

# Designing a Model and Historical Cost Calculation of Services by ABC Method and Budgeting By ABB Method

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## Abstract

This study deals with the design of the historical cost calculation model by Activity Based Costing (ABC) method and budgeting model based on the Activity Based Budgeting (ABB) in the municipality of Sirik Port. The present study is a descriptive-survey type with operating approach and applied results. The activity and output cost were calculated by using activity-based costing method and then budget was anticipated based on the activity. First, the historical cost of services was calculated by (ABC) method and then was compared to the historical cost of the current municipal accounting systems that was calculated by traditional (conventional) methods to determine whether there is a significant difference between these two costing methods or not. Also, the budget anticipated by (ABB) method is compared to the budget compiled by conventional method to determine whether there is a significant difference between these two methods of budgeting or not. Finally, whether the Activity Based Costing and Activity Based Budgeting can be used in the municipality of Sirik Port or not. The results indicate that there is significant difference between the activity-based historical cost with available traditional costing methods and also between activity-based budgeting with budgeting by traditional (conventional) method. Also there is the calculating possibility of the historical cost of service by (ABC) method and budgeting by (ABB) method in the municipality of Sirik Port.

**Keywords:** Activity Based Costing (ABC), Activity Based Budgeting (ABB), source stimulus, activity stimulus

## Introduction

Managers require accurate information for financial decisions, so the task of accounting is to prepare required information for financial decision making. What has become the particular importance today is that organizations require to apply a method that in addition to the non-complexity was low cost and provides the highest data of processes, activities and services to the managers, therefore, the traditional costing does not respond to this need. Several new costing methods have been proposed that the most important of these methods include: aim-based costing and activity-based costing. (Dastgir & Arab Yarmohammadi, 2005)

There are two methods to calculate the historical cost in industrial accounting: the traditional (conventional) method and modern method. In modern method which is known to Activity Based Costing (ABC), it is tried to remove the weaknesses of traditional method (especially in the indirect costs sharing) and by identifying all the resources that are allocated to the activities supporting the production and delivery to customers, a more precise historical cost to be calculated than the traditional method. According to Namazi (2000), this approach that led to create a method for costing not only was a method for historical cost accounting, but also its cost information in decision-making process in foregoing areas led to increase the effectiveness of decisions and the emergence of two modern approaches in performance management, process management, and budgeting and financial management that were called the Activity Based Management and Activity Based Budgeting. (Hassan Abadi& Sharaf, 2008)

Budgeting is stated as the process to allocate limited resources to unlimited needs that its main objective refers to the optimum utilization of limited and rare resources. According to Ayatollahi (1996), the dispropor-

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tionate activity level and budget allocated to each unit is one of the major weaknesses of the traditional approach. Today, the new approach of Activity Based Budgeting (ABB) is replaced the old methods of budgeting. In this approach, resources are assigned to the organizational units based on the activity size. This approach allocates the organization's resources to each unit based on the activity unlike the traditional budgeting that did not observe the proportionality between the allocation of resources and activity size. Gholizadeh *et al* (2009)

## Statement of problem

Traditional industrial and management accounting systems not only are not meet the managers' needs, but also using their information lead to managers' confusion and lack of proper decision making and eventually can lead to the emergence of huge losses of companies. (Cooper, 1989) One of the modern systems of costing that its various applications is developing in service activities refers to so-called activity-based costing system. This system calculate the effects result from changes of activities, complexities, diversity and specific characteristics of each activity by using appropriate methods. (Ajhadry, 2008) Unlike the traditional costing that does not observe the congruence between resource allocation and the activity size, Activity Based Costing (ABC) allocates the resources of organization based on the activity to each unit. In this method, at first the historical cost of activities is calculated with respect to the amount of the resources consumed, and then the historical cost of each services is calculated in proportion to the amount of the activities used (cost stimulus). These stages cause managers to determine the historical cost of each services, as well as gain a great deal of information about the activities and processes. (Namazi, 1999)

