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## **Identification and Prioritization of the Factors Affecting the Implementation of Activity-Based Costing with Analytic Hierarchy Process: Qaemshahr Municipality Case Study**

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### **Abstract**

The aim of the research is to identify and prioritize the factors affecting the successful implementation of Activity-Based Costing (ABC) system in Qaemshahr Municipality so that we can learn about the factors affecting the deployment of the ABC system in the organization under study. The present study is applied and descriptive-analytical (non-experimental) in terms of the objective and methodology, respectively. Statistical population of the study includes 35 managers, deputies and experts in finance and accounting department of Qaemshahr Municipality in 2016. The required data were collected using a validated questionnaire based on conceptual models; and the data were analyzed through Expert Choice and Topsis software. Research findings about the research questions show that from the perspective of managers, deputies and experts in finance and accounting department of Qaemshahr Municipality, parameters of: 1. Technical factors with the final weight vector of "0.389", 2. Individual factors with the final weight vector of "0.277", 3. Environmental factors with the final weight vector of "0.173", and 4. Organizational factors with the final weight vector of "0.161", are respectively the most important factors in the successful implementation and deployment of ABC system in Qaemshahr Municipality.

**Keywords:** Activity-Based Costing (ABC) system, Ttechnical factors, Individual factors, Environmental factors, Organizational factors, Qaemshahr Municipality.

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## **1. Introduction**

In recent years, public sector organizations have faced increasing pressure to improve their efficiency and effectiveness. The tendency of policy makers to satisfy the people and meet the direct expectations of taxpayers, pressure of the private sector for territory expansion, etc. has made the public sector managers to look more operationally at issues such as determination of the exact cost of finished goods and services, improvement of processes, assessment of the options of using external services, or privatization and alignment of activities with the organization's mission and strategic plan (Abdul Majid and Soleiman, 2008). Activity-Based Costing has many benefits. Some of these benefits include cost reduction targets, performance measurement, decision-making guide, and helping budgeting. (Kaplan, 1984)

One of the new systems of costing whose various applications are expanding in service activities day by day is called Activity-Based Costing (ABC) system. Using appropriate methods, this system calculates the effects of changes in activities, complexities, diversity and the particular characteristics of each activity (Ross 2004, Lievens et al. 2003).

Now, according to the contents expressed about the importance of Activity-Based Costing system in public organizations for accountability and transparency of financial activities, this study seeks to identify and prioritize the factors affecting the deployment of ABC in Qaemshahr Municipality.

## **2. Theoretical Foundations**

### **2.1 Activity-Based Costing (ABC)**

ABC is a costing method in which costs are allocated primarily to activities, and then, the collected costs are prorated to products according to the use of any activities. ABC is based on the concept of activities and resource consumption by products and activities, respectively. (Afzali, 2012)

Components of the ABC model in view of the cost allocation are resource, resource driver, cost element, activities, cost pool, activity center, activity driver, and cost object.

ABC cost allocation method reflects the flow of costs from resources to activities and from activities toward the cost object. For this purpose, resource bases are used for allocating resources to activities, and activity bases are used to share the costs of each activity, as the

cost. As a result, this method provides useful information for improving the performance of different parts of the organization which are at the disposal of management.

## **2.2 Factors Affecting the Activity-Based Costing**

### *Organizational factors*

Organizational factors are related to behavior and formal and informal relationships of employees and managers at different levels in the organization. These factors can be managed and controlled by managers. Sub-factors of the organizational factors include the participation of non-financial sections in the system design and implementation, lack of staff resistance to the new information system, preparation of the staff in different sections, adequate and timely training, presence of instructions to implement the system, presence of supervision and monitoring for operations, taking into account the informational needs of different parts of the organization, and integration of the new system with other systems (Khuzin and Garkaz, 2010).

### *Environmental factors*

Environmental factors are related to conditions outside the organization, and managers have the least control over them. Sub-factors of environmental factors include comprehensive identification of system benefits by the community, presence of standards and guidelines related to the new system, and training the system in universities and educational centers (Khuzin, 2009).

### *Individual factors*

Individual factors include the features and characteristics of the system design and implementation team. Sub-factors of individual factors include lack of strict study of details when designing, implementing simulation techniques, reasonable schedule of design and implementation, full-time job by the design team, enough venture by the design team, design team competency and appropriate behavior of authority (Khuzin, 2009).

