

**TOTAL QUALITY MANAGEMENT (TQM) ADVANCEMENT AND  
CRITICAL SUCCESS FACTORS FOR IMPLEMENTATION IN  
MANUFACTURING SMALL AND MEDIUM SIZED ENTERPRISE (SMEs)**

**FINAL REPORT FOR RMC  
SHORT TERM RESEARCH GRANT  
VOT 71663**

**FEBRUARY 2003**

## **ABSTRACT**

Recognition of quality management as an important factor holds the key to competitiveness in the global market irrespective of the size of the company. Total Quality Management (TQM) practices are primarily found in larger and multinational organizations but little has been written on how TQM has been applied in SMEs of Malaysia. This project reports the results of a full survey conducted among a sample of local SMEs in Malaysia. The survey is expected to reveal the level of TQM implementation in the industrial sector via a postal questionnaire. The survey covered 300 company chosen from many sector and produced a response rate of 10.7 percent. The survey findings are analyzed using statistical analysis package SPSS 11.0. Attempts at finding significant differences between small and large companies were successful. It also revealed areas lacking in implementation among SMEs in Malaysia. SMEs must be able to adopt TQM to help them meet global challenges in the long run. Finally, this project culminates with a discussion and the general conclusions from the survey findings. The result finding is expected to be powerful information for future research directions especially as an indicator for the development of a suitable TQM framework for the local SMEs in Malaysia.

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## **ABSTRAK**

Pengurusan berkualiti telah menjadi salah satu faktor penting dalam menangani isu persaingan dalam pasaran global perniagaan tidak kira saiz industri tersebut. Pengamalan Pengurusan Kualiti Menyeluruh (TQM) biasanya banyak diaplikasikan dalam industri besar dan multinasional. Masih kurang kajian tentang bagaimana TQM dapat diaplikasikan dalam Industri Kecil dan Sederhana (IKS) terutamanya di Malaysia.

Projek ini melaporkan keputusan hasil kajian yang dilakukan ke atas sebilangan sampel syarikat IKS di Malaysia. Hasil kajian ini telah berjaya mengenalpasti faktor-faktor kritikal dalam melaksanakan TQM dalam syarikat IKS. Satu kajiselidik yang melibatkan sejumlah 300 buah syarikat dari pelbagai industri telah dilakukan, dan telah menghasilkan maklumbalas sebanyak 10.7 peratus. Maklumat daripada hasil kajian ini dianalisis menggunakan pakej analisis statistik SPSS Versi 11.0. Percubaan untuk mencari samada wujud perbezaan yang ketara berkenaan tahap implementasi antara IKS dan industri besar telah dilakukan, dan ia didapati benar. Kajian ini juga telah menunjukkan beberapa kriteria yang kurang dipraktikkan dalam IKS di Malaysia. Syarikat-syarikat IKS disarankan agar dapat menyesuaikan diri untuk menerima TQM sebagai satu strategi untuk menghadapi isu dan cabaran globalisasi kini dan di masa hadapan. Projek ini diakhiri dengan perbincangan dan keputusan menyeluruh yang diperolehi daripada kajian soal selidik yang dijalankan. Keputusan hasil kajian dijangka akan berguna untuk kajian di masa hadapan, terutamanya sebagai suatu panduan kepada pembangunan rangkakerja TQM yang sesuai digunakan oleh IKS tempatan di Malaysia.

## CHAPTER 1

### BACKGROUND TO THE RESEARCH

#### 1.1 Introduction

In today's globalized economy, competition is becoming ever more intense. Many companies are trying very hard not only to satisfy their customer's needs but where possible exceed them. This can only be achieved through cost reduction, improvement in product performance, increased customer satisfaction and a constant effort towards world class organizations. In order for companies to survive and grow in the future, it is essential that they deliver high quality goods and services. Those that can deliver quality are the ones that will prosper in the next century (Ross, 1994).

Companies actually compete on three major issues; *Quality, Price and Delivery*. If the choice is to compete in the market place on the basis of product or service price, then the level of competition is clearly defined; the low-cost provider wins. However, companies choosing the low cost approach may find themselves losing premium business to competitors while retaining the low-margin business in the long term (Victor, 1995). In fact, they are also vulnerable to any competitor who can offer value at a lower price. This is why many companies have become aware of the need to make quality is the competitive marketing strategy in a global market. Large companies for instance, have started to implement total quality initiative in their products and services. The increasing acceptance of Total Quality Management (TQM) as a philosophy of management and a way of company life has taken place for almost three decades.

Many companies understand that TQM is necessary for them to remain competitive, retaining their market share and to be able to respond to changing

competitive demand in today business world. Based on some studies (Ross, 1994, Ghobahdian, 1995, Ahire et al., 1996, Gulbro et al., 2000), not all companies are able to implement TQM successfully. This is because it requires a different implementation approach to cater for the varying needs of the industries in order for effective implementation. Small and medium sized enterprises (SMEs), for example, have been slow in adopting TQM when compared to large companies. Their involvement has focused primarily on ISO 9000 certification, and very few had advanced beyond that (Yusof, 2000).

Therefore, the identification of critical success factors for successful implementation as well as the problems faced by SMEs in implementing TQM is an important area to be understood. The value of this research is one of the primary steps towards reaching the needs of local SMEs that are trying to implement TQM in their business. It will focus on the SMEs in the manufacturing sectors has faired in view of TQM as a tool in their quality journey. With a better understanding of this issues, it can be a groundwork for the development of an appropriate TQM framework for practical implementation by the SMEs.

## **1.2 Background of TQM in Malaysia**

While the development of quality has always been spearheaded by developed countries, Malaysia has not been left behind in quality development. The Malaysian Government implemented its Umbrella Project in 1990, with the aim of upgrading technical levels and product quality amongst Small and Medium Sized Industry (SMIs), through SIRIM. The project aims to promote the gradual introduction of quality among SMIs based on ISO 9000 with the technical assistance of foreign affiliates and other advanced manufacturing companies. For example, Small and Medium Industry Development Corporation (SMIDEC), a government agency is being introduced for the responsibility of SMEs' development in Malaysia.

Besides, the Malaysian government had carried out various efforts to assist in enhancing quality among Malaysian industries. For example, SIRIM was given the task of promoting ISO 9000 and TQM among Malaysian industries. Various schemes

have been introduced such as technical services to encourage dissemination of technology transfer among the multinational corporations and small and medium industries. SIRIM also intensified its standardization and quality assurance activities particularly on improving the quality of products among SMEs.

For instance, SIRIM has launched the SIRIM Industrial Dialogue 2000 recently, as a step to identify the needs of SMEs has proven to be successful. SIRIM hopes to identify the gaps in its portfolio of services provided to the industry in this Dialogue.

Currently, the main trends within quality management in Malaysia can be classified according to the following categories (Hamzah, 1994):

- Japanese affiliates joint ventures with Japanese companies or those companies supplying products, which apply Japanese systems of quality management.
- Multinational companies from Europe or USA, which apply TQC (Total Quality Control) in accordance with their own standard manuals.
- Those companies aiming to realize quality systems in line with ISO 9000, to meet the demand of export markets.
- Those companies recognizing the importance of quality management but whose efforts are no more than line inspection.
- Those companies recognizing the importance of quality management but are unable to realize the objective results because of insufficient facilities.

Only a small number of Malaysian SMIs have reached a stage of development where they are able to apply quality management (QM) and effect an upgrading of their technical levels autonomously. The majority implement QM in response to buyers' requirements, and so they rarely undertake anything beyond product inspection. According to a survey conducted by Idris, (1995) the main reason for wanting certified standards was to improve performance through adopting ISO 9000 standard (38%) and as a part of TQM improvement initiatives (29%). It was surprising to note that customer demand was not the most important reason to certify

standard! However, it is sufficient enough to know that the organization still have the awareness of wanting certified standards had been TQM itself.

Idris (1995) found that one third of its respondents claimed to “have TQM”. This is considered quite low since the sample organizations are registered firms, which were excluded from the survey. However, a majority of TQM initiative (more than 70 per cent of TQM companies) has been only recently implemented in less than five years of adoption. Hence, TQM is obviously still very much in its infancy. What about the current quality awareness among the Malaysian companies? The findings of this study attempt to ensure this question and will be explained in Chapter 5 of this report.

### **1.3 Objective And Scope of Survey**

The level of awareness of TQM has increased considerably over the past few years. There has been research done on TQM related issues. This research is carried out to check the current level of TQM implementation among a various type of industries in Malaysia. A survey was conducted for the purpose. The scope of survey will be targeted to ISO 9000 and non- ISO9000 registered Small and Medium Size (SMEs) manufacturing industries in Malaysia. From this survey, the researcher will be able to investigate the level of TQM implementation in SMEs in Malaysia.

The objective of this survey is to find out:

- The status of TQM implementation in Malaysian manufacturing companies.

Then from analysis and results:

- Pinpoint areas lacking in implementation
- Provide suggestion and guidelines for TQM implementation of TQM in SMEs
- Understanding the future trend of Malaysian quality improvement activities.

