

## The Influence of Organizational and Environmental Factors on Cost Systems Design in Egypt

**Tariq H. Ismail**

Professor of Accounting, Faculty of Commerce, Cairo University, Giza 12613, Egypt  
Professor of Accounting, Faculty of Business, Majmaah University, P.O.Box 66, Majmaah, Saudi Arabia.

**Nancy Mohamed Mahmoud**

Assistant Lecture, Faculty of Commerce, Cairo University, Giza 12613, Egypt.

### Abstract

This paper aims at examining the extent to which organizational and environmental factors influence the cost systems design in Egyptian manufacturing firms. We use a questionnaire to survey a sample of Egyptian privately held firms in a wide spectrum of industrial sectors. The results reveal that the use of highly sophisticated cost systems in Egyptian manufacturing firms is limited, simple and complex traditional systems are widely used, and very few firms adopting simple Activity-Based Costing. Additionally, it was found that the sophistication level of cost systems is positively associated with the importance of cost information, while no association was found with product diversity, intensity of the competitive environment and cost structure. The results suggest that improvement in manufacturing performance resulting from reducing cycle and lead times, improving product quality and reducing costs is associated with an effective selection of cost system.

The findings of this study will help management and practitioners in the Egyptian industrial sector to design effective cost systems with a certain level of sophistication that rationalize decisions and improve manufacturing performance. This study is one of few surveys that examine the impact of contextual factors on the product cost sophistication level and manufacturing performance in the Egyptian context.

**Keywords** Product cost systems, Activity- Based Costing, cost centers, cost pools, cost drivers, environmental culture, organization culture, Egypt.

### 1. Introduction

Firms are facing significant changes in their business environment nowadays, where deregulation, corporate governance, increasing in global competition, rapid changes in information technology, increasing in customers' demands for greater product diversity and the development of integrated enterprise-wide information systems have forced many firms to implement more sophisticated product cost systems. Firms in all sectors are examining ways to reduce costs, shorten product development times and manage risks (Gunasekaran et al., 2005).

Traditional cost systems might vary and range from simple systems (one cost pool and one cost driver) to complex systems (many cost pools and few cost drivers). Also, Activity-Based Costing (ABC) systems could vary from simple systems (few high aggregated cost pools and few different types of cost drivers) to complex systems (many cost pools and many different types of cost drivers). Such classification may lead to the difficulty in distinguishing between simple ABC and complex traditional cost systems. Furthermore, it is difficult to determine precisely at what point a traditional system becomes an ABC system (Malmi, 1999).

However, we believe in the classification of product costing systems based on a criterion that was not fairly investigated in previous studies, where cost systems are classified according to characteristics rather than the discrete alternatives of traditional and ABC systems.

Only few studies, in developed countries, have tested the effect of contextual factors on cost systems, among of these are Abernathy et al. (2001), Drury and Tayles (2005), Al- Omiri and Drury (2007) and Schoute (2009). The review of literature related to product cost systems in Egypt indicated that virtually all of the research has concentrated on contextual factors influencing the adoption or non-adoption of ABC systems (Felleh, 2002, Abdelhamid, 2002, Basoni, 2004 and Triest and Elshahat, 2007). Prior studies did not adequately capture the diversity of practices that exist because they sought to classify cost systems in two categories only, either traditional or ABC systems.

However, there is a lack of empirical work that examines cost systems in the Egyptian private sector and pinpoints factors that may affect the level of sophistication of those systems as well as examining the effects of cost systems on manufacturing performance. Egypt is an important country in the Arab world, both in terms of political influence and economic impact. Furthermore, the Egyptian business environment has experienced substantial reforms in the past few decades. Although Egypt has a rich cultural and commercial tradition, most studies agree that its present business and management practices lag behind its Western counterparts. None the less, Western influence in Egypt has grown recently (Triest and Elshahat, 2007).

This study is one of the few surveys of costing practices in Egypt. The study narrows this gap by determining factors influencing cost system design and tests the effect of cost systems on manufacturing performance. This study tests the extent to which different organizational and environmental factors influence cost systems design. Organizational factors include: product diversity, cost structure and importance of cost information, while intensity of competition is the environmental factor. Additionally, it examines the impact of cost systems on manufacturing performance using three proxies of manufacturing performance; quality, time and cost.

The rest of this paper is structured as follows: section two presents the literature review; hypotheses development is outlined in section three; research methodology is presented in section four. Data analysis and discussion of results are in section five, followed by conclusions, limitations and directions for future research in section six.

## **2. Review of Literature**

### *Empirical research on cost systems sophistication level in developed countries*

Very few leading studies have been carried out in developed countries that classify product cost systems according to characteristics rather than by the discrete alternatives of traditional and ABC systems. Abernathy et al. (2001) examined the implications of product diversity of cost systems design in Australia. Results indicated that the design of cost systems is not only influenced by product diversity but also by the way in which technology is used to manage diversity.

Drury and Tayles (2005) examined the extent to which potential explanatory factors influence the level of complexity of cost systems design in UK companies. The investigated systems are ranging from very simple to highly complex cost systems. Cost system complexity was measured using two proxies: the number of cost pools and different types of cost drivers. Four variables were statistically significant: product diversity, degree of customization, size and corporate sector; where the financial and service sectors had significantly higher levels of cost system complexity compared with companies operating in the manufacturing sector.

Al- Omiri and Drury (2007) tested the extent to which potential contextual factors influence the characteristics of cost systems using a sample of UK companies at business unit level. Results reveal that more sophisticated cost systems were positively associated with the importance of cost information, size, the intensity of competition and the financial sector. ABC adoption was also associated with the use of other innovative management accounting techniques, lean production, just-in-time and the service sector. Cost

structure, product diversity and the quality of information technology were not found to be significant although the first two were associated with the use of cost systems.

Schoute (2009) uses data of 133 medium-sized manufacturing Dutch firms to examine the associations between cost system complexity, purposes of use, and cost system effectiveness. Cost system complexity was measured using four proxies: the number of cost pools (centers) used, the number of cost allocation bases, the nature of cost pools and cost allocation bases. The results robustly indicated that at higher (lower) levels of usage for product planning purposes, cost system complexity negatively (positively) affects the cost system intensity of use, while at higher (lower) levels of usage for cost management purposes, cost system complexity positively (negatively) affects the cost system intensity of use and satisfaction.

Based on the above discussion, it can be concluded that what distinguishes traditional cost systems from ABC systems is not the number of cost centers or pools, but the nature of cost pools and cost allocation bases used. Both traditional and ABC systems may have small or large numbers of cost pools and cost allocation bases, but only ABC systems may have ABC pools and/or hierarchical cost allocation bases. Majority of surveys has classified cost system design mainly based on the number of cost pools and cost allocation bases. Therefore information about cost systems is likely to be relatively reliably in surveys (Drury and Tayles, 2005 and Al-Omiri and Drury, 2007).

#### *Current status of cost systems in Egypt*

Ibrahim (1986) stated that cost information represents essential inputs to short-run management decisions. Hence, relevant information is used to provide (i) analytical information on costs, activities and responsibility centers, (ii) periodic general-purpose or special-purpose reports, and (iii) predicted information for decision making.

