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Abstract

This paper reports the current status of quality management implementation in quality-oriented companies in Hong Kong, identifies the major problems they encounter, and suggests future directions for quality management in Hong Kong. We use the critical factors of quality management developed by Black and Porter (1996) as the evaluation criteria for this study. Using a structured questionnaire, we survey over 1,000 companies with an operational quality management system and receive 304 valid responses for data analysis. The respondent companies are classified into four industry types: manufacturing, service, construction, and public utility. The results display a cross-section of their quality management implementation status in these different industries in Hong Kong. We find that these companies in the public utility and service industries appear to have a higher level of quality management implementation than those in the manufacturing and construction industries. They also seem to differ in their emphases on their quality management implementation. Implications of the results and suggestions for quality management implementation are provided.

Introduction

The rapidly changing market and economic environments in the 1990s, characterized by such phenomena as globalisation and deregulation of markets, increasing expectations of customers, and rapid technology transfer, have presented challenges to most companies in Hong Kong. They also face severe competition from low-cost labour-intensive companies in Thailand and Mainland China, and high value-added companies in Taiwan and Korea. In response to these challenges, many of them have joined the quality movement and implemented various quality improvement programs including quality circles, quality control, and the ISO 9000 series as a means to enhance competitiveness. To facilitate their drive towards higher quality levels, it is important to understand the current practices and the problems encountered on their journey to quality management implementation.

In recent years, quality management systems, particularly total quality management (TQM), have received worldwide attention and are being pursued in many nations. Quality management has gained in popularity mainly because of increasing consumer consciousness of quality and growing international competitive pressure. For many years, the importance of product and service quality has been acknowledged as a major factor contributing to competitive advantages. With the need to cater for more demanding customers and to cope with intensifying competition, quality orientation seems to be the required strategy to remain competitive (Willborn & Cheng, 1994).

Indeed, the importance of quality as a business objective has been widely appreciated throughout the world, particularly during the past decade (Kanji, 1990). The pursuit of quality has been popularised as an approach to gaining a competitive edge in national and global markets. Many companies in the business world believe in the power of quality as research has confirmed the strategic benefits of quality improvement in terms of greater market share

and return on investment (Phillips *et al.*, 1983). It has also proved to be effective in lowering manufacturing costs and improving productivity (Garvin, 1983). More importantly, empirical evidence tends to support the link between quality management and organizational performance (Hendricks & Singhal, 1997; Powell, 1995; Samson & Terziovski, 1999; Zairi *et al.*, 1994).

In view of the popularity of quality management as an effective management approach to cope with competitive pressure, many organizations in Hong Kong have implemented quality management. Indeed, the introduction of quality management has generated a tremendous amount of interest in many sectors of the economy – manufacturing, service, construction and public organizations. Industry-wide acceptance of quality management has resulted in extensive diffusion of quality concepts in Hong Kong. For instance, the Hong Kong Government established the Hong Kong Quality Assurance Agency (HKQAA) in 1989 to assist industry and commerce in developing quality management systems and to function as a third-party certification body to issue the ISO 9000 series of certification. The HKQAA issued its first batch of ISO 9000 series certificates in April 1991. Since then, the number of companies with ISO certification has been increasing. By 2000, over 1,400 ISO certifications had been issued in Hong Kong by the HKQAA, not including companies certified to ISO standards by foreign registrars. This shows that many companies in Hong Kong are aware of the need to upgrade the quality of their products and services in order to keep pace with the competition both within and outside the economy. Increasingly, they regard the quality management system as a tool for improving their competitiveness. However, there seems to have been little systematic study of the status of quality management implementation in Hong Kong. In view of the extensive diffusion of quality management in Hong Kong, it is desirable that quality management-based research be

conducted for the benefit of the Hong Kong economy. Prompted by such a desire, we carry out this study aiming to:

- 1) evaluate the current status of quality management implementation in quality-oriented companies in Hong Kong,
- 2) identify problems in quality management implementation in those companies in the different types of Hong Kong industries, and
- 3) formulate guidelines for quality management implementation in Hong Kong.