#### **1.4 Methodology of the Project**

Figure 1.1 indicates the methodology and procedures in conducting the project. It starts with a detailed literature review of TQM that requires a general understanding of TQM. Next, the objective and scope of research is defined to give a clearer picture of the research. All related quality issues in Malaysia faced especially by SMEs were being gathered to learn about the current trend of Malaysian quality activities. Further to that, all the TQM concepts will be compiled to suit the objective and scope of research as well as providing a guideline for future review.

Questionnaires are being prepared after determining the type of approach and style that is suitable for the survey. The questions are designed with a purpose to check on the level of understanding and implementation of TQM among SMEs.

The first draft of the questionnaire was sent to three quality experts. All comments and suggestions were taken into consideration and corrections identified toward the improvement of questionnaire. After revising and combining all useful feedback, the final questionnaire was distributed to 300 companies.

Eventually, the survey was carried out within two months. While waiting for the survey's response, computer software (SPSS 11.0) for the purpose of the research is familiarized in the preparation for analysis.

Finally, the project expects to provide a good guideline for a TQM model that can be applied to suit the needs of SMEs in Malaysia. This can be done by identifying the common causes of failure in implementing TQM in Malaysian industries. Comments and suggestions for future research will also be outlined to conclude the result findings on Total Quality Management practices.

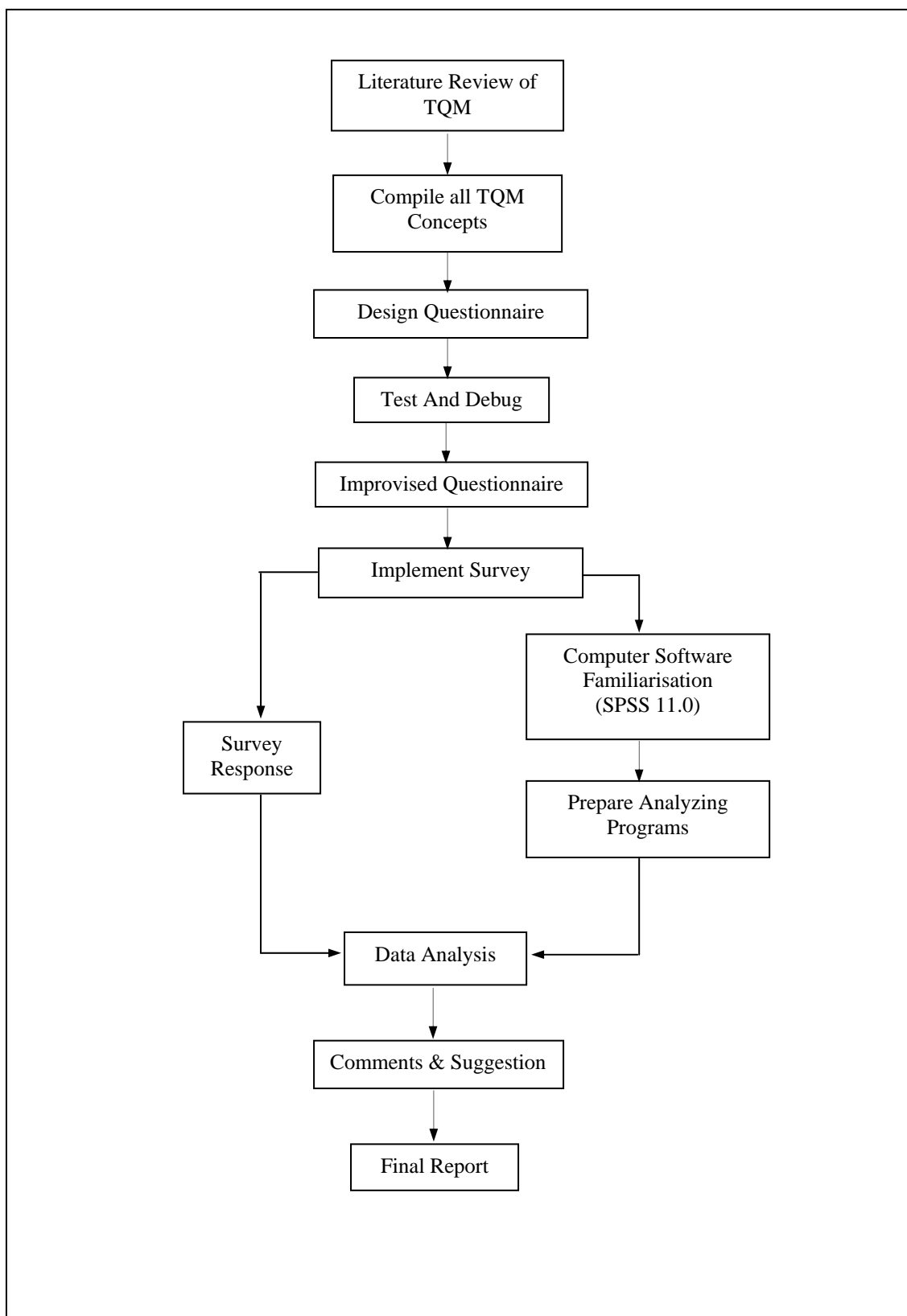


Figure 1.1 : Flow chart of Project Procedures

## **CHAPTER 2**

### **LITERATURE REVIEW ON TOTAL QUALITY MANAGEMENT**

#### **2.1 Introduction**

In embarking on the quality journey, as with any other change management initiatives, one must first have a clear definition and an understanding of the basic philosophy being pursued. This chapter provides with an overview on various aspects of Total Quality Management (TQM) relating to the research. It traces the origins of the term TQM and describes the numerous definitions employed by academics, consultants, engineers and practitioners. Feigenbaum and Ishikawa are perhaps the greatest contributors to the development of the term. However, the prominent quality gurus such as Deming, Juran and Crosby were those who have shaped the dimensions, practices and mechanisms which underpin the concept although none of them actually uses the term (Dale et.al, 1994).

#### **2.2 Definition of Quality**

Quite a number of definitions for quality can be found in the extant literature. It is not an easy task defining the term, as most writers, practitioners, and academics on this subject have their own definition, by and large devising it to suit their own beliefs, prejudices and business and academic experiences. For example, Garvin (1984,1988) suggested five co-existing definitions that emerge from certain points of view (Dahlggaard et al., 1998). They are:

- 1) transcendent (excellence)
- 2) product- based ( amount of desirable attribute)
- 3) user-based (fitness for use) (similar to Juran)



- 4) manufacturing- based (conformance to specification) (similar to Crosby)
- 5) value- based (satisfaction relative to price) (similar to Feigenbaum)

Although there are many ways to define quality, there is a worldwide acceptable definition stated in ANSI / ASQ Standard A-3 1987, where:

*“ quality is the totality of features and characteristics of a product or service that bear on its ability to satisfy implied or stated needs”*

Despite the divergence of views on what quality is, it may be summed up as “doing things properly” (Dahlggaard et al., 1998) for enhancing competitiveness and profitability within the context of quality culture.

### **2.3 Historical Perspectives of Total Quality Management**

The historical evolution of TQM has taken place in 4 stages, namely; Quality Inspection, Quality Control, Quality Assurance and Total Quality Management (TQM) (Dahlggaard et al., 1998). Table 2.1 shows the characteristics of the different stages in TQM.

Quality control, as we know it probably had its beginnings in the factory system that developed following the Industrial Revolution. Products were made from non-standardized materials using non-standardized method. The result was products of varying quality. The only real standards used were measures of dimensions, weight, and quality (Ross, 1998). The most common form of quality control was inspection made by the purchaser where poor quality product found would be separated from acceptable quality product and then would be scrapped, reworked or sold as lower quality. Inspection took place mainly to ensure that the sorting of conformance and non-conformance product can be done and mostly involved visual inspection or testing of the product following manufacture.

Table 2.1: Characteristics of the different stages in TQM (Source [10])

Stage	Characteristics
QI (1910)	Salvage Sorting Corrective action Identify sources of non-conformance
QC (1924)	Quality manual Performance data Self-inspection Product testing Quality planning Use of statistics Paperwork control
QA (1950)	Third-party approvals Systems audits Quality planning Quality manuals Quality cost Process control Failure mode and effect analysis Non-production operation
TQM (1980)	Focused vision Continuous improvements Internal customer Performance measure Prevention Company-wide application Interdepartmental barriers Management leadership

With further industrial advancement, came the second stage of TQM development and quality was controlled through supervised skills, written specification, measurement and standardization. Frederick W. Taylor developed his system of scientific management, which emphasized productivity at the expense of quality such as work-study. Methods of statistical quality control and the development of Shewhart's control chart, acceptance-sampling methods by Dodge-Roming during the period 1924-1931 helped this era to prosper further from the inspection era (Dahlgaard et.al, 1998).

The third stage of quality evolution is an emphasis of the change from detection activities towards prevention of poor quality or defects. In this stage,

called Quality Assurance, it aims to provide sufficient confidence that a product or service will satisfy customers needs by performing systems audit, Failure Mode and Effect Analysis, design of experiment and similar initiatives. Most of these traditional quality control measures were designed as a defense mechanism to prevent failure or eliminate defects. Other activities such as comprehensive quality manual, use of quality cost, development of process control and auditing of quality system are also developed in order to progress from quality control to quality assurance.