Despite the importance of product cost systems, their implementation in Egypt is defective (Basioni, 2004). Felleh (2002) found that cost systems in the industrial sectors need some developments. An effective cost system is required to provide accurate cost information necessary for cost planning and control.

Ashor (2000) suggested a conceptual framework of ABC that can be used in manufacturing firms, but his proposal lacks a linkage to the concepts used in the constitution of some of its basic components. Hence, this represents the main flaw of the proposed framework which hampers its use in practice.

Ashor (2008) refined the conceptual framework of ABC introduced in 2000 to consider a conceptual scheme for the activities, where activities were categorized into output unit-level activities, batch-level activities, product-sustaining activities, and facility- sustaining level. Then, resources consumed were linked with the activities defined in order to establish cause- effect relationship. However, in spite of the enhancement of the proposed ABC framework that encourages in some way the adoption of an effective cost system or ABC, its use seems absent (Triest and Elshahat, 2007).

Elshahat (2006) found that Egyptian firms have been using the surcharge cost accounting system that has been criticized from numerous perspectives, where the objectives still focus on analyzing cost information over products and services, calculating the cost of inventory and identifying trends in the way costs are incurred. Furthermore, results reveal that the most salient is the limited usage of ABC in the Egyptian business environment, and the Egyptian firms measure their performance to a great extent based on financial measurements.

Basioni (2004) and Triest and Elshahat (2007) stated that cost information in Egyptian environment is used mainly for pricing purposes based on cost-plus approach that fits the economic policy in Egypt. However, it is very likely that market prices are not yet completely determined by these market forces; therefore, Egyptian firms use a cost-plus approach to set prices. Overall, the use of cost information for efficiency improvement seems less important. The use of any advanced accounting techniques such as ABC

seems limited. The most important factor causing the absence of cost systems in the industrial firms in Egypt is the lack of awareness of its importance and benefits in enhancing performance (Felleh, 2002).

In light of reviewing the literature, it can be noticed that cost accounting information in Egypt is available at a basic level at the most and used more for pricing purposes than for a wide range of managerial decisions.

#### *Cost systems and performance*

Many studies have examined the impact of cost systems on performance. For example, Kennedy and Affleck-Graves (2001), Pizzini (2006), Sanford (2009) and Zaman (2009) investigated the impact of ABC on the firm overall performance; Ittner et al. (2002) and Banker et al. (2008) had concentrated on the plant- level operational performance; Frey and Gordon (1999) and Cagwin and Bouwman (2002), studied the impact of ABC on financial performance, and Bescos and charaf (2010) examined the relationship between ABC and non-financial performance.

Frey and Gordon (1999) and Cagwin and Bouwman (2002) found that the use of ABC by business units is associated with higher return on investment (ROI). However, Sanford (2009) found no significant relationship between ABC practices and a firm's performance, as measured by ROI. Furthermore, he found no significant relationship between the strategy followed by the organization and the use of ABC. However, Frey and Gordon (1999) agreed that ABC is associated with higher ROIs in business units following a differentiation strategy and not in those adopting cost leadership strategies.

Ittner et al. (2002) and Zaman (2009) reported that the extensive use of ABC affect plant performance directly through reducing the production cost, lowering the customers cost, improving quality levels, decreasing cycle time, and increasing first pass quality. However, Banker et al. (2008) found that ABC has no significant direct impact on plant performance, as measured by improvements in unit manufacturing costs, cycle time, and product quality. World Class Manufacturing practices completely mediate the positive impact of ABC on plant performance, and thus advanced manufacturing capabilities represent a critical missing link in understanding the overall impact of ABC.

Prior studies have discussed either the impact of contextual factors on the adoption of cost systems or on performance. To the best of our knowledge, only very few studies (i.e. Cagwin and Bouwman, 2002; Sanford, 2009) have viewed cost systems as a mediator between contextual factors and performance. Therefore, this study is designed to examine the impact of organizational and environmental determinants on cost systems and test the impact of cost systems on the manufacturing performance in the Egyptian context.

### **3. Hypotheses Development**

Prior research in the area of the influence of organizational and environmental factors on the level of sophistication of cost systems and manufacturing performance has many directions. For example, Cooper and Kaplan (1988a), Estrin et al. (1994), Bjornenak (1997), Krumweide (1998) Drury and Tayles (2005), and Al-Omiri and Drury (2007) have examined some factors that might affect the level of sophistication of cost systems. This paper examines those factors discussed in prior research in relation to Egyptian context as below:

#### **- Product diversity**

Cooper and Kaplan (1988a) and Estrin et al. (1994) have argued that product diversity is a major factor that results in the reporting of distorted product costs as output of traditional cost systems. When products consume different proportions of resources of supportive departments, a cost system that incorporates many cost pools, with each cost pool representing a separate supportive activity, better captures the variability in resource consumption. To capture volume diversity, a complex cost system is required that establishes separate cost pools for batch-level activities and incorporates non-volume based cost drivers that measure the consumption of resources by batch sizes rather than volume (Drury and Tayles, 2005).

Within a production setting, Malmi (1999) found that the conventional wisdom of management accounting assumes that the underlying production process and the type of cost system are somehow related. The complexity of the production process has an impact on the choice of cost systems. The more complex the production process the more complex the cost system which models it. Furthermore, Malmi stated that product diversity determines the production process complexity; the more complex the products the more the activities are required for manufacturing. Thus, to measure the resource consumption of different products in a complex setting, more complex cost systems involving a greater number of cost pools and cost drivers are required.

Based on the above discussion it can be concluded that greater product diversity requires more complex cost systems to capture the variation in resource consumption by different products. Simple cost systems that rely on a small number of cost pools and drivers are unlikely to capture the diversity of consumption of activity's resources by cost objects. Significantly distorted product costs are therefore more likely to be reported when high diversity exists.

However, Bjornenak (1997) and Krumweide (1998) failed to link cost systems with product diversity. Hence, inconsistent results lead to the need for further investigation; therefore, the following first hypothesis is formulated:

*H<sub>1</sub>: There is a positive relationship between product diversity and the level of sophistication of cost systems.*

- **Competitive environment**

Several studies have examined the relationship between the design and use of management accounting systems and the intensity of competition (Simons, 1990 and Libby and Waterhouse, 1996). The results of these studies suggest that firms facing intensely competitive market environments tend to employ relatively more sophisticated management accounting systems. Additionally, Cooper and Kaplan (1988b) have identified that firms facing severe competition should implement ABC. It is argued that firms operating in a more competitive environment have a greater need for complex cost systems that increase the probability of assigning costs to products, services and customers more accurately. In highly competitive industries, mistakes made from relying on inaccurate cost information are more likely to be exploited by competitors. Firms facing intensive competition have a greater impetus to pursue more actively their chosen cost strategy.

