A survey of quality management systems with special reference to certain modern tools

Peter Miller, *Southern Cross University*
E Lau
Chapter for partner research book
Hong Kong

Lau Man Chung (Eric) and Peter Miller

Title of study:
A Survey of Quality Management Systems with Special References to Certain Modern Tools

Purpose of the study:
After 1980, the concept of customer satisfaction influenced the operating style of businesses in United States. Businesses paid higher attention to customer satisfaction. Enterprises started looking for new operating style in order to improve profitability. After Motorola’s creation of Six Sigma, Allied Signal and GE applied it in the 1990s. International enterprises such as Sony, Texas Instruments and Honeywell linked up quality assurance and profitability together through the application of Six Sigma system.

Today, the importance of product and service quality is seen as a major factor to enhance competitive advantages. However, during the implementation of quality management, businesses have to invest huge amount of human resources, financial resources and time. Some issues are vital to managers who are carrying out or preparing to launch quality management activities.

The research tried to find out the position of quality management in the building up of a company’s business strategy. Did companies construct business strategy structure by putting quality in the center? Was enough resources used to ensure effective execution of quality management system?

If the major purpose of integrating quality management activities into business was to improve performance in relation to output quality, operation cost, staff motivation and financial profit, what was the degree of influence of quality management activities to business performance?

After understanding the current situation of organizations in applying quality management activities, and how different major factors influencing business performance, a system to predict business performance would be developed.
Explanation to the level of influence from different activities would be provided. This relationship would assist managers to set a priority list in launching quality management activities and predict future performance.

**Keywords:**
Survey, quality management, business strategy, business performance, TQM, Six-sigma

**Mini literature review:**
In the early 1900s, Frederick W. Taylor’s concept of ‘Scientific Management’ greatly influenced the nature of quality in manufacturing organizations. Through focusing on production efficiency and separating jobs into small work tasks, the modern assembly line was developed. Independent quality control departments carried out the tasks of inspection to ensure that products were manufactured up to standard. The separation of good from bad product became the major task of ensuring quality.

Deming and Juran introduced statistical quality management to Japanese factories after Second World War as part of General MacArthur’s rebuilding program. They convinced the Japanese top management that quality improvement could bring them new markets over the world. The Japanese managers accepted their ideas and fully supported the quality improvement activities from 1970s to 1980s causing a high improvement in quality level of Japanese products.

(Willborn & Cheng 1994) also pointed out that the importance of product and service quality was seen as a major factor to enhance competitive advantage. With the need to cater for higher demanding customers and to cope with intensive competition, quality orientation was the required strategy to maintain competitiveness.

Moreover, the putting of quality as a business objective had been widely used throughout the world during the last decade (Kanji 1990). Quality management had been commonly used as an effective management approach to cope with competitive pressure. It had also been proved effective to reduce manufacturing costs and improve productivity (Garvin 1983). Furthermore, many findings supported the relationship between quality management and organizational performance (Hendricks & Singhal 1997, Powell 1995, Samson & Terziovski 1999, Zairi et al 1994). Managers realized that the approaches they used to establish strategy, analyze data, evaluate performance
and reward, train employees and communicate with customers were all affecting the quality of products, customer satisfaction and business results. They recognized that the ‘quality of management’ was as important as the ‘management of quality’. Organizations started to integrate quality management principles into their management systems to form their new business strategy. My study was to build a model combining strategic construction, implementation tools and methodologies, and their relationships with quality and business performances.

The questions relate to the study include:

1. What is the level of support within organizations in conducting quality improvement activities? The term ‘support’ in the research represents only the intention and attitude but not the actual execution.
2. What is the level of execution of quality management activities in organizations established with quality management system?
3. What is the change in general performance after implementing the quality management system? The term ‘general performance’ in the research represents the combination of ‘employee motivation’, ‘turnover improvement’, ‘costs reduction’, and ‘customer satisfaction’.
4. What major quality management activities are influencing the success of the improvement in general performance?
5. What are the implications that assist management to integrate quality management system successfully into business strategy?

