

**PARAMETERS AFFECTING THE INCREASE OF PERFORMANCE  
EFFICIENCY INSIDE SOME EGYPTIAN MANUFACTURING FIRMS BY  
APPLYING ABC SYSTEM**

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**Abstract:** *The present investigation aims to state the parameters affecting the increase of performance efficiency inside some manufacturing firms by applying ABC system in Egypt. The authors used the survey method to describe and analyze these parameters in some Egyptian firms. The population of the investigation was Egyptian manufacturing firms. Accordingly, the number of received questionnaires was 386 (from 19 Egyptian manufacturing firms) in the second half of 2013. Finally, the results indicated that the values of parameter weights (Effect percentage on efficiency increase) are 20, 19,18,16,14 and 13% for good understanding of production processes, effective usage extent of documentary system, good selection of the cost manager to activate the ABC system, developing the future planning by using forecasting data, not historical, top management support and cost analysis using quantitative and computerized methods, respectively.*

**Keywords:** *activity based costing; manufacturing; egyptian firms; costing system efficiency.*

**JEL classification:** *D24, M41*

## **INTRODUCTION**

Some developing countries such as Egypt have, made manufacturing management their prime agenda. They are going through a process of restructuring their manufacturing systems to emphasize competition, integration with global markets and increasing level of privatizations. Global competitors operating in global markets almost always tend to have world-class performance (Salaheldin, 2007). So, these Egyptian manufacturing firms need to an efficient cost system, in order to improve the effectiveness and efficiency of the production processes in general and, in particular, pricing decisions.

Research on Activity-Based Costing and its applications has mainly been focused on organizations in developed countries. Little has been learnt as to whether ABC techniques can be implemented successfully in organizations in developing countries (Liu and Pan, 2007). The Activity-Based Costing (ABC) is developed to improve the accuracy of product cost data derived from the Traditional Cost (TC) system (Tsai, 1996). This matter helps manufacturing firms in developing countries to improve their competitive position. It has many applications until it became a tool to manage the integrated performance and to support the economical units. So, developing countries such as Egypt need to increase the performance efficiency of firms by applying ABC system.

Those researchers who follow the research and literature of the cost accounting and managerial accounting since the beginning of the eighties from the previous century, can witness in the last few years the birth of a new costing system which resulted in considering the previous costing system as an aging traditional system which does not match with what happened in the last three decades especially with the increase in the severity of the international competition as the consequence of the international orientation towards the liberation and the globalization of the economy.

The various types of firms faced several problems in the traditional methods for the allocation of the indirect costs within the framework of the large development in the information systems and the multiple activities and the complexity of the work procedures.

The Activities Based Costing (ABC) system became recognized as a widespread system because it is a main method for allocation of indirect costs.

Nowadays, a great need for a new research as appeared to determine the adoption of Activity Based Costing (ABC) system in Egyptian business environment.

### **RESERACH OBJECTIVES**

Stefea et al. (2013a and 2013b) stated, in past studies, Aspects of obstacles for applying Activity Based Costing (ABC) system in Egyptian firms and some important factors affecting evolution of Activity Based Costing (ABC) system in Egyptian manufacturing firms. So, the main objective of the present research is determining parameters affecting the increase of performance efficiency inside some firms by applying ABC system in Egyptian manufacturing firms.

### **RESEARCH METHODOLOGY**

The authors used the survey method to describe and analyze the parameters affecting the increase of performance efficiency inside some firms by applying Activity Based Costing (ABC) system. The population of the research was Egyptian manufacturing firms.

### **REVIEW OF LITRATURE**

The Activity Based Costing (ABC) system is defined as an accounting (Costing) and administration system simultaneously where it presents two types of information: a) Financial information related to the costs of activities and products or services; b) Financial information related to those activities (Dergham, 2005). Some modern manufacturing firms in Egypt trend using Activity Based Costing (ABC) system because it achieves the following features:

1. Supporting mechanisms for controlling and managing the costs through specifying accurately the events and activities which drive costs. Also, ABC system assist to achieve the accurate following up of indirect costs which currently forms a large portion of the total costs even in some economical services firms (Abd El-Ghany, 1999 and Needles et al., 2010). Also, determining the relationship among the costs and individuals. Consequently, ABC system evaluates the responsibilities of individuals towards using methods of the available resources and assists the management team in directing the method of control to achieve the target of sufficiency in performance (Balakrishnan et al., 2013).
2. Determining the important activities in the firms because it is a valuable managerial tool and it is useful in the service organizations which the Traditional Cost (TC) systems are not appropriate for the nature of services sector system (El-Erbeed, 2003).
3. Maximizing the profitability through providing accurate and timely information about costs in the light of severe competition in the aim of pricing the products or services. Hence, the income is directly related to costs where the selling prices reduce in case of mass production and the prices increase in case of small production volumes. Therefore, pricing strategies are considered a main element for maximizing (improving) profitability

through specifying the production and the customer mixtures (Samy, 2000 and Mowen et al., 2012).

4. Justice and subjectivity in allocation of indirect costs through selecting cost drivers which are suitable for resources and the activities and which show the causal relationship of the cost behaviors (Abd EL-Karim and El-Kakhn, 1997 and Balakrishnan et al, 2013).

5. Making better managerial decisions through accurate determination of the products costs and hence making decisions related to stopping producing a certain product or expanding producing it or comparing between manufacturing an important part of a certain product or buying it from abroad (Chan, 1993; Dhaher, 2002; Needy et al., 2003 and Johnson, 2008).

6. Rationalizing the internal and external management decisions because it provides the firms with the financial and non-financial information. Also, It provides precise information about costs which results obtaining better information concerning the costs of products and their profitability and the firm profitability as a whole (Samy, 2000 and Witherite and Kim, 2006).

7. Contribution in provision of improved financial and non-financial information to the firms where financial information relates to determining the cost accurately, reduce the cost and resources consumption through linking among the activities and what they consume in terms of resources and the surplus resources in the firm. On the other hand, submitting non-financial information about the operations and activities of the firm, contributes in reducing the cost by improving the performance and raising the efficiency of performance of the activities and expelling the un-necessary activities which do not achieve added value to the firm (Chan, 1993; Ramsey, 1994; Samy, 2000; Grasso, 2005 and Balakrishnan et al., 2013).

8. Determining the differences among the actually used resources and the available submitted resources or the cost of product or service and concentrates on idle work hours and defected materials (Sabry, 2002).

9. Increasing the importance of the accountants role because the Activity Based Costing (ABC) system provides more accurate and real information about the usages of the firms and about the activities which drive the costs. This matter leads to increase the firm management by managing these resources and increasing the efficiency of the operational processes and consequently increasing the importance of the accountants in the fields of planning, control and decisions-making (Abu Khashaba, 1999).

Geri and Ronen (2005) stated that there are additional benefits as a consequence of using the Activity Based Costing (ABC) system such as the managers at all organizational levels consider the Activity Based Costing (ABC) system give more accurate and trusted information than that are generated by the Traditional Cost (TC) system. They are ready to use this information to make decisions and evaluate the performance because this ABC system can illustrate a better concept of the costs and concentrating on understanding the activities which consume the organizational resources.

Nachtmann and Al-Rifai (2004) confirmed that the Activity Based Costing (ABC) system helps the industrial and services firms in improving its competitive capacity which enable them to take better decisions based on a better understanding of the behavior of products or services.

Grandlich (2004) and Neumann et al. (2004) revealed that the Activity Based Costing (ABC) system proved that it is a good tool to manage the costs because it concentrates on re-designing the firm activities through dispelling the un-necessary activities. With the proliferation of computer - related services, the explosion in data communication and ongoing trends toward globalization managers in high-tech. industries are considering new ways to manage and control costs. Activity Based Costing (ABC) system, the alternative to the Traditional Cost (TC) systems, has been applied to

manufacturing and service industries. Successful implementations in the healthcare insurance and transport industries have been reported in last few years.

Also, Abd El-Karim and El-Kakhn (1997) and Drury (2008) illustrated that despite the novelty of ABC system, the modern surveys pointing out to increasing trend of the industrial and services firms for using this system. One of the surveys was performed on 300 British industrial firms, after a short period of appearance of this new system, showed that 3% of the firms sample had actually applied this system and 9% of them will apply it in the near future and 38% of them study possibility of applying. These results stated that applying ABC system in these firms are considered as a satisfactory outcome.

10) Existence some opportunities to improve Activity Based Costing (ABC) system in practice (Hermanson et al., 2006).

It became un-acceptable to rely on methods which do not get the accountants to the expected targets. Therefore, many researchers carried out many studies which aimed at reaching the features of the new managerial cost intellect. This intellect is called “Activity Based Costing (ABC) system”.

Turney and Stratton (1992) showed that the Activity Based Costing (ABC) system is characterized of being a cost accounting and managerial system at the same time, where it provides accurate information especially that related to the production costs. At the same time, it provides other information about the activity costs and consequently this system can manage these activities successfully which in turn results in a continuous improvement for the performance.

Greene and Metwalli (2001) pointed out that the most important characteristics can achieve implementing the Activity Based Costing (ABC) system which is characterized in the accurate specification of the product or service costs.

Sievanen and Tornberg (2002) stated that the front strong point for the Activity Based Costing (ABC) system is characterized by its ability to discover the opportunities to reduce the costs.

Harr (1990) mentioned that Activity Based Costing (ABC) system is an appropriate tool to guide cost, effectively, in an environment of continuing change and it can be used as a method to reduce costs without compromising the quality of the product or service provided.

Kaplan (1992) stated that the usage of Activity Based Costing (ABC) system can lead to reduce the additional costs which represent a great amount of the total cost in several firms.

Also, Kaplan (2008) showed that how to use ABC system for operational planning by having it forecast the levels of resource capacity- employees, equipment, space, technology the firm need to supply in order to deliver on the revenue targets in firm strategic plan. This is a powerful analysis tool that eliminates almost all of the guesswork, subjectivity and negotiations normally associated with the source planning or budgeting process.

King (1991) illustrated that application of Activity Based Costing (ABC) system will lead to reduce the costs where will be determined the cost drivers in a more accurate method and exclusion of non-value added activities which will lead to produce the product at a low cost.

Lawson (1994) pointed out that the Activity Based Costing (ABC) system is providing financial information in addition to non- financial information which are considered useful information in determining the non-value added activity which must be excluded.

Nolan (2004) showed importance of Activity Based Costing (ABC) systems usage for increasing the performance efficiency in the firms.

He said that application of Activity Based Costing (ABC) system in the firms leads to an integration among resource management, profitability and strategic management.

Innes and Mitchell (1997) stated that Activity Based Costing (ABC) system is considered an effective tool for measuring the performance efficiency in addition to the possibility to rely on this system to develop the budget of the firm. This system also helps in providing more accurate information to prepare budgets that are used as a basis to evaluate the performance efficiency and a control method to achieve the objectives of the firms.

Turney (2010) illustrated that the Activity Based Costing (ABC) system is a multi-faceted tool. It is a database for financial and organizational information and it supports performance management systems and provides the appropriate information for making the decisions. He added that this system can be utilized in several usages such as profit improvement, resource planning, predictive cost measurement, cost measurement, capacity planning, performance measurement and others.

Gering (1999), matching other studies, confirmed that the Activity Based Costing (ABC) system is considered as a good tool for performance improvement. The performance improvement process represents one important use of the Activity Based Costing (ABC) system; also it helps the firm to a better understanding of the customers needs in addition to it is a framework which can be used to identify and negotiate win-win customer situations.

Cagwin and Bouwman (2002) added, to the previously stated features, that the presence of positive relationship among the stated system and the modern management methods such as the Total Quality Management (TQM), Buying for the use or the Just In Time (JIT), Business Process Re-Engineering (BPR) and the Flexible Manufacturing Systems (FMS); in addition to improving the average Return On Investments (ROI) in the economical units when implementation is carried out in various types of production and complicated processes.

The successful implementation of the Activity Based Costing (ABC) system has a great effect in providing several features to the economical unit, which may be summarized as follows:

1. The appropriate allocation of additional costs.
2. Accurate measurement of the product or service costs.
3. Providing non-financial information linked to the activities and resources to enable managing them effectively and provides a support to rationalize the decision-making processes.
4. Assisting in developing the budget based on the activities.
5. Discovering costs providing opportunities and determining the activities which do not add values to the product and service.
6. Supporting the performance measurement, planning the energy, forecasting the costs, understanding the customers needs and improving the profitability.

