

## **The Implementation of Cost of Quality (COQ) Reporting System in Malaysian Manufacturing Companies : Difficulties Encountered and Benefits Acquired.**

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### **Abstract**

*This study attempted explored the difficulties encountered in the implementation of Cost of Quality (COQ) reporting among manufacturing organizations in Malaysia. A questionnaire survey method was used to find out the difficulties encountered during COQ implementation as well as the benefits obtained after COQ implementation. The findings of the study revealed that only 33 organizations (or 39.3%) out of 84 organizations had implemented COQ reporting system. Lack of cooperation among departments and difficulties in getting data were the top two challenges faced by these 33 organizations during the implementation of COQ. However, there are some benefits reported, after the implementation of COQ reporting in these organizations. The main benefits gained are, improvements in terms of the quality of product/service and the reduction of the company's failure rate.*

**Keywords:** Cost of Quality, implementation, manufacturing, difficulties, benefits.

### **1. Introduction**

COQ has been in existence for about four decades and the highly competitive, globalised business environment of today has made COQ a useful tool in monitoring and achieving cost reductions, in order to remain competitive. COQ reporting's ability to identify potential areas for improvement has been recognised by researchers (Setijono and Dahlgaard, 2008). It is also regard as a performance indicator for cost saving initiatives (Arvaiova et al, 2009). However, previous studies showed that COQ reporting is not being adopted extensively worldwide [Yang, C.C (1999); Rapley et al (1999); Oliver and Qu (1999) & Arvaiova et al (2009)]. Various reasons were cited for the non-adoption of COQ reporting and the most common reason is the lack of awareness and understanding of COQ principles (Arvaiova et al, 2009; Sower at al, 2007 and Wheldon and Ross, 1998). Other reasons reported, for the non-adoption of COQ reporting are the lack of management support and the perception that the current accounting system used in organizations are adequate (Arvaiova et al, 2009).

Apart from the above mentioned reasons, the implementation of COQ reporting itself is not an easy process where organizations encounter numerous difficulties during the implementation period. There is a lack of research to explore the difficulties encountered by organizations in the implementation of COQ reporting system, especially in the developing countries. Therefore this research was conducted to investigate the difficulties encountered as well as benefits gained through the implementation of COQ reporting among manufacturing organizations in Malaysia. By identifying the difficulties encountered, practitioners can plan better, to overcome the main difficulties and reap the benefits of COQ reporting. This will assist organizations in Malaysia especially the manufacturing sector to improve their cost saving measures, to remain competitive amid stiff competition from neighboring countries in Asia.

The objectives of this research are

- i. To determine difficulties encountered during the implementation of COQ reporting among manufacturing organizations in Malaysia
- ii. To detemine the benefits achieved by manufacturing organizations in Malaysia through the implementation of COQ reporting

### **2. Review of Literature**

#### **2.1 Definitions of COQ**

The widely accepted Feigenbaum's PAF Model classified cost of quality into three categories – Prevention cost, Appraisal cost and Failure cost (Plunket and Dale, 1987).

Juran further divided the failure cost into external and internal failure cost (Juran, J.M. and Gryna, F.M. Jr., 1980). As stated by Plunket and Dale (1987), the PAF model is the most commonly used COQ model in the United States and Great Britain. Sower, E.V., Quarles, R. and Broussard, E. (2007), confirmed that American Society for Quality (ASQ) adopted the classification of COQ by four categories (where failure cost is divided into external and internal failure costs), based on PAF model. The same classification of COQ will be adopted throughout this paper.