The last stage of this development, i.e. TQM, involves the understanding and implementation of quality management principles and concepts in every aspect of business activities. Utilization of these activities provides the customer with the best product or service at the lowest cost. The aim should be continued quality improvement, which has become a critical distinction in today's competitive arena where the winning strategy is to gain customer loyalty. This is because anyone is able to produce or sell a product at a lower cost but not everyone can offer value with that product (Tang, 1995).

Following World War II, the quality of products produced in the United States declined as manufacturers tried to keep up with the demand for non- military goods that had not been produced during the war. It was during this period that the development of TQM took place with the contributions of various American experts who developed theories and practical techniques for improving quality. The pioneers were W. Edwards Deming, Joseph M. Juran, Armand V. Feignbaum, and Philip Crosby. Figure 2.1 shows a summary of their theories and definitions made by these experts as compared to the current ISO 9000 key elements.

<b>Theory and Definition</b>						
	<b>Crosby</b>	<b>Deming</b>	<b>Feigenbaum</b>	<b>Ishikawa</b>	<b>Juran</b>	<b>ISO 9000</b>
<b>Quality definition</b>	Conformance to requirements	Three corners of quality: product, user, instructions for use	What the customer says it is	Satisfactory to the customer	Fitness for use	Conformance to procedures and specifications
<b>Philosophy</b>	Defect Free	Constancy of purpose; Statistical analysis	Full customer satisfaction at economical cost	Company-wide quality control	Project approach; in order of importance	Documentation defines and reflects practice
<b>Approach</b>	Motivate the people	Statistical techniques	Systems approach to total quality control	Talk with data	Quality trilogy; planning, control and improvement	Self audit with independent review
<b>Mechanics</b>	Fourteen steps	Fourteen obligations of management	The nine "M"s	Seven Statistical tools	Diagnostic and remedial journeys	Three ISO 9000 standards and two guidelines

Figure 2.1: Comparison of ISO and Quality Gurus Key Elements (Source: Richardson (1997))

Deming is best known for developing a system of statistical quality control, although his contribution goes substantially beyond those techniques (Saunders, 1995). His philosophy begins with top management but maintains that a company must adopt the fourteen points of this system at all levels. He believes that quality must be built into the product at all stages in order to achieve a high level of excellence. He introduces statistics as a management tool and relies on statistical process control as a means of managing variations in a process. He developed what is known as the Deming Chain reaction; as quality improves, costs will decrease and productivity will increase, resulting in more jobs, greater market share and long term survival.

Juran, like Deming was invited to Japan in 1954 by the Union of Japanese Scientists and Engineers (*JUSE*). His lecture introduced the managerial dimensions of planning, organizing, and controlling and focused on the responsibility of management to achieve quality and the need for setting goal (Juran, 1951). Juran defines quality *as fitness for use* in terms of design, conformance, availability, safety,

and field use. Thus, his concept more closely incorporates the point of view of the customer. He advocated ten steps to quality improvement that has a broader concept than Deming which emphasis more on the responsibility of management to achieve total quality.

Crosby (1979) stresses motivation and planning and does not dwell much on statistical process control and the problem-solving techniques of Deming and Juran. Like Deming, Crosby has his own fourteen points that he believes to be good quality practices for a company to adopt. He believes that quality is free because the small cost of prevention will always be lower than the cost of detection, correction and failure.

Armand Feigenbaum also achieves visibility through his work with the Japanese. Unlike Deming and Juran, he used a total quality control (TQC) approach that may very well be the forerunner of today's TQM. He defined TQC as "an effective system for integrating the quality development, quality maintenance, and quality-improvement efforts of the various groups in an organization so as to enable production and service at the most economical levels which allow for full customer satisfaction" (Dale, 1994).

Consequently, Japanese companies have also developed their own approach to TQC by Ishikawa (Dale, 1998) based on the teachings of Deming and Juran and shaping it to suit their own culture and operating environment along with the development of a new sets of tools and techniques and operating systems. The Japanese style of TQC, Company Wide Quality Control (CWQC) means that "Quality control consists of developing, designing, producing, marketing and servicing products and services with optimum cost-effectiveness and usefulness, which customers will purchase with satisfaction. To achieve these aims, all the separate parts of a company must work together" (Ishikawa, 1989).

Looking at Feigenbaum's and Ishikawa's definitions, one can see that there are no major differences. However, Ishikawa (1985) is of the view that the difference between CWQC and Feigenbaum's approach is that TQC be conducted by QC specialists while CWQC has never been an exclusive domain of such specialists. It

can be seen that the focus in the participation of employees is weak and the task of improving quality is given to managers (Dale, 1994).

At the end of 1970s and the beginning of 1980s, as a result of Japanese pressure and the success of some American writers, it created a general concern about the focus on quality management in the United States and from this country to the rest of the world. Finally, the publication of the Malcolm Baldrige National Quality Award and other similar awards in other countries was the official recognition of the importance of TQM.

## **2.4 Definition of TQM**

Numerous definitions have been given on Total Quality Management (TQM) by quality gurus, practitioners and academician. Besterfield (1995) defined TQM as both a philosophy and a set of guiding principles that represents the foundation of a continuously improving organization. It integrates fundamental management techniques, existing improvement efforts and technical tools under a disciplined approach.

Using a three-word definition, Wilkinson and Wither (1990) defines TQM as (Ho, 1999):

Total : every person is involved (its customers and suppliers)  
 Quality : customer requirements are met exactly  
 Management : senior executives are fully committed

Berry (1991) defined TQM process as a total corporate focus on meeting and exceeding customer's expectations and significantly reducing costs resulting from poor quality by adopting a new management system and corporate culture (Yusof, 1999). Wolkins (1996) outlined TQM as a tool to integrate fundamental management techniques, existing improvement efforts and technical tools under a disciplined approach focused on continuous improvement.

All these definitions actually yield to the same conclusion that strong emphasis must be given towards achieving excellence in organization. However, there are no solid rules on how TQM should be implemented. As Kanji (1990) had described that TQM is:

*The way of life of an organization committed to customer satisfaction through continuous improvement. This way of life varies from organization to organization and from one country to another but has certain principles, which can be implemented to secure market share, increase profits and reduce costs.*

## **2.5 TQM Philosophy**

The TQM philosophy provides the overall concept that fosters continuous improvement in an organization. This philosophy stresses a systematic, integrated, consistent, organization-wide perspective involving everyone and everything. It focuses primarily on total satisfaction for both internal and external customers within a management environment that seeks continuous improvement of all systems and processes.

Continuous improvements can be achieved through internal and external quality improvements (Dahlgaard, Kristensen and Kanji, 1998). Figure 2.2 shows how to achieve higher profit by stressing on internal and external quality improvements. Internal improvements refer to the utilization of resources and preventing defects and problems in the process. Gradually, this result in the effectiveness of controlling and minimizing production cost which in turn yield to higher profits. Similarly, external quality improvements put more emphasis on designing quality into the product, which aims to earn higher profits by remaining competitive with a bigger market share. This can be done through the ability of companies to respond quickly to the demands of their customer and offering them with a better value added services.

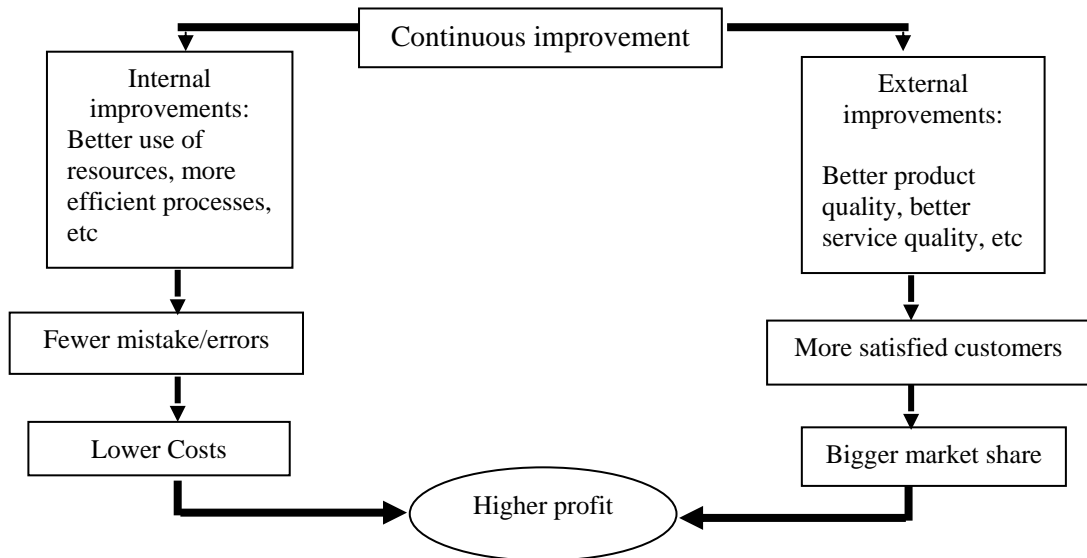


Figure 2.2: Continuous improvements and their consequences (Source [11])

## 2.6 TQM Basic Principles

TQM calls for a cultural transformation that requires employee involvement at all levels and a spirit of teamwork among customers, suppliers, employees, and managers. Employee involvement, participation and empowerment form the cornerstones of TQM (Saylor, 1992). There are certain essential principles, which can be implemented to secure greater market share, increase profits and reduce cost. These six principles to guarantee success are:

- management leadership and commitment
- continuous improvement
- total customer satisfaction
- employee involvement
- training and education
- reward and recognition



### ***Management leadership and commitment***

*The transformation to world-class quality is not possible without committed visionary, hands-on leadership.*

*Steven George*

Source [18]

Some principles and practices of TQM may differ among firms and industries, but there is unanimous agreement as to the importance of leadership by top management when implementing TQM. Leadership involves defining the need for change, creating new frameworks to mobilize commitment to those vision-frameworks for thinking about strategy, structure and people (Aalbrecht, 1991). This requires management to actively participate in quality transformation. They have to outline the quality goals, quality policies and quality plans so that employees are constantly reminded that the customer, not the product, is the top priority (Besterfield, 1995). Quality goals give all employees clear indication of what is going to be achieved concerning quality. Quality policies when described in detail will provide guideline on how employees are to achieve that goal. Management commitment; requires developing management systems that assure and ensure that quality is built into each and every process in organization. Thus, meaningful plans, such as performing an annual quality audit help top management acquire the necessary insight into problems the company faces in realizing the quality plan. In short, management commitment and leadership represent a paradigm shift from the traditional management role and responsibilities towards a new role, supporting and enhancing the total quality culture and environment.