From the previous studies, the author may be concluded that the Activity Based Costing (ABC) system represents a modern perspective which can achieve several benefits to the an Egyptian firm such as contribution in measuring performance accurately through managing the costs by determining the activities which more linked to costs; then cancelling the useless activities. This matter gives the management team the opportunity for a better re-distribution of resources, preparing the budgets, control, evaluation of performance and provision of accurate costing information for the unit or the provided service. All these represent a better aspects for development and assistance in increasing the role and importance of the accountants and also gave a good chance to increase the efficiency of business environment in some International and Egyptian firms. Sanad (2012)

recommended to apply the Activity Based Costing (ABC) system in the field of Egyptian accounting business environment for the following reasons:

- a. This system treats the distortions caused by allocating the indirect costs during application of traditional accounting system inside the firm.
- b. It is an effective system for distresses manufacturing firms in the field of competition market which started to expand and grow rapidly. This matter is achieved through identifying the characteristics that must be met in the various activities for restructuring costs of firm products accurately.
- c. Also, it contributes in determining the prices of the products in line with the cost and size of demand and thus the success of the spread of products distribution and increasing the firm profit.

He also recommended to apply the Activity Based Costing (ABC) system in Egyptian manufacturing firm in order to improve the added value activities and exclude non added value activities and their resources costs. This matter assists to determine the appropriate strategy of firm which leads to achieving profits and competitive advantages in the market.

Stefea et al. (2013a) stated that the Activity Based Costing (ABC) system is one of the main alternatives to cost systems for manufacturing firms, however this system has not wide spread in Egypt. The questionnaire stated some important aspects of obstacles for applying ABC system. Statistical analysis showed that there were significant differences among these aspects of obstacles for applying ABC system in Egyptian manufacturing firms. These obstacles may be arranged, in descending order, according to their impact severity for applying Activity Based Costing (ABC) system on Egyptian firm performance as follows: a) The weakness of support from top management, b) Resistance to change, c) The weakness of system accounting, d) The costs of design and application system, e) The weakness of human expertise, f) The random behavior of indirect costs [Technical dimension].

Stefea et al. (2013b) indicated that Activity-Based Costing (ABC) has many applications even it became a tool to manage the integrated performance and support to Egyptian manufacturing firms. But in Egypt, there were significant differences among some important factors affecting evolution of ABC system. These factors may be arranged, in descending order, according to effect severity on evolution of ABC system in Egyptian firms as follows:

- a. Profitability management ,
- b. Financial planning ,
- c. The strategies planning ,
- d. Performance management and e) Human capital management.

## **DATA**

The authors used the questionnaire instrument in addition to the test approach to confirm the correctness of collected views. The number of sent questionnaire instruments was 419 and the number of the received questionnaires was 386(19 firms in the second half of 2013) with a response percentage of 92.12%.

## **METHODS OF DATA ANALYSIS**

The qualitative approach is provides a deeper understanding of the Social Science, So the study use this methods with questionnaire, Clarify the questionnaire's purposes for concrete set of aims, Identify and itemize subsidiary topics that relate to its central purpose,

Formulate specific information requirements relating to each issue, Plan with the data analysis in mind.

The researcher used a Statistical Package for the Social Sciences (SPSS) for application of reliability, descriptive and inferential statistics.

### STATISTICAL ANALYSIS

#### RELIABILITY:

The correlation coefficient among the dimensions (Parameters) was significant (at level 1%) and the Cronbach-Alpha Coefficient was 82.41.

#### DESCRIPTIVE:

Table 1 shows the values of Mean and Standard Deviation (S.D.) of survey dimensions (Parameters).

**Table 1**

**Parameters affecting the increase of performance efficiency inside some Egyptian manufacturing firms by applying Activity Based Costing (ABC) system.**

No.	Dimension(Parameter)	Mean	Std. Deviation (S.D.)	Coefficient of variation
1	Good selection of the cost manager to activate the system.	3.759	1.387	0.368981
2	Developing the future planning by using forecasting data, not historical.	3.199	1.979	0.618631
No.	Dimension(Parameter)	Mean	Std. Deviation (S.D.)	Coefficient of variation
3	Cost analysis using quantitative and computerized methods.	2.707	1.477	0.545622
4	Effective usage extent of documentary system.	3.902	1.230	0.315223
5	Good understanding of production processes.	4.158	0.642	0.154401
6	Top management support.	2.972	1.259	0.42362

Source: SPSS output

The field questionnaire determined some important parameters which affect the increase of performance efficiency inside some Egyptian manufacturing firms by applying Activity Based Costing (ABC) system. The descriptive statistics of dimensions (Parameters) on the increase of performance efficiency showed that the mean values for the parameters of good understanding of production processes (4.158) > effective usage extent of documentary system (3.902) > good selection of the cost manager to activate the system (3.759) > developing the future planning by using forecasting data, not historical (3.199) >

top management support (2.972) > cost analysis using quantitative and computerized methods (2.707) .