Summary of Hypotheses:

Hypothesis H₁: Strategic activities influence the outcomes of the businesses.
Hypothesis H₁ₐ: Top management support leads to improvement in outcomes for the organization.
Hypothesis H₁₆: Quality orientated culture enhances successful outcomes of businesses.
Hypothesis H₁₄: Establishment of quality policy helps to improve outcomes of businesses.
Hypothesis H₁₅: Establishment of quality target helps to improve outcomes of businesses.
Hypothesis H₁₆: Carrying out quality guarantee activities enhances improvement in successful outcomes of businesses.
Hypothesis H₂: Implementation activities influence the outcomes of businesses.
Hypothesis H₂a: Establishment of quality committee enhances successful outcomes of businesses.
Hypothesis H₂b: Execute quality plan and technique improves outcomes for the organization.
Hypothesis H₂c: The use of statistical indicators to measure outcomes improves performance of businesses.
Hypothesis H₂e: Providing continuous training to employees will improve outcomes of businesses.

Methodology:
The concepts and model developed in my study were firstly tested by using quantitative research because quantitative approach is objective in nature and concentrates on measuring phenomena. It answers questions such as ‘How many’, ‘How often’ and ‘What proportion’. Quantitative research approach involves a survey. The approach involves collecting and analyzing numerical data and applying statistical test.

Kent (2001) observed that Likert-type scaled points were used to measure a wide variety of latent constructs, particularly in social science research, such as organizational culture and customer satisfaction. The seven-point Likert scale was utilized in my study with 1 on the scale representing ‘the lowest’ or ‘the most disagree’ level and 7 on the scale representing ‘the highest’ or ‘the most agree’ level. Participants were asked to assess the support and execution level of each quality management activities and the impact on the organization’s outcomes. (Aharoni, 1993) pointed out that using a seven-point scale, as opposed to a five-point scale, provided for a wider delineation of performance responses, which was indicative of the broad range of performance levels in the market place.

Since most of the Hong Kong people are Chinese, questionnaires written in both English and Chinese were used in the survey. In the questionnaire, Section 1 collected some background information concerning the replying company and the employee answering the questionnaire. Section 2 contained questions related to the amount of support and execution of the quality management activities in both strategic and implementation level in participants’ organizations, and also the performance changed
after carrying out the quality management activities mentioned.

After reviewing different research papers and textbooks, there was no limitation on the number of questions that should be asked. However, research showed that higher response rates correlate higher with shorter surveys. In Hong Kong, the response rate of previous researches was relatively low when survey involved business sectors especially the SME firms. In order to avoid a very low response rate and non-response bias that reduced the generalization of the finding, the number of questions was kept to a minimum. Questions were asked only if the answer would contribute to the survey. Moreover, each question collected data concerning two independent variables related to the level of support and execution. These could increase the total number of data collected without requiring additional responding time from participants to read extra questions. As a result, although the number of questions was maintained at a low level, the quality and content of the research was not weakened. At the same time, it helped to sustain an acceptable response rate.

One of the objectives of my study was to find out the relationship between the level of support and level of execution in quality management in relation to the general performance of companies in Hong Kong. Therefore, the sampling frame was defined as all organizations in Hong Kong carrying out quality management activities. Those without any knowledge and experience in quality management were excluded.

Furthermore, to supplement the findings, key participants in the quality management field were invited to an in depth interview to provide more detailed information related to quality management. Key participants were defined as the managers or people in charge of the quality management function of an organization equipped with a quality management system. The one-to-one interview lasted around 30 minutes. Information related to quality management was collected. This consisted of their suggestions and opinions in quality management activities, comments on the findings of the survey and other previous researches, and the future directions of quality management. It fulfilled the triangulation purpose and enhanced the reliability of the findings. Their suggestions might also induce topics for future research.

**Findings:**
After investigating the statistical indicators, the figures showed that quality management was a top down process. Top management fully understood the importance of quality in seeking competitive advantages. With the consideration of
quality would generate profit, top management became the initiator to introduce quality strategy into organizations. Interviewees also agreed that top managements were aware that their full support became the most critical factor for successfully carrying out quality control. There were many examples in the past that the initiative was driven by leaders at the highest levels of the organization, such as the CEOs of GE (Jack Welch), Motorola (Bob Galvin), and AlliedSignal (Larry Bossidy).

Based on the research data and the opinions from the interviewees, another key factor for the success of quality management was the involvement of top management to promote the positive values and culture of quality in different levels of the organization. A participative, flexible, risk-taking organizational culture was significantly related to quality improvement implementation (Shortell et al 1995).

