

Quality Cost Management in the Malaysian Manufacturing Industry

Tze San Ong

Faculty of Economics and Management
University Putra Malaysia, Malaysia

Boon Heng Teh

Faculty of Management
Multimedia University Malaysia

Abstract

This paper is a preliminary study on quality cost management in Malaysian manufacturing industry. It explores the trends in the adoption of quality cost management practices and discusses factors affecting the implementation of quality cost management. A survey covering 30 companies was carried out through a questionnaire which was distributed to manufacturing companies in Malaysia that varied in size and according to products manufactured. The findings revealed that factors such as incentives and size of the organizations affected the implementation of quality cost management and activities. It concludes that quality cost management is not only the prerequisite for a company to perform better, but it is also an important element to gain a competitive edge in this marketplace.

Keywords: Quality cost management, performance, Malaysian manufacturing.

Introduction

The purpose of measuring performance is not only to determine how a business is performing but also how it can perform better. Performance measurement is an important aid to making judgments and decisions. The decisions with which operations management is concerned can be classified into: strategy, process, cost, quality, capacity, location and layout, and operating decisions (Brah, Tee and Rao, 2002).

Increasing pressure of global competition and a significant increase in customer awareness have made quality management one of the most important strategic concerns of firms. Manufacturing organizations have to change the focus of their strategies, operations, processes and procedures to remain competitive. An

ISSN 1675-3194

© 2011 Asia-Pacific Management Accounting Association, Accounting Research Institute & Faculty of Accountancy and UPENA, Universiti Teknologi MARA, Malaysia.

important issue in the development of contemporary strategies such as quality, flexibility, reliability and cost leadership is the extent to which management performance measures enhance the potential for these strategies to improve performance (Ghalayini and Noble, 1996; Jusoh and Parnell, 2008).

Quality costing is important to organizations because it is a key competitive tool that cannot be ignored by any organization. Additionally, the implementation of a quality improvement process can result in substantial cost savings and generate higher revenues (Schiffauerova and Thomson, 2006). Cost of Quality is the cost incurred to ensure quality of the products or services. It is important to measure the cost of poor quality in an organization, which is generally associated with defective products, for example, the costs of preventing, finding, and repairing defects. It can be used to sustain and initiate quality improvement efforts (Kaner, 1996, Schiffauerova and Thomson, 2006). Based on the findings of Kaner (1996), the costs of quality are huge, running at 20% - 40% of the total sales of an organization and many of these costs can be significantly reduced or completely avoided, if quality activities are implemented in the right way. However, costs and benefits of quality improvement must be balanced too. Therefore, measuring and reporting the cost of quality should be considered an important issue in an organization (Beskese and Cebeci, 2001; Schiffauerova and Thomson, 2006; Kapuge and Smith, 2007).

Performance can be measured through quality cost management in an organization. Many factors can influence the success of quality cost management such as time, cost, company size, competitive advantage, attitude of workers, and environmental factors such as technological change, globalization, and customer needs (Antony, Leung and Knowles, 2002; Brah et al., 2002; Ghalayini and Noble, 1996; Lau, 1999).

According to Roden and Dale (2001), employee responsiveness and the firm's culture are vital for making the implementation of cost of quality reporting successful. Wan and Dale (2002) concur that employees and the firm's culture are two important elements in the cost of quality reporting implementation. Furthermore, one of the guidelines that Bamford and Land (2006) suggest in order to ensure cost of quality reporting system is being implemented successfully is senior management commitment. The study conducted by Rasamanie and Kanapathy (2011) found out that the main challenge faced by Malaysian manufacturers while implementing the cost of quality reporting system was the lack of cooperation with other departments.

The above evidence shows that companies do encounter various difficulties in adopting quality cost management. Moreover, it is clear that employees can

affect the adoption of quality cost management. Since incentives influence the employee's involvement (Pelletier and Rahim, 1993; Wilkinson, Redman and Snape, 1994; Lau, 1999) and cooperation in firms (Heywood, Jirjahn and Tsertsvadze, 2005; Berger, Herbertz and Sliwka, 2011), it is believed that incentives can affect the adoption of quality cost management in organizations.