Research methodology

Measures

To evaluate quality management implementation status, it is important to have a valid instrument for measurement. The ten-dimension thirty-two item instrument of Black and Porter (1996), developed on the basis of the Malcolm Baldrige National Quality Award (MBNQA) of the United States, is adopted to serve this purpose. The ten dimensions include:

- 1) people and customer management,
- 2) supplier partnerships,
- 3) communication of improvement information,
- 4) customer satisfaction orientation,
- 5) external interface management,
- 6) strategic quality management,
- 7) teamwork structures for improvement,
- 8) operational quality planning,
- 9) quality improvement measurement systems, and
- 10) corporate quality culture.

However, we find seven potentially confusing items in the instrument during the questionnaire development stage. Each of them contains two questions. We split each of the seven items into two and this adds seven more items to the original Black and Porter's instrument used in our survey questionnaire. Furthermore, examples are provided to many of the questions to facilitate the respondents in understanding the questionnaire items. We use perceptual measures on a five-point interval scale, with 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree, to capture information about quality management implementation in the form of attitude statements. Respondents are required to indicate their degree of agreement or disagreement with each statement. They are also asked to indicate the type of industry their companies belong to and provide other relevant company information in the survey. The measurement items that represent quality management implementation and the codings are presented at Appendix A.

Data collection and demographics

To evaluate the quality management implementation status in quality-oriented companies, it is important that the sampled companies have some concrete forms of quality management implementation to ensure validity in sample selection. Therefore, the sampling frame of this study includes the Hong Kong Management Association's (HKMA) quality award winners and finalists (N = 10), and companies/business units, certified to ISO 9000 series in Hong Kong (N = 1,082). The HKMA's quality award is modelled on the MBNQA, whose criteria are widely accepted as the blueprint of TQM. Furthermore, ISO certification is generally regarded as a step towards the implementation of TQM (Frehr, 1997).

We draw a sample of 1,092 companies from the buyer's guide of the HKQAA, the ISO 9000 directory published by the Hong Kong Trade Development Council (HKTDC), and the list of winners and finalists of the HKMA's quality management award. This sample represents companies in Hong Kong known to have implemented a quality

management system. The sample companies are cross-checked to avoid double mailing. The survey questionnaire is sent out twice.

The survey questionnaire is mailed to the quality manager or the personnel responsible for quality management. We solicit only one response from each sampled company. We acknowledge that bias in data collection may stem from the use of a single respondent in this study. However, this key informant strategy may provide a more reliable source of information and help to ensure that the respondents have the necessary knowledge to respond (Phillips, 1981). Because a quality management system requires a company-wide focus, we assume that these informants have a good knowledge of the quality management implementation status in their companies.

The two mailings of the survey questionnaire yield 342 returns, among which 304 are valid for data analysis — a usable response rate of 28.6%. Of these, there are 69 manufacturing firms, 107 service firms, 114 construction companies, and 14 public utility organizations. A high percentage of the respondents are 'service' and 'construction' companies. The profiles of the respondent companies to the study and their characteristics are displayed in table 1.

<< Insert table 1 about here >>

Results

To evaluate the status (level) of quality management implementation in quality-oriented companies in Hong Kong, we calculate the mean value for each of the factors in the Black and Porter's (1996) instrument measured on a five-point interval scale with multiple items. The mean value of all the items measuring a particular factor (e.g. QM1) is taken as the value of that factor. The value (level) of quality management implementation is derived by an average of all the factors, i.e., QM1-QM10. In this study,

a company achieving a level of quality management implementation above the mean value of 3 is regarded as having a “positive” level of implementation. This means that the company has taken conscientious efforts to practice quality management or to implement quality management systems. Whereas a company with a level of quality management implementation below the mean value of 3 would indicate that it lacks the efforts to practice quality management or to implement quality management systems. Table 2 shows the factors, the number of items which measure them, the means, standard deviations, reliability values based on Cronbach’s alpha, and item-total correlation coefficients.

<< Insert tables 2 and 3 about here>>

The results show that the companies generally have a 'positive' (point value = 3.49) level of quality management implementation at the upper end of the five-point interval scale, where 5 represents the maximum positive evaluation and 1 means the maximum negative evaluation. A closer look at the quality management implementation factors reveals that none of the factors in quality management implementation falls below the medium point value of 3.0. This suggests that they recognize the critical components of quality management and have implemented them at a certain level of sophistication. The companies in all the industry types view quality management as an integrated approach, giving generally equal importance to all aspects of quality management implementation rather than putting emphasis on individual quality management factors.