Studies indicate that the current budgeting process is still based on the traditional linear budgeting model in most governmental agencies of country. Some inadequacies of this budgeting system include limitation in long-term planning, monitoring difficulties, being non-operational and ambiguity, lack of accountability and lack of informational system regarding the budget performance and consequently, lack of effectiveness and efficiency evaluation of the credit programs that have imposed large costs to country. (Mahdavi, 2009)

With a brief glance at executive agencies approach such as municipalities in our country we found that due to the nonprofit services that provided by municipalities, unfortunately, the costing methods and historical cost calculation of services as well as the detailed prediction of budget have not been considered very so far. It seems

even accounting system of this part does not provide adequate and proper information for decision making of managers in various dimensions and this system solely reflects the consumption of financial resources based on the budgetary rows that must be spent in the allocated program. According to the role of accurate information in making decisions and especially financial and cost information, the available costing system in the municipality is not able to identify and discover the costs and correct calculation of the historical costs of services and finally cannot predict the budget more accurately. Therefore, the main question of this research is that whether there is a difference between the historical cost calculation of services by ABC method and the traditional method in municipalities? Whether budgeting by ABB method can also be different from the traditional methods running on municipalities and finally, is it possible to design a model for each costing and budgeting operation by modern methods?

## Review of Literature

### *Activity Based Costing (ABC)*

In this method, initially, the historical cost of activities is calculated according to the amount of the resources consumed, and then the historical cost of each service is calculated in proportion to the amount of the utilized activities (cost stimulus). These stages cause managers to determine the historical cost of each service, as well as obtaining much information about the activities and processes. According to Department of Resource Management Development and Parliamentary Affairs (2004) Activity-Based Costing system has obvious characteristics that distinguish it from other costing methods such as the detailed analysis of the activities performed in the service delivery process and the accurate identification of costs and providing non-financial information to improve performance and increase efficiency of service provider units. (Rajabi, 2004)

### *Activity Based Budgeting (ABB)*

ABB is abbreviation of Activity-Based Budgeting which means budgeting based on the activity. In this method, the budgetary cost of activities to be emphasized that are necessary for the production and supply of products and services. Therefore, attention should be paid to the costs that are spent on doing activities. In a general definition, we can say ABB provides budget based on the cost of performing activities (budgeting activities) and makes resource consumption related to these activities. This system in addition to considering products and services, identifies the activities related

to them and then estimates the resources needed for these activities. It can be said that the ABB system is the reverse of ABC (Gholizdeh, 2009)

### Cost Stimulus

Cost stimulus is a logical and measurable variable that the resources consumption rate by activity as well as the activity consumption rate by cost issues can be calculated by it. (Zafar, 1998) Indeed, whatever is important in each method of costing refers to the selection of cost stimulus. Given that in Activity Based Costing method, unlike the traditional costing, several cost stimulus are used in two stages, this factor results in a more accurate allocation of costs. The correct selection of cost stimulus has great impact on the model reliability rate (Ali Heydari, 2008).

### Activity Stimulus

Activity stimuli allocate the utilized amount to do the works to cost issues by using proper bases. In fact, cost issues are defined as whatever is considered as the final product or service in the manufacturing or service organization (Rouddposhti, 2008)

### Background of study

Since 1988 when Activity-Based Costing was introduced by Cooper and Kaplan, so far a lot of researches have been done in this area that most of them in addition to scientific results have had significant functional results. Most researches are related to the various sectors of industry and manufacturing companies, also researches have been done regarding service activities including Youssefian (2001), Rajabi (2004), Taher Kourdi (2004), Ebadifar *et al* (2007), Acton (2005), Sharman (1996), Yang and Klanier (1997), Thorne (1997), Cooper & Kaplan (1998), Cooper & Robin (1998), Cleary (1999), Hermiston (1999), Cox Downey and Smith (2002), Cooper and Roger (2002). Also, researches have been done in the area of activity-based budgeting by Ramezani (2005), in press (1997), Borjesson (1999), Cooper & Slagmulder (2000), Liu (2003). Arabs *et al* (2011) have conducted a study entitled “determining the historical cost of radiology services in hospitals affiliated to Tehran University of Medical Sciences by using activity-based costing” and concluded that the historical cost of one unit of radiology services in their studies have shown significant difference than other studies. From their perspective the best reason for emerged difference refers to the calculation of some costs that are neglected in other studies. On the other hand, from