Thus, firms facing intense competition have a greater need for accurate cost information. If this requirement can be met using simple cost systems then such systems will suffice, otherwise, increasing levels of competition provide greater incentives for firms to adopt cost systems with higher levels of complexity. The above discussion suggests that greater competition increases the probability of firms requiring complex cost systems. However, Drury and Tayles (2005) found that the intensity of competition is not a significant factor in influencing the choice of cost systems. Based on the above discussion the second hypothesis is formulated:

*H<sub>2</sub>: There is a positive relationship between competitive environment and the level of sophistication of cost systems.*

- **Cost structure**

Both simple and complex cost systems accurately assign direct costs to cost objects. In general, increasing levels of complexity in the design of cost systems should lead to the more accurate assignment of some of the indirect costs to cost objects (Drury and Tayles, 2005). Johnson and Kaplan (1987) claim that, over several decades, there has been a dramatic change in cost structures resulting in a need for firms to modify their cost systems. Cooper and Kaplan (1988a) has also agreed that overhead costs, as a percentage of total costs, have increased over the years, particularly in recent years, causing simple systems based on using direct labor hours as the cost driver to report increasingly distorted product costs.

Brierley et al. (2001) found that direct material costs tend to be higher than indirect costs and direct labor tended to represent the minority of the costs. They concluded that if indirect costs make up a relatively small proportion of total costs in some industries, it may not be worthwhile investing in sophisticated accounting methods to allocate indirect costs to products in these industries since traditional systems are unlikely to result in the reporting of seriously distorted costs. Kaplan and Cooper (1998) advocate that firms with high indirect costs should assign these costs using ABC systems, since traditional systems are likely to report distorted costs.

Based on discussion of the literature, the level of complexity required to assign indirect costs to cost objects is a function of the amount of indirect costs to be assigned. However, Drury and Tayles (2005) and Al-Omiri and Drury (2007) found that cost structure was not a significant variable in any of the four dependent variable measures of the product cost system sophistication level. This discussion leads to the development of the third hypothesis:

*H<sub>3</sub>: There is a relationship between the proportion of indirect costs within the firm's cost structure and the level of sophistication of cost system chosen.*

- **Importance of cost information**

A major role of product cost systems is to provide relevant cost information to manage the cost and mix of existing activities, products, services, locations and customers (Kaplan and Atkinson, 1998; Drury, 1998 and Horngren et al., 2006). Estrin et al. (1994) and Anderson (1995) stated that relevant information should be generated to ensure that only profitable activities are undertaken. The cost system plays a crucial role here in generating information for periodic profitability analysis for distinguishing between profitable and unprofitable activities. If the cost system does not capture accurately enough the consumption of resources, the reported product costs will be distorted, and there is a danger that managers may drop profitable products or continue the production of unprofitable products.

Drury and Tayles (2005) pointed out that firms are likely to differ in terms of the required accuracy of cost information for profitability analysis. It is necessary to rank product profitability for product mix decisions because lower levels of product cost accuracy will suffice if profit margins are high for all products. However, more accurate product costs may be required if product profit margins are low, or capacity constraints exist. Following the above line of reasoning, we argue that cost information may likely impact the sophistication of cost systems, thus, the following fourth hypothesis is developed:

*H<sub>4</sub>: There is no relationship between the importance of cost information and the sophistication level of cost systems.*

- **Cost systems and manufacturing performance**

Prior literature on the impact of product cost systems on performance highlighted three potential types of improvements in the manufacturing performance: lower costs, improved quality, and reduced manufacturing cycle time (Swenson, 1995; Ittner et al., 2002; Banker et al., 2008 and Leffakis, 2009). ABC advocates (i.e., Cooper and Kaplan, 1991 and Innes and Mitchell, 1995) claimed that sophisticated cost systems or ABC systems provide detailed information on the value-added and non-value-added activities performed by the firm, the costs associated with these activities, and the drivers of activity costs. This information allows managers to reduce costs by designing products and processes that consume less resources, increasing the efficiency of existing activities, eliminating activities that do not add value to customers, and improving coordination with customers and suppliers. The increased information on activities and cost drivers is also expected to enhance quality improvement initiatives by identifying the activities caused by poor quality and the drivers of these problems (Armitage and Russell, 1993 and Carolfi, 1996).

In addition, highlighting the costs of quality-related non-value-added activities, ABC systems can help to justify investments in quality improvement activities that might otherwise be considered uneconomic, and improve the allocation of resources to the highest valued improvement projects (Ittner, 1999). Furthermore, many non-value-added activities such as counting, checking, and moving increase the duration of a process or are driven by the amount of time a product takes in an activity. By identifying activities that cause non-value-added time, an effective cost system can assist in justifying investments in cycle time reduction and provide the detailed information needed to minimize delays (Cooper and Kaplan, 1991).

In contrast to claims raised by ABC advocates, some other studies suggest that the cost data provided by ABC systems need not be more accurate than the costs reported by less sophisticated or traditional cost systems. For example, Datar and Gupta (1994) showed that improving the specification of cost allocation bases and increasing the number of cost pools in ABC systems can actually increase product cost measurement errors. Banker and Potter (1993) and Bromwich and Hong (1999) added that the desirability and ability of ABC procedures to produce relatively accurate cost estimates vary with competitive markets, input markets and the organization's underlying technology. They conclude that ABC systems are only preferred under specialized conditions. Thus, extensive use of ABC data may have zero or negative association with manufacturing performance. This discussion leads to the development of the fifth hypothesis:

*H<sub>5</sub>: There is a positive relationship between the product cost systems and the manufacturing performance.*

#### **4. Research methodology**

##### *Data collection*

This study uses a questionnaire (as shown in Appendix 1) to collect data from representatives of Egyptian manufacturing firms operating in Cairo Zone on cost systems. Questionnaires have been used widely in the literature in surveys on cost systems sophistication level (for example: Felleh, 2002; Drury and Tayles, 2005; Al-Omiri and Drury, 2007; Triest and Elshahat, 2007; Brierley, 2008 and Schoute, 2009). The sample of firms was chosen based on information provided by the Central Agency for Public Mobilization and Statistics (CAPMS) in Egypt on its publication called Industrial Production Statistics for 2009, where all firms are privately held and data can be picked more friendly compared with the bureaucratic procedures exist in dealing with state-owned firms (Triest and Elshahat, 2007).

The population consists of 1729 privately held manufacturing firms operating in Cairo Zone comprising 8 sectors; spinning and weaving, wood, pharmaceutical, printing, food, chemical, metal and engineering industries. In order to select a representative sample, we rely on the steps described by Yamane (1967) which determine the appropriate sample size for a given population, under a certain confidence and precision levels<sup>1</sup>.

A cluster sampling method was carried out to define a sample of 96 manufacturing firms in eight sectors. We distribute and pick-up the questionnaires personally to ensure high response rate (85%). A total of 82 questionnaires was returned that are valid for analysis. Table 1 summarizes the sample companies according to the sector. There were 14 questionnaires not collected as management is not interested in surveys.

**Table 1: Sample companies according to the sector**

Sectors	Responses	%
Spinning and Weaving Industries	30	0.36
Wood Industries	5	0.06
Pharmaceutical Industries	3	0.04
Printing industries	5	0.06
Food Industries	8	0.10
Chemical industries	18	0.22
Metal Industries	5	0.06
Engineering Industries	8	0.10
Total	82	100%

*Research model and variables*

Two multiple regression models are used to examine the relationships between organizational and environmental factors and cost systems design as well as performance. Three categories of variables are used to examine such relationships: dependent, independent and control variables as discussed below:

*Dependent variables*

Cost system sophistication level is a dependent variable that might be affected by product diversity, competitive environment, cost structure and the importance of cost information. On the other hand, it acts as a mediator variable that might affect manufacturing performance. Three different measures were used as proxies for determining the level of cost system sophistication (ABC/ Non- ABC, number of cost pools and number of cost drivers). First, a dichotomous variable was used to measure the level of cost system sophistication. ABC adopters were categorized as sophisticated systems and non-ABC adopters were categorized as non-sophisticated systems. Respondents were asked to express the stage in which ABC systems are implemented to define whether firms are ABC adopters or non-adopters. Second, respondents are requested to state the number of cost centers or cost pools used within the cost systems to assign indirect costs to products or services. Third, respondents were requested to identify how many different types of overhead allocation bases were used in the allocation process.

Manufacturing performance was proxied by three measures: quality, time and cost. Quality was measured by asking the respondents whether their cost systems help in determining the cost of quality improvement and the cost of scrap and rework. Time was measured by asking the respondents whether their cost systems help in determining the cost of finishing their manufacturing cycle and the cost of their customer lead time. Cost was measured by asking the respondents whether their cost systems help in the measurement of a unit manufacturing costs and the reduction in costs of producing one unit of their products.

*Independent variables*

The four independent variables are product diversity, cost structure, intensity of competition and the importance of cost information. The cost structure is measured by indirect costs as a percentage of total costs. Respondents are requested to express their perspectives on the other independent variables based on a Likert scale of five points.

Four questions were used to measure product diversity, of which two questions relate to volume diversity and the other two are related to support diversity. Concerning volume diversity, respondents were asked to indicate on a 5-point Likert scale (ranging from 1= strongly disagree to 5=strongly agree) whether considerable variation exists in the sales volume between the top 20% of the best selling items and the bottom 20% of the lowest selling items, and whether major differences exist in the sales volumes between the



different products. Support diversity was measured by asking the respondents whether most products require similar resources to design, manufacture/provide and distribute, and whether costs of the support department (e.g. purchasing, information processing, and marketing) resources consumed by each product line are the same.

The intensity of competition was measured using three questions. Respondents were asked to indicate on a 5-point Likert scale (ranged from 1=strongly disagree to 5=strongly agree) the level of competition, the level of competition for their products over approximately the past 10 years, and price competition within their industries.

Four questions were used to measure the importance of cost information for decision- making. Respondents were asked to indicate on a 5-point Likert scale (ranged from 1=not important at all to 5=highly important) whether the cost of products must be highly reliable to compete in markets, cost data is extremely important in their cost reduction efforts, cost information is the most important factor in making different decisions, and whether their firms perform many special studies relating to product introduction, discontinuation, redesign, mix or cost reduction decisions.

Table 2 summarizes the dependent, the independent and the control variables.

**Table 2: Study variables and Cronbach's Alpha coefficients**

Variables	Proxy Measures	Cronbach's Alpha
Cost system sophistication level	-ABC/Non ABC. -Number of cost pools. -Number of different types of cost drivers.	Objective
Manufacturing performance	-Quality. -Time. -Cost.	0.507
<i>Independent variables</i>		
Product diversity	-Volume diversity -Support diversity	0.761
Cost structure	-Overhead costs as a percentage of total costs.	Objective
Intensity of competition	- Intensity of competition	0.575
Importance of cost information	- Importance of cost information	0.686
<i>Control variables</i>		
Firm size	-Number of employees	N/A
Industry Type	-A dichotomous variable	N/A

*Control variables*

Among control variables that were found to have a relation to firm performance in previous studies are firm size (AbdulSamad, 2004; Wiwattanakantang, 2001) and industry type (Kamardin and Haron, 2011). Firm size might be measured based on total assets, sales volume, or number of employees. In this study, we use the number of employees. Respondents were asked to rank the firm according to one of the three categories;

small-size firms (less than 50 employees), medium- size firms (between 50 and 250 employees) and large-size firms (more than 250 employees). Industry type was defined based on the main activity a firm is operating.

#### *Research Model*

The impact of organizational variables (product diversity, cost structure and the importance of cost information) and environmental variable (intensity of competition) on cost systems sophistication level is examined by estimating the coefficients in the following multiple regression model (Model 1) after all the study variables as well as control variables are considered.

#### **Model 1: Multiple regression model of cost system sophistication level**

$$COSTSYS = \beta_0 + \beta_1 PRODDIV + \beta_2 COMPINT + \beta_3 COSTSTRU + \beta_4 INFOIMPO + \beta_5 SIZ + \beta_6 INDUS + \varepsilon$$

Where:

*COSTSYS* = Cost systems sophistication level.

$\beta_0$  = The intercept of the regression line and it is the constant value.

$\beta_1 - \beta_6$  = Coefficients of independent variables.

*PRODDIV* = Product diversity.

*COMPINT* = Intensity of competition.

*COSTSTRU* = Cost structure.

*INFOIMPO* = Importance of cost information.

*SIZ* = Firm size.

*INDUS* = Industry type.

$\varepsilon$  = Errors of estimate.

Furthermore, the relationship between cost systems and the manufacturing performance is examined using the following multiple regression model (Model 2) which can be expressed as follows:

#### **Model 2: Multiple regression model of manufacturing performance**

$$PERF = \beta_0 + \beta_1 COSTSYS + \beta_2 SIZ + \beta_3 INDUS + \varepsilon$$

Where:

*PERF* = Manufacturing performance.

$\beta_0$  = The intercept of the regression line and it is the constant value.

$\beta_1 - \beta_3$  = Coefficients of independent variables.

*COSTSYS* = Cost systems sophistication level.

*SIZ* = Firm size.

*INDUS* = Industry type.

$\varepsilon$  = Errors of estimate.

## **5. Data analysis and discussion of results**

### *Reliability test*

As shown in table 2, results of reliability test reveal that Cranach's Alpha for the questionnaire as a whole is about 0.60, which is the minimum acceptable level suggested by Hair et al. (1998), meaning that the questionnaire is reliable. However, Cranach's Alpha of product diversity and the importance of cost information is greater than 0.60 indicating that the questions are reliable to a high extent, whereas Cranach's Alpha of intensity of competition and manufacturing performance is marginally below the minimum acceptable level of 0.60 suggested by Hair et al. (1998) but above the minimum of 0.50 suggested by Gliem and Gliem (2003), indicating that the questions are reliable to some extent.

Data analysis was carried out as follows: first, simple regression was carried out to test the relationship between sophistication level of cost systems and each of the four independent variables (product diversity, intensity of competition, cost structure, and the importance of cost information). Second, multiple regression analysis was conducted to test the impact, if any, of the organizational and environmental factors on cost systems sophistication level as well as the extent to which the cost systems can explain the variation in manufacturing performance.

*Descriptive statistics*

The results of cost systems sophistication level suggest that 50% of firms adopt simple traditional systems with single allocation base and less than three cost pools, 48% of the sample adopt complex traditional systems with three or more cost pools and more than one allocation base, while the remaining 2% adopt simple ABC with more than 3 cost pools and single allocation base. The ABC adoption rate is very modest compared with that exists in developed countries as the UK and the US, where the rate is about 20%. Consequently, highly sophisticated cost systems are applied in Egypt at a limited level.

Furthermore, results reveal that adopting a highly complex cost system can exist only if the firms rely on cost information in their decisions as: cost reduction, pricing, make or buy, producing new products, product redesign, adding or deleting products, product line or department, customer profitability analysis and in their special studies relating to product introduction, discontinuation, redesign, mix, therefore, such decisions need accurate cost information that could be obtained from highly sophisticated cost systems.

*Univariate analysis*

Ordinary least square regression is used to test the relation between the dependent variable, cost systems sophistication level, and the independent variables. Accordingly, simple regression is conducted to test the extent to which each of the following variables; product diversity, intensity of competition, cost structure, and the importance of cost information can explain variation in the sophistication level of cost systems.

As shown in table 3, results of simple regression suggest that cost structure explains only 0.2 % of the variation in sophistication level of cost systems; product diversity and intensity of competition explain 1.2 % and 2.3% respectively of the variation in sophistication level of cost systems. However, the importance of cost information explains 8% of sophistication level variation.

**Table 3: Simple regression of the relationship between sophistication level of cost systems and independent variables**

Independent variables	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Std. Error
Product diversity	0.111	0.012	0.000	1.22636
Intensity of competition	0.151	0.023	0.011	1.21972
Cost structure	0.040	0.002	-0.011	1.23295
Importance of cost information	0.283	0.080	0.069	1.18340

*Multivariate analysis*

We conducted a multivariate regression analysis to take into consideration the simultaneous effects of all organizational and environmental variables and the control variables on cost systems sophistication level. To test multicollinearity in the regression model (1), Variance Inflation Factor analysis was carried out to quantify the severity of multicollinearity. Results in table 4 reveal that VIF for all the independent variables is approximately 1, which suggests that multicollinearity does not exist between dependent variables of product diversity, intensity of competition, cost structure, and the importance of cost information, where VIF is less than 10 (Sekaran, 2000).

**Table 4: Multiple regression results of cost systems sophistication level**

Variables	Predicted Sign	Coefficient	P-value	VIF
Intercept	None	7.614	0.002	
Product diversity	+	0.193	0.362	1.040
Intensity of competition	+	-0.041	0.873	1.051
Cost structure	?	0.028	0.286	1.030
Importance of cost information	+	1.131	0.018*	1.050
Firm size	?	0.330	0.084	
Industry type	?	0.068	0.188	
<i>R</i>		0.394		
<i>R square</i>		0.155		
<i>Adjusted R square</i>		0.088		
<i>Std. error of the estimate</i>		1.17115		

*Note: \* significant at 0.01level*

A close look to the results shown in table 4 reveals that the multiple regression model accounts for 15.5% in explaining sophistication level variations of cost systems. Results showed that the importance of cost information has a positive significant relationship with the sophistication level of cost systems (Sig. <0.05). This result is consistent with those of Anderson (1995), Krumweide (1998), Baird et al. (2004), and Pavlatos and Paggios (2009) who found that the differing needs of organizations for accurate cost data for strategic decisions and cost reduction may affect cost systems adoption. The results suggest that in Egypt, cost information is widely used in decision-making process including decisions related to pricing, adding, redesigning or deleting products and customer profitability analysis, therefore, a highly sophisticated cost systems are required to meet the need of highly accurate cost information.

Furthermore, the results suggest that product diversity has an insignificant relationship with cost systems sophistication level (Sig. >0.05). Consequently, the first hypothesis is rejected. Such result is consistent with those of Bjornenak (1997), Krumweide (1998) and Al- Omiri and Drury (2007), where they do not find any relationship between product cost systems and product diversity. It can be concluded that it is not necessary for firms that have highly diversified products or have a complex production process to adopt a highly sophisticated cost system.

Based on results on table 4, intensity of competition reveals insignificant relationship with cost systems sophistication level (Sig.>0.05). Therefore, the second hypothesis is rejected. This result is consistent with Drury and Tayles (2005), Brierley, 2008, and Pavlatos and Paggios (2009) who found that intensity of competition that the organization face does not affect the cost systems. Firms that face intensive competition need more accurate cost information that could be achieved through highly sophisticated cost systems. However, if this requirement can be met using the simple system then this system will suffice.

Cost structure, proxied by overhead costs as a percentage of total costs, has a positive insignificant relationship with cost system sophistication level (Sig.>0.05). Therefore, the third hypothesis is accepted. This result is consistent with that of Cohen et al. (2002), Drury and Tayles (2005), Khalid (2005), Al- Omiri and Drury (2007) and Brierley (2008), where they found that number of cost pools and number of allocation bases are not affected by whether overhead costs represent a high proportion of total costs or not.

The importance of cost information has a positive significant relationship with the sophistication level of cost system. Accordingly, as cost information becomes important to the firm, the need for more accurate

information will increase. Therefore, the firm will adopt more sophisticated cost system. As a result, the fourth hypothesis is accepted. However, this result is consistent with the findings of Anderson (1995), Krumweide (1998), Baird, et al. (2004), Cinquini et al. (2008), and Pavlatos and Paggios (2009).

Additionally, the multiple regression analysis showed that the firm size does not affect the level of sophistication of cost systems. Despite the importance of firm size as a variable that universally affects the structure of work activities, Libby and Waterhouse (1996), Gosselin (1997), Xiong et al. (2009) and Ahmadzadeh et al. (2011) found also that the size of business unit does not influence the adoption of highly sophisticated cost systems.

Industry type has no significant relationship with cost systems sophisticated level. This finding is in line with Innes and Mitchell (1997), Anand et al. (2005) and Ahmadzadeh et al. (2011) who stated that a highly sophisticated system may be used equally well in any type of industry, therefore, there is no relation between cost system sophistication level and the industry type.

To test the extent to which the cost systems can explain the variation in the manufacturing performance of firms, multiple regression was carried out using model (2). Results in table 5 showed that cost systems, measured by number of cost pools, number of allocation bases, and whether the organization adopts ABC or not, explains 10.9% of the variation in the manufacturing performance.

The results of the study indicate that cost systems have a significant relationship with manufacturing performance (Sig. <0.05). Therefore, the fifth hypothesis is accepted. This result is consistent with those of Ittner et al. (2002), Banker et al. (2008), Zaman (2009) and Bescos and charaf (2010). An effective selection of product cost system could help in improving the manufacturing performance through reducing cycle and lead times, increasing product quality and reducing product costs. When a firm selects an effective cost system, it will be able to measure the costs of products as well as the costs of activities more accurately, which in turn will help the firm to reduce the cycle time of production, reduce product costs by eliminating non value added activities and improve product quality by focusing on the value added activities.