### ***Continuous Improvement***

*It is only when management supports, in both word and deed, the goal of continuous improvement, that it will begin to see increases in both quality and productivity.*

*Wheeler & Chambers*

Source [18]

Continuous improvement of all systems and processes in an organization is essential for TQM success. A continuous improvement system gears the organization toward attainment of the vision (Richardson, 1997). The improvement system must not only be continuously applied, but also consistently, throughout the organization. This requires a disciplined continuous improvement system based on trust, with everyone in the organization striving to improve the system (Crosby, 1979).

Saylor (1992) suggested a continuous system cycle that involves 5 stages as showed in Figure 2.3. The cycle starts by defining the vision or mission of the organization. Top leadership determines the vision, with input from everyone. Then everyone in the organization ascertains his specific mission to accomplish the overall vision. In doing so this, the focus and priorities of the vision are determined, established, understood and supported by all.

The next phase after defining their vision include listing all improvement opportunities. It is important to obtain an understanding of the process of determining improvement opportunity at this stage. Customers, both internal and external, are identified and their needs and expectations understood. Suppliers also are matched with requirements. Any potential problems are identified during this process.

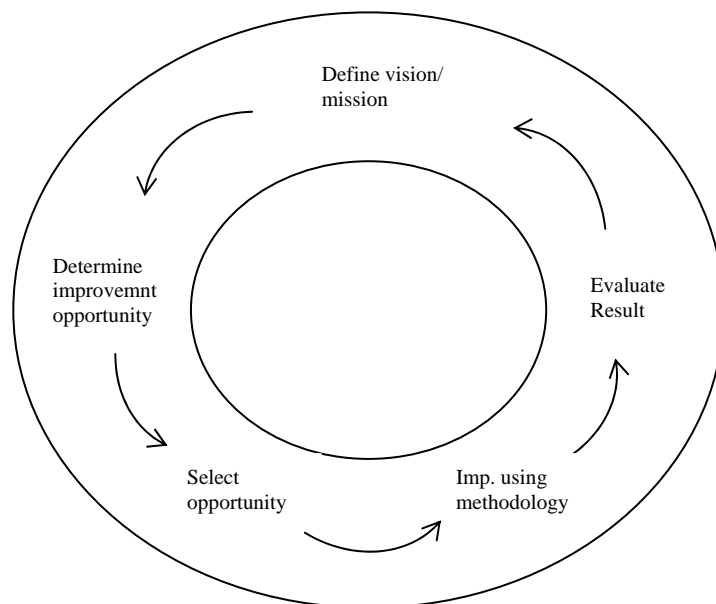


Figure 2.3: Continuous improvement cycle. Source [50]

For the third stage of selecting improvement opportunity, specific improvement opportunities are selected based on the critical processes that have the greatest impact on customer satisfaction. These problems are solved using a disciplined methodology such as statistical process control, quality function deployment and process analysis and should be used consistently to complete a mission, improve a process and solve problems throughout the organization.

Finally, similar to Shewhart PDCA cycle, the results for the impact of improvements are evaluated against the overall mission. In this case, a sixth stage can be added as a reminder: Do it again and again and again. The cycle is never ending in a continuous improvement system.

### ***Total Customer Satisfaction***

*If TQM is aimed at anything; it is aimed at winning and keeping customers-keeping them delighted.*

*Berry*

Source [18]

Increasingly, manufacturing and service organizations are using customer satisfaction as the measure of quality. This fact is reflected in the Malcolm Baldrige National Quality Award, wherein customer satisfaction accounts for 300 out of the 1000 total points.

An organization must give its customers a quality product or service that meets their needs, at reasonable price, on-time delivery, and outstanding service. Listening to the 'customers' and responding quickly to their changing needs, expectations and perceptions is one of the TQM basic approaches. By keeping close to their customer, companies can establish customer needs; gather information on customer trend and benchmarking them with their competitors. This can be a winning strategy towards winning new customers and retaining customer loyalty.

Total customer satisfaction also means giving an unwavering focus on the internal customer. Before external customers can be satisfied, obstacles faced by internal customers have to be eliminated in the first place. This is because employees are the asset and part of the firm's process. It is important to create a good working condition necessary for them to produce and deliver quality by providing them proper training, tools, information and empowerment required for self- management to work efficiently. Only then, the entire workforce can truly be utilized through active involvement from committed and satisfied employees.

### ***Employee Involvement***

*At the heart of TQM is the concept of intrinsic motivation. Empowerment-involvement in decision making is commonly viewed as essential for assuring sustained results.*

*Healthcare Forum*

Source [18]

Deming's fourteen points for management are worth remembering. The basis of his philosophy is contained in the following principle: 1) institute training on the job. 2) Breakdown barriers between departments to build teamwork. 3) Drive out fear in the workplace. 4) Eliminate quotas on the shop floor. 5) Create conditions that allow employees to have pride in their workmanship and abolish annual reviews and merit ratings and 6) institute a program of education and self-improvement (Saunders, 1995).

Employee involvement is a long-term commitment for a new way of doing business and needs a fundamental change in culture (George, 1994). Binney (1992) described unlocking people potential as one of the total quality principles whereby it creates an environment in which people can readily learn, where teamwork can flourish and individuals grow in self-confidence and self-esteem.

In the past, the focus in achieving such improvements was frequently the "system" – traditional techniques and methods of quality control. Such a focus may

overlook the fact that operation of the system depends on people, and no system will work with disinterested or poorly trained employees. It must be coordinating the system and people at the same time.

Employee involvement is a process for empowering members of an organization to make decisions and to solve problems appropriate to their levels in the organization (Richardson, 1997). Empowerment is equally effective in service industries, where most frequently customer perception of quality stands or falls based on the action of the employee in a – one-on one relationship with the customer. This can be achieved by making the employee part of the organization, which is essential to the success of the organization. Employees who believe they are important will be motivated to ensure that their efforts are consistent and dependable upon the contributions made.

### ***Training and Education***

*World-class companies realize that all firms have access to the same equipment, technology, financing, and people. The “half-life” of any academic degree is extremely short; therefore, the real difference among companies is the degree to which employees are developed.*

*Ernest & Young*

Source [18]

Training and education provide the necessary skills and knowledge- the ability to make it happen (Saylor, 1992). This process is an investment that must be made. According to Dahlggaard et.al (1994) Japan, Estonia and India are reported to allocate between 65 and 80 hours per year for each educational and training activities per employee. They believe that satisfaction of the workforce and hence motivation and ability to act as a constructive part in the process of continuous improvement depend on education and training.

In the TQM environment, everyone is required to gain additional capabilities to improve the process and perform work. Hence, a comprehensive training program

is necessary and must be institutionalized within the entire organization. Training in TQM philosophy, guiding principles and tools and techniques is never ending. Personal and team interaction skills must be continually refined. This training should be given only as it is needed to the people who will use it immediately. It should start with specific training for management. Once management has the skills to lead the TQM process, the rest of the organization should be trained to ensure a systematic, integrated, consistent organization- wide effort (Richardson, 1997).

Specific job skills training must be provided and constantly updated to reflect the improved processes. All too often management exhorts employees to get things right first time, to operate effectively in quality improvement teams and to participate in the never ending search for excellence. Yet, at the same time, they often fail to provide the training, tools, information and empowerment required for self-management to work effectively.

Hence, all training must be geared to specific, clearly define objectives; it must be performed as close as possible to the time it is required and must be reinforced to ensure the results needed to achieve victory. It should bear in mind that training and education are never ending for everyone in the organization. Continuous improvement means learning and companies seeking to adopt TQ, need to become learning organization (Binney, 1992).

### ***Rewards and Recognition***

*For workers... to do quality work, they must be managed in a way that convinces them that the work they are asked to do satisfies their needs. The more it does, the harder they will work.*

*Glasser*

Source [18]

Rewards are generally considered to be something given for quality work such as money or other tangible things of financial value. Recognition is an act of

acknowledgement that is directed at an individual's self-esteem and social needs (Richardson, 1997).