their perspective due to the high share of personnel costs and building than the total costs, paying special attention to these resources and proper use of them can be an essential and important step in increasing the efficiency and cost savings of the health system's costs. Trabio *et al* (2010) in a study calculated the historical cost of services in the radiology sector in educational medical hospital of Golestan of Ahvaz by using activity-based costing (ABC). Their research results indicated that there is significant difference between the real price of studied radiology services and the approved tariffs. This difference shows itself in the form of financial loss to the hospital. Therefore, it is necessary to use the precise cost calculating methods such as activity-based costing for services pricing to improve the financial system of hospital and reduce its costs.

Ebadifard Azar *et al* (2008) conducted a research entitled “The historical cost calculation of different educational levels' students teaching in the Management and Medical Information Faculty, Medical University of Iran by activity based costing” and showed that data collection and registration in the form of transcribed documents can not respond to the costing calculation needs in a way that provide useful information to managers in different periods.

Nazmi & Namazi (2013) by comparative assessment of the information utility of the costing system with the activity-based traditional costing in electronic banking concluded that there is significant difference between the results of the two systems and ABC system is more profitable in calculating the historical cost than the traditional historical cost system.

Arabmazar Yazdi & Naseri (2004) conducted a study entitled “The feasibility of designing a historical cost calculating model of bank deposits by ABC method on Welfare Bank” and their research results indicated that the significant difference will be created in the historical cost of various services with bank managers determined and expected numbers if the activity-based methods to be used in the banking services costing.

Babajani (2006) in a study entitled “The autonomy granted to universities and institutions of higher education” has stated that the historical cost estimation of student requires the utilization of activity-based budgeting system and calculation of the actual historical cost of student must be done through implementation of activity-based costing system. He knows the establishment of two systems for the development and modernization of the financial systems of universities and higher education institutions unavoidable.

Chongruksut (2004) investigate the relationship between the implementation of activity-based costing

with organizational and behavioral variables in his paper. His studies show that the major variables affecting the implementation of activity-based costing, including senior management support, training, consistency of dominant environmental stimuli, continuity of activity-based costing system with other accounting system like salary and payment and performance evaluation, etc.

Brad *et al* (2006) by investigating the strategy and structure of organization know effective the three factors of organization's size, the usefulness of historical cost information and culture of organization in adaptation rate and implementation of the performance-based management practices and activity-based costing.

Major and Hopper (2008) by conducting a study showed that managers of different parts of the organization have different attitudes towards the use and implementation of Activity Based Costing system. Different definition scope of executive and legislator authorities, technical issues and other challenges have led in the utilization of this system will always be dealing with ambiguity and uncertainty. The results of this study show that the use of Activity Based Costing should be proportional to the resistance of manpower and managers' satisfaction and the behavioral problems should be given more attention.

Bradley and Mozyerin (2002) in a study on activity-based budgeting in RMIT University have stated that several universities in Australia potentially have the ability to use the benefits of ABB. Their researches have been based on the conducted studies over more than a decade of study during 1990. In these studies they stated that ABC has not been a new system and expressed the need to evolve and develop the ABB system. Then, the advantages and disadvantages of ABB and ABC have been investigated. In evolutionary process of ABC, the resources models, activity models, cost issue model and key concepts of ABC and ABM are analyzed. And it is concluded that ABB is the same converse of ABC.