The study also found that financial performance was the most common indicator used by businessmen to measure performance. An objective of quality management was to achieve higher customer satisfaction. Financial performance was enhanced through the improvement in customer satisfaction. The relationship explained the enthusiastic of top management in integrating quality management into the business strategy. Some interviewees pointed out that in order to obtain enough resources from top management, quality management activities were required to have the capability to generate profits in both long and medium term.

On the other hand, the data showed that resources invested into the establishment of quality management policy and target was comparatively low. Moreover, the using of statistical indicators, such as Six Sigma, to measure performance was not popular in Hong Kong. Local managers might not be familiar with or were even in lack of knowledge in the application of statistical quality management system regardless of many researches had proved the benefits of using statistical indicators to evaluate performance. On the other hand, some interviewees pointed out that the changes of business environment in Hong Kong would cause the emerging of Six Sigma in the foreseeing future. Six Sigma might be considered as a medium term tool to achieve the target of improvement in financial performance.

‘Paired-Samples T Test’ was used in the research to compare the means of variables in the level of support and actual execution. Obvious differences were observed. Interviewees explained that although top management knew that continuous quality improvement was a vital factor for achieving competitive advantages, there were always barriers in executing the concept and plans in real situation. Barriers might
come from lack of resources such as skillful employees and financial support.

The highest discrepancy was the establishment of company culture in achieving customer satisfaction through quality improvement. It showed that although organizations realize that quality management was hard to be effective without backing up from strong culture, the actual effort devoted in developing positive culture was insufficient. It did not match with their intention in improving output quality.

Moreover, the study found that although organizations were fully aware of the function of quality committee, they did not invest sufficient resources to develop quality management team. Without the coordination of quality committee, efficiency and effectiveness in quality management would be reduced.

The study also showed that the execution of the quality management activities in implementation level causes greater influence than in strategy level to the general performance of the organizations. General performance included the improvement of employee motivation, increase in turnover, reduction of costs and enhancement of customer satisfaction.

By using the multiple linear regressions and ‘Backward Search Method’, four quality management activities were identified to have more significant influence to general performance. The four activities included ‘top management’s support and involvement’, ‘execution of quality plans and techniques’, ‘use statistical indicators to measure performance’ and ‘provide continuous training to employees’. The use of statistical indicators to measure performance under the implementation level caused the greatest influence to the general performance of organizations. It showed that statistics was a valuable tool for managers in getting an objective measure and analysis to the quality performance of organizations. It assisted to determine the exact areas requiring extraordinary attention and the degree of improvement after carrying out quality management activities.

The next was the execution of quality plans and techniques in quality management processes in the strategic level. It directly caused improvement in efficiency and effectiveness in the process of continuous quality improvement campaign.

The third was top management support and involvement. It always paid important parts in quality management. This phenomenon was consistence with the findings of
many previous researches.

Providing continuous training to employees was another factor influencing the quality of organizational output. Employees’ skills in quality management needed to be upgraded continuously to enhance improvement in general performance.

**Limitations:**
There were some limitations of my study. First, the data collected might not represent all organizations in Hong Kong but only those that practiced certain substantial quality management and had registered with Hong Kong Quality Assurance Association (HKQAA). Second, the companies’ size, history, operation and scope of business of the participants were different. Most organizations in my sample were in the business field of manufacturing, trading and information technology. The finding might not be applicable to other industry. Third, this research was carried out in Hong Kong. The finding might not be generalisable to other countries.

**The impact of the research on the country:**
Based on the findings of my study, organizations in Hong Kong needed to invest more resources and work harder to implement activities relating to quality issues. Some suggestions were provided to organizations in establishing business strategy related to quality management.

Five strategic activities were studied in the research. Senior-management commitment was the only activity remaining in the final regression function. It showed that management of quality had to start from top management with the involvement of chief executives. The study recommended that senior directors and management had to recognize his responsibility to commit to a quality policy and demonstrate that they were serious about quality. Their involvement created quality interactions between the marketing, production, operation, purchasing and other service functions. Within each and every department of the organization at all levels, basic change of attitudes towards quality was also required. It was essential to provide relevant information, convey good practices, and generate interest, ideas and awareness through excellent communication processes from senior management. Failure to communicate effectively would create unnecessary problems such as confusion, loss of interest and eventually in declining quality. Furthermore, middle management had to explain the quality management concept to their junior staff. The commitment of quality
improvement had to communicate effectively throughout the organization.