Crosby's 12<sup>th</sup> step and Juran's 7<sup>th</sup> step indicate that reward and recognition should be instituted to support TQM movement. They feel that recognition, praise, coaching and show of concern are all vital forms of reward that must never be neglected.

Reward and recognition should be appropriate to the situation by being rank ordered- the higher the achievement, the higher the reward. It could be such things as a bonus, salary increase, and change in the title, promotion, theater tickets, or perhaps a pat on the back (Besterfield, 1995).

In a TQM environment, there must be a change in the usual recognition system. One must give recognition for efforts, not just for goal attainment. This recognition of effort provides a powerful incentive for everyone to become involved in quality improvement. It helps illustrate the commitment from management. It is also essential that employee involvement be used in planning and executing any recognition or reward system. Programs that are developed with employee involvement will most likely to succeed.

## **2.7 Fundamentals of Quality Approaches**

Crosby, Deming, Feigenbaum, Ishikawa and Juran can be considered the most important gurus of the quality management movements. All of these pioneers believe that management and the system, rather than the workers are the cause of poor quality. These and other trailblazers have largely absorbed and synthesized each other ideas, but in general, they belong to two schools of thought; those *focus on technical processes and tools* and those who *focus on management dimensions* (Ross, 1994). Deming provides manufacturers with methods to measure the variations in a production process in order to determine the causes of poor quality. Juran emphasized setting specific annual goals and establishing teams to work on them. Crosby stresses a program of zero defects. Feigenbaum teaches total quality

control aimed at managing by applying statistical and engineering methods throughout the company.

There are fundamental quality approaches practiced today (Tang, 1995). They are:

1. Conformance to specifications and standards (Systems Approach), and
2. Theories and practices of quality experts (Humanistic Approach)

The first approach covers all business methods, practices, and procedures that should conform to a specific set of documented standards or specifications. This quality practice is governed by audits, inspections, and tests to ensure conformance. The focus is on products and services, and typically it is internal, within the company or extending to suppliers of goods and services. Quality in this context is applied to physical things – parts, equipment, and so on. Military specification, American National Standards Institute (ANSI), and ISO 9000 (International Organization for Standardization) Standards are typical of this approach.

The second approach, the quality experts, or gurus, more broadly addresses the company and organizational aspects of quality implementation. This approach complements standards and specifications with additional focus on the role of management, planning, people contributions, customer focus, teamwork, and business process. These elements tend to be less physical and more of the “soft” technologies such as building and maintaining relationships and understanding the nature and flow of work. This approach is less audit and inspection oriented and more prevention based.

Lau and Idris (1999) conducted a study on the soft elements needed to ensure the success of TQM implementation in Malaysia. They identified the major influence that bring changes in TQM tangible effect (Growth, Profitability, Quality, Market competitiveness) from the soft elements of Culture and Trust (12.5%) followed by Teamwork at 11.25%.

Consequently, the philosophy and key elements form the reference point for most discussion on TQM today. But when one talks about quality today, ISO 9000 is



always part of the conversation. ISO 9000 is a set of 5 worldwide standards that establish requirement for the *management of quality*. Unlike product standards, these standards are for quality management system. It comprised of five major documents (three standards and two sets of guidelines) and some subsidiary documents created by the International Organization for Standardization. The standards outline twenty elements defining how to establish, document, and maintain an effective quality system. Each country, which has adopted these standards, has its own set of standards technically equivalent to the ISO series.

In Malaysia, SIRIM Berhad, has been responsible for providing certification for systems and products for Malaysian industries. It aims to help improve the quality of Malaysian products, thereby contributing to the industrial development and export promotion by upgrading the capabilities in testing, inspection and product certification. Even though the ISO 9000 family of quality standards was introduced in Malaysia since 1987, it is sad that the involvement of Malaysian industries are still low as compared to more developed countries such as United Kingdom, France and Germany (Idris, 2000).

## **2.8 Introduction to Critical Success Factors**

Saraph et al (1989) pioneered the study of critical factors for TQM in which they derived a set of eight critical factors of quality management mainly derived from the literature. They defined critical factors as those 'critical areas of managerial planning and action that must be practiced to achieve effective quality management in business unit'. The study of CSFs was later pursued by others who approached the problem using different methodologies for factors derivation (Porter and Parker [1993], Ahire et al [1996], and Tamimi and Gershon [1995]), using a different set of factors (Ramirez and Loney [1993], Black and Porter [1996], and replicating the instrument in different cultures and countries (Zairi [1996], Badri et. al [1995]).

## 2.9 Objectives of studies on CSFs

Different authors have attempted to investigate the CSFs in TQM with differing purposes and objectives. Saraph et al's [1989] main objective was to develop an instrument to measure quality management practices at the divisional level of companies. The critical factors in their instrument measured the 'extent of practice' of the elements but have not considered the perceived 'level of importance' for implementation. Garvin (1983) conducted a specific empirical study to determine the differences in quality practices between Japanese and American air-conditioner manufacturers. Based on his study, he determines certain practices, which contributed towards quality excellence, undertaken by the Japanese manufacturers. They included management commitment for quality, quality programs, policies and systems, comprehensive product design, system for vendor selection and management and workforce management and an integrated system of quality management.

Badri et al (1995) replicated Saraph et al's study in one middle east country to prove the viability of the developed instrument in an international context. They revealed weakness in the instrument, in which there were elements that needed further clarification, one example was the effectiveness of a quality department in improving quality.

Black and Porter (1996) developed their factors from the Malcolm Baldrige award criteria, on the basis that it is the best established and recognized framework for measuring TQM. Tamimi and Gershon (1995) developed an instrument to measure quality management practices from Deming's 14 points and critical factors.

Ahire et al (1996) proposed a set of 12 implementation constructs (similar to factors) of quality management strategies derived mainly from the literature. Their instrument was tested and validated for manufacturing industry thus making it applicable to the particular industry. Their main purpose was to develop a reliable and valid instrument for measuring quality management practices that affected by proper quality practices but also customer and human resources satisfaction and above all organizational quality performance.

Based on these studies, there were two main areas of focus. The first centered around attempting to systematically present the factors within TQM, and the second, on the factors critical for implementation. Each of them represents a different concept. Critical factors for TQM, as proposed by Saraph et al (1989), were developed because no one at that time had attempted to 'theorise' and 'formalise' TQM. Most of the TQM practitioners were 'preaching' according to their understanding of the gurus' teaching, which made TQM too philosophical. The researcher believes that the set of critical factors formulated by them was intended to address this problem. The second approach on CSFs for TQM implementation proposed by Ahire et al (1996) and Black and Porter (3.30) hinge around those important and necessary for making TQM adoption success.

Another important aspect to be recognized is that although studies on CSFs of implementation were conducted for companies of all sizes, very few actually focused on SMEs. Even Saraph et al's study did not consider companies having less than 1000 employees. They argued that 'firms with less than 1000 employees were not considered since the quality management practices of these firms were likely to be relatively unsophisticated, or at the very least variable'. This is arguably not true.

Kanji and Malek (1999) and Kanji and Yui (1997) have developed their own set of CSFs based on Kanji's Business Excellence Model. Quazi and Padibjo (1998) conducted a study in Singapore on those SMEs, which were attempting to move towards TQM through a certification route. Their objectives were to help organizations identify their respective training needs for training and consultancy support. Towards that end, they developed a survey instrument to measure quality management practices based on the Malcolm Baldrige/Singapore award criteria. 39 elements were produced from 7 critical factors. However, it could be argued that two of the factors; quality results and customer satisfaction are not appropriate. Porter and Parker (1993) have similarly argued that quality results are a measure of TQM success and customer satisfaction is an implicit goal of the TQM process. Both of them are actually outcomes of TQM, but not critical factors. Using award criteria as success factors without proper scrutinizing them can be misleading. Critical factors should be interpreted as those circumstances or practices which already exist, or those that need to be developed in ensuring the success of TQM implementation.

## 2.10 Conclusions

In conclusion, a through review on quality and TQM has been made. Figure 2.3 presented in the earlier section summarizes the theory and key elements of quality experts such as Crosby, Deming, Feigenbaum, Ishikawa and Juran. Each has brought it own philosophy and practice. Deming is famous for his “14 point approach” (Deming 1986, Walton 1986); Juran, his “quality trilogy” (Juran 1988), Ishikawa, his “7 statistical tools” (Ishikawa 1985). Feigenbaum has the “nine M’s” (Feigenbaum 1983) and Crosby has “Zero Defects, “14 steps” and his “quality is free” philosophy (Crosby 1979) [Tang, 1995].

Successful implementation of quality in a company requires the combined approach of standards and total quality concepts articulated by the quality gurus (Ciampa, 1992). The current ISO standards are specifically internally focused and lack a customer perspective. It focused on doing the things right, not necessary doing the right things from a customer point of view (Lamprecht, 1995). This is the limitation that the ISO recognized. Figure 2.4 provides a comparative review of ISO 9000 with quality gurus on the current global practice in total quality management today. While each has its own approach, the elements are basically the same.