## Methodology

The present study is an applied research because it tries to find solutions to issues and problems of statistical population. Its method is a descriptive - analytic type. Its data is obtained through the study of financial statements and financial costs' documents of municipality and those who directly associated with services providing are interviewed in order to evaluate the service processes and determine the cost stimuli. In this part through meeting and invitation of pro-

cess owners including the mayor, financial and accounting expert, management of municipal services and construction services in relation to the services provided by the municipality, in addition to dialogue, the services processes list is prepared and is categorized to different sectors. The recorded documents and financial reports and operations of municipality in 2013 are used to obtain the information of costs made about resources, programs and activities.

### *Statistical population and sample of study*

The studied population refers to municipalities and municipality of Sirik Port is selected as a case study that includes all the resources, programs, activities and costs of that municipality.

### *Anatomy of Activity-Based Costing (ABC) Model*

The following stages are done to calculate the historical cost by ABC method:

#### *The servicing process analysis and identifying and determining the activities*

For example, in municipalities, the management units and administrative affairs (Secretariat, staffing, computer operator) provide services to municipal services and construction services units (Development of green space, firefighting, transportation, bridge construction, urban facade, etc.).

#### *Determining the cost centers*

After determining the activities, the cost centers should be specified in this stage. In order to determine the cost centers points such as specifying the actual consumption rate of materials for each center, identifying the personnel of each center, the possibility of separating the costs to activities should be considered. Activities can be classified in two main costs in municipalities:

- A. Support activities (administrative services),
- B. operating activities (municipal services and construction services)

Management activities, public relations, staffing, financial affairs, secretariat, commissariat and Computer Operator can be classified as subset of support cost center and green space development activities, firefighting, transportation, urban facade, etc as subset of the costs center of municipal services and activities like bridge construction, green space creating, construction of commercial complex, etc as subset of the costs center of construction services.

#### *Determining the resources and activity stimulus*

In determining the number of activities and relevant cost stimuli, it is necessary to pay attention to homogeneity of each activity and how it is used by vari-

ous services. Homogeneity of activity means that items of overhead costs to be collected in a group and to be consumed in almost equal proportion by each services.

*The allocation of costs to cost issues based on the resources and activities stimulus*

At this stage of the implementation of activity-based costing system, the resources used to perform activities are detected. These resources include direct materials, direct salary, overhead costs that the historical cost are obtained from their sum. In order to design the activity-based costing system it is necessary to determine the historical cost of support services (including management and administrative affairs, etc.) and the historical cost of operating services (including municipal services and technical services). In order to calculate the historical cost of services, initially, the direct materials, direct salary, overhead costs should be calculated in each support and operational activities. Also, in this study after examining the financial documents and direct observation, materials, salary and overhead of the operational and support activities are extracted and separated. Resources should be shared to activities by a proper stimulus after gathering infor-

mation and financial data related to the resources consumed in the second stage of activity-based costing. In this research in order to find precise stimuli, different people are interviewed like financial and accounting experts, authority of administrative affairs, authority of urban services, authority of technical service, authority of firefighting and transportation and also workers of the urban and technical services. For example, the urban sweepers were asked how many hours a day they are working and the purpose of this question is to find the person hour stimulus (number of persons  $\times$  hours). In order to make more obvious the methodology, examples of resources sharing (costs items: materials, salary, overhead) by using cost stimulus and also cost sharing of activities to services by using activity stimulus are presented as follows:

The cost allocation method is in this way that at first, the historical cost of support center costs is allocated to its own subsets (secretariat, staffing, and computer operator). Examples of sharing materials, salary, overhead costs of support costs centers to their own subsets are presented in Tables (1), (2) and (3). Other tables are appendix of this study.

**Table 1. Example of sharing material cost of support services to subset activities**

Cost: Materials - Official Consumed Necessities Source :%			
Activity cost	Cost per unit	Quantity	Name of activities
4,569,104	57,113,800	8	Management
2,284,552	57,113,800	4	Legal affairs
5,711,380	57,113,800	10	Public relation
6,853,656	57,113,800	12	Staffing
8,567,070	57,113,800	15	Secretariat
11,422,760	57,113,800	20	Accounting
1,713,414	57,113,800	3	Commissariat
2,284,552	57,113,800	4	Computer operator
5,711,380	57,113,800	10	Urban services
7,995,932	57,113,800	14	Developmental Services
57,113,800		100	Total

After determining the initial historical cost of management cost centers, legal affairs, public relations, etc the costs of these centers should be allocated due to the services provide to each other and operations centers (municipal and construction

services). To do this, it is necessary to determine the service percentage that every cost center takes from other center. These percentages are collected through the interview with experts of each activity center.

**Table 2. Examples of sharing direct salary cost of support services to subset activities**

Cost	Item cost (source): administrative fee		Activity name
	Month no	Quantity	
113,425,032	12	9,452,086	Management
62,720,700	12	5,226,725	Pantry
92,604,528	12	7,717,044	Legal affairs
83,527,416	12	6,960,618	Staffing and public relations
78,546,396	12	6,545,533	Secretariat
114,112,572	12	9,509,381	Accounting
78,619,992	12	6,551,666	Commissariat
75,486,600	12	6,290,550	Computer operator
79,539,348	12	6,628,279	Developmental Services
778,582,584			Total

**Table 3. Example of sharing overhead cost of support services to subset activities**

Cost	Item cost (power): Overhead - the cost of electricity Trigger Source: The number of appliances		Activity name
	Electricity cost for each set	Quantity	
1,290,976.76	322,744.19	4	Management
322,744.19	322,744.19	1	Pantry
1,290,976.76	322,744.19	4	Legal affairs
968,232.57	322,744.19	3	Public relation
968,232.57	322,744.19	3	Staffing
1,290,976.76	322,744.19	4	Secretariat
2,259,209.33	322,744.19	7	Accounting
1,290,976.76	322,744.19	4	Commissariat
1,613,720.95	322,744.19	5	Computer operator
1,290,976.76	322,744.19	4	Urban services
1,290,976.76	322,744.19	4	Developmental Services
13,878,000		43	Total

**Table 4. The historical cost of the cost center of support activities by ABC method**

Cost	Overload	Wage	Materials	Activity
365,016,362	229,228,226	113,425,032	22,363,104	Management
101,062,748	37,013,048	62,720,700	1,329,000	Pantry
156,498,911	60,280,831	92,604,528	3,613,552	Legal affairs
249,425,452	201,285,864	41,763,708	6,375,880	Public relation
82,889,051	32,948,587	41,763,708	8,176,756	Staffing
118,139,441	29,696,975	78,546,396	9,896,070	Secretariat
231,061,906	103,209,674	114,112,572	13,739,660	Accounting
350,556,336	265,388,430	78,619,992	6,547,914	Commissariat
105,541,318	26,441,166	75,486,600	3,613,552	Computer operator
165,315,731	69,785,451	79,539,348	15,990,932	Urban services
22,795,934	10,603,554	0	12,192,380	Developmental Services
1,948,303,190	1,065,881,806	778,582,584	103,838,800	

**Table 5. The servicing percentage of support centers to each other**

Computer operator	Commissariat	Accounting	Secretaries	Staffing	Public relation	Legal affairs	Pantry	Management	Initial cost	Activity name	
0	5	10	5	10	45	10	15	0	365,016,362	Management	x1
0	50	25	5	20	0	0	0	0	101,062,748	Pantry	x2
15	15	10	10	10	20	0	10	10	156,498,911	Legal affairs	x3
20	10	10	15	5	0	0	20	20	249,425,452	Public relation	x4
15	5	10	15	0	15	20	10	10	82,889,051	Staffing	x5
20	10	15	0	10	0	0	10	35	118,139,441	Secretariat	x6
15	5	0	10	10	5	30	15	10	231,061,906	Accounting	x7
15	0	0	5	5	15	40	10	10	350,556,336	Commissariat	x8
0	0	20	35	30	0	0	10	5	105,541,318	Computer operator	x9
100	100	100	100	100	100	100	100	100		Total	

The historical cost of each support center can be determined by specifying the percentages. For example:

Cost of management cost center = initial cost of management center + (pantry) 15% + (legal) 10% + (Public Relation) 45% + (staffing) +10% (secretariat) + 5% (accounting) 10% (commissariat) + 5% (computer operator)

Management center is achieved by replacement of historical cost of each center and multiplying it in determined historical cost percentage. Historical cost is similarly calculated for other offices. Tables relating to the calculation of this part are presented in the Appendix.