Furthermore, top management required to develop an implementation method to ensure that their plans and strategies would successfully be executed within the organization. In the study, implementation activities remaining in the final regression function included execution of quality improvement plan and techniques, use of statistical indicators to measure performance and provide continuous training to employees.

Organizations in Hong Kong were recommended to focus on the execution of quality improvement plan and techniques in different levels. The best way to achieve that was to follow a structured improvement method as suggested in my study that led the organizations moving logically from a definition of the problem to the implementation of solutions. The high performance and statistical data-driven approach of Six Sigma system was another choice. The Six Sigma provided the ability to analyze and solve the root causes of business problems. The system aligned the outputs of a business directly to customer requirements and delivered real improvement and profits. It was expected to be more and more popularly used in Hong Kong.

The research notified that human resource management had been recognized as one of the keys to improve quality. Hong Kong organizations were recommended to invest more resources to employee development through strategic alignment of human resource management policies, effective communications, employee empowerment and involvement, training and development, teamwork, review and continuous improvement. Commitment to improve quality could also be strengthened by involving more employees in planning and shaping the quality strategy. As a result, more cross-functional quality management teams were expected to be established by organizations to boost morale in achieving quality target. By pooling of expertise and resources together, complex problems beyond the capability of individual or even one department might be tackled with greater diversity of knowledge, skills and experience.

The final recommendation was to pay more attention in monitoring of employee motivation. The data showed that most employees in Hong Kong had never been motivated even improvement in quality exists. It reflected that top management did not work hard enough to communicate and develop the culture of quality in every working level. Employees only experienced higher requirement on their works
without seeing any benefit to them through improving quality. In order to improve the situation, the efforts and achievements in quality enhancement by operational staff had to be obtained the recognition, attention and reward. The culture of quality would then be developed to become the motivation of integrating quality management system into business strategy. Top management needed to address these issues to remove barriers in executing quality management activities.

**Researcher’s retrospective piece**

**Name of researcher**
Lau Man Chung

**Genesis of research**
I had worked as an accountant in Hong Kong for twenty years. During the period, one of my major duties was to develop and improve the internal control system of many different organizations. This background not only provided me plenty of practical experience but also enhanced my interest in quality management. Although the concepts of quality management have been studied for decades, various concepts can only be used as references. Managers are still searching for the most proper way to establish a quality management system which best fulfills the target of continuous quality improvement for their organizations. In order to transfer various quality management concepts into a concrete model, I conducted a research in building a model of integrating quality management system into business strategy.

**Hurdles that had to be overcome**
The major hurdle I faced was when the Ethics Committee raised the concerns about the insufficient number of questions in the survey questionnaire. The committee was afraid that with such a short questionnaire, I could not achieve the research purposes.

Although my supervisor and the writers of some articles mentioned that good research was not only depended on the number of questions but the justification given for the building up of the questionnaire, the concern of the Ethics Committee had to be addressed.

In order to address the concern, I provided the justification of using a comparatively
short questionnaire. Furthermore, I coordinated detailed interviews with a few key players in the relevant areas after conducting the survey. In fact, this additional procedure changed the research methodology from purely quantitative to a combination of quantitative and qualitative.

**Relationships**

Peter was my first teacher in conducting a doctorate level research. He showed me the procedures of writing a thesis. Starting from introducing the ways of developing research topic, he then explained the use of different types of research methodologies. Since he was staying in Australia while I was working in Hong Kong, it was hard to establish close relationship with him. However, when I was absolutely frustrated in addressing the Ethics Committee’s concern, he helped me by inviting an experienced professor to Hong Kong to discuss the issue with the Hong Kong supervisor. With his help, the problem was finally resolved.

I worked more closely with the Hong Kong supervisor, Professor Chiu of the University of Hong Kong. His richness of experience in conducting research activities could always point out my insufficient and give me valuable suggestions during the whole research process. I was his last doctoral student because he was retired right after the completion of my doctorate degree.

**Reflection**

My overall experience during the research is rewarding although with a lot of ups and downs during the process. When I was working as an accountant in the commercial field, one of my major duties was to continuously review the quality management system. The research fulfilled my career interest although I was no longer working in the commercial sector, as well as satisfied the requirements of achieving my DBA degree. Through investigating of quality management activities from the introduction of quality control in the last century till the use of statistical approaches nowadays, the research gave me a wider understanding of the application of quality management strategy. The research findings also provided me a lot of insights and ideas on the alternatives of the latest applications of quality management strategy in today’s business firms.