<b>Quality Improvement Elements</b>						
	Crosby	Deming	Feigenbaum	Ishikawa	Juran	ISO 9000
<b>Quality Planning</b>	Good things happen when planned	Plan, do, check, act(PDCA) cycles	... Must deliver satisfactory product quality	Cause and effect diagram	... Will result in minimal need for subsequent improvement	Defined in ISO 9000 and 9004 guidelines
<b>Process Control</b>	Zero Defects	Improvement of the production process	Significantly important	Detect any abnormality	variables are not equally important	Procedures and specs define level of control
<b>Measurement</b>	Cost of quality: Price of non-conformance	Reproduction of variation	Quality cost data	Physical, chemical, and human sense perception	Quantification of characteristics	Adherence to procedures and specifications
<b>Education</b>	Formally structured	Education and self-improvement for everyone	Quality education never ends	Participation by ALL employees	Use basic skills as team member and problem solver	All education tracked and reported
<b>Improvement</b>	... A long while before it becomes permanent	...Constancy and forever	... From all the men and women	... Never in the short team	Do better than the standard	Continuous review and update
<b>Management</b>	Start at the top	Cannot be delegated	Organized company-wide	No exclusive domain of Q.C. specialists	Start at the top	ISO 9004 defines the QM system requirements
<b>Employee Participation</b>	Each person	Everyone's job	Genuine management involvement	All employees	Entire Hierarchy	Addressed in ISO 9004
<b>Suppliers</b>	Oriented to needs of the company	Long-term relationship with key suppliers	Important ingredient	Select two subcontractors	Multiple sources	Addressed in the ISO standards

Figure 2.4: Comparison of ISO and Quality Gurus Key Elements (Source [54])

## **CHAPTER 3**

### **TQM AND SMEs IN MALAYSIA**

#### **3.1 Introduction**

This chapter reviews the definition and types of SMEs, differences between characteristics of SMEs and large companies, their quality management practices and government's support in helping SMEs cope with adoption of TQM. A better understanding of the context in which SMEs operate would be beneficial for the researcher to have a firm foundation in conducting the research.

For many years, the large companies seem to have dominated the discussion concerning quality management and continuous improvement processes. Small and Medium-Sized (SMEs) firms have all been left out. As SMEs make up over 88.9 percent of businesses in Malaysia, it is important to look at their contribution to quality (Asri, 1995).

According to Ghobadian and Gallear (1996), SMEs are the backbone of the economies of many countries. Many SMEs are suppliers to larger corporations and have been severely pressured to improve the quality of their products and services. If they did not, they would risk being dropped as a supplier (Gulbro et.al, 2000). Thus, there is a dependent relationship that exists between larger and smaller organizations with increasing pressures on firms of all sizes to improve quality.

#### **3.2 Definition on SMEs in Malaysia**

There is no certain correct definition for small and medium size enterprises (SMEs) and it varies between countries, industries and even between different

government agencies within one country (Yusof, 2000). In fact in Malaysia, various definitions have been given to SMEs. Some agencies have classified SMEs based on certain criteria like the number of full time employees, capital acquisition, fixed capital and yearly profit. For instance, DTI (1996) addressed SMEs as those, which employ fewer than 250 workers in the organization (Yusof,1999). Parkin and Parkin (1996), on the other hand, have suggested that SMEs will have fewer than 500 employees in UK.

According to Asri (1997), until today there is still no consensus on the definition of SMEs in Malaysia even though it is widely discussed. The Ministry of International Trade and Industry (MITI) had once outlined the few definitions on SMEs that often varies with time. For example, the Industrial Coordination ACT (ICA) which was introduced in 1975 described SMEs that have paid-up capital less than RM 7.5 million and having up to 75 full time employee (Asri,1997).

The Federation of Malaysian Manufacturers (FMM) also has similar definition on SMEs. They defined SMEs as a manufacturing industry with issued capital below RM 2.5 million and less than 75 full time employees (FMM, 2000). Based on the definition given by Small and Medium Industries Development Corporation (SMIDEC), the SMEs should have a paid-up capital of RM25 million or less, having a headcount of 150 employees or less, and are of 100% Malaysian ownership.

A number of local researchers such as Aziz (1984), Fong (1988), Salleh (1990) and Chee (1986) had been actively involved in studies on SMEs. All these earlier studies on the SMEs definitions in Malaysia demonstrated a general trend towards the classification of SMEs as an industry that employs less than 200 full time employees. Although there are weaknesses in categorizing SMEs according to the number of employees without considering their capital utilization or issued capital because there are firms that use capital intensive approach or labour intensive approach in their manufacturing. This will of course prevent the use of high employment in the industry and vice versa for the latter (Asri,1997). Moreover, monetary value based definitions, such as amount of turnover, were not used because

they fluctuate quite wildly with time, inflation, interest rates and other economic conditions (Yusof, 1998).

In short, this research will follow the definition agreed by 3 international agencies that have a proven record of study in the development of Malaysia SMEs. The three (World Bank (1984), United Nations Industrial Development Organization, UNIDO (1985 and 1980) and Asian Development Bank (1990) have classified Malaysian Industry into 3 main category:

- a) Small Scaled Industry refers to business employment of less than 50 employees.
- b) Medium Scaled Industry refers to business employment of between 50 and 199 employees.
- c) Large Scaled Industry as a firm that employs more than 200 people and above.

### **3.3 Types and Characteristics of SMEs.**

One of the immutable characteristics of small businesses is that, in order to avoid direct competition with their large counter parts, they have tended to rely on specialized short-run production developed to satisfy the unique needs of a particular market niche; versatile use of the most advanced production technology; a flexible production schedule to satisfy a broad range of customer requirements and changing regional markets; personalized customer contracts (Blackford,1991). An interesting feature of small businesses is that fewer than one in eight are manufacturers. Often, these small businesses subcontract to larger manufacturers/ assemblers (500 or more employees). Generally, the reason for such an association is that the small manufacturer can design and deliver the product in half the time it would take for the larger firm.

In Malaysia, small scales industries are engaged in a wide variety of non-agriculture economic activities producing finished goods such as foodstuff, furniture, handicraft fabricated metal products, wood-based products, textiles and clothing. The



medium scale industries are more active in the processing of beverages and tobacco, electrical and electronics products, chemical products, non-metallic mineral products and the production of automotive components and parts.

The latest available survey of the manufacturing industry undertaken by the Department of Statistical in 1985 indicated that there were 3722 (64%) small scale industries and 1638 (28.1%) medium scale industries representing of the total number of manufacturing establishment within the country. Thus is apparently clear that SMEs plays a very important role in Malaysia's economy especially in ensuring that the Multinational Corporation (MNC)- both foreign and locally owned to remain competitive. The capability of SMEs to provide world-class services and products in the supply chain will help reduce the cost and dependency of MNC to import foreign raw materials. The lack of product quality from SMEs adversely affects the competitive ability of the larger organizations (Chew, 2000).

#### **3.4 Differences Between Large Companies and SMEs.**

The analysis of different characteristics helps to encourage the effectiveness of implementing a TQM framework suitable for SMEs. Ashire and Golhar (1996) indicated that operational differences exist between small and large companies, and that no attempt has been made to determine if these firms implement policies differently. They believed that small and large firms differ in their experiences with continuous quality improvement.

Ghobadian and Gallear (1995) made a list of differences that exists between large and small medium sized enterprise. Briefly, the differences exist in structure, policy-making procedures and utilization of resources to the extent that the application of large business concept may not fit in directly to SMEs. Table 3.1 points out the main characteristics to be expected between SMEs and large organizations.

For example, one of the distinguishing features of large companies is the existence of hierarchical with several layers of management. They are likely to have

high level of specialization, standardization and formalization. SMEs, on the other hand, do not have these in their agenda. Perhaps it's a mixed blessing because a low degree of specialization offers a broader perspective of issues and problems rather than narrow specialize functional views. Thus the SMEs are better in providing improvements ideas. Furthermore, their activities and operations are not governed by formal rules and procedures, which often results in more flexibility and faster response to new change initiatives.