Historical cost of each support activities is obtained in Table (6).

**Table 6. The historical cost of support centers after mutual sharing**

x1	Management	562,897,003.25
x2	Pantry	356,591,174.75
x3	Legal affairs	364,615,600.30
x4	Public relation	443,776,730.50
x5	Staffing	272,396,683.25
x6	Secretariat	355,113,530.70
x7	Accounting	395,605,764.00
x8	Commissariat	523,060,251.50
x9	Computer operator	246,326,311.75

**Table 8. The historical cost of operational activities by ABC method**

Total cost	Sub-administrative sharing	Administrative sharing	Initial cost	Operational activities
7,950,480,318.05	2,056,711,035.05	22,795,934	5,870,973,349	Urban services
10,693,952,064.95	1,569,765,430.95	165,315,731	8,958,870,903	Developmental services

After determining the historical cost of each support centers, cost of these centers is shared between operational centers (municipal services and construction services). For example, management cost center is shared between municipal services and construction services. (Table 7)

**Table 7. Support center cost sharing to operational centers**

Activity: %	Cost: 562,897,003.25	Support Center: Management
Cost	Quantity	Operational activity name
365,883,052.11	65	Urban services
197,013,951.14	35	Developmental services

At this stage, after sharing the cost of materials, salary and overhead, the historical cost of municipal services and construction services are calculated similar to a method mentioned for support services. (The sharing method of municipal services and construction services costs are presented in the Appendix of this study)

After historical cost calculation of municipal and construction services and adding to the historical costs obtained from support centers' cost sharing in Table (7) the final historical cost is determined for municipal and construction services. (Table 8)

After determining the historical cost of municipal and construction services, the costs of these centers should be shared between subset activities. Example of historical cost sharing of municipal services in Table (9) and example of the historical cost sharing of construction services is presented in Table (10). Other Tables are appendix of study.

The process of cost sharing to activities is possible to the extent that it become impossible to divide the overall activities to more detailed activities.

In this study, after historical cost sharing of municipal services to the subset activities of municipal services (including urban management, collection and disposal of waste, green space development, public health, resorts), the costs of these activities can be shared into more detailed activities. For example, the historical cost of activity of waste collection and disposal can be allocated into more detailed activities such as urban sweeping, garbage collection and disposal of urban waste. (Table 11)

**Table 9. Historical cost sharing of municipal services to subset activities**

Cost	2,079,506,969.05		Sharing urban service cost				Operational activity name
	Total cost/ total quantity	Hour in year	month	Hour in month	Hour in day	person	
45,829,354.69	15912.97038	2880	12	240	8	1	Urban management
567,138,264.29	15912.97038	35640	12	2970	9	11	Waste collection and disposal
183,317,418.76	15912.97038	11520	12	960	8	4	Green space development
0	0	0	0	0	0	0	Public health
274,976,128.14	15912.97038	17280	12	1440	24	2	Cemetery
91,658,709.38	15912.97038	5760	12	480	8	2	Urban façade
366,634,837.52	15912.97038	23040	12	1920	8	8	Transportation
549,952,256.28	15912.97038	34560	12	2880	24	4	Fire
2,079,506,969.05		130680					Total

