

A Case Study on Costs of Quality (COQ) Behaviour: Iran Khodro Industrial Dies Company)

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Abstract

Recently, quality is an undeniable necessity for survival of an organization. In contrast, lower costs and the price is the main competitive advantage of enterprises; therefore, quality is not allowed in favour of any cost for the organization. That is why organizations need to control their costs of quality to compete and survive. Purpose of costs of quality is to determine the optimal level of quality. In other words, the system is expected to make the highest quality feasible by minimal costs. Some Iranian organizations, including Iran Khodro Industrial Dies Company, also understood the need to identify and implement quality-costing systems. Since 1386, the company aims to identify and control the cost of its quality by implementing the quality costing system. By describing components of cost of quality and information collection, the present study tries to evaluate the three-year process of Iran Khodro Industrial Dies Company and analyse the results in a case study.

Keywords: cost of quality, cost of prevention, appraisal costs, internal and external failure costs

Introduction

During current century, Concepts related to quality have become widespread by Global developments in the field of technology, rapidly changes in markets and more competitive activities of enterprises. Many organizations evaluate quality as an essential element to achieve customer satisfaction and a pretext for survival and development in a competitive situation. Nowadays, the concept of quality is beyond the reliable product and its purpose is to achieve total quality on which performance and people are effective [1].

High quality Product or service will influence the cost; COQ auditing is one of the key elements in achieving quality [9]. Cost of quality (COQ) is based on tangible costs identified in the auditing system, because its basis is considered the real exchange used in the production process. Concepts of COQs are applied in manufacturing and service organizations. Organizations which measured COQ found interesting results. COQ is a strong measurement system which translates low quality concepts, activities for quality program and quality improvement into management [7].

Although the purpose of implementation of quality systems is to achieve customer satisfaction, this goal should be achieved by minimal cost. Therefore, familiarity with the philosophy and methods of quality costing is essential for managers who promote their organization by mechanisms related to quality [1].

COQ is Total costs imposed to the organization for prevention of poor quality, making sure to meet quality requirements and any other costs that have arisen because of poor quality. The low quality is defined as non-value adding activity, waste, errors and failures in achieving customer needs [3]. In other words, the cost of quality is the cost of poor quality and substandard product, or the cost that occurs when the higher quality is not achieved [4].

A major problem in the field of quality costing is that COQs are not fully recorded in the accounting reports, and significant parts of them often remain unnoticed. In addition, these costs should not be limited only to manufacturing activities and operations; but the cost of service and support must also be noted [1].

Literature Review

Although the implementation of quality systems has become necessary for survival in a turbulent and competitive environment of current era, it should be noted that the ultimate goal of those attempts is improving the organization and increasing the benefits [1]. Organizations every day lose much of their wealth because of

the poor quality [8]. If the quality is considered as a requirement for improvement, quality costing can be an essential tool for managing improvement. In fact, quality costing will cause effective spending of costs of quality along with management of organizational improvement. In other words, quality costing is a powerful tool for enlightenment and awareness of the management in order to use its resources optimally for improving the organization and increasing interests [1].

COQs are the costs imposed on producers, consumers and society for quality of products or services, including costs associated with preventing defects, appraisals and damages due to internal and external failures. COQs also include the cost of providing and assuring satisfactory quality and costs of losses arising from a lack of quality [5].

High costs for quality may lead us to the undesirable quality levels. On the other hand, the increase in unnecessary costs will reduce profit margin. As a result, the optimal level of COQ should be determined by information related to COQ, because COQs cannot be managed as long as they are not measured [9].

The purpose of calculating COQs is to determine the costs of poor quality product or cost of providing good quality as a management tool for continuous improvement and quality improvement in the organization by recording, assessing, separating and evaluating costs of quality, so that COQ indicators provide a good basis for managerial decision making in the organization [4].

COQ is classified into four main groups:

A) The cost of prevention

It refers to the planned cost which an organization accepts to ensure that any objection will not be incurred until the delivery of goods or services to the client. Delivery process can include the design, development, production and transportation. For example, cost of prevention can include the costs of training, continuous improvement efforts, quality management, process control, market research, testing and preventive maintenance departments [3].

B) The costs of assessment

All sections related to the final output should always be evaluated by an appropriate system to meet the desired specifications and quality standards. The costs that are included in this section include inspection and testing of inputs, processes and outputs, creation and implementation of quality systems and auditing, control of measurement and inspection tools, supply of parts and inspection of inventory quality [1].

C) Cost of internal failure

It Includes costs related to the criticism that occurs before delivery of the product to the customer and the organization realizes these defects in different ways such as testing and inspection of quality control department. Costs that fall into this category include the costs of waste, repair, failure or non-compliance analysis, one hundred percent inspection, work stoppages, supplier error [2].