Table 3.1: A comparison between the characteristics of large and SMEs (Source [17])

Large organizations	Small and Medium organizations
<ul style="list-style-type: none"> <li>• Hierarchical with several layers of management</li> <li>• Clear and extensive functional division of activities. High degree of specialization</li> <li>• Strong departmental/functional mindset</li> <li>• Activities and operations governed by formal and procedures</li> <li>• High degree of standardization and formulation</li> <li>• Mostly bureaucratic</li> <li>• Extended decision making chain</li> <li>• Top management a long distance away from the point of delivery</li> <li>• Top management's visibility limited</li> <li>• Wide span of activities</li> <li>• Multi-sited and possibly multinational</li> <li>• Cultural diversity</li> <li>• Systems dominated</li> <li>• Cultural inertia</li> <li>• Rigid organization and flow</li> <li>• Very few interest groups</li> <li>• Incidence of fact-based decisions more prevalent</li> <li>• Dominated by professionals and technocrats</li> <li>• Range of management styles: Directive, participative, paternal</li> <li>• Meritocratic</li> <li>• Individuals normally cannot see the result of their endeavors</li> <li>• Ample human capital, financial resources and know-how</li> <li>• Training and staff development is more likely to be planned and large scale</li> <li>• Specified training budget</li> <li>• Extensive external contacts</li> <li>• High incidence of unionization</li> <li>• Normally slow response to environmental changes</li> <li>• High degree of resistance to change</li> </ul>	<ul style="list-style-type: none"> <li>• Flat with very few layers of management</li> <li>• Division of activities limited and unclear. Low degree of specialization</li> <li>• Absence of departmental/functional mind set. Corporate mindset</li> <li>• Activities and operations not governed by formal rules and procedures.</li> <li>• Low degree of standardization and formalization</li> <li>• Mostly organic</li> <li>• Short decision making chain</li> <li>• Top management close to the point of delivery</li> <li>• Top management highly visible.</li> <li>• Span of activities narrow</li> <li>• Single-sited</li> <li>• Unified culture</li> <li>• People dominated</li> <li>• Fluid culture</li> <li>• Flexible organization and flows</li> <li>• Very few interest groups</li> <li>• Incident of 'gut feeling' decisions more prevalent</li> <li>• Dominated by pioneers and entrepreneurs</li> <li>• Range of management styles: Directive, paternal</li> <li>• Patronage</li> <li>• Individuals normally can see the result of their endeavors</li> <li>• Modest human capital, financial resources and know-how</li> <li>• Training and staff development is more likely to be ad hoc and small scale</li> <li>• No specified training budget</li> <li>• Limited external contacts</li> <li>• Low incidence of unionization</li> <li>• Normally rapid response to environmental changes</li> <li>• Negligible resistance to change</li> </ul>

<ul style="list-style-type: none"> <li>• Potentially many internal change catalyst</li> <li>• Low incidence of innovativeness</li> <li>• Formal evaluation, control and reporting procedures</li> <li>• Control oriented</li> <li>• Rigid corporate culture dominating operations and behaviors</li> </ul>	<ul style="list-style-type: none"> <li>• Very few internal change catalyst</li> <li>• High incidence of innovativeness</li> <li>• Informal evaluation, control and reporting procedures</li> <li>• Result oriented</li> <li>• Operations and behavior of employees influenced by owners'/ managers' ethos and outlook</li> </ul>
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Apart from that, Yusof and Aspinwall (2000) have also done a careful analysis on the difference of characteristics with added advantages and disadvantages of SMEs characteristics. It allows a better understanding towards developing a sound implementation framework to meet the needs of small businesses. However, this research does not intend to pursue this direction. Instead, it focuses more on investigating the level of understanding and implementation of TQM in Malaysian SMEs. It is hoped that this research could lead to a more comprehensive and effective approach towards future research on the development of SMEs framework suitable to the Malaysian context.

### **3.5 Quality Management Practices in SMEs.**

Many SMEs have an awareness of the necessity to implement quality management. However it is extremely rare among the local SMEs to find firms, which actually apply TQM, including quality control (QC) circle activities and other necessary practices, as an important element in upgrading in-house technical levels (Hamzah, 1994).

Based on the survey conducted by SIRIM in 1995 (McEwan, 1996) on 650 registered ISO 9000 companies, it was found that most frequently applied quality activities were problem solving techniques (72%), quality awareness programme (62%) and statistical sampling (62%). Unfortunately, the adoption of TQM (21%) and QCC (23%) is still very low. The breakdown of activities is shown Table 3.2. Considering the result from the survey, all the improvement activities were highly rated as beneficial to an organization.

Table 3.2: Breakdown percentage of responses according to quality activities. Source [37]

Quality Activities	Percentage of Respondents
Problem Solving Technique	72%
Quality Awareness Program	62%
Statistical Stamping	62%
5S (Japanese Housekeeping)	55%
Statistical Process Control	48%
Total Productive Maintenance	44%
QCC	23%
TQM	21%

Many firms are found interested in complying with demand of export market to apply quality systems based on ISO 9000 series. However, in general, because of the large amount of paper work required by ISO 9000, it's difficult for the SMEs to tackle such tasks (Hamzah, 1994). Instead more than 150 manufacturing SMEs companies have participated in Total Quality Program (TQP) at various stages launched by SIRIM in 1994. This training program provides a step-by-step improvement opportunity for firms, which are committed to better satisfying customers through TQM. The steps are 5-S (housekeeping), MPPC (marketing purchase and production control), QCC (quality control circle), QIP (quality improvement practices scheme), ISO/MS (quality systems), TPM (total productive maintenance) and TQM (total quality management). A detailed account of the TQP can be found Hamzah and Ho (1994). More than 70 percent of the companies are at the quality management system implementation stage (McEwan, 1996).

Prior to the steps, a modal of excellence is developed, this model is called "SIRIMEX" , or the SIRIM Excellent Model as depicted in Figure 3.1. It was developed as a framework for the effective delivery of training and consultancy services by SIRIM to help SMEs to achieve TQM. SIRIMEX is believed to be a total solution to problems encountered by SMEs in the QIP (Quality Improvement Plan). This is because the model was built on in-depth research on the state of development

of Malaysian SMEs and on understanding the needs of customers. Although it may take more than a year or two to achieve, it's proven to be effective (Hamzah, Ho 1994).

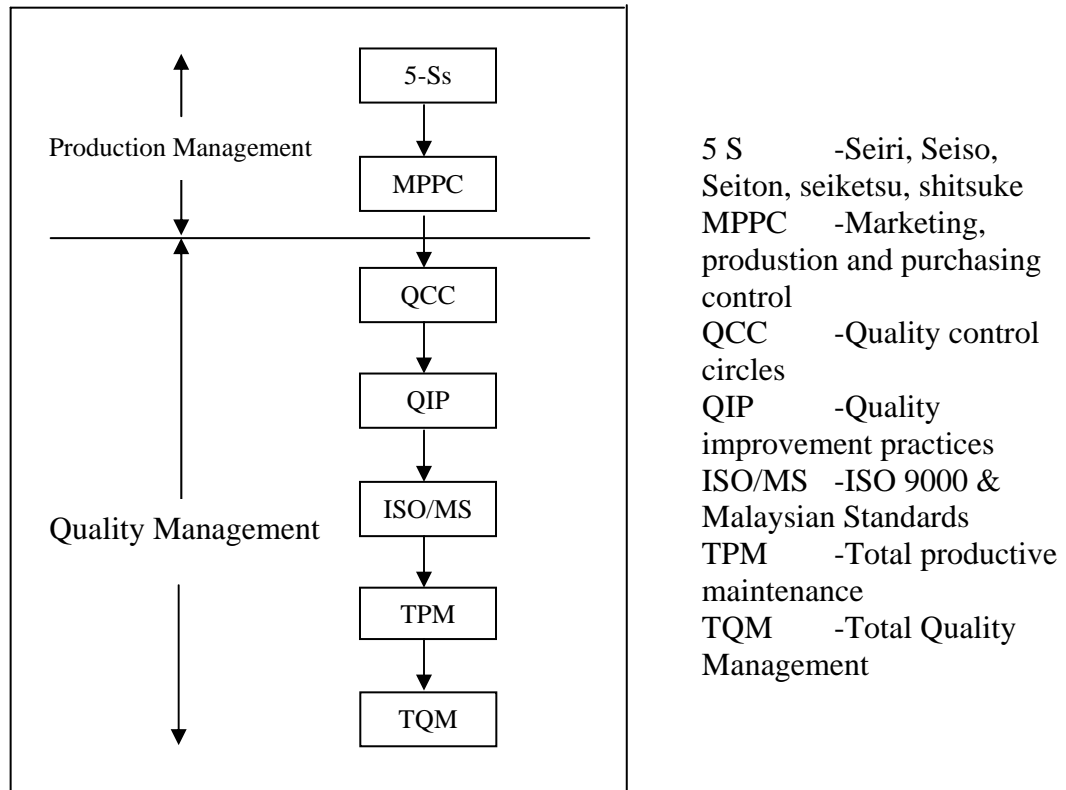


Figure 3.1: The SIRIMEX Model

### 3.6 The Reasons for TQM adoption in SMEs.

The concept of Total Quality Management and ISO 9000 are relatively new to the Malaysian industries. Even though the ISO 9000 family of quality standards was launched in 1987, the local industries especially the SMEs are still having the attitude of "wait and see". Most of them are satisfied with the amount of work being performed, the profit realized, and the perception that the customers are satisfied. Only until they are losing the market share to competitors, they begin to adopt TQM as their approach to improve business performance.

Generally, companies aimed to seek for product certification through the Malaysian Standards (MS) or certification of quality systems based on ISO 9000. MS is a basis for product certification and are classified according to three categories: *Product standards* which specify the shapes, dimensions, quality and functions of products, *Method standard* that demands for specific methods of test, analyses and inspection as well as codes of practices and *Basic standard* which is used to specify such basic elements as glossaries of terms, marks units and progression. These standards, MS are mandatory for all industries including products related to electrical safety, automobiles, fire fighting as well as principal export products including rubber and palm oil (Ho, 1994).

Most of the main adopted standards were MS ISO 9002 (91%), MS ISO 9001 (8%) and QS 9000(1%). It is estimated that the total number of registered companies has reached 2200. As of October 1999, a total of 1810 companies has been certified in Malaysia by SIRIM QAS and other certification bodies such as DNV and Lloyd's (Idris, 1999). The response from companies has been encouraging. In January 2001, SIRIM QAS had reported of issuing 2139 certificates for both ISO 9001 and ISO 9002 (Appendix C-II).