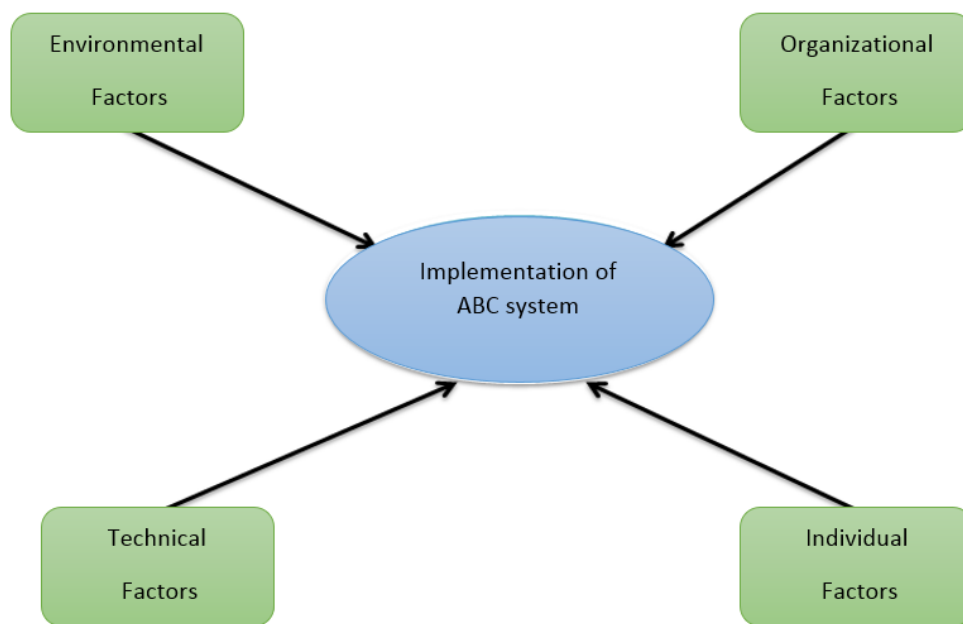
### *Technical factors*

Technical factors result from cases rooted in the nature of an Activity-Based Costing system. Sub-factors of technical factors include enough confidence of staff to the system data, presence of few cost driver activities and cost centers, presence of certain cost issues, taking into account all costs of the value chain, strong solidarity between drivers and costs, existence

of an organizational plan for the implementation of the system, the exact definition of the activities, and minimal difference between the results of the new system.

### 3. Research Conceptual Model

According to the theoretical foundations of the research and the foregoing discussion, the conceptual model of the research can be shown as graph (1); research hypotheses are also based on it.



Graph 1: Research conceptual model (Reference: Talibnia et al., 2012)

### 4. Research Objectives

- a) Identifying and determining the factors affecting the successful implementation of Activity-Based Costing (ABC) system in Qaemshahr Municipality.
- b) Prioritizing the factors affecting the successful implementation of Activity-Based Costing (ABC) system in Qaemshahr Municipality.

## **5. Research Questions**

- 1) What are the factors affecting the successful implementation of Activity-Based Costing (ABC) system in Qaemshahr Municipality?
- 2) How is the prioritization of the factors affecting the successful implementation of Activity-Based Costing (ABC) system in Qaemshahr Municipality?

## **6. Data and methodologies of model estimation**

This research is in the field of applied research, and given that the field data are used to test hypotheses, it is in the group of descriptive-survey research.

Statistical population of the study includes 35 managers, deputies and experts in finance and accounting department of Qaemshahr Municipality in 2016. Therefore, a non-random sampling method was implemented to reach the target population.

In this study, the tools for collecting data about factors affecting the implementation of Activity-Based Costing (ABC) are Activity-Based Costing System Deployment Inventory (ABC) of Talebnia et al. (2012), with 25 questions of 5-option Likert. Validity and reliability were reviewed and approved by Talebnia et al. (2012).

The required data collected using AHP and Topsis techniques questionnaire were analyzed through Expert Choice and Topsis software.

## **7. Model Estimation**

### **7.1 Results of AHP technique to prioritize the main components**

This section expresses the results of the AHP technique implementation to rank the factors affecting the successful implementation of Activity-Based Costing (ABC) system in Qaemshahr Municipality. After calculating the geometric mean of the four main criteria using Expert Choice software, the weight of each criterion is measured and listed in Table 3.

Table 3: Final weight vector of the main criteria in successful implementation of Activity-Based Costing (ABC) system

Main criteria	Weights
Organizational factors	0.161
Environmental factors	0.173
Individual factors	0.277
Technical factors	0.389

According to the results presented in Table 3, technical, personal, environmental, and organizational factors have respectively the highest impact on the successful implementation of Activity-Based Costing (ABC) system in Qaemshahr Municipality. Table 4, 5, 6, and 7 show the results of ranking sub-factors affecting the successful implementation of Activity-Based Costing (ABC) system in Qaemshahr municipality.

## 7.2 Results of Topsis technique to prioritize the sub-factors

This section expresses the results of the implementation of Topsis technique for ranking sub-factors affecting the successful implementation of Activity-Based Costing (ABC) system in Qaemshahr municipality.