D) Cost of External failure

If the deficiencies and flaws of the product reveal after delivery to the customer, the caused expenditure is classified as external failure costs. These costs include the costs of warranty, customer complaints and product return [1].

It should be noted that these cost factors do not include all factors; instead, there are costs which are specific to industries. Usually, failure costs of all industries account for the biggest contribution. Costs of prevention are usually the lowest cost of quality [2].

Costing of quality is largely clear and unambiguous. The ultimate goal is to determine the optimal level of quality at which the cost is minimal. What is more important is to determine the items that should be considered as the cost of quality [1].

Joseph Juran proposed a theoretical model representing the inverse relationship between prevention and appraisal costs and the cost of failure. Accordingly, greater investment on prevention and inspection will reduce the cost of failure. More costs of prevention reduce the costs of assessment. This reversed transaction which is a well-known and highly acceptable well reflects the concept of optimal quality as a basis of quality costing (Figure 1).

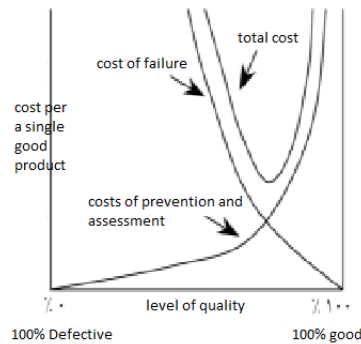


Figure 1: inversed relationship between costs of prevention and assessment and costs of failure

Therefore, there is a level of quality in which COQ is minimal. However, in later periods, some researchers have criticized and challenged this theory.

The theory was based on the grounds that there is no optimal and economic point for quality and the optimal level of quality is indeed the faultless level (Figure 2).

Burgess attempted to reconcile these two theories together. His studies have concluded that the classical view was appropriate for limited and specified period and modern view was helpful for unlimited horizon. The Finer, Davos, Maslos and Dada had suggested that the traditional model provides a detailed and still image of economic levels of quality; while in dynamic and multi-period conditions, the cost of failure reduces over time without need to increase the cost of assessment and prevention.

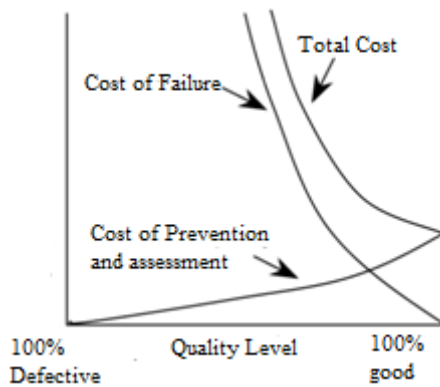


Figure 2: modern theories (flawless level as the optimal level of COQs)

Despite criticisms on traditional theories of Juran, the traditional model and the inverse relationship is widely acceptable [1].

Although there might be many methods for collecting costs of quality in the organizations, our focus in this paper is on the traditional methods.

Collecting costs of quality

To collect costs of quality, it is first required to know the purpose of collecting costs of quality. Obviously, if there were no purpose, there would be nothing for aiming.

The purpose can be to detect expensive quality problems or reduce costs of quality. In this case, it is necessary to order the collection of COQs to compare the information with previous reports. Collection of costs may be initially associated with complications. For example, not all costs of quality may be evaluated. Crosby believes

that about one third of the total cost of quality becomes evident in the first activity. Naturally, the collected costs increase by practical experience of the system. It is better to collect costs by evaluating costs of failure and keep in mind that a small percentage of decrease in enormous costs is better than a large reduction in negligible costs [2].

This method is based on the early writings of Juran. This method uses data available in the organization through financial or accounting records. This information may be obtained by attendance reports, expense reports, and purchase orders, reworking reports, loss reports and other similar reports. This method is the easiest and most standard way. Steps are as follows:

As with any quality improvement program, the commitment to top management support is essential for successful implementation of quality costing. This can be helped by specialists of quality control or auditing departments who can estimate the cost of quality. For most organizations, this figure will be noticeable.

For quality costing, a team consisting of quality and auditing groups is required. It is better that managers attend this team, because this reduces their resistance; moreover, results of quality costing may be accepted easier.

The group must specify the type of quality costing and put them in four groups of COQs. Groups can consider a code for every kind of COQ for convenient.

The group must report the cost of quality in a given time period, say a month.

The traditional method is the best method to start quality costing. Because most organizations have accounting or finance departments which record some costs of quality such as training, warranty costs, waste costs in their system. This method is used in all large and small organizations, universities, suppliers and any other organizations providing an almost faster view of the costs of quality.

However, this method of collecting costs associated with non-value added activities is very difficult because they are not recorded in the accounting system; in addition, most accounting systems do not record all costs of quality such as failure analysis, re-inspections, product quality audits, evaluation of items in stock. Therefore, more costs can be added to the list of COQ by increasing experience in quality costing [2].

Analysis of Data

Since 2004, Iran Khodro Industrial Dies Company began to produce parts of Iran Khodro products. The related quality costing system was implemented in 2007. Outlines of the costs associated with each category were revised twice.

Last revision was done based on previous experiences and better determination of outlines in 2008. Considering the information systems available in the company and collecting systemic information, outlines were divided into relevant subcategories. Information was collected by the system in a monthly order. The following table summarizes information collected during 2009, 2010 and 2011.

Table 1: costs of quality for three successive years (million Rials)

Cost	Detailed outline	2009	2010	2011
Preventive costs	Marketing	211	316	266
	Preventive costs of operations			
	Quality supervision			
Costs of supervision and testing	Inspection and testing costs of purchase	94	273	271
	Costs of inspection and testing of operations			
	External costs of inspection and testing			
Internal failure costs	Error costs of production	19	33	161
	Error costs of operations			
External failure costs	-	871	439	482

According to information in the above table, COQ balance sheets for three consecutive years can be prepared as follows.

COQ balance sheet 2009			
19	Costs of internal failures	211	Costs of prevention
871	Costs of external failures	94	Costs of assessment
890		305	
-585			
COQ balance sheet 2010			
33	Costs of internal failures	316	Costs of prevention
439	Costs of external failures	273	Costs of assessment
472		589	
117			
COQ balance sheet 2011			
160	Costs of internal failures	266	Costs of prevention
482	Costs of external failures	271	Costs of assessment
642		537	
-105			

By evaluating COQ balance sheet in three consecutive periods, following results can be achieved:

1. By increase in costs of prevention and assessment, costs of external failure will significantly reduce.
2. Decrease in the cost of prevention significantly increases costs of internal failure.
3. As Figure 3 shows, the increase in costs of prevention and assessment decreases or keeps the failure costs constant and whereby increases costs of failure.

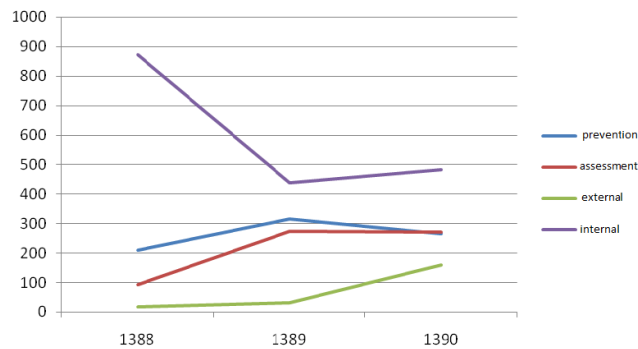


Figure 3: The cost of quality in three consecutive years

Conclusions

As the results show, COQ can reveal many dark spots on expenses and the relationship between types of costs. Findings show that controlling costs of prevention and assessment costs can control costs of failure. In addition, wastes and reworks can be evaluated in relation to costs of quality.

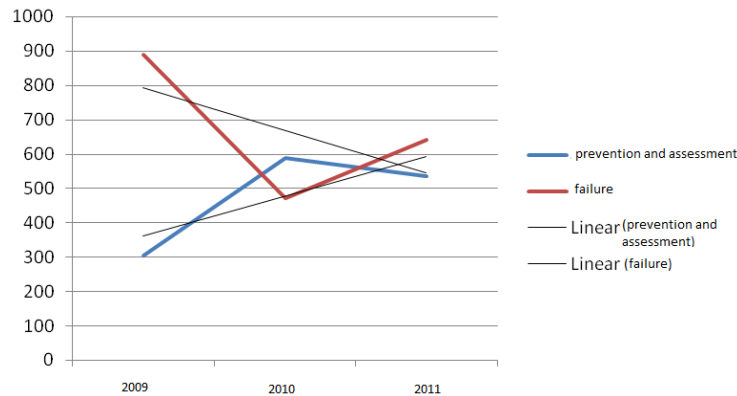


Figure 4: inverse relationship between costs of prevention and assessment

Figure 4 confirms the inverse relationship between costs of prevention and assessment and costs of failure as addressed by Juran.

Data from analyses can identify areas of opportunity within the organization to plan on costs with the greatest impact on reducing costs and increasing quality. Based on this information, the costs which are neutral on expenses can be eliminated and new costs can be defined to achieve an optimal quality costing system.

Resources

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