Also, the Standard Deviation (S.D.) values for the impact of these parameters mentioned above are 0.642, 1.230, 1.387, 1.979, 1.259 and 1.477, respectively.

The descriptive statistics analysis of dimensions (parameters) affecting the increase of performance efficiency inside some manufacturing firms by applying ABC system in Egypt showed that the parameter of good understanding of production processes has the highest mean value (4.158) and the parameter of cost analysis using quantitative and computerized methods has the lowest mean value (2.707).

Also, the parameter of developing the future planning by using forecasting data, not historical has the highest value of Standard Deviation (S.D.) (1.979) but the parameter of good understanding of production processes has the lowest value (0.642).

Through descriptive analysis, the study found the parameters affecting the increase of performance efficiency inside Egyptian manufacturing firms by applying ABC system is "Good understanding of production processes" agreement (84.56%); then "Effective usage extent of documentary system" agreement (68.48%); "Good selection of the cost manager to activate the system"; agreement (63.1%); then "Top management support "agreement (57.64%); then "Cost analysis using quantitative and computerized methods" agreement (45.44%), and then "Developing the future planning by using forecasting data, not historical" agreement (38.14 %) of the research sample.

**INFERENTIAL STATISTICS:**

The researchers used the Friedman Test as inferential analysis statistics to detect differences in treatments across multiple parameters test.

**Table 2**

**Output of Friedman Test (Ranks and statistics).**

a. Ranks

Mean rank	Parameter
4.00	P1
3.00	P2
1.00	P3
5.00	P4
6.00	P5
2.00	P6

b. Test Statistics

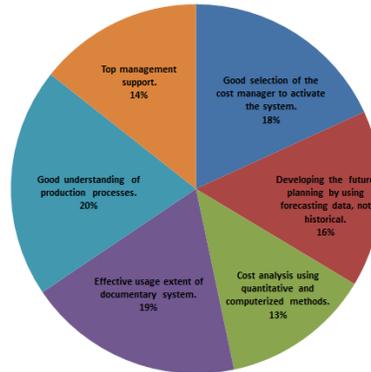
386	N
1930.000	Chi-Square
5	df
.000	Asymp. Sig.

Source: SPSS output

Table 2 indicates that there is a significant difference among the parameters affecting the increase of performance efficiency inside some manufacturing firms by applying Activity Based Costing (ABC) system in Egypt.

**WEIGHTS OF PARAMETERS (EFFECT PERCENTAGE ON EFFICIENCY INCREASE):**

*Fig.1: Weights of parameters*



Source: SPSS output

The analysis of questionnaire data also illustrated that the weights of parameters (Effect percentage on efficiency increase) are 20,19,18,16,14 and 13% for good understanding of production processes, effective usage extent of documentary system, good selection of the cost manager to activate the system, developing the future planning by using forecasting data, not historical, top management support and cost analysis using quantitative and computerized methods, respectively (Fig.1).

**CONCLUSION**

- 1- Activity-Based Costing (ABC) has many applications even it became a tool to manage the integrated performance and support to Egyptian manufacturing firms.
- 2- Specifying and selecting the cost driver, is back bone of Activity Based Costing (ABC) system during applying this system in the Egyptian manufacturing firm departments.
- 3- High qualified human element such as the cost managers is an important parameter to increase the performance efficiency inside the Egyptian manufacturing firms.
- 4- The Activity Based Costing (ABC) system is not designed to issue immediate decisions, but to provide more accurate information about the provided industrial services in the Egyptian firm through effective usage of documentary systems and consequently, increasing the efficiency and effectiveness of performance by analyzing and calculating the cost of industrial service at any time and aiding the managerial team in providing modern quantitative and computerized technologies and forecasting data programs which help the top management staff in the process of making the decisions.
- 5- There are also some important parameter which affect the increase of performance efficiency by applying ABC system in those firms.
- 6- The results indicated that these parameters are good understanding of production processes, effective usage extent of documentary system , good selection of the cost manager to activate the system , developing the future planning by using forecasting data,

not historical, top management support and cost analysis using quantitative and computerized methods.

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