Table 4: Ranking sub-components of technical factors criteria in the successful implementation of ABC

Priority	Sub-components of technical factors criteria	Weight
First	Enough confidence of staff to the system data	0.287
Second	Presence of few cost driver activities and cost centers	0.235

Third	Presence of certain cost issues that consume the activities	0.132
Fourth	Taking into account all costs of the value chain	0.117
Fifth	Strong solidarity between drivers and costs	0.096
Sixth	Existence of an organizational plan for the implementation of the system	0.084
Seventh	Exact definition of the activities	0.049

According to the results presented in Table 4, enough confidence of staff to the system data, presence of few cost driver activities and cost centers, presence of certain cost issues that consume the activities, taking into account all costs of the value chain, strong solidarity between drivers and costs, existence of an organizational plan for the implementation of the system, the exact definition of the activities have respectively the highest effects among technical factors on the successful implementation of ABC system in Qaemshahr municipality.

Table 5: Ranking sub-components of individual factors criteria in the successful implementation of ABC

Priority	Sub-components of individual factors criteria	Weight
First	Lack of strict study of details when designing	0.194
Second	Implementing simulation techniques	0.182
Third	Reasonable schedule of design and implementation	0.151
Fourth	Full-time job by the design team	0.131
Fifth	Enough venture by the design team	0.122
Sixth	Design team competency	0.111
Seventh	Appropriate behavior of authority	0.109

According to the results presented in Table 5, lack of strict study of details when designing, implementing simulation techniques, reasonable schedule of design and implementation, full-time job by the design team, enough venture by the design team, design team competency and appropriate behavior of authority have respectively the highest effects among individual factors on the successful implementation of ABC system in Qaemshahr municipality.

Table 6: Ranking sub-components of environmental factors criteria in the successful implementation of ABC

Priority	Sub-components of environmental factors criteria	Weight
First	Comprehensive identification of system benefits by the community	0.367
Second	Presence of standards and guidelines related to the new system	0.348
Third	Training the system in universities and educational centers	0.285

According to the results presented in Table 6, comprehensive identification of system benefits by the community, presence of standards and guidelines related to the new system, and training the system in universities and educational centers have respectively the highest effects among environmental factors on the successful implementation of ABC system in Qaemshahr municipality.

Table 7: Ranking sub-components of organizational factors criteria in the successful implementation of ABC

Priority	Sub-components of organizational factors criteria	Weight
First	Participation of non-financial sections in the system design and implementation	0.298
Second	Lack of staff resistance to the new information system	0.197



Third	Preparation of the staff in different sections	0.095
Fourth	Adequate and timely training	0.093
Fifth	Presence of instructions to implement the system	0.088
Sixth	Presence of supervision and monitoring for operations	0.086
Seventh	Taking into account the informational needs of different parts of the organization	0.077
Eighth	Integration of the new system with other systems	0.065

According to the results presented in Table 7, participation of non-financial sections in the system design and implementation, lack of staff resistance to the new information system, preparation of the staff in different sections, adequate and timely training, presence of instructions to implement the system, presence of supervision and monitoring for operations, taking into account the informational needs of different parts of the organization, and integration of the new system with other systems have respectively the highest effects among organizational factors on the successful implementation of ABC system in Qaemshahr municipality.

## 8. Conclusion

The aim of the current research is to identify and prioritize the factors affecting the successful implementation of Activity-Based Costing (ABC) system in Qaemshahr municipality. Research findings about the research questions show that from the perspective of managers, deputies and experts in finance and accounting department of Qaemshahr Municipality, parameters of: 1. Technical factors with the final weight vector of "0.389", 2. Individual factors with the final weight vector of "0.277", 3. Environmental factors with the final weight vector of "0.173", and 4. Organizational factors with the final weight vector of "0.161", are respectively the most important factors in the successful implementation and deployment of ABC system in Qaemshahr Municipality.

## **9. Recommendations**

Based on the data obtained and according to the results of research including identification and prioritization of the factors affecting the successful implementation of Activity-Based Costing (ABC) system in Qaemshahr municipality, following recommendations are presented:

1. Participation of non-financial sections in the system design and implementation based on ABC system.
2. Staff's attention and lack of their resistance to the new information system will accelerate the implementation of ABC system.
3. Comprehensive introduction of ABC benefits to staff of different units and even the client as a member of the society are of the important issues in management.
4. Of personal issues that authorities should be aware of, is the lack of strict attention to the details when designing the ABC system, which does not lead to staff positioning.
5. Using and applying simulation techniques by experts and elites to run the ABC system.
6. Enough confidence of staff to the system data, and efforts to enhance safety and security of information is of the important technical points.
7. It is important to pay attention to the existence of certain cost issues which consumes the activities.

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