This was my first formal research study. Due to the inexperience in conducting research activities, it took me months before I could shape out a research
methodology which seemed to be able to satisfy my research objectives. At the beginning, I was looking for the absolute best way of conducting research among different methodologies. After the discussion with my supervisor and other experienced researchers, I understood that the best way of conducting research was not exist. Researchers always have the freedom to choose and design their own research approaches provided that they can justify their approaches which can properly achieve their research objectives. The methodology finally used in my study was a questionnaire survey plus interviews. The process enabled me to acquire experience in conducting both of the quantitative and the qualitative research methodologies.

It was crucial to keep the pace of studying through the whole studying period in completing the DBA. I was aware that if I put the work aside for a period of time, it would be very hard to pick it up again in the later day. I asked myself to write at least a few lines related to the thesis every week in order to maintain the mood of studying. My sustained effort finally led the thesis to be satisfied by my supervisor and the external examiners.

Supervisors comments

Peter Miller

I acknowledge that this candidate’s local supervisor is Professor Chiu Wing Kin who was not able to contribute to this part of the chapter.

Relationships

As the former Director of the DBA program, one of my roles was to approve all applications for admission into the program. It was at this stage that I noticed and took some personal interest in the research project proposed by Lau Man Chung (Eric). I have some interest in the quality movement and have had several doctoral candidates undertake projects in the continuous improvement area. Product and service quality are regarded as a major source of competitive advantage for organisations and therefore the research is current and exciting. Eric’s project investigating the level of support within organisations conducting quality improvement activities therefore caught my immediate attention.
As I also attend the six monthly doctoral symposia conducted in Hong Kong for Doctor of Business Administration (DBA) candidates, I was able to keep an eye on Eric’s progress as he began the process to focus the research topic and area into something that was researchable and rigorous.

Reflection

To be the principal or ‘pod’ supervisor for the Hong Kong based candidates is a privilege and it enables me to stay in contact with the candidates and their supervisors.

I recall Eric’s research in progress presentations at the first doctoral symposia. The aims of research in progress presentations are to:

- Inform other researchers and academic staff of the status and direction of the candidate’s proposed/current research project,
- Provide candidates with the opportunity to put forward ideas and to receive critical feedback on their planned or current research project,
- Give candidates an opportunity to reflect on their research by having to prepare a presentation to their peers.

Like most new candidates, Eric was struggling to focus his research interest into a project that was capable of being investigated in a rigorous way. This period of focusing occurs simultaneously with training in research design and methods. I consider the ability to focus the research to be one of the most difficult tasks for new candidates. When candidates are passionate about their areas of interest, sometimes they find it difficult to reduce the research into a sufficiently focused set of research questions that are doable, as they wish to find out more about the topic than a focused doctoral research project allows.

However, as can be read in Eric’s account above, he was able to focus the project to limit the investigation to the level of support within organisations in conducting
quality improvement activities, major quality management activities and how they might be linked into business strategy. Having reviewed the literature, Eric was then in a position to design a research project to pursue the questions and hypotheses raised. The outcomes of the investigation have been very rewarding. The research was very applied and has made significant recommendations for organisations in Hong Kong to focus on the execution of a quality improvement plan and techniques at different management or organisational levels.

This research will have important and significant implications for organisations both in Hong Kong and possibly worldwide as the findings may be generalised despite the limitations correctly imposed by Eric above.

I am very satisfied with the outcomes of the research and the suggested ways forward for organisations and their managers.

Candidate’s Profile

Lau Man Chung is a lecturer in accounting in the Hong Kong Institute of Technology from 2004. Before his academic career, he was working as a professional accountant in the business sector. He is an associate member of the CPA Australia and the Hong Kong Institute of Certified Public Accountants. He completed his DBA degree from Southern Cross University in 2009. Prior to completing his DBA, he received a Master of Business Administration and a Bachelor of Commerce in Griffith University and the University of Queensland respectively.

Supervisor’s Profile

Peter Miller is an Associate Professor in the Graduate College of Management at Southern Cross University, Australia. He was the former Director of the global DBA program and was also the principal supervisor for all Hong Kong based DBA candidates and works with the local supervisors to ensure quality control of the research projects. Peter has published several books and international refereed journal articles and is on the editorial boards of several international journals.
References