The main reasons for wanting certified standards in Malaysia are usually the need to improve performance (Idris, 1996). Shea and Gobeli (1995) cited some of the reasons of small businesses to embark on the TQM journey (Yusof, 2000). They were:

- Promotion of growth – it is easier to convince the company's bankers to invest in them if there is evidence that the organization is well run.
- Management belief in the principle of customer satisfaction and employee empowerment which reflects the management style supporting TQM (marketing strategy)
- Changing customer expectations even for organization seen to be doing well (competitive issue)
- Making work more enjoyable and

- To improve poor company performance if the company is not doing well (survival issue)

In summary, the highlighted importance of TQM for SMEs is to improve their current business practices as well as quality of products and services, and to ensure long term survival. However, there are several barriers to effective implementation of TQM in such organizations, namely, the apparent lack of business experience and knowledge, and also financial as well as human resources limitations.

### **3.7 Government Support for Quality in SMEs**

The involvement of SMEs in TQM can further be accelerated with the support from local government. In Australia, investments in quality initiatives are largely influenced by the availability of government subsidies rather than the genuine need for improvement in operations and services (Mandal et.al, 1999). In Singapore, it appeared that full commitment of the company management is not enough without a quality culture created externally by the government in the journey towards TQM (Quazi, 1998).

Of late, numerous programs and schemes have been launched to help SMEs in all facets of its affairs- be it financial, operational or management related. The Malaysian government has been involved in the promotion of ISO 9000 among the Malaysian industries. This is achieved through activities carried out by government agencies such as SIRIM Berhad, SMIDEC, NPC and MAMPU. SIRIM Berhad through Small and Medium Industries Development provides assistance to industries in particular the local SMIs in terms of training and extension services on ISO 9000. A special scheme namely Quality Improvement Practices Scheme (QIP) was launched in 1988 to promote the awareness of ISO 9000 among SMIs. QIP standard is basically ISO 9002 standard but of lower requirements. Currently more than 100 companies were certified to QIP scheme Malaysia has adopted ISO 9000 series in full and referenced them as the MS ISO 9000 (Idris, 2000).

Generally, SIRIM Training Services (STS), a subsidiary of SIRIM Berhad, is involved in coordinating training related to ISO 9000 and EMS 14000 for any size and sector of industries. SIRIM QAS Sdn.Bhd, which is another subsidiary, is involved in the certification activities, which is accredited by Department of Standard of Malaysia (DSM). DSM is the only local accreditation body that operates in Malaysia.

SMIDEC, a government agency, which looks at the welfare of SMEs provides matching grants to any SMEs wishing to implement ISO 9000 through its Industrial Technical Assistance Fund (ITAF). Besides SMIDEC, government ministry also provides financial aids to SMEs. Meanwhile the National Institute of Public Administration (INTAN), National Productivity Corporation (NPC) and Malaysian Administrative and Planning Unit (MAMPU) are involved in training and consultation on ISO 9000 but their main targets are service type industry and government sector.

### **3.8 Conclusion**

In an attempt to understand the reality of SMEs quality initiatives, various literature reviews has been conducted. Gurus of quality and many practitioners clearly indicated that TQM concept could be used by SMEs with considerable success (Gallear, 1995). However, TQM is not a guarantee of success. It is a broad framework; within which many different approaches and practices coexist (Moreno, 1993). The application of unmodified concepts developed in large organizations by SMEs is likely to produce adverse result (Gallear, 1995). SMEs must learn to adapt by adopting the quality methods that are being used by larger firms.

In addition, more continuous improvement efforts are needed in the near future. SMEs must do more than pay-lip service to the idea of quality products. Top management's support and involvement is crucial in communicating its vision,



setting the direction and arranging adequate resources for employee education and training.

Towards this end, SMEs should make active use of the services provided by promotional bodies such as the NPC, SMIDEC and SIRIM to upgrade their technical levels and smoothen. Good management particularly in the production processes will ensure process capability in meeting production requirement with the effective usage of some methods such as PDCA cycle, seven QC tools, statistical process control (SPC), sampling and inspection.

## **CHAPTER 4**

### **METHODOLOGY**

#### **4.1 Introduction**

Most of the quality experts find it difficult to measure the level of effectiveness from implementing quality programs. Each of them has their own approach on defining the level of implementation. Oakland et.al (1994) and Clayton and Charles (1995) use hard and soft indicators to measure competitive achievement for business (Ismail, 1999). Black and Porter (1996) develop their TQM constructs using the Malcolm Baldrige Award criteria while Quazi and Padibjo (1997) also design their survey form the Malcolm Baldrige/Singapore Quality award criteria. Tamimi and Gershon (1995) developed an instrument to measure quality management practices from Deming's approach (Yusof, 1999). Ahire et.al (1996) proposed a set of 12 implementation constructs of quality management strategies derived mainly from literature and finally Yusof and Aspinwall (1999) proposed 10 of them.

As mentioned previously, the objective of this project is to investigate level of implementation of TQM. Most of the researchers and quality experts have opted for questionnaires to elicit information with regard to management perception and practices on TQM, how the implementation was conducted, the benefits and outcomes, the problems encountered as well as the factors that contribute to the success of TQM. In this study a survey was conducted using mail questionnaire to fulfill the need of the research.

## 4.2 Design of Questionnaire

In order to facilitate data collection, the survey method was used. Towards that end, a questionnaire was developed. A lot of preparation goes into a survey. First, the questions must be tailored in such a way that encompasses the scope and objectives of the research. For this research, the survey is designed to investigate the level of implementation of TQM in Malaysian SMEs. The questionnaire was structured and based on an extensive literature review of international and local surveys (Quazi et al., 1998, Yusof, 1999, Moreno, 1993) of quality management and integration of all the best theories articulated by the quality gurus.

The survey is conducted using a postal questionnaire survey, which is generally cheaper than other methods. Such a questionnaire can be helpful in gathering large amounts of data from a sample of a given population and therefore be used to test research hypotheses (Mandal et al., 1999).

Most researchers found it is difficult to design a reliable and suitable questionnaire to gather information from the sample of a population. The questions must be clear and straightforward in four important aspects; simple language, common concepts, manageable tasks and widespread information. So, the questionnaire was designed in a simple table format that requires the respondent to tick their answer in the appropriate box so as to save time when answering the questions. Most of the questions require the opinions and degree of practice of quality system from the responding companies.

Based on the comprehensive review of TQM literature, a total of 8 constructs were designed with little modifications made from 10 constructs as proposed by Yusof (1999). Following other similar studies (Yusof, 1999, Luzon, 1993, Zhang, 2000), a five-point Likert scale was employed for scoring responses (1 = strongly disagree and 5 = strongly agree). Additionally, zero was also included in the scale as an added option indicating the respondent had “no opinion” or the item was not applicable to their respective organization.

Basically, the questionnaire is divided into 4 main sections. Section 1 keeps tracks on the general information of responding companies. In this section, the background aspects of the respondent such as number of employees, types of industry involves by respondent companies, quality system certification and years of involvement will be obtained.

In section 2, it consisted of two sub-sections. The first sub-section are attempted to check the degree of quality management practices on 8 key quality factors of the organization, which derived mainly from literature. A total of 42 statements are provided to be answered by the respondent companies. For each statement, respondent were asked to rate two aspects; firstly is the level of importance they placed on each, and secondly, the extent to which they thought it was current practice in the organization. Respondent was asked to rate each statement on the Likert scale as (1) 'not important at all' to (5) 'very important' for the importance aspect. While the rating for the extent of practice aspect was given as (1) 'very low' to (5) 'very high' practiced. The second sub-section requires respondents to identify those quality activities that respondent companies have implemented. There was an additional scale; NA for 'not applicable' provided to allow for those respondents who were unsure of the answer. Although some companies are expected to having implement quality improvement activities, each of them is also encouraged to display different views on the effectiveness obtained while implementing TQM in their companies.

Section 3 of the questionnaire finds out the 5 most critical success factors that are vital and necessary for successful implementation of TQM in responding companies. Besides, respondents were also urged in their opinion of the common difficulties that occurred while implementing TQM.

Finally, section 4 describes the degree of agreement achieved on benefit of implementing TQM in organization. Business outcomes measurements such as increased in market share, profitability, and productivity are used to identify the positive effect that the quality system has brought to their organizations.

### **4.3 Testing and debugging of questionnaire**

Once the questionnaire has been developed, it was important to pilot it to ensure that any errors made during design were rectified and improvements made before the full-scale survey was conducted (Yusof, 1999). For the pilot survey, a total of three quality experts from UTM and nine manufacturing companies (3 responded) have been approached to evaluate the validity of the questionnaire. The three UTM experts are well known for their in-depth experience in the field of quality. They are Prof. Dr. Mohd. Shariff, En. Jafri Mohd Rohani and Prof Dr. Awaluddin. An example of the letter sent for the pilot study is given in Appendix A-I.

One of the experts, suggested that the scope of the research be limited to the electronics industries in Malaysia to avoid the need for large sample size which will increase the time and cost of survey; something that this research could not offer. Meanwhile, one manufacturing quality assurance manager pointed out those quