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Factors Affecting the Development and Establishment of the Cost of Quality System for Consumer Goods Producing Companies in Tehran Stock Exchange

Fahimeh Balalaei Someie Saraee[1], Somaieh Banikhedmat[*2], Mostafa Navid Talemi[3]

[1]MA in Business Management (Finance Major); [2]MA, Business Management, University Instructor, Payame Noor University, Astara, Iran; [3] MA in MBA

Abstract

The present research is concerned with determining the factors affecting the establishment of quality systems in companies registered in Tehran Stock Exchange. The variables under the study are companies' accounting systems efficiency to provide information, organizational size, the extent of companies' assets, and the extent of sales cycle, while the dependent variable is the establishment of the cost of quality system. This study uses a descriptive survey method, and the research relies on a correlational descriptive-analytic design with applied purposes. The population under study included stock exchange companies producing consumer goods, and the data for analysis were collected via questionnaires. The results revealed that the relationship between the variables about the efficiency of companies' accounting system to provide information the establishment of the quality costing system was confirmed, while the relationship of the cost of quality system to the other three variables was rejected.

Keywords: quality costing system, stock exchange, consumer goods, accounting system efficiency

Introduction

Achieving success in today's competitive markets depends on many factors. One of the most important of which is the continuous improvement of *quality*. Generally speaking, quality means conformity with established standards. Organizations, converting qualitative concepts into quantitative measures try to objectify the achievement of goals. When quality is explained in quantitative terms, costs for realizing quality can be accurately measured.

Prior research shows that enhancing quality is not the only factor satisfying clients, because other factors such as cutting prices and manufacturing costs play a significant role as well (Emami, 2007). Nowadays, Iran's industry needs to take part in international markets, while the industry should expand its export. From among the factors affecting this expansion is the quality level of products that, as a competition, plays an important role in exportation and even importation development (Dehdar, 2009). Yet, statistics published in Iran indicate that companies relatively ignore the quality of issues. Holding conferences and applying different methods all more or less resulted in failure. Still, what is the cause of such failures?

From among the causes accounting for the failure and according to experts' views, costs of quality (COQ) is recognized as an important factor, because producers maintain and enhance the quality of products which lead to irrecoverable costs (Gholozade & Poorbakhsh, 2010). One of the basic obstacles to achieving effective and efficient quality is the illusion to reach the higher quality and necessarily demand to spend extravagant costs. The real relationship between costs and quality can be discovered by investigating cost-related factors.

Producing a product or providing a service that brings about high customer satisfaction cannot be realized without taking into account the costs. In fact, the overriding responsibility of management is to strike a balance between the quality and costs (Raeesi Ardeli & Raeesi, 2004). Investigating COQ systems is an instrument that enhance quality, recognize extra costs and unproductive activities, and finally eliminate them.

Corresponding author: Somaieh Banikhedmat, MA, Business Management, University Instructor, Payame Noor University, Astara, Iran. Email: banikhedmat_64@yahoo.com

Applying appropriate COQ system, besides providing a better use of resources and facilities, helps to invest the preventive activities, fulfill customer satisfaction, and reduce costs to the extent possible (Eslami-Tazeshar, 2002). Costing quality is a process-based costing method in which costs of activities are categorized and compared according to the degree of their impact on quality. Costs of quality are specifically significant because many questions depend on them; for instance, what possible effects with low quality may impose on price and consequently on income and revenue, and to what extent the desired costs should be for achieving good quality.

Controlling COQ helps to determine the costs necessary for the quality of products and services, and in turn the prices paid to cut such quality. This process will make it possible to control costs more accurately and improve the quality of products and services by taking preventive measures (Gholizadeh & Poorbakhsh, 2010). COQ was first introduced in the United States in 1950 by Feign Baum who expanded and implemented the concept in General Electric Corporate America. Thus, COQ were first used in industry. Yet, today industrial countries tend to increasingly use COQ in business, public sectors, services, transportation, distribution, and so on (Raeesi Ardeli & Raeesi, 2004).

Broadly speaking, COQ refers to costs related to all activities performed in an organization to produce high quality products. COQ is divided into three categories: costs of waste prevention, assessment costs, and costs of failure. Each of these categories is ,of course , further divided into sub-groups (Eslami-Tazeshar, 2002). Each of these groups of cost is defined below (Emami, 2007, pp.3-4).

1. Costs of internal failure: costs that cover assessment, improvement and/or replacement of a product before it reaches to the consumers.

2. Costs of external failure: costs that cover assessment, improvement and/or replacement of a product after it has reached consumers.

3. Assessment costs: cover assessment or audit of products or services to make sure of quality standards.

4. Prevention costs: are spent on preventing goods waste or low quality products. Clearly, spending costs on prevention is always more cost-effect than that of assessment and failure.

Normally organizations do not calculate COQ precisely because such costs are not necessary for drawing up balance sheet, profit and loss, although these factors can significantly influence companies' profitability. In absence of COQ assessment systems, organizations will not be able to trace the origins of these costs or determine a method to control them. Also, because organizations are to collect and report COQ under no legal obligation, such costs usually represent arbitrary values.

Investigations have revealed that, in spite of the managers' assumption, COQ often demand high sums. In many companies, these costs amount 20% of sales and about 25-40% of operational costs (Raeesi Ardeli & Raeesi, 2004). Now, considering the importance of the present topic, the question is what factors are involved in setting up a COQ system in companies registered in Tehran Stock Exchange?

Several studies have been conducted on COQ. The components of the COQ system were introduced by two researchers from Victoria Industrial University in 1999. The researchers, Oliver and Qu (1990) divided the COQ into different components. Waste prevention costs, assessment costs, and costs of failure were the variables which received more consideration in their study (Oliver and Que, 1999). Lovea and Iranib (2003), in a study on project management quality at information system for the construction industry, described COQ system as being composed of such components as waste preventions costs and assessment costs. Briggs *et al.* (2007), , found organization size, quality standards, and employees' motivation for participating in activities as factors effecting the development of COQ systems in a research on the quality of services provided by hotels in Scotland.

Reed *et al.* (2000) found that certain factors affected COQ system. The factors observed by Reed *et al.* (ibid.) include training and educating employees, top management commitment (LEADERSHIP), and organizational culture. In a MA thesis concerned with COQ systems in the pharmaceutical industry, Mobini (1998) recognized certain obstacles to set up COQ systems that include complexities of measuring costs, poor and insufficient academic training, and incapacity of incorporations' accounting systems to provide information.

Eslami-Tazeshar (2002) conducted a study on the obstacles to develop COQ in the automobile manufacturing industry. The results of the study showed that the main obstacles to establish COQ systems are unawareness of top management, poor and insufficient academic training, lack of universally accepted standards, costs measurement complexities, and incapacity of incorporations' accounting systems in providing necessary information.

Nikdel (1998) primarily explicated total quality management and its relationship to quality costs by studying the model and establishment of COQ in an industrial unit. Next, after introducing theoretical concepts, they applied the model to the industrial

forging manufacturing. This applied stage stated from recognizing the current status of the company under study in such areas as production, molding, quality and finance, while all costs and related high-quality activities were recognized. After determining cost-related variables in each of the major sectors and associating these variables with different activities in the company, the data were collected and qualitative data collection system was established.

Following that stage, the style of presenting and structuring cost-related reports within certain time periods were determined, and a common basis to investigate each and every COQ factor was decided upon. Finally, after the system was implemented, results were observed and useful suggestions for improving quality and cutting costs were presented (see Nikdel, 1998).

Using a fuzzy approach, Dehdar (2009) studied obstacles to develop COQ systems in companies producing consumer goods in Tehran Stock Exchange. The results revealed that factors such as employee's motivation for work participation, organizational culture, employees' continuous training, and top management awareness affected the establishment of COQ systems in the companies under study.

Theoretical Framework of the Study

Referring to national and international studies and interviewing university professors, managers and financial experts from several organizations and companies, the researchers of the present study recognized four major independent variables with a direct relationship to set up a COQ system:

1. The capacity of the accounting system to provide the sufficient information
2. Organizational size
3. Extend the company's assets
4. Extend the sales cycle

These variables have been recognized in different researches as factors affecting the COQ system, and according to the definitions, the model used in the present study would be illustrated as follows:

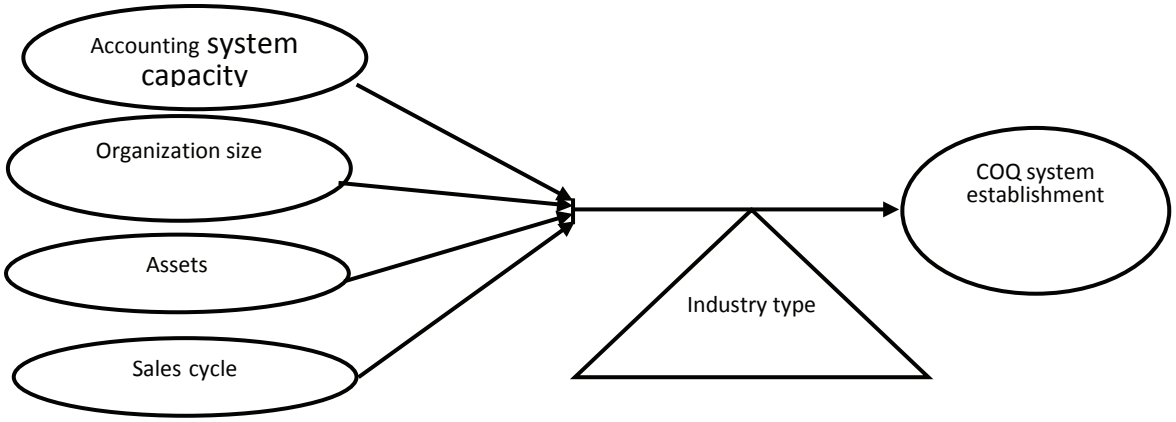

Figure 1. The conceptual model of the study

The conceptual and operational definitions of the variables are as follows:

COQ: covers the costing of goods and services including failure costs, assessment costs, and prevention costs (Gholizadeh & Poorbakhsh, 2010).

Efficiency of the accounting system: accounting is a discipline which regularly collects, analyzes, measures, registers, categories, and assigns the information related to transactions, financial operations, and administrative events, and provides the information in statements to individuals who want to make informed decisions about the affairs of the institution. In fact, the accounting system collects the existing information in an organization, prepare various pieces of information for decision-making (Gholizadeh & Poorbakhsh 2010). The efficiency of the incorporations' accounting system in providing information refers to the extent to which the accounting system is capable of collecting and presenting necessary information for the COQ system (Mobini, 1998). This variable is measured through questionnaires.

Organization size: organization size refers as a variable to whole personnel of an organization in 80% of the researches conducted (Robins, 1987)

Company assets: the assets of a commercial unit are economic resources with prospects

(Nowravesh and Karami, 2007). Assets are rights to future economic benefits or other legal ways to achieve the benefits arising from transactions or other prior events under the control of the commercial unit. Assets in accounting refer to all monetary properties and rights. The assets of a unit may be a tangible entity such land, buildings, or cash, or may be intangible financial rights or advantages such as goodwill or obligatory claims. Customarily, assets are divided into different groups on the balance sheet. Two of the widely used groups are current and fixed assets. An asset is a financial concept referring to rights and properties convertible to money, arising from transactions and definite operations and events and being owned by a commercial unit. An asset is one of the accounting elements showing the financial status of a non-governmental unit (Horngren *et al.*, 2001). The value of the variable is calculated by its date sum in the balance sheet.

Sales cycle: is profit divided by sales.

$$\text{sales cycle} = \frac{\text{profit}}{\text{sales}}$$

Considering the statement of the problem and the literature, the hypotheses of this study are as follows:

1. There is a positive relationship between the efficiency of the accounting system in providing information for the COQ system and the establishment of the COQ system.

2. There is a positive relationship between organization size and the development of the COQ system.

3. There is a positive relationship between the extent of companies' assets and the development of the COQ system.

4. There is a positive relationship between the extent of sales cycle and the development and establishment of the COQ system.

5. There is a relationship between the efficiency of the accounting system, organization size, extent of assets, and sales cycle to the development and establishment of the COQ system considering type of industry.

Materials and Methods

In the present study, the descriptive survey method was used. The research has a correlational descriptive-analytic design with applied purposes. The population under study included the companies registered in Tehran Stock Exchange, and the sample was randomly selected. The total population size was 141 (N=141), and to collect the data, 20 questionnaires were primarily distributed. Then, the variance of the dependent variable was calculated and the number of samples was determined via the following formula:

$$n = \frac{z^2_{a/2} S^2_x .N}{e^2 .N - e^2 + (Z^2_{\alpha/2} .S^2_x)}$$

Following the calculations, a total number of 44 samples were collected. To gather the data the field method was used and questionnaires were used as data collection tools. Also, the reliability coefficient of the questionnaire was calculated via Cronbach's alpha. Regarding the development and establishment of COQ system, the coefficient observed was found to be 74.7, and the value of the capacity of the accounting system was found to be 73.8. As a result, questionnaire is reliable enough. The data collected though questionnaires were analyzed in SPSS, and regression test was used to examine the hypotheses of the study.

Results

Testing the hypotheses

Hypothesis 1. There is a positive relationship between the efficiency of the accounting system in providing information for the COQ system and the establishment of the COQ system.

H_0: There is not any relationship between the efficiency of the accounting system in providing information for the COQ system and the establishment of the COQ system.

H_1: There is a relationship between the efficiency of the accounting system in providing information for the COQ system and the establishment of the COQ system.

Table 1. The degree of the relationship between the efficiency of accounting system to the establishment of the COQ system

Model		R	R Square	Adjusted R Square	Std. Error of the Estimate
dimension01	1	.638[a]	.407	.392	.39591

Table 2. Regression between the efficiency of accounting system to the establishment of the COQ system

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		Std. Error	Beta			
1	(Constant)	1.794	.368		4.878	.000
	Capacity of accounting system	.531	.099	.638	5.363	.000

Considering the value of *sig* which is less than .05, H_0 is rejected with 95% certainty and H_1 is confirmed. Thus, there seems to be a significantly positive relationship between the efficiency of the accounting system in providing information for the COQ system and the establishment of the COQ system. Also, considering Table 2, the intensity of the relationship is 63.8. To determine the directionality of the effect, with regard to the β coefficient, it is observed that the effect is direct and positive. On the other hand, the coefficient of determination of this hypothesis is 0.407, implying that the independent variable can predict 40.7 of the changes in the dependent variable.

Hypothesis 2: There is a positive relationship between organization size and the development of the COQ system.

H_0: There is not any relationship between organization size and the development of the COQ system.

H_1: There is a relationship between organization size and the development of the COQ system.

Table 3. The intensity of the relationship between organization size and the development of the COQ system

Model		R	R Square	Adjusted R Square	Std. Error of the Estimate
dimension01	1	.029[a]	.001	-.023	.51370

Considering the value of *sig* which is greater than .05, H_0 is confirmed with 95% certainty and H_1 is rejected. Thus, there is not any significant relationship organization size and the development of the COQ system.

Hypothesis 3: There is a positive relationship between the extent of companies' assets and the development of the COQ system.

H_0: There is not any relationship the extent of companies' assets and the development of the COQ system.

H_1: There is a relationship between the extent of companies' assets and the development of the COQ system.

Table 4. The intensity of the relationship the extent of companies' assets and the development of the COQ system

Model		R	R Square	Adjusted R Square	Std. Error of the Estimate
dimension01	1	.069[a]	.005	-.019	.51270

Considering the value of *sig* which is greater than .05, H_0 is confirmed with 95% certainty and H_1 is rejected. Thus, there is not any significant relationship between the extent of companies' assets and the development of the COQ system.

Hypothesis 4: There is a positive relationship between the extent of sales cycle and the development and establishment of the COQ system.

H_0: There is not any relationship between the extent of sales cycle and the development and establishment of the COQ system.

H_1: There is a relationship between the extent of sales cycle and the development and establishment of the COQ system.

Table 5. The intensity of the relationship between the extent of sales cycle and the development and establishment of the COQ system

Model		R	R Square	Adjusted R Square	Std. Error of the Estimate
dimension01	1	.027[a]	.001	-.023	.51372

Considering the value of *sig* which is greater than .05, H_0 is confirmed with 95% certainty and H_1 is rejected. Thus, there is not any significant relationship between the extent of sales cycle and the development and establishment of the COQ system.

Hypothesis 5: There is a relationship between the efficiency of the accounting system, organization size, extent of assets, and sales cycle to the development and establishment of the COQ system considering type of industry.

Table 6. Correlational coefficient test between independent variables and the dependent variable considering type of industry

Extent of development/establishment of COQ considering industry type		Accounting system efficiency	Organization size	Assets	Sales cycle
Machinery &equipment	Pearson Correlation	0.669	0.401	-0.268	-0.193
	Sig. (2-tailed)	0.100	0.373	0.561	0.679
	N	7	7	7	7
Pharmaceutical drugs & materials	Pearson Correlation	.809*	0.18	0.63	.837*
	Sig. (2-tailed)	0.028	0.699	0.129	0.019
	N	7	7	7	7
Automobile parts manufacturing	Pearson Correlation	0.545	0.249	0.19	-0.298
	Sig. (2-tailed)	0.264	0.634	0.719	0.566
	N	6	6	6	6
Chemical products	Pearson Correlation	-0.043	-0.644	-0.427	-0.068
	Sig. (2-tailed)	0.926	0.119	0.339	0.885
	N	7	7	7	7
Other mineral non-metal materials	Pearson Correlation	.883*	-0.142	-.828*	-.837*
	Sig. (2-tailed)	0.020	0.788	0.042	0.038
	N	6	6	6	6
Cement, lime, plaster	Pearson Correlation	0.732	0.115	0.57	0.431
	Sig. (2-tailed)	0.160	0.854	0.316	0.468
	N	5	5	5	5
products Food	Pearson Correlation	0.264	-0.098	-0.803	0.408
	Sig. (2-tailed)	0.614	0.853	0.055	0.422
	N	6	6	6	6

6.1. The individual observation of industries revealed that the degree of development and establishment of the COQ system did not have any significant relationship to any of the variables including capacity of the accounting system, organization size, extent of assets, and sales cycle in the machinery and equipment industry.

6.2. In the Pharmaceutical drugs & materials industry, capacity of the accounting system showed sig=0.028, while sales cycle showed sig=0.019. Considering the fact that sig is less than 0.05, these two variables have a significant relationship to the development and establishment of the COQ system.

6.3. In the Automobile parts manufacturing, the degree of the development and establishment of the COQ system did not show any significant relationship to any of the variables including capacity of the

accounting system, organization size, extent of assets, and sales cycle.

6.4. In the chemical materials industry, the degree of the development and establishment of the COQ system did not show any significant relationship to any of the variables including capacity of the accounting system, organization size, extent of assets, and sales cycle.

6.5. In the Other mineral non-metal materials industry**,** capacity of the accounting system showed sig=0.0.42, and sales cycle showed sig=0.038. Because the level of significance in these cases in less than 0.05, they have a significant relationship to the development and establishment of the COQ system.

6.6. In the Cement, lime and plaster industry, the degree of the development and establishment of the COQ system did not show any significant relationship to any the accounting system, organization size, extent of assets, and sales cycle.

6.7. In the food products industry, the extent of assets showed sig=o.o5, which means that this variable has a significant relationship to the development and establishment of the COQ system.

Implications of the study

1. Considering the findings of the present study, there is an association between the capacity of the accounting system and the development and establishment of the COQ system, and the study can propose the following suggestions:

a. Companies should reinforce their accounting systems.

b. Companies should shape their accounting team in such a way that COQ experts are also involved.

c. Companies should use advanced software to present information in times of necessity to management. Using intelligent programs can be considerably helpful because they can facilitate data collection and reporting.

2. The minimum capacity of accounting system (2.9778) was observed in the factor capacity of accounting system to supplying the costs. Thus, the following suggestions are made for the purpose of reinforcing the capacity of the accounting system to cover reparation costs in the companies registered in Tehran Stock Exchange:

a. Companies should enhance the capacity of their accounting system to supply information related to reparation.

b. Companies should store their information properly to be able to have access to their reparation information in case of unexpected incidents, and if necessary, have contact with the accounting system or automatic document issuance system.

c. Companies should store a comprehensive list in their archive of parts, equipment, maps, map developers, and equipment trouble-shoot instructions.

d. Companies should have control over the quality of raw materials and manufactured components.

e. Companies should implement a reparation and maintenance management system, and describe and measure the role of costs in such activities.

3. Another factor related to the capacity of the accounting system was waste costs with an average of 3.000. Companies registered in Tehran Stock Exchange are suggested to consider the following points to reinforce their accounting systems to supply waste costs in case of consumer goods:

a. Companies should concentrate more on industrial accounting

b. Organizations should continuously control and register waste costs to reduce them as far as possible.

c. Companies should implement a system to facilitate the access to waste costs.

d. Companies can implement a system in which waste costs are separated according to the factors causing them to recognize which elements require more time and energy in the prevention process.

4. Another factor with a low average (3.7045) was raw materials maintenance costs. Thus, in this regard, the following suggestions can be considered:

a. Companies should reinforce their accounting system as far as raw materials maintenance costs are concerned.

b. Companies should give more consideration to industrial accounting systems.

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