilization and idle capacity in hours in Rafidain Bank can be calculated from table (6).

Table 6: Calculation the Utilization and Idle Capacity in Hours in Rafidain Bank

Activity Unit	Quantities (Number of Loans) (1)	Time of Implementation the Unit (Hour) (2)	Total time (Hour) (3) = 2 × 1
Employees Loans	1427	12.5	17837.5
Companies Loans	364	28.75	10465
Cares Loans	928	21.5	19952
Building Loans	32	9.25	296
Utilization Capacity 68.8%			48550.5
Idle Capacity 31.2%			22009.5
Total Time 100%			70560

Source: Preparation by researcher.

It is a clear from the table above that the bank has a capacity of 48550.5 hours, equivalent to 68.8% of the theoretical capacity. Thus, the idle capacity is 22009.5 hours or 31.2% of the theoretical capacity. The cost of each departments can be calculated according to the TDABC approach as follows:

Employees Loans:

Cost of Credit Department = $1427 \times 6 \times 5768 = 49385616$ Dinars.

Cost of Customer Service Department = $1427 \times 2 \times 5761 = 16441894$ Dinars.

Cost of Treasury Department = $1427 \times 3 \times 1177 = 5038737$ Dinars.

Cost of Internal Management Department = $1427 \times 1.5 \times 1374 = 2941047$ Dinars.

Companies Loans:

Cost of Credit Department = $364 \times 15 \times 5768 = 31493280$ Dinars.

Cost of Customer Service Department = $364 \times 3.75 \times 5761 = 7863765$ Dinars.

Cost of Treasury Department = $364 \times 7 \times 1177 = 2998996$ Dinars.

Cost of Internal Management Department = $364 \times 3 \times 1374 = 1500408$ Dinars.

Cares Loans:

Cost of Credit Department = $928 \times 10 \times 5768 = 53527040$ Dinars.

Cost of Customer Service Department = $928 \times 3 \times 5761 = 16038624$ Dinars.

Cost of Treasury Department = $928 \times 6.5 \times 1177 = 7099664$ Dinars.

Cost of Internal Management Department = $928 \times 2 \times 1374 = 2550144$ Dinars.

Building Loans:

Cost of Credit Department = $32 \times 14 \times 5768 = 2584064$ Dinars.

Cost of Customer Service Department = $32 \times 1 \times 5761 = 178591$ Dinars.

Cost of Treasury Department = $32 \times 3 \times 1177 = 112992$ Dinars.

Cost of Internal Management Department = $32 \times 1.25 \times 1374 = 54960$ Dinars.

The costs can be distributed to the credit, customer service, treasury and internal management departments based on time driven activity-based costing (TDABC), which is explained in table (7).

Table 7: Allocation Costs to Departments based on TDABC in Rafidain Bank

Details	Costs				Total
	Credit Department	Customer Service	Treasury Department	Internal Management	
Employees Loans	49385616	16441894	5038737	2941047	73807294
Companies Loans	31493280	7863765	2998996	1500408	43856449
Cares Loans	53527040	16038624	7099664	2550144	79215472
Building Loans	2584064	178591	112992	54960	2930607
Total	136990000	40522874	15250389	7046559	199809822
Percentage	68.5%	20.3%	7.7%	3.5%	100%

Source: Preparation by researcher.

It is a clear from the table above that the cost of the credit department amounted to 136990000 dinars, while the cost of the customer service department amounted to 40522874 dinars. The cost of the treasury department amounted to 15250389 dinars, and the cost of internal management amounted to 7046559 dinars. Thus, the total costs amounted to 199809822 dinars. This means that the distribution of costs to the credit, customer service, treasury and internal management departments are 68.5%, 20.3%, 7.7%, and 3.5%, respectively. The bank applied the traditional method of allocating the costs to the four departments. The costs are distributed by 40%, 25%, 20%, and 15% respectively. This means that the distribution of costs to the credit, customer service, treasury and internal management departments will amount to 79923929, 49952456, 39961946, and 29971473, dinars respectively. The income statement can be prepared for the bank as shown in table (8).

Table 8: Income Statement under Current Status (before Application of TDBAC) in Rafidain Bank on 31/12/2017

Details	Costs				Total
	Credit Department	Customer Service	Treasury Department	Internal Management	
Revenues	170301309	50088620	20035448	10017725	250443102
- Costs	(79923929)	(49952456)	(39961946)	(29971473)	(199809822)
Profit (Loss)	90377380	136164	(19926516)	(19953748)	50633280

Source: Preparation by researcher.