**Table 10. Historical cost sharing of construction services to projects of subset**

Person in hour cost	Civil service cost from administrative and sub-administrative 1,735,081,161.95				Project name
	Person in year	Person/hour	hour	person	
120,738,937.30	6,201	19470	1770	11	Coastal park construction
74,415,360.00	6,201.28	12000	1200	10	Side street construction
357,193,728.00	6,201.28	57600	2880	20	Construction of public toilets
41,275,719.68	6,201.28	6656	832	8	Construction of commercial and recreational complex
28,575,498.24	6,201.28	4608	576	8	Construction of Bridge Street tube
47,625,830.40	6,201.28	7680	1920	4	Pavement pedestrian boulevards Project
72,430,950.40	6,201.28	11680	5840	2	Water supply graveyard project
459,267,006.73	6,201.28	74060	2645	28	Presidential place construction
53,579,059.20	6,201.28	8640	1440	6	Construction of Forest Park
408,540,326.40	6,201.28	65880	3660	18	Construction of recreational places
27,781,734.40	6,201.28	4480	560	8	Painting project and margin repairing
43,657,011.20	6,201.28	7040	1760	4	infrastructure investment projects
1,735,081,161.95		279794			total

The historical cost of support services, municipal services and construction services will be

achieved after stage to stage implementation of costing by ABC method. (Table 12)



**Table 11. The historical cost sharing of waste collection and disposal activity**

Person per hour	1,219,367,692		Collection and waste disposal			
Cost	Total cost/ total quantity	Hour per year	Hour per day	hour	person	Operational activity name
554,258,041.66	37,962.88	14600	40	8	5	Urban cleaning
332,554,824.99	37,962.88	8760	24	8	3	Waste collection and transportation
221,703,216.66	37,962.88	5840	16	8	2	Disposal of urban waste
110,851,608.33	37,962.88	2920	8	8	1	Rehabilitation of river tracks
1,219,367,692		32,120			11	

**Table 12. The historical cost of support and operational activities by ABC method**

Materials	Total cost for support services	
	Wage	Overload
103,838,800	778,582,584	1,065,881,806
1948303190	Total cost based on ABC	
Total cost for urban services		
5870973349	Initial total cost	
22,795,934	urban service share for support costs	
2,056,711,035.05	Urban service share for sub-support activities	
7,950,480,318.05	Total cost based on ABC	
Total cost for civil services		
8958870903	Initial total cost	
65,315,731	urban service share for support costs	
1,569,765,430.95	Urban service share for sub-support activities	
10,693,952,064.95	Total cost based on ABC	

In addition to collecting the required data for ABC system designing, the analysis of production process and services providing is needed to implement the activity-based budgeting (ABB). This information is obtained by interview which including: The

capacity size prediction of services provided by the municipality is for the next period. For example, how many square meters are predicted for urban sweeping by municipality? The sample of predicting budget by ABB method is presented in the following table.

**Table 13. Budgeting by ABB method**

Total	Cost in 2013	Previous year cost	Prediction	Previous year	Unit	output	Plan
29672112329	2561	29065856671	11587800	14188800	Square meter	Urban cleaning	Collection and urban waste disposal
51961691405	284722	33255482499	1825	1460	Ton	Waste collection	
34641127603	189814	22170321666	1825	1460	Ton	Urban waste disposal	

### The analysis method of mutual services of units

In this study, during the implementation of ABC system's stages, after calculating the initial cost of support activities, it is necessary to share the cost

due to the relationship between the support cost centers and services that provide to each other to determine the historical cost of each support activities. The "mutual sharing approach" was used to allocate the mutual services costs of these units. The linear equation is used for this purpose. The cost of

each support activity is calculated by using the linear equation as following:

$$Y_i = \alpha_i + \beta_i(X_i)$$

$Y_i$  = The center cost of intended support cost

$\alpha_i$  = The cost of intended support activities

$\beta_i$  = The receive services percent from other service offices

$X_i$  = The cost of other service activities

For example, the activity cost calculation of the Secretariat is as follows:

The Secretariat's center cost is equal to:

(Computer Operator) 40% + (Accounting) 20% + (Staffing) 30% + (management) 10% + Secretariat activities' cost