Results in table 3 show that the companies in the public utility industry have the highest level of quality management implementation (mean = 3.93), followed by those in the service industry (mean = 3.64), and then the manufacturing industry (mean = 3.52).

The companies in the construction industry are found to have the lowest level of quality management implementation (mean = 3.28). The results also show that statistically significant differences, i.e., $p < 0.05$, exist among companies in the four industry types in quality management implementation and all the underlying factors.

With respect to the emphases on quality management implementation, the companies in all the four industries attach the greatest importance to the factor of quality improvement and measurement systems (QM9). This means that they all stress the importance of 'fact-based' management and 'charting' progress in quality improvement, and are making remarkable efforts to measure improvement in their products/services and processes. The second highest emphasized quality management factor is external interface management (QM5) for the companies in the public utility and service industries, people and customer management (QM1) for the companies in the manufacturing industry, and supplier partnerships (QM2) for the companies in the construction industry. This indicates that quality-oriented companies in both the public utility and service industries greatly emphasize the satisfaction of various stakeholders in their quality management implementation process. The companies in the manufacturing industry place a high importance on employee development and proactive customer relations in support of overall quality and performance objectives, while the companies in the construction industry view supplier partnerships as a highly prioritised area for quality improvement.

The least valued quality management factors among the four industry types are teamwork structures for improvement (QM7) for the companies in the service and construction industries, communication of improvement information (QM3) for those in the manufacturing industry, and customer satisfaction orientation (QM4) for those in the public utility industry. However, it is important to note that all of these less emphasized

factors have 'positive' point values, i.e., mean > 3.0, in all the four industries. Teamwork structures for improvement has a lower value for the companies in the service and construction industries (as seen from the scores for QM7 – teamwork structures for improvement in table 3). This implies that non-hierarchical organizational structure and a 'process improvement' view of quality management are less favoured for the companies in these two industries among other quality management factors. Communication of improvement information, the sharing of knowledge and experience of quality improvement both within and outside the company, is rather weak for the companies in the manufacturing industry. Customer satisfaction orientation for the companies in the public utility sector receives the lowest score, i.e., 3.71, among the quality management implementation factors. However, it is interesting to note that when compared with their counterparts across the industries, this is the highest value. This seems to indicate that the public utilities are in fact leading the other industries in Hong Kong in the area of customer satisfaction orientation. Perhaps other industries in Hong Kong can use the public utility sector as a benchmark.

Conclusions and implications

We carry out this study to report on the degree to which quality management is being implemented in quality-oriented companies in Hong Kong and look for areas where they can make improvement in their quality management implementation. This is especially important when Hong Kong industries are facing severe competition from low cost and high value-added rivals in neighbouring countries. The study also suggests guidelines to Hong Kong's companies for planning and implementing quality management by providing them with the territory's average and industry-specific levels of quality management implementation. They can use these figures to gauge their own quality management implementation levels to keep pace with their industrial norms. For

example, companies can use the average figures (both the overall score and individual score for each of the quality management factors) for benchmarking purposes, if certain aspects of their quality management implementation lag behind the industrial or even the Hong Kong's average. The results should help them not only to increase their quality awareness, but also implement quality management more effectively with the industrial average levels provided, and the strengths and weaknesses of quality management implementation identified in different industries.

Based on the survey findings, we draw the following conclusions:

- 1) Quality-oriented companies in Hong Kong are expending remarkable efforts on quality management with respect to all the critical factors of quality management implementation. This is evidenced in the 'positive' values of their implementation efforts and all the underlying quality management implementation factors.
- 2) The companies in the public utility and service industries have a higher level of quality management implementation than those in the manufacturing and construction industries. This implies that the companies in the latter groups in Hong Kong need to put in more efforts to catch up with their counterparts in the former groups.
- 3) The companies in all the four industry types highly value the factor of quality improvement measurement systems in their implementation. This means that they highly emphasize measurement in their quality management implementation methods, regardless of industry types.
- 4) Among the quality management implementation factors, the companies in the service and construction industries are relatively weak in the factor of teamwork structures for improvement. On the other hand, the companies in the manufacturing industry put less effort in the communication of improvement information. The findings provide insights for the companies in the industries concerned about their potential

weaknesses in the quality management implementation process. Therefore, they can study findings as a basis to identify and improve their weak areas and to achieve a 'balance' and an 'integrated' quality management implementation.