**Table 5: Multiple regression results of manufacturing performance**

Variables	Predicted Sign	Coefficient	P-value
Intercept	None	3.989	0.000
Cost Systems	+	0.063	0.012*
Firm size	+	0.017	0.681
Industry type	+	0.011	0.334
<i>R</i>		0.329	
<i>R square</i>		0.109	
<i>Adjusted R square</i>		0.074	
<i>Std. error of the estimate</i>		0.25845	

*Note: \* significant at 0.01level*

The results do not suggest any impact of the firm size and industry type on manufacturing performance. However, this result is consistent with Gooding and Wagner (1985) and Kim and Kim (2009) who stated that improvements in firm's performance are not related to its size. It can be concluded that large firms do not always lead to better performance. The positive impact of size on performance may become less as the size increases. Furthermore, greater size can be associated with cumbersome formal procedures which may limit the flexibility with regard to a variety of decisions and hence restrict speedy adaptation to changing business environments. Additionally, this result is consistent with Swamidass and Kotha (1998) who found

that there is no relation between industry type and its performance, where they stated that one reason for the absence of industry type effect in the sample may be due to the pre-selection of industries to ensure some degree of homogeneity in the sample and this could be the case in our study.

## 6. Conclusions, limitations and directions for future research

The distinctive feature of this study is that it has adopted a broader perspective than previous studies by examining cost systems design that vary along a continuum rather than two discrete alternatives; either traditional or ABC systems as this classification do not adequately capture the diversity of practices that exist.

The results of this study revealed that manufacturing cost systems in Egypt are still in a developing stage; approximately 65% of the sample has no adequate awareness of ABC systems. We claim that respondents may have used different concepts to describe allocation of costs based on usage of resources. However, 33% of respondents recognize the concept of ABC systems, but they express that they are not willingly be able to use it as a cost allocation method.

Furthermore, the results on cost systems sophistication suggest that 50% of firms adopt simple traditional systems with single allocation base and less than three cost pools, 48% of the sample adopt complex traditional systems with three or more cost pools and more than one allocation base, while the remaining 2% adopt simple ABC with more than 3 cost pools and single allocation base. Additionally, adopting a highly complex cost system can exist only if the manufacturing firms rely on cost information in their decisions.

Despite the importance of more sophisticated cost systems that provide more accurate cost information than simple traditional ones, the majority of Egyptian firms believe that the implementation of such systems is quite difficult due to the high costs of implementation and maintenance, employees are not qualified enough for such advanced systems and the production systems in the Egyptian environment are not too complex to adopt sophisticated cost systems.

Furthermore, the results reveal the need of manufacturing firms to adopt more sophisticated cost systems to improve their manufacturing performance through reducing product costs, improving product quality and reducing cycle and lead times.

However, the results of this study are subject to a number of potential limitations; (i) the survey data was collected from one respondent in each firm, the majority of which were working as financial managers/controllers. Although such respondents are likely to be more knowledgeable about the requested data in their firm, their positions may have led to common method bias, (ii) the study is limited to private firms in the manufacturing sector located mainly in Cairo Zone, and (iii) we cannot claim that the questions captured all the needed information to carry out such research, and questions do not reflect the accurate point of respondents' views. Despite these potential limitations, this study presents a step further in our understanding of cost systems in Egyptian context and will help managers to maintain cost systems that fit their needs and lead to sound decisions.

There is a need for further research to (i) investigate differences between the private and public sector of Egyptian firms in terms of the diversity of contextual factors that influence cost systems sophistication level using a wide spectrum of variables, and (ii) test the impact of highly sophisticated cost systems on manufacturing performance using longitudinal analysis.

### Notes

<sup>1</sup>This study uses 95% as a confidence level with +/- 10% precision level. The equation used to determine the sample size is as below:

$$n = \frac{N}{1 + N(e)^2}$$

Where n= the sample size, N= population, e= level of precision

### References

- Abdelhamid, S., 2002. Costing systems under total quality management concept, unpublished Ph.D. Thesis, Faculty of Commerce, Cairo University, Egypt.
- Abdul Samad, F. 2004. Corporate governance and ownership structure in the Malaysian corporation sector. *Corporate Governance: Advances in Financial Economics*. 9,355–385.
- Abernethy, M. A., Lillis, A. M., Brownell, P., Carter, P., 2001. Product diversity and costing system design choice: Field study evidence. *Management Accounting Research*. 12,261–279.
- Ahmadzadeh, T., Etemadi, H., Pifeh, A., 2011. Exploration of factors influencing on choice the activity-based costing system in Iranian organizations. *International Journal of Business Administration*. 2, 1, 61- 70.
- Al-Omiri, M., Drury, C., 2007. A survey of factors influencing the choice of product costing systems in UK organizations. *Management Accounting Research*. 18, 399–424.
- Anand, M., Sahary, B.S., Saha, S., 2005. Activity-based cost management practices in India: An empirical study. *Decision*. 32, 1, 123- 152.
- Anderson, S. W., 1995. A framework for assessing cost management system changes: the case of activity-based costing at General Motors, 1986–1993. *Journal of Management Accounting Research*. 7, 1–51.
- Armitage, H., Russell, G., 1993. Activity-based management information: TQM's missing link. *CMA- The Management Accounting Magazine*. 67, 2, 7- 12.
- Ashor, A. S., 2000. Activity-Based costing: an evaluation of theoretical framework. *Proceeding of Conference on Accountability in Light of Contemporary Challenges*, Egyptian Institute of Accountants and Auditors, Cairo, Egypt.
- Ashor, A. S., 2008. A proposed framework of activity-based costing. *Scientific Journal of Economics and Commerce*. 1, 1, 145-180.
- Baird, K. M., Harrison, G. L., Reeve, R. C., 2004. Adoption of activity management practices: A note on the extent of adoption and the influence of organizational and cultural factors. *Management Accounting Research*. 15, 383–399.
- Banker, R. D., Potter, G., 1993. Economic implications of single cost driver systems. *Journal of Management Accounting Research*. 5, 15-31.
- Banker, R. D., Bardhan, I. R., Chen, T. Y., 2008. The role of manufacturing practices in mediating the impact of activity-based costing on plant performance. *Accounting, Organizations and Society*. 33, 1–19.
- Basoni, S., 2004. Costing systems in developed economics, Working Paper, Faculty of Commerce, Cairo University, Egypt.
- Becker, T. E., 2005. Potential problems in the statistical control of variables in organizational research: A qualitative analysis with recommendations. *Organizational Research Methods*. 8, 3, 274- 289.
- Bescos, P. L., Charaf, K., 2010. The adoption of ABC and the improvement of performance: The case of the Central Bank of Morocco. *Proceedings of the 33<sup>rd</sup> Annual Congress of the European Accounting Association*, Istanbul, Turkey.
- Bjornenak, T., 1997. Diffusion and accounting: the case of ABC in Norway. *Management Accounting Research*. 8, 1, 3- 17.
- Brierley, J. A., 2008. Toward an understanding of the sophistication of product costing systems. *Journal of Management Accounting Research*. 20, 1,61- 96.
- Bromwich, M., Hong, C., 1999. Activity- based costing systems and incremental costs. *Management Accounting Research*. 10, 1, 39- 60.

- Cagwin, D., Bouwman, M. J., 2002. The association between activity-based costing and improvement in financial performance. *Management Accounting Research*. 13, 1, 1-39.
- Carolfi, I. A., 1996. ABM can improve quality and control costs. *CMA- The Management Accounting Magazine*. 70, 4, 12- 16.
- Cohen, S., Venieris, G., Kaimenaki, E., 2005. ABC: adopters, supporters, deniers and unawares. *Managerial Auditing Journal*. 20, 9, 981- 1000.
- Cooper, R., Kaplan, R. S., 1988a. How cost accounting distorts product costs. *Management Accounting*. 69, 10, 20- 27.
- Cooper, R., Kaplan, R. S., 1988b. Measure costs right: Make the right decisions. *Harvard Business Review*. 96- 103.
- Cooper, R., Kaplan, R. S., 1991. Profit priorities from activity based costing. *Harvard Business Review*, May- June. 130- 137.
- Datar, S., Gupta, M., 1994. Aggregation, specification and measurement errors in product costing. *The Accounting Review*. 69, 4, 567- 591.
- Drury, C., 1998. *Costing: An introduction*, 4<sup>th</sup> edition, London: Chapman and Hall.
- Drury, C., Tayles, M., 2005. Explicating the design of overhead absorption procedures in UK organizations. *The British Accounting Review*. 37, 47-84.
- Elshahat, M., 2006. Cost information and strategic planning in the Egyptian private sector. Ph.D. Thesis, the University of Twente.
- Estrin, T. L., Kantor, J., Albers, D., 1994. Is ABC suitable for your company?. *Management Accounting*. 75, 10, 40- 45.
- Felleh, A., 2002. Costing systems effectiveness in supporting total quality strategy: an empirical study. *Journal of Commercial Research and Studies*. 2, 159-197.
- Frey, K., Gordon, L. A., 1999. ABC, strategy and business unit performance. *International Journal of Applied Quality Management*. 2, 1, 1-23.
- Gliem, J. A., Gliem, R. R., 2003. Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. Paper presented at the Midwest Research to Practice Conference in Adult, Continuing, and Community Education, Columbus.
- Gooding, R. Z., Wagner, J. A., 1985. A meta-analytic review of the relationship between size and performance: The productivity and efficiency of organizations and their subunits. *Administrative Science Quarterly*. 30, 4, 462-481.
- Gunasekaran, A., Williams, H. J., McGaughey, R.E., 2005. Performance measurement and costing system in new enterprise. *Technovation*. 25, 5, 523-533.
- Hair, J.F., Anderson, R.E., Tatham, R.L., Black, W.G., 1998. *Multivariate Data Analysis*. 6<sup>th</sup> edition. Prentice Hall, New Jersey.
- Horngren, C. T., Datar, S. M., Foster, G., 2006. *Cost Accounting: A Managerial Emphasis*. 12<sup>th</sup> edition. Prentice Hall Inc., N.Y.
- Ibrahim, K. H., 1986. Usefulness of costing systems: decision makers' perspectives. *Scientific Journal of Economics and Commerce*, 1, 1, 383-410.
- Innes, J., Mitchell, F., 1995. A survey of activity based costing in the UK's largest companies. *Management Accounting Research*. 6, 137- 153.
- Innes, J., Mitchell, F., 1997. The application of activity-based costing in the United Kingdom's largest financial institutions. *The Service Industries Journal*. 17, 1, 190- 203.



- Ittner, C. D., 1999. Activity-based costing concepts for quality improvement. *European Management Journal*. 17, 5, 492- 500.
- Ittner, C. D., Lanen, W. N., Larcker, D. F., 2002. The association between activity-based costing and manufacturing performance. *Journal of Accounting Research*. 40, 3, 711-726.
- Johnson, H. T., Kaplan, R. S., 1987. *Relavance Lost: The Rise and Fall of Mangement Accounting*. Boston, MA: Harvard Business School Press.
- Kaplan, R. S., Atkinson, A. A., 1998. *Advanced Management Accounting*, 3<sup>rd</sup>edition, Prentice Hill, Englewood Cliffs, N.J.
- Kaplan, R. S., Cooper, R., 1998. *Cost and Effect: Using Integrated Systems to Drive Profitability and Performance*, Boston, MA: Harvard Business School Press.
- Kamardin, H., Haron, H., 2011. Board performance and firm performance of Malaysian listed companies. *International Journal of Economics and Accounting*. 2, 3, 282–306.
- Kennedy, T., Affleck- Graves, J., 2001. The impact of activity-based costing techniques on firm performance. *Journal of Management Accounting Research*. 13, 19- 45.
- Khalid, A., 2005. Activity-based costing in Saudi Arabia's largest 100 firms in 2003. *Journal of American Academy of Business*. 6, 2, 285-292.
- Kim, W. Y., Kim, E. K., 2009. Does firm size matter in explaining firm performance? the case of Korean SMEs in an open economy. *Proceedings of International Council for Small Business (ICSB), World Conference*, Seoul, Korea.
- Krumwiede, K. R., 1998. The implementation stages of activity-based costing and the impact of contextual and organizational factors. *Journal of Management Accounting Research*. 10, 239- 277.
- Leffakis, Z., 2009. The effects of high performance work systems on operational performance in different manufacturing environments: improving the “fit” of HRM practices in mass customization. Ph.D. Thesis, the University of Toledo.
- Libby, T., Waterhouse, J. H., 1996. Predicting change in management accounting systems. *Journal of Management Accounting Research*. 8, 137- 150.
- Malmi, T., 1999. Activity-based costing diffusion across organizations: An exploratory empirical analysis of Finnish firms. *Accounting, Organization, and Society*. 24, 649- 672.
- Pavlatos, O., Paggios, I., 2009. A survey of factors influencing the cost system design in hotels. *International Journal of Hospitality Management*. 28, 263–271.
- Pizzini, M. J., 2006. The relation between cost-system design, managers’ evaluations of the relevance and usefulness of cost data, and financial performance: An empirical study of US hospitals. *Accounting, Organizations and Society*. 31, 179–210.
- Sekaran, U., 2000. *Research Methods for Business: A Skill- Building Approach*, John Wiley and Sons, N.Y.
- Sanford, R. A., 2009. The impact of activity-based costing on organizational performance. Ph.D. Dissertation, H. Wayne Huizenga School of Business and Entrepreneurship, Nova Southeastern University.
- Schoute, M., 2009. The relationship between cost system complexity, purposes of use, and cost system effectiveness. *The British Accounting Review*. 41, 208- 226.
- Simons, R., 1990. The role of management control systems in creating competitive advantage: new perspectives. *Accounting, Organizations and Society*. 15, 1/2, 127–143.
- Smith, Z. R., Wells, C. S., 2006. Central limit theorem and sample size. Paper presented at the annual meeting of the Northeastern Educational Research Association, Kerhonkson, New York.