## Conclusion

The historical cost of services was calculated by two methods to investigate that is there any significant difference between the historical cost of services by traditional method and activity-based costing method or not. The results show that the historical cost of services by traditional method is 17,039,282,842 Rials and by activity-based costing method is 20,592,735,573 Rials. The activity-based budgeting model was implemented to examine that is there any significant difference between the budgeting cost by traditional method and activity-based budgeting method or not. The obtained results indicate that budgeting by ABB method is 38,421,085,522 Rials and budgeting by traditional method is equal to 20,000,000,000 Rials. According to the obtained results, there is a significant difference between the historical cost by traditional methods and Activity Based Costing. Considering that the historical cost calculation by activity-based costing method was conducted based on the existed financial statements figures, it can be concluded that the existing financial system can respond to the activity-based historical cost calculation and historical cost calculation of services by ABC method is possible by existing financial system of studied municipality. Given that the purpose of ABB model is to predict the required budget of outputs (services) and municipality services including municipal services and construction services, the results indicate that currently, activity based budgeting is possible only for the activities of municipal services. About construction activities, the only possibility to calculate the historical cost of construction projects is by activity-based costing method, however, due to the outsourcing projects to contractor companies and lack of precise prediction of services providing size, the activity-based budgeting is not possible for the coming year.

## References

- Ali Heydari Biyoki, T., & Khademi Zarea, H. (2009). Costing structure designing of banking services based on the ABC by data mining approach, Yazd University.
- Arab, M., Akabri Salari, A., Gheyasvand, H., Droudi, R.A., Hamidi, M., & Mogheri, J. (2011). Determining the historical cost of radiology services in hospitals affiliated to Medical Sciences University of Tehran
- Arabmazar Yazdi, M., & Naseri, M. (2004). Feasibility of the historical cost calculation model designing of bank deposits by ABC method, case study of Welfare Bank.
- Ayatollahi, A. (1996). Planning Principles, Public Management Training Centre Publications
- Babajani, J., (2006). Article of autonomy granted to the universities and higher education institutions
- Dastgir, M., & Arabyar Mohammadi, J. (2005). Investigating the barriers for implementation of target costing system in companies accepted in Tehran Stock Exchange, Accounting and Auditing Study, 12 (39): 63-75
- Department of Resource Management Development and Parliamentary Affairs (2004). ABC system in determining the historical cost of hospital services, Report No. 102. Workshop on Operational Budgeting
- Ebadifard Azar, F., Abolghasem Gorji, H., Hadian, M., & Mahboub Ahari, M., (2008). The historical cost calculation of educating students of different educational levels in the Management and Medical Informing Faculty, Medical Sciences University of Iran by activity-based costing method
- Gholizadeh, H., & Sanei, S. (2009). Activity-based Planning and Budgeting (ABPB) a new approach in budgeting, second conference of operational budgeting - Tehran
- Mahdavi, A. M. (2009). Compiling the operational budget for the executive agencies of Kerman province, Paper presented at the Second International Conference on Operational Budgeting, Tehran
- Namazi, M. (1999). The evaluation of activity-based costing in management accounting and its behavioral considerations. Accounting and Auditing Study, seventh year, 71-106
- Nazemi, A., & Namazi, M. (2013). Comparative evaluation of the information utility of activity-based costing system by traditional costing in electronic banking

- Rajabi, A., (2004). Activity Based Costing (ABC) System Designing to calculate the historical cost of services in public hospitals, research project of the Ministry of Health and Treatment
- Ramazani, A.R. (2005). Activity-based budgeting in universities and higher education institutions at Shiraz University
- Roudposhti, F. (2008). Activity-Based Costing, Activity Based Management (ABC / ABM), Termeh Publications, First Edition
- Taher Kourdi, M.R. (2004). The use of Activity Based Costing in the Oil Plateau Company of Iran
- Torabi, A., Keshavarz, Kh., Najafpour, Zh., & Mohammadi, J. (2010). The historical cost of Radiology Services Sector of Educational and Medical Hospital of Golestan of Ahvaz by using activity-based costing (ABC) method
- Yousefiyan, M. (2011). Activity-Based Costing System in Cement companies accepted in Tehran Stock Exchange, Administrative Science Faculty of Shahid Beheshti University