In sum, the findings show a 'positive' level of quality management implementation for quality-oriented companies in Hong Kong. This means that they are generally conscious of the importance of quality improvement. We also find that the companies in the public utility and service industries outperform those in the manufacturing and construction industries in terms of the quality management implementation level. The results seem to be natural as the Hong Kong Government has in recent years strongly promoted quality management and service quality to enhance the competitiveness of the economy. Many public utilities and service companies have embarked on quality improvement programs in response to the government's advice. Furthermore, the business nature in the public utility and service industries involve more customer contacts and are more customer-responsive than the manufacturing and construction industries which are oriented more towards product/contract specifications. However, the service industry needs to pay more attention to teamwork structures in its quality management implementation, to ensure 'coordinated' and 'concerted' efforts in serving customers.

While the implementation of quality management for the companies in both the manufacturing and construction industries are at a 'positive' level, they need to increase their pace of quality management implementation and recognize their weaknesses in their quality improvement journeys, particularly in respect of the communication of improvement information and teamwork structures for quality improvement. To this end, they should adopt a flat organizational structure and establish cross-functional working teams to facilitate information flows and create a teamwork environment. We suggest

that they learn from the experience of the top performers in the service and public utility sectors, and benchmark the quality management practises of the high performing companies in their industries.

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Appendix A - List of Questionnaire Items and Their Codings in Quality Management Implementation

Quality Management Implementation

QM1 People and Customer Management

- 1 Strategic human resources management (e.g. education, training, and employee involvement schemes) is a key performance objective of our company.
- 2 Our company monitors the effectiveness of the quality education and training which support the company's quality and performance objectives.
- 3 Our company uses employee recognition and performance measurement schemes (e.g. frequent evaluation of employee participation in quality improvement) which support the company's quality and performance objectives.
- 4 Our company employs proactive customer relations (e.g. market research, follow-up with customers, and use of customer service standards) i.e., frequent use of customer information to improve customer satisfaction.

QM2 Supplier Partnerships

- 1 Our company audits suppliers' quality (e.g. by first party audits, management reviews, inspection, and accreditation to ISO series).
- 2 Our company takes action (e.g. providing rapid information and data exchange) to assist and improve the quality and responsiveness of our suppliers.
- 3 Our company considers suppliers as associates rather than as adversaries (e.g. by reliance on few dependable suppliers, development of long-term relations, involvement in the design/development process).

QM3 Communication of Improvement Information

- 1 Our company employs quality costs (e.g. appraisal, prevention, and failure) to facilitate the continuous improvement processes.
- 2 Our company assesses the need for quality education and training (e.g. on-the-job performance improvement, employee growth) and its subsequent delivery and review.
- 3 Benchmarking of processes in non-competing organizations for process improvement is practiced in our company (e.g. learn best practice outside the company's industry).
- 4 Our company interacts with outside groups (e.g. education, business, trade, professional groups) for mutual benefits of quality improvement.

QM4 Customer Satisfaction Orientation

- 1 Our company promotes trust and confidence in our products/services (e.g. by quality policy, third party assurance, guarantees, and warranties).
- 2 Our company evaluates competitors with respect to the level of customer satisfaction (e.g. by company-based competitive studies, evaluations made by independent organizations including customers).
- 3 Our company evaluates customer satisfaction with internal performance objectives (e.g. by comparisons with past customer satisfaction index or standard set).
- 4 Our company determines and improves customer satisfaction (e.g. by identifying market segments, benefits sought by customer groups, and the target quality requirements of each segment or group).
- 5 Benchmarking of direct competitors' products/services for improvement of own products/services is practiced in our company (e.g. learn best practice within the company's industry).
- 6 Benchmarking of direct competitors' processes for improvement of own processes is practiced in our company (e.g. learn best practice within the company's industry).

QM5 External Interface Management

- 1 Our company recognizes its social responsibilities such as public health and safety, environmental protection, and waste management (e.g. by including its public responsibilities in its quality policy and practice).

- 2 Our company determines customers' future requirements and the relative importance of product/service features (e.g. by survey, focus group, dialogue with customers).
- 3 Our company's new product/service development process is designed to ensure satisfaction of customer needs (e.g. by tools such as quality function deployment, venture team, new product development committee).

QM6 Strategic Quality Management

- 1 Our company uses process capability studies to ensure that product/service design requirements are delivered by the processes.
- 2 Our managers take active leadership in coaching, encouraging, communicating and promoting quality issues (e.g. frequent reinforcement of the company's quality value).
- 3 Satisfaction of intrinsic rewards (e.g. employee job satisfaction, sense of achievement) for employees is considered as a critical factor for attaining our company's quality objectives.
- 4 Satisfaction of extrinsic rewards (e.g. pleasant working conditions, job security, fair salary and promotion) for employees is considered as critical factor for attaining our company's quality objectives.
- 5 Our top management commits to quality improvement through involvement and visibility in quality activities and communication of quality values (e.g. frequent involvement and reinforcement of quality values within and outside the company).
- 6 Our company implements long-term plans (3 years or more) which are based on customer needs.
- 7 Our company implements long-term plans (3 years or more) which are based on company capabilities.
- 8 A continuous improvement program of processes based on objective analysis of operational performance (e.g. improved cycle time, productivity, and waste reduction) is carried out in our company.

QM7 Teamwork Structures for Improvement

- 1 Our company uses non-hierarchical organizational structures (e.g. councils, quality circles, steering committees, and quality improvement teams) to support quality improvement.
- 2 Work is organized in our company according to key business processes which reflect customer needs, rather than on traditional specialization of functions.

QM8 Operational Quality Planning

- 1 Our company implements short-term plans (1 to 2 years) which are based on customer needs.
- 2 Our company implements short-term plans (1 to 2 years) which are based on company capabilities.
- 3 Quality goals, measurable and time-based (e.g. reduction of failure costs by 10% within the next six months) are included in the development of our short-term plans (1 to 2 years).

QM9 Quality Improvement Measurement Systems

- 1 Our company evaluates and improves its products/services.
- 2 Our company evaluates and improves its business processes.
- 3 Our company manages data/information (e.g. data/information on quality improvement, customer and employee relations, supplier relations) to support quality improvement efforts.
- 4 Our company employs procedures (e.g. regular reviews and time updates) to ensure reliability, consistency, and rapid access to data and information throughout the company.

QM10 Corporate Quality Culture

- 1 Quality goals, measurable and time-based (e.g. increase in customer satisfaction by 20% within the next three years) are included in the development of our long-term plans (3 years or more).
- 2 The quality culture (e.g. common value, belief, and behaviors) in our company is company wide.

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Table 1. *Profile of the respondent companies*

Frequencies (Percentage)	Manufacturing	Service	Construction	Public utility	Total
No. of employees					
Below 100	10 (14.5%)	52 (48.6%)	38 (33.3%)	1 (7.1%)	101 (33.2%)
100 – 999	28 (40.6%)	35 (32.7%)	54 (47.4%)	3 (21.4%)	120 (39.5%)
1,000 - 4,999	24 (34.8%)	8 (7.5%)	18 (15.8%)	7 (50%)	57 (18.8%)
5,000 or above	6 (8.7%)	10 (9.3%)	3 (2.6%)	3 (21.4%)	22 (7.2%)
Unknown	1 (1.4%)	2 (1.9%)	1 (0.9%)	--	4 (1.3%)
Level of turnover (HKD)					
Below 1 million	1 (1.4%)	6 (5.6%)	--	--	7 (2.3%)
1-10 million	10 (14.5%)	20 (18.7%)	13 (11.4%)	--	43 (14.1%)
10-100 million	19 (27.5%)	27 (25.2%)	35 (30.7%)	3 (21.4%)	84 (27.6%)
Over 100 million	33 (47.8%)	34 (31.8%)	58 (50.9%)	9 (64.3%)	134 (44.1%)
Unknown	6 (8.7%)	20 (18.7%)	8 (7%)	2 (14.3%)	36 (11.8%)
Length of quality management program					
1 - 2 years	7 (10.1%)	38 (35.4%)	33 (29%)	2 (14.3%)	80 (26.3%)
3 - 4 years	22 (31.9%)	35 (32.7%)	41 (35.9%)	3 (21.4%)	101 (33.2%)
5 - 6 years	17 (24.6%)	17 (15.9%)	21 (18.4%)	6 (42.9%)	61 (20.1%)
7 - 8 years	11 (15.9%)	7 (6.5%)	14 (12.3%)	2 (14.3%)	34 (11.2%)
9 years or above	7 (10%)	6 (5.5%)	2 (1.8%)	1 (7.1%)	16 (5.3%)
Unknown	5 (7.2%)	4 (3.7%)	3 (2.6%)	--	12 (3.9%)
Total no. of firms	69 (22.7%)	107 (35.2%)	114 (37.5%)	14 (4.6%)	304 (100%)