### **Difficulties during the implementation of COQ reporting system**

Lack of data or difficulties in collecting data, lack of cooperation from top management and lack of understanding of COQ principles are common difficulties identified during the implementation of COQ reporting (Rodchua, 2009; Bamford and Land, 2006 and Elridge et al, 2006). Roden and Dale, (2001), detailed out difficulties in collecting COQ data by an engineering firm as below:

- Firm culture and employee attitudes towards COQ system is not conducive
- Lack of information and accountability makes it difficult to collect COQ data
- Complexity in existing accounting system which unable to sort data according to various division also make it difficult to measure COQ data

Meanwhile Wan and Dale (2002) stressed the importance of employees as well as firm culture in the implementation of COQ reporting. This supported earlier findings by Roden and Dale (2001) that employee responsiveness as well as the culture of the firm played important roles in the success of COQ implementation. A study by Arvaiova, M., Aspinwall and M.E., Walker, S.D. (2009) revealed that the main difficulty faced by telecommunications organizations in the United Kingdom during the setting up of COQ reporting system was to identify new quality improvement opportunities. Interestingly, Bamford and Land (2006) proposed some guidelines to ensure the success of COQ implementation. The substance of the guidelines is as follows:

- Senior management commitment is vital for the success of COQ project and must be in place before it the implementation begins.
- Use existing systems instead of trying to invent new methods for COQ data collection.
- Link COQ to other measures which give more relevance and impact.
- Continually improve the COQ reporting system.

### **2.3 Benefits acquired through the implementation of COQ reporting system**

According to Kiani et al. (2009), despite the obstacles encountered during its implementation COQ reporting has a major role to play in achieving the ultimate goal of every organization, to capture and enhance customer satisfaction level (Kiani *et al.*, 2009). This notion is supported by earlier findings that COQ reporting enables identification of potential areas for improvements, which will lead to effective quality programs and eventually improve overall organizational performance [Kim and Nakhai (2008), Yang, C.C. (2008), Ramdeen et al, (2007) and Johnson (1994)]. Meanwhile, Ramudhin *et al.*, (2008) stated that COQ reporting reduced the operations and overall cost to the lowest while C.C Yang (2008) noted that COQ reporting enhanced organizations' competitiveness through higher quality and lower costs. Roden and Dale (2000) outlined the advantages of COQ implementation. They are:-

- Quality data are more readily accepted because they are gathered and analyzed with the accounting department in a team environment.
- The COQ system aids in the evaluation of capital investment alternatives.
- The COQ system helps justify and steer investments in prevention activities, which lower quality costs. It also helps justify and steer other quality improvement efforts and investments.
- The COQ system leads to the development of a more advanced performance measure in the areas of customer satisfaction, production and design.
- Return on investment and sales are improved while costs are reduced.

The review of literature shows that, COQ reporting has the potential of bringing numerous benefits to the organizations but the organizations must also be aware of difficulties encountered during the implementation period so that they are better prepared to overcome the obstacles. This purpose of this study is to explore the difficulties encountered during the implementation of COQ reporting as well as the benefits achieved by manufacturing organizations in Malaysia, a fast developing nation that aims to achieve a developed nation status by the year 2020.

### **3. Research Method**

A self-administered questionnaire survey was utilized to gather relevant data.

The questionnaire, which was originally developed and validated by Arvaiova, M., Aspinwall, M.E. and Walker S.D. (2009) was slightly modified, to suit the Malaysian context. The sampling frame used was the Federation of Malaysian Manufacturers (FMM) 2009 Directory, which listed the manufacturing firms that are members of FMM. The list consisted of 3974 manufacturing firms from 23 different sectors. Questionnaires were sent via email to a proportionately stratified sample of 200 manufacturing firms. The respondents were confined to quality department heads, quality managers, quality engineers or executives responsible for quality management. Prior to the distribution of the questionnaires, a pilot study was conducted to assess the questionnaire's clarity and its suitability. Ten quality management practitioners from the manufacturing sector participated in the pilot study. Apart from them, the pilot test also saw the participation of five academics, with manufacturing experience. Taking into account the comments from the pilot test, very slight amendments were made prior to actual distribution. The response rate was only 18 percent, after six weeks (even after many follow-up telephone calls). To increase the response rate, an additional 48 questionnaires were issued directly to relevant participants who were attending training programmes conducted by FMM. A total of 84 useable responses were received, out of the 248 questionnaires issued. The final response rate was 33.9%.