Research examining the relationship between incentives and the adoption of quality cost management, especially in developing countries, for example, Malaysia, is limited. Thus, this study was conducted to investigate the effects of two factors – incentive paid and the size of organization – on the adoption of quality cost management. The findings of this study could be used to enable the Malaysian manufacturing sector to enjoy a competitive advantage.

Specific Objectives

1. To examine the adoption of the quality cost management within Malaysian manufacturing companies.
2. To investigate the effects of two factors – incentive pay and size of the organization – on quality cost management adoption.

Literature Review

Quality Costing

Quality costing is seen as a means of helping companies to reduce manufacturing costs by identifying excessive cost and non-value-added activities (e.g. Wilkinson et al., 1994; Ghobadian and Gallear, 1997; Schiffauerova and Thomson, 2006; Kumar, Grosbois, Choisine and Kumar, 2008) It is now widely accepted that quality costs constitute specific costs: the costs incurred in the design, implementation, operation and maintenance of a quality management system, the costs of resources committed to continuous improvement, the costs of system, product and service failures, and all other necessary costs and non-value added activities required to achieve a quality product or service. As such, measuring and reporting these costs should be considered a critical issue for any manager who aims to achieve competitiveness in today's markets (Kapuge and Smith, 2007). However, insufficient data or difficulties in obtaining data needed, lack of supportive cooperation from top management and lack of understanding of quality costing management have been identified during the implementation of quality management system (Rodchua, 2009; Bamford and Land, 2006 and Eldridge, Balubaid and Barber, 2006). In order to assist the implementation of quality costing management, effective incentive plans play a very important

role (Brah, Tee and Rao, 2002; Berger, Herbertz and Sliwka, 2011). This study examines the adoption of quality cost management in a developing country as the research context.

Incentives Schemes vs. Performance Measurement

An organization can use a compensation system or performance appraisal process to encourage their employees to participate in developing an effective measurement system. Rewards can be implemented in several forms such as financial rewards and recognition awards. Award and recognition programs, profit-sharing programs, increase in pay, benefits and incentives, and suggestion programs are some of the systems that can be used to reward employees for good environmental practices (Pelletier and Rahim, 1993; Wilkinson et al., 1994; Lau, 1999).

According to Shah and Fitzroy (1998), a properly structured incentive system that rewards initiative and teamwork as well as output can provide elements of achievement, recognition, and other motivator factors. This is not a new topic in the management control or human resources literature. Previous academic research on this topic has been mainly concerned with the use of accounting measures in incentive schemes or in performance evaluation processes. From the mid 1990s, researchers started focussing on the use of non-financial measures in annual incentive schemes (e.g. Pelletier and Rahim, 1993; Ittner and Larcker, 2001) or on the performance and behavioral effects of incorporating non-financial measures in incentive contracts (Tatikonda and Tatikonda, 1996; Ittner et al., 2001). In order to assist the implementation of quality costing management, effective incentive plans play a very important role (Brah, Tee and Rao, 2002; Berger, Herbertz, and Sliwka, 2011). Wan and Dale (2002) concur that employees and firm culture are two important elements in the cost of quality reporting implementation.

The review of literature shows that quality costing management has the potential of bringing advantages to organizations. However, the obstacles encountered in adopting quality costing management must be handled. This study explores the relationship between incentive schemes and the adoption of quality costing management by manufacturing organizations in Malaysia, a fast developing nation that aims to achieve the status of a developed nation by the year 2020.

Methodology

The Sample

The sampling frame for the study on quality measurement comprised all manufacturing companies located in Malaysia. The companies varied in size, from 10 or fewer employees to over 500 employees.

Data Collection

Data collection was accomplished through distribution of questionnaires to 200 randomly selected manufacturing companies in Malaysia. However, only 30 completed and useable questionnaires were returned. This number represents 15 percent of the response rate. Although 15 percent of response rate seems a bit low,, the feedback came from companies that had 10-500 employees and from almost every industry in Malaysia, and provided some insights into trends and practices of quality cost management in the Malaysian manufacturing industry.

The respondents were asked to indicate the extent of their organization's adoption of quality cost management, using a 5 point-scale ranging from 1 (strongly disagree) to 5 (to a strongly agree) for the organization's objectives and ranging from 1 (least important) to 5 (most important) for organization strategy over the last five years. Besides, respondents were asked to choose one or more of the options offered to indicate their reason(s) for not measuring the quality cost, quality objectives, people involved in making quality specifications, methods used to detect quality problems and types of incentives provided to their employees who participated in quality improvement programs. Respondents were also asked to answer several open-ended questions.

Hypotheses of the Study

H1: There is a positive relationship between incentives paid and quality cost management.

H2: There is a positive relationship between the size of the company and the quality cost measurement.

Demographic Information

Table 1 summarises the organizations' profiles with the breakdown in terms of number of the employees, number of years in operation, type of ownership, industry products or type and ISO certification received by the organization.

Table 1: Demographic Information of Organizations

Items	Frequency	Percent (%)
<i>Size of Companies</i>		
Micro-co (0-9)	3	10
Small (10-99)	14	46.7
Medium (100-499)	7	23.3
Large (500 above)	6	20
<i>No of years in operation</i>		
New (1-10 years)	10	33.3
Moderate (11-30 years)	16	53.3
Established (31 above)	4	13.3
<i>Type of Ownership</i>		
Foreign	3	10
Joint venture (JV)	4	13.3
Malaysian	23	76.7
<i>Industry products/types</i>		
Food and beverages	4	13.3
Industrial chemicals and others chemicals	1	3.3
Electronic and electrical	4	13.3
Metal industry	5	16.7
Machinery and equipment	2	6.7
Textiles, wearing apparel	3	10
Paper and paper products	1	3.3
Others (automotive, pipe, valves & fittings, optical products, umbrellas)	10	33.3
<i>ISO Certification</i>		
Yes	17	56.7
No	13	43.3

The number of employees was used to measure the size of a firm [i.e. micro (1-9 employees), small (10-99 employees, medium (100-499 employees) and large (≤ 500 employees). The results showed that the majority of the firms surveyed were considered as small. A large proportion (46.7 percent) of the organizations was categorized as small sized companies; 23.3 percent of the organizations were medium companies; while the large organizations constituted 20 percent of the total respondents and the remaining 10 percent of the organizations were micro-companies.

In terms of years in operation, 33.3 percent of manufacturing organizations were newly established (below 10 years), 53.3 percent of organizations were moderate (11-30 years) and the remaining 13.3 percent were established (31 years and above). The majority of the organizations were Malaysian-owned (76.7%). Only four manufacturing organizations (13.3%) were Joint Venture (JV) while three manufacturing organizations were foreign-owned (10%). In terms of ISO Certification, 56.7 percent had ISO 9001 Certification and 43.3 percent of these companies had not been awarded this certification.

Results and Findings

The Relationship between Incentive Pay and Quality Cost Management

Table 2: Incentives to Encourage Employees' Participation in Quality Improvement Programs and Quality Cost Measurement

		Adoption of Quality cost Measurement		
		Yes	No	Total
Incentives to encourage employees' participation in quality improvement programs	Yes	17	4	21
	No	7	2	9
Total		24	6	30

Table 2 lists incentive pay and quality improvement programs. 24 (80%) organizations out of 30 were measuring the quality cost while only 6 (20%) of them did not measure the quality cost. However, it was found that more than 70% of the organizations that measured the quality cost were providing incentives to encourage their employees' participation in the quality improvement programs. This finding is consistent with that of Wilkinson et al. (1994), that organizations which linked pay (incentive) to quality indicators had more successful program implementation.

Table 3: Types of Incentives Given to Employees

Types of Incentives	Frequency	Percentage (%)
Monetary incentives (bonus)	8	38
Non-monetary incentives (extra annual leave and free company stock)	2	10
Both	11	52
Total	21	100

24 organizations had adopted the quality cost measurement but only 21 of the organizations provided incentives to their employees. The organizations provided incentives to encourage their employees to participate in quality improvement programs either in monetary or non-monetary forms or both. 52% of the organizations provided incentives, both monetary and non monetary forms, and 38% of the organizations provided only monetary incentives.

Table 4: Methods Used to Detect Quality Problems

Method used to detect quality problems	Frequency	Percentage (%)
Statistical control chart	7	23.3
Ishikawa method	11	36.7
Statistical control chart & Ishikawa method	2	6.7
Statistical control chart, Pareto chart & Ishikawa method	3	10
Pareto chart & Ishikawa method	1	3.3
Others	5	16.7
Missing data	1	3.3
Total	30	100

Various statistical methods can be used for the maintenance of quality in a continuous flow of products in the manufacturing industry. The survey revealed that the Ishikawa method was widely used in the manufacturing industry to detect quality problem (36.7%). The Ishikawa diagram is a cause-and-effect diagram. Its purpose is to determine the most probable cause of a problem and is often used in the quality discipline. Next was the Statistical Control chart (23.3%) used in the industry to monitor processes that are far from Zero-Defect (ZD). It is a tool used to determine whether a manufacturing or business process is in a state of statistical control or not. Besides, three out 30 organizations (10%) used all three methods to detect the quality problem, 6.7% of organizations used the Statistical Control Chart and Ishikawa method whereas only one organization (3.3%) used the Pareto chart and the Ishikawa method to detect quality problems. A Pareto Chart breaks a big problem down into smaller pieces, identifies the most significant factors, shows where to focus efforts, and allows better use of limited resources. It was also found that one organization did not use any method to detect the quality problem.

Size of Organization and Quality Cost Management

Table 5 shows that three organizations were considered as micro-companies, fourteen organizations were categorized as small companies, seven organizations belonged to the medium category, and six organizations were categorized as large.

Table 5: Relationship between Number of Employees and Quality Cost Measurement

		Quality cost measurement		
		Yes	No	Total
Size of employees	micro-co	2	1	3
	small	12	2	14
	medium	6	1	7
	large	4	2	6
Total		24	6	30

Table 6: Relationship between Company's Ownership and Quality Cost Measurement

		Quality cost measurement		
		Yes	No	Total
Type of Ownership	Foreign	3	0	3
	JV	4	0	4
	Malaysian	17	6	23
Total		24	6	30

Table 6 illustrates the relationship between ownership of the companies and quality cost measurement. The result showed that all foreign and joint venture organizations measured quality cost. Manufacturing companies, especially foreign and joint venture companies appeared to use a broader range of measures of quality improvement, perhaps reflecting a more developed approach to quality management. Among the Malaysian owned companies, 17 organizations (out of 23 organizations) measured quality cost while 6 of them did not measure quality cost.

Table 7: ISO 9000 Certification Received and Quality Cost Measurement

		Quality cost measurement		
		Yes	No	Total
Receive ISO 9000 Certification	Yes	14	3	17
	No	10	3	13
Total		24	6	30

Table 7 shows the relationship between companies with ISO certification and quality cost measurement. A total of 17 respondents stated that they had the ISO 9000 certificate and 14 out of the 17 organizations measured quality cost. Three companies that did not measure quality cost had also the ISO 9000 certification.

However, the study also found that quality cost measurement did not contribute to the companies' achievement of ISO 9000 certification. It was found that ten companies that measured quality costs had not been awarded the ISO 9000 certification, and only three companies that did not measure quality cost had also not been awarded the ISO 9000 certification. This finding supports the finding of research done by Beskese and Cebeci (2001) that companies with ISO certification put more effort into measuring and adopting their quality cost activities.

Correlation Analysis

Table 9: Correlations between Incentives Paid and Quality Cost Management

		Quality cost Management	Incentives Pay
Quality cost Management	Pearson Correlation	1	.364
	Sig		.049*
Incentives Pay	Pearson Correlation	.364	1
	Sig	.049*	

* Correlation is significant at the 0.05 level (2-tailed)

Table 9 shows the correlation matrix for the two scale variables, incentives paid and quality cost management. Quality cost management was found to be significantly correlated with incentive pay. This indicates that the organizations should provide incentives to their employees in order to achieve success in quality cost measurement programs.

Table 10 shows that there is significant relationship between the size of the company and quality cost management. Furthermore, the correlation reported in the table is positive. This indicates that large organizations, so far, have been more active in embracing quality cost measurement principles. This result is consistent with the finding of Ghobadian and Gallear (1997) that organizations with more resources (financially and non-financial) were able to focus on quality cost management (non-financial perspective) as compared to other organizations.

Conclusion

The primary objectives of this research were to study the factors influencing quality cost management in the Malaysian manufacturing industry. It was anticipated that manufacturing companies which had adopted quality measurement programs would be pursuing effective internal controls, and

Table 10: Correlations between Size of the Company and the Quality Cost Measurement

		Size of Companies	Quality Cost Management
Size of Companies	Pearson Correlation	1	.720
	Sig.		.004**
Quality Cost Management	Pearson Correlation	.720	1
	Sig.	.004**	

** Correlation is significant at the 0.01 level (2-tailed)

delivering high-quality performance. Indeed, successful implementation of quality management is a major organizational change and a long term paradigm shift. This study has drawn attention to the importance of quality measurement to organizations, and obtained findings to support the conclusion drawn by Singh, Garg, Deshmukh and Kumar (2007) that effective implementation of quality cost program will improve organization performance in terms of lead time, product cost, fast delivery and product quality.

The survey has also shown that factors such as incentives do contribute to the adoption of quality measurement programs. Incentives paid to employees will encourage them to participate in the quality cost measurement programs. Incentives provided to employees encourage better quality and drive providers to deliver higher quality products. The adoption of quality cost management is generally seen more in large companies (with more resources) than in small companies.

Limitations of the Study

Future studies can be conducted on a bigger scale. In order to increase the response rate, besides making follow-up telephone calls, researchers can seek the help of the Federation of Malaysian Manufacturers (FMM) to distribute questionnaires to the participants who attend programmes run by FMM. Besides, research involving the services sector can also be conducted as it is one of the fastest-growing sectors in the country. Finally, case studies can be conducted for further insights into different aspects of the adoption of quality cost measurement programmes.

References

- Antony, J., Leung, K. and Knowles, G. (2002). Critical Success Factors of TQM Implementation in Hong Kong Industries, *International Journal of Quality & Reliability Management*, 19, 5: 551-566.
- Bamford, R.D. and Land, N. (2006). The Application and Use of the PAF Quality Costing Model Within a Footwear Company, *International Journal of Quality & Reliability Management*, 23, 3: 265-278.
- Berger, J., Herbertz, C. and Sliwka, D. (2011). Incentives and Cooperation in Firms: Field Evidence, *Discussion Paper No. 5618*.
- Beskese, A. and Cebeci, U. (2001). Quality Management Worldwide, Total Quality Management and ISO 9000 Applications in Turkey, *Journal: The TQM Magazine*, 13, 1: 69-73.
- Brah, A.T., Tee, S.L. and Rao, B. M. (2002). Relationship between TQM and Performance of Singapore Companies, *International Journal of Quality & Reliability Management*, 19, 4: 356-379.
- Bryde, D.J. and Robinson, L. (2007). The Relationship between Total Quality Management and The Focus of Project Management Practices, *The TQM Magazine*, 19, 1: 50-61.
- Eldridge, S., Balubaid, M. and Barber, K. D. (2006). Using A Knowledge Management Approach to Support Quality Costing, *International Journal of Quality & Reliability Management*, 23, 1: 81-101.
- Ghalayini, A. M. and Noble, J. S. (1996). The Changing Basis of Performance Measurement, *International Journal of Operations and Production Management*, 16, 8: 63-80.
- Ghobadian, A. and Gallear, D. (1997). TQM and Organization Size, *International Journal of Operations and Production Management*, 17, 2: 21-163.
- Heywood, J. S., Jirjahn, U. and Tsertsvadze, G. (2005). Getting Along with Colleagues - Does Profit Sharing Help or Hurt? *Kyklos*, 58: 557-573.
- Ittner, C. D. and Larcker, D. F. (2001). Assessing Empirical Research in Managerial Accounting: A Value-Based Management Perspective, *Journal of Accounting and Economics*, 32: 339-410.
- Jusoh, R. and Parnell, J. A. (2008). Competitive Strategy and Performance Measurement Iin The Malaysian Context: An Exploratory Study, *Management Decision*, 46, 1: 5-31.
- Kaner, C. (1996). *Quality Cost Analysis: Benefits and Risks*, Copyright © Cem Kaner.

- Kapuge, A. M. and Smith, M. (2007). Management Practices and Performance Reporting in The Sri Lankan Apparel Sector, *Managerial Auditing Journal*, 22, 3: 303-318.
- Kumar, V. D., Grosbois, D., Choisine, F. and Kumar, U. (2008). Performance Measurement by TQM Adopters, *The TQM Journal*, 20, 3: 209-222.
- Lau, R. S. M. (1999). Critical Factors for Achieving Manufacturing Flexibility, *International Journal of Operations and Production Management*, 19, 3: 328-341.
- Leachman, C., Pegels, C. and Shin, S.K. (2005). Manufacturing Performance: Evaluation and Determinants International, *Journal of Operations and Production Management*, 25, 9: 51-874.
- Pelletier, B.P. and Rahim, M.A. (1993). Total Quality Management and Drawbacks of Incentive Systems: Fact or Fallacy?, *Industrial Management*.
- Rasamanie, M. and Kanapathy, K. (2011). The Implementation of Cost of Quality (COQ) Reporting System in Malaysian Manufacturing Companies: Difficulties Encountered and Benefits Acquired, *International Journal of Business and Social Science*, 2, 6: 243-247.
- Roden, S. and Dale, G. B. (2001). Quality Costing in a Small Engineering Company: Issues and Difficulties, *The TQM Magazine*, 13, 6: 388-399.
- Schiffauerova, A. and Thomson, V. (2006). Managing Cost of Quality: Insight into Industry Practice, *The TQM Magazine*, 18, 5: 542-550.
- Schiffauerova, A. and Thomson, V. (2006). A Review of Research on Cost of Quality Models and Best Practices, *International Journal of Quality and Reliability Management*, 23, 4.
- Shah, K. K. R. and Fitzroy, P. T. (1998). A Review of Quality Cost Surveys, *Total Quality Management*, 9, 6: 479-486.
- Singh, R. K., Garg, S.K., Deshmukh, S.G. and Kumar, M. (2007). Modelling of Critical Success Factors for Implementation of AMTs, *Journal of Modelling in Management*, 2, 3: 232-250.
- Tatikonda, L. U. and Tatikonda, R.J. (1996). Measuring and Reporting the Cost of Quality, *Production and Inventory Management Journal*, 37: 1-7.
- Taylor, W. A. (1998). TQM Implementation: Organisation Practices and Information Infrastructures, *Omega, Int. J. Mgmt Sci*, 26, 6: 715-727.
- Tiwari, A., Turner, C. and Sackett, P. (2007). A Framework for Implementing Cost and Quality Practices within Manufacturing, *Journal of Manufacturing Technology Management*, 18, 6: 731-760.

Wan, G. M. and Dale, B. G. (2002). Setting Up a Quality Costing System, an Evaluation of Key Issues, *Business Process Management Journal*, 8, 2: 104-116.

Wilkinson, A., Redman, T. and Snape, E. (1994). What Is Happening in Quality Management?: Findings from an IM Survey, *Journal: The TQM Magazine*, 6, 1: 55-58.

Xie, M. and Goh, T.N. (1999). Statistical Techniques for Quality, *The TQM Magazine*, 11, 4: 238-241.

Copyright of Asia-Pacific Management Accounting Journal is the property of Universiti Teknologi Mara Represented by Accounting Research Institute and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.