Table 2. *Descriptive statistics, alpha values, and item-total correlation coefficients*

Factors	No. of items	Mean	S.D.	Alpha	Item-total correlation
Quality management implementation	--	3.49	0.71	0.95	--
QM1 – People and customer management	4	3.61	0.80	0.80	0.82
QM2 – Supplier partnerships	3	3.64	0.82	0.73	0.63
QM3 – Communication of improvement information	4	3.30	0.83	0.77	0.82
QM4 – Customer satisfaction orientation	6	3.41	0.82	0.86	0.82
QM5 – External interface management	3	3.64	0.89	0.78	0.81
QM6 – Strategic quality management	8	3.46	0.80	0.89	0.88
QM7 – Teamwork structures for improvement	2	3.30	0.97	0.67	0.73
QM8 – Operational quality planning	3	3.41	0.87	0.77	0.68
QM9 – Quality improvement measurement systems	4	3.82	0.80	0.88	0.84
QM10 – Corporate quality culture	2	3.31	0.98	0.69	0.82

Table 3. *Results for quality management implementation by industry*

Construct/ factors	Manufacturing (N=69)	Service (N=107)	Construction (N=114)	Public utility (N=14)	F	Sig.
Quality management implementation	3.52 (0.75)	3.64 (0.66)	3.28 (0.67)	3.93 (0.78)	7.17	.000*
QM1 - People and customer management	3.66 (0.81)	3.78 (0.77)	3.36 (0.77)	3.99 (0.76)	6.60	.000*
QM2 – Supplier partnerships	3.64 (0.87)	3.80 (0.79)	3.46 (0.79)	3.86 (0.79)	3.50	.016*
QM3 – Communication of improvement information	3.17 (0.96)	3.43 (0.81)	3.18 (0.71)	3.92 (0.76)	4.88	.003*
QM4 – Customer satisfaction orientation	3.38 (0.78)	3.59 (0.82)	3.22 (0.76)	3.71 (1.18)	4.46	.004*
QM5 – External interface management	3.62 (0.92)	3.87 (0.81)	3.38 (0.86)	4.19 (1.01)	8.00	.000*
QM6 – Strategic quality management	3.48 (0.85)	3.61 (0.77)	3.26 (0.77)	3.84 (0.81)	4.85	.003*
QM7 – Teamwork structures for improvement	3.29 (1.13)	3.41 (0.94)	3.15 (0.88)	3.82 (0.85)	2.77	.042*
QM8 – Operational quality planning	3.51 (0.94)	3.50 (0.89)	3.20 (0.78)	3.87 (0.69)	4.41	.005*
QM9 – Quality improvement measurement systems	3.92 (0.76)	3.96 (0.82)	3.57 (0.76)	4.32 (0.74)	7.51	.000*
QM10 – Corporate quality culture	3.49 (0.95)	3.46 (0.97)	3.0 (0.94)	3.75 (1.01)	6.86	.000*

Note: Entries in the table are mean values on a 5-point interval scale and entries in parentheses are standard deviations with * indicating significance at $p < 0.05$ level.