#### **4. Survey Result**

##### **4.1 Respondent Organizations' Profile**

Out of the 84 respondent organizations, 17% of them produced food and beverages products, 12% fabricated metal products, 10% motor vehicles, semi trailers and trailer products, 8% chemical and chemical products and basic metal products, 7% radio, television and communication products, 6% electrical machinery and apparatus products and rubber and plastic products, 5% machinery and equipment products and furniture products, 4% paper, non metallic and printing products, 2% office, medical and precision equipment products and 1% coke, refined petroleum products. In terms of duration of business, 47.6% (40) of the organizations have been in the business for more than 20 years, 36.9% (31) of them have been in the business between 10 to 20 years while 15.5% (13) of them have been in the business for less than 10 years. Based on annual sales turnover 45.2% (38) of the organizations were large companies while 54.8% (46) of them were small and medium organizations. Out of 84 respondents, 97.6% of them (82 respondents) were certified to at least one of the quality management systems (ISO 9000, ISO/TS 16949, ISO 13845, ISO 22000 and ISO/IEC 27001). Only 33 organizations (or 39.3%) out of 84 organizations had implemented COQ reporting system. The responses from these organizations were analyzed, to ascertain the difficulties encountered and benefits gained through the implementation of COQ reporting system.

##### **4.2 Difficulties Encountered During the Implementation of COQ Reporting**

The 33 respondent organizations were asked to specify difficulties encountered during the implementation of COQ reporting in their respective organizations according to the level of difficulty, on a scale of 1 to 5 where 1 is very difficult, 2 is fairly difficult, 3 is neutral, 4 is not so difficult and 5 is not difficult at all. The mean values and rankings of the five reasons are depicted in Table 1.

The mean values ranged from 2.88 - 3.48. All the mean values are below 4, which mean that the respondent organizations encountered difficulties in all ten areas. The ranking based on mean values show that lack of cooperation with other departments (2.88) is the main difficulty encountered during implementation of COQ reporting system. This was followed by difficulties in getting access to particular financial data (2.91) and personalization of the program where strong interest was derived only from few sponsors (2.97).

##### **4.3 Benefits Achieved Through the Implementation of COQ Reporting System**

The 33 organizations which had already implemented COQ reporting system were asked to rate the thirteen benefits achieved after the implementation of COQ reporting system, on a scale of 1 to 5, according to the level of impact, where 1 is strong impact, 2 is moderate impact, 3 is neutral, 4 low impact and 5 is no impact. The mean values and rankings of the thirteen benefits are shown in Table 2.

The mean values range from 1.64 to 2.21. This indicates that after the implementation of COQ reporting system, the respondent organizations had benefited on all the thirteen aspects. Based on the mean values and ranking, COQ reporting system had the highest impact on product/service quality improvement and company's failure rate reduction (1.64).

#### **5. Discussion**

In this study, the highest response rate was from the food and beverages industry (17%), second highest was from the metal industry (12%) and the third highest was from the chemicals industry (10%). Majority of the respondent organizations (47.6%) have been operating their businesses for more than 20 years while only 15.5% of the respondent firms have been operating their business for less than 10 years.

The characteristic of the organizations, in terms of duration of being in business shows that the majority of the respondent firms should have gained experience in various quality management approaches in the past decades. In terms of size, 45.2% of the respondent organizations were large organizations. The large size of these organizations indicates that lack of manpower would not be an obstacle to maintain the quality management system in these organizations. In terms of quality management certification, 97.6% of the respondent organizations were certified to quality management system. This percentage is considered as much higher compared to a study conducted by Arvaiova, M., Aspinwall, M.E. and Walker S.D. (2009) where only 39% of the respondent organizations were certified to quality management system. The findings of this research indicate that the 33 respondent organizations which had implemented COQ reporting encountered various difficulties during implementation stage. The manufacturing organizations in Malaysia cited lack of cooperation with other departments as the main difficulty encountered during the implementation of COQ reporting system.