It is a clear from the table above that the credit department and the customer service department achieved a profit of 90377380, 136164 dinner respectively, while the treasury and internal management departments incurred a loss of 19926516, 19953748 dinner respectively. This is because of the unequal distribution of costs over the four departments of the bank. However, when applying the TDABC approach in the bank, a rational basis for the distribution of costs will be applied to the credit, customer service, treasury and internal management, which will be 136990000, 40522874, 15250389, 7046559 dinner respectively . Accordingly, it is necessary to use the time driven activity based costing (TDABC) in measuring the cost of bank service by relying on cost drivers and time equivalents to allocate the indirect costs to the cost objectives in a fair manner. The income statement of the bank can be prepared after applying the time driven activity-based costing (TDABC) as shown in table (9).

Table 9: Income Statement under the Proposed Status (After Application of TDABC) in Rafidain Bank on 31/12/2017

Details	Costs				Total
	Credit Department	Customer Service	Treasury Department	Internal Management	
Revenues	170301309	50088620	20035448	10017725	250443102
- Costs	(136990000)	(40522874)	(15250389)	(7046559)	(199809822)
Profit (Loss)	33311309	9565746	4785059	2971166	50633280

Source: Preparation by researcher.

It is a clear from the table above that each of the four departments in the bank has made a profit. The credit department achieved a profit of 33311309 dinars. The customer service department has achieved a profit of 9565746 dinars. The treasury department has achieved a profit of 4785059 dinars. The internal management department has achieved a profit of 2971166 dinars. Thus, the total profit at the level of the four departments in the bank will be 50633280 dinars.

Conclusions and Recommendations

Conclusions

Based on this research, the following may be concluded :

- 1) Time driven activity-based costing (TDABC) is an alternative approach of cost that addresses the problems and shortcomings in ABC. TDABC is less expensive, faster in practice, easier to use, and helps in determining the cost accurately based on the actual capacity to supply resources through reliance on cost drivers and time equations.
- 2) Cost drivers are the activity or variable that underlies cost, which is the main driver causing the increase or decrease in cost of products. Either the time equivalents are used to express the time of completion of the activity or the event using the time drivers. Forced

representation is used to predict the time necessary to process the activity or event on specific orders that correspond to the activity attributes.

- 3) Time driven activity based costing (TDABC) can be applied in banks by relying on cost drivers and time equations in order to measure the cost of the bank service accurately for each departments.
- 4) It is possible to apply the TDABC approach in Rafidain Bank in order to help the bank in measuring the cost of the bank service accurately. Thus, the following results can be achieved:
 - a. The cost per hour in the credit department amounted to 5768 dinars, the cost per hour in the customer service department amounted to 5761 dinars, the cost per hour in the treasury department amounted to 1177 dinars, and the cost per hour in the internal management amounted to 1374 dinars.
 - b. The bank has 48550.5 hours, equivalent to 68.8% of the theoretical capacity, and the idle capacity is 22009.5 hours, equivalent to 31.2% of the theoretical capacity.
 - c. The cost of the credit department amounted to 136990000 dinars, the cost of customer service department amounted to 40522874 dinars, the cost of the treasury department amounted to 15250389 dinars, and the cost of internal management amounted to 7046559 dinars. Thus, the total cost is 199809822 dinars. This means that the distribution of costs to departments are 68.5%, 20.3%, 7.7%, and 3.5%, respectively.

Recommendations

In the light of the conclusions, this study recommends the following:

- 1) Develop the cost systems in accordance with the requirements of the modern business environment, and take advantage of cost and management techniques, which are the most important approach of time driven activity based costing (TDABC) in order to help measuring the cost of bank services accurately .
- 2) Rely on cost drivers based on time in order to link resources and activities and thus allocate resource costs to specific activities through forced representation that are used to predict the time needed to process the activity or event at specific orders consistent with the activity attributes.
- 3) Commit to applying the time driven activity based costing (TDABC) in determining the costs based on activities and time drivers in order to measure the cost accurately, and thus reach the real amount of net profit in the service economic unit .
- 4) Use the time driven activity based costing (TDABC) in measuring the cost of bank service by relying on cost drivers and time equivalents to allocate the indirect costs to the cost objectives accurately.
- 5) Adopt the data of this research and follow the methodology and the initial steps to use the approach to determine the costs based on activities time drivers in measuring the cost of bank service accurately, in a way that helps reach the real amount of net profit.



REFERENCES

- Atkinson A. ; Kaplan R. & Young, M. (2004), "Management Accounting", 4th ed., Prentice Hall International, New Jersey .
- Barfield J. ; Raiborn C. & Kinney, M. (2003), "Cost Accounting : Traditions and Innovations", 5th ed., South Western, USA .
- Bruggeman, W. ; Everaert, P. & Anderson S. (2005), "Modeling Logistics Costs Using Time Driven ABC : A case in a Distribution Company Ghent", Journal of Accounting Research, Vol.(3), No.(18), pp:(1-25) .
- Cooper R. (2005), "Does Your Company Need Anew Cost System ?", Journal of Cost Management, Vol.(5), No.(26), pp:(45-49) .
- Corners A. & Hardit, G. (2004), "Time Driven Activity Based Costing (TDABC) - Motivation and application prospects", Journal of Controlling and Management, Vol.(2), No.(1), pp:(108-118) .
- Everet, P. & Bruggeman, W. (2007), "Time Driven Activity Based Costing Exploring the Understanding Model", Journal of Cost Management, Vol.(21), No.(2), pp:(16-20) .
- Garrison R. ; Noreen, E. & Brewer, P. (2012), "Managerial Accounting", 14th ed, McGraw Hill Irwin, New York, USA .
- Gervais M. ; Levant Y. & Dacron, C. (2009), "Time Driven Activity-Based Costing (TDABC) : An Initial Appraisal through a Longitudinal Case Study", Journal of Business Management, Vol.(8), No.(2), pp:(1-15) .
- Hon, J. & Chu, S. (2012), "Implementation of Time Driven Activity Based Costing : A Case Study of Aerospace Precision Casting Factory", Journal of Industrial Engineering & Management Systems, Vol.(1), No.(5), pp:(1-17) .
- Horngren, Charles T. ; Dater, Srikant M. & Rajan, Madhav V. (2012), "Cost Accounting : A Managerial Emphasis", 14th ed., Prentice Hall, USA .
- James D. Tarr (2016), "Activity Based Costing in the Information Age", 4th ed, McGraw Hill Irwin, New York, USA .
- Kaplan R. & Anderson, S. (2004), "Time Driven Activity Based Costing (TDABC)", Harvard Business Review, Vol.(82), No.(11), pp:(131-138) .



- Kaplan R. & Anderson, S. (2007), "Time Driven Activity-Based Costing (TDABC)", Harvard Business Review, Vol.(12), No.(3), pp:(1-10) .
- Kaplan, R. ; Atkinson A. ; Matura E. & Young, S. (2012), "Management Accounting Information for Decision - Making and Strategy Execution", 6th ed, Education, Inc., Upper Saddle River, New Jersey .
- Kaplan, R. & Anderson, A. (2003), "Time Driven Activity Based Costing" , 2nd ed, Pearson Education, Inc., Upper Saddle River, New Jersey .
- Max, M. (2007), "Leveraging Process Documentation for Time Driven Activity Based Costing (TDABC)", Journal of Performance Management, Vol.(20), No.(3), pp:(16-28) .
- Namazi, Mohammad (2009), "Performance Focused ABC", Journal of Cost Management, Vol.(2), No.(6), pp:(39-45) .
- Neumann R. ; Gerlach, H. ; Moldauer E. ; Finch M. & Olson, C. (2004), "Cost Management Using ABC for IT Activities and Services", Journal of Management Accounting Quarterly, Vol.(14), No.(9), pp:(29-40) .
- Primrose, P. (2015), "ATM Investment and Costing System", Journal of Management Accounting, Vol.(4), No.(12), pp:(126-138) .
- Rebischke, S. (2005), "ABC Information for Financial Institutions", Journal of Performance Management, Vol.(1), No.(3), pp:(1-14) .
- Samuel, J. (2005), "Management of Company Finance", Journal of Business Management, Vol.(6), No.(28), pp:(1-18) .
- Sawicki J. (2009), "Corporate Governance and Dividend Policy in Southeast Asia", Journal of Finance, Vol.(15), No.(34), pp:(334-342) .
- Semarang, U. (2012), "Research Methods for Business with SPSS", 4th ed, Pearson Education, Inc., Upper Saddle River, New Jersey .
- Stout , David & Propri, Joseoh (2012), "Implementing Time Driven Activity Based Costing at a Medium Sized Electronics Companies", Journal of Management Accounting Quarterly, Vol.(12), No.(3), pp:(1-11) .
- Szychta, Anna (2008), "Time Driven Activity Based Costing (TDABC)", Journal of Management Accounting, Vol.(6), No.(22), pp:(290-305) .



- Szychta, Anna (2010), "Time Driven Activity Based Costing in Service Industries", Journal of Social Sciences, Vol.(1), No.(67), pp:(49-60) .
- Terungwa, A. (2014), "Practicability of Time driven Activity based Costing ", Journal of Contemporary Management, Vol.(33), No.(12), pp:(1-12) .
- Thomson, J. Samuel (2003), "Strategic Finance - Institute of Management Accountants", 6th ed, McGraw Hill Irwin, New York, USA .
- Turney P. Levant (1991), "Common Cents : The ABC Performance Break Through", 2nd ed, Mac Millan Press Ltd, London, UK .
- Udpa, S. (2015) "Time driven Activity Based Costing for Hospital", Health Care Management Review, Vol.(21), No.(3), pp:(12-30) .