- Swamidass, P. M., Kotha, S., 1998. Explaining manufacturing technology use, firm size and performance using a multidimensional view of technology. *Journal of Operations Management*. 17, 23–37.
- Swenson, D., 1995. The benefits of activity-based cost management to the manufacturing industry. *Journal of Management Accounting Research*. 7, 167- 180.
- Triest, S. V., Elshahat, M. F., 2007. The use of costing information in Egypt: A research note. *Journal of Accounting and Organizational Change*. 3, 3, 329-343.
- Xiong, Y., Su, W., Lin, T. W., 2008. Activity-based costing popularity in China. *Cost Management*. 22, 3, 40- 48.
- Yamane, T., 1967. *Statistics: An Introductory Analysis*. 2<sup>nd</sup> edition, Harper and Ro., N.Y.
- Zaman, M., 2009. The Impact of activity based costing on firm performance: The Australian experience. *International Review of Business Research Papers*. 5, 4, 200-208.
- Wiwattanakantang, Y., 2001. Controlling shareholders and corporate value: evidence from Thailand. *Pacific-Basin Finance Journal*. 9, 323–362.

### Appendix 1 Survey questions

**Please provide answers to all questions in the following three sections:**

**Section (1): This section includes general information about your firm, Please tick one box to indicate the following:**

1. The number of employees in your firm:  
 Less than 50                       50- 250                       More than 250
2. The industry type in which your firm operates:  
 Spinning and Weaving Industries       Pharmaceutical Industries       Chemicals Industries  
 Wood Industries                       Printing Industries                       Food Industries  
 Metal Industries                       Engineering Industries                       Others.....

**Section (2):**

**Part I: General questions related to the costing system of your firm:**

3. Please indicate below approximately how many separate cost pools are used to assign indirect costs to products.  
cost pools ----- (PLEASE RECORD THE APPROXIMATE NUMBER HERE)
4. Please indicate below how many different types of indirect cost/overhead allocation bases are used in your firm.  
different types of allocation bases -----(PLEASE RECORD THE APPROXIMATE NUMBER HERE)
5. Regarding activity-based costing (ABC), please tick one selection below to indicate which of the following stages best describes your firm's current situation:
  - a. ABC has not been seriously considered.
  - b. ABC has been considered (not implemented) and rejected as a cost assignment method.
  - c. ABC is being considered and implementation is possible, but the required resources are limited.
  - d. Approval has been granted to implement ABC and allocate the necessary resources, but implementation has not yet begun
  - e. Implementation is in process: The ABC implementation team is in the process of determining project

- scope and objectives, collecting data and/or analyzing activities and cost drivers.
- f. ABC has been implemented and information was obtained but did not yet used.
  - g. ABC has been implemented and information was obtained but it was not useful.
  - h. Implemented and generally accepted: ABC information is commonly used by non-accounting staff for decision-making and/or cost management purposes. It is considered a normal part of the information system.

**Part II: This part consists of some questions related to the organizational and environmental determinants of costing system:**

- 6. Please provide an approximate percentage breakdown of your firm' cost structure by entering the percentage in the appropriate spaces below:

**Direct costs:**

Direct Material  
Direct Labor  
Direct Marketing Costs  
Total Direct costs

**Indirect Costs:**

Manufacturing Overhead  
Indirect Marketing Costs  
Administrative Expenses  
Total Indirect costs

- **The following statements are related to the complexity of manufacturing provision and extent of competition your firm faces. Please express your opinion for each of the following using the following scale:**

5	4	3	2	1
<i>Strongly Agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly Disagree</i>

- 1. Most products require similar resources to be designed, manufactured and distributed.
- 2. Considerable variation exists in the sales volume between the top 20% of the best selling items and the bottom 20% of the lowest selling items.
- 3. There are major differences in sales volumes among different products.
- 4. Costs of support department (e.g. purchasing, information processing, and marketing) resources consumed by each product line are almost the same.
- 5. The firm faces intensive competition in the global markets.
- 6. Over approximately the past 10 years, the level of competition for your products has significantly increased.
- 7. Price competition within this industry is extremely intense.
- 8. The level of competition in the market for the major products of your firm is extremely intense.

-To what extent cost data is crucial in your company. Please express your opinion using the following scale:

<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b><i>Highly Important</i></b>	<b><i>Important</i></b>	<b><i>Important to Some Extent</i></b>	<b><i>Not Important</i></b>	<b><i>Not Important at all</i></b>

1. The cost of products must be highly reliable for competition purposes.
2. Cost data are extremely important cost reduction efforts.
3. Cost information is the most important factor when making decisions related to:
  - Pricing decisions
  - Make or buy decisions
  - Producing new product
  - Product redesign
  - Adding or deleting products, product line or department
  - Customer profitability analysis
  - Entering new markets
4. The firm performs many special studies relating to product introduction, discontinuation, redesign, mix or cost reduction decisions.

**Part III: Questions related to the manufacturing performance of your firm:**

Based on your experiences, please indicate to what extent your product costing system helps your organization. Rate your opinion using the following scale:

<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b><i>To a Great Extent</i></b>	<b><i>To a High Extent</i></b>	<b><i>To Some Extent</i></b>	<b><i>To a Little Extent</i></b>	<b><i>Not at All</i></b>

**To what extent your costing system helps in determining the following:**

1. The cost of quality improvement.
2. The cost of scrap and rework.
3. The cost of finishing the manufacturing cycle of producing your products.
4. The cost of your customer lead times.
5. The cost of your products.
6. The cost reduction of producing one unit of your products made by your costing system.

**Section (3): Personal Questions:**

– Name of your firm (Optional):.....

– Please tick one box below to indicate the following:

– Years of Experience:

Less than 5 years

5- 10 years

More than 10 years

– Current position:

Financial  
Manager

Cost  
Accountant

Cost  
Manager

Production Manager

**Tariq Ismail** is a Professor of Accounting at Cairo University, Egypt, and at Majmaah University, Saudi Arabia. He has published many books which had worldwide audience as well as numerous articles in leading international journals including *International Journal of Critical Accounting*, *International Journal of Economics and Accounting*, *Journal of Accounting and Organizational Change*, *Journal of Applied Accounting Research*, *Managerial Auditing Journal*, *Journal of Financial Reporting and Accounting*, *Transformations in Business and Economics*, *Research Journal of Finance & Accounting* and *Journal of Business Strategy*. He had many research grants and awards for the contributions he made in his field. He is on editorial board of several journals including the *International Journal of Economics and Accounting*, *International Journal of Management Accounting Research*, *Journal of Financial Reporting & Accounting* and *Academy of Accounting and Financial Studies Journal*. Additionally, he is on editorial advisory board of *Emerald Emerging Markets Case Studies*. His current research focuses on disclosure quality and financial reporting, management accounting in emerging economies, corporate governance, and auditing issues.

**Nancy Mahmoud** is an Assistant Lecturer of Accounting at Cairo University, Egypt. Her research interests are related to management and cost accounting, in particular the impact of cultural and organizational factors on accounting systems outputs.