This is different from the findings from previous studies, where lack of cooperation from top management (Rodchua, 2009), identifying new quality improvement opportunities (Arvaiova *et al.* (2009), and difficulty in getting COQ information (Bamford and Land, 2006) were identified as the most difficult obstacle encountered by organizations. However, the second most difficult obstacle encountered by responding organizations i.e. difficulties in getting access to particular financial data in this research is similar with the findings by Ramford and Land (2006). This research revealed that COQ reporting had benefited the 33 organizations which had implemented COQ reporting system all 13 aspects. The COQ reporting had high impact in increasing product/service quality, reducing the company's failure rate and reducing product/service costs. The findings of this study support the findings of previous studies that the organizations which have implemented COQ reporting system realize benefits, although they do encounter difficulties during the implementation stage [Kiani *et al.* (2009), Kim and Nakhai, (2008), Ramudhin *et al.* (2008), Yang, C.C., (2008), Sower *et al.* (2007) and Ramdeen *et al.* (2007)].

## 6. Conclusion

The result of this research indicates that the implementation of COQ reporting system will definitely bring benefits to the organization. However as cited by manufacturing organizations in Malaysia, the implementation process is not that easy and every organization has to encounter various difficulties during the implementation period. As discussed earlier in this research, the COQ reporting system has benefited organizations which had implemented COQ reporting, in terms of all the 13 different aspects. This research revealed that COQ reporting can lead Malaysian manufacturing organizations to achieve higher levels product and service quality, lower product/service costs and ultimately higher levels of customer satisfaction. The difficulties encountered by respondent organizations can be used as examples, by other practitioners in the field, to plan ways to overcome these difficulties when implementing COQ reporting in their organizations. Future research can be conducted on a bigger scale, to cover a bigger sample size from manufacturing and services sector as well. There is a need to study the implementation of COQ reporting in service based organizations, given the tremendous growth in the services sector in recent years. Case studies can be conducted to identify ways to overcome difficulties and also to reveal best practices in the implementation of COQ reporting system.

**Table 1 :** Difficulties Encountered During the Implementation of COQ Reporting System

Difficulties Encountered	Mean	Ranking
Lack of cooperation with other departments	2.88	1
Difficulties with getting access to particular financial data	2.91	2
Personalization of the program (strong interest only from the few sponsors)	2.97	3
Difficulties with standardizing a corporate quality costs system	3.06	4
Lack of benchmarking opportunities, literature sources and consultancy services	3.09	5
Lack of top management support in the early stage	3.18	6
Difficulties with identifying new quality improvement opportunities	3.33	7
Identification of activities that relate to quality	3.39	8
Difficulties with analyzing the data collected	3.48	9
Identification of quality cost items	3.52	10

**Table 2: Benefits Achieved after the Implementation of COQ Reporting System**

<b>Benefits Achieved After The Implementation of COQ Reporting System</b>	<b>Mean</b>	<b>Ranking</b>
Increase product/service quality	1.64	1
Reduce the company's failure rate	1.64	1
Reduce product/service costs	1.67	2
Reduce process costs	1.70	3
Enable identification of quality related improvement actions and their payoff analysis	1.82	4
The existing quality management system will become more comprehensive	1.82	4
Identify non-value added processes	1.88	5
Enable analysis regarding the impact of product/service quality on business such as sales turnover, profit and loss	1.91	6
Improve supplier's performance	1.91	6
Introduce new process measures in monetary terms	2.09	7
Provide accurate financial data on quality investments	2.15	8
Enable benchmarking with other division or companies	2.18	9
Establish new bases for budgets considering quality issues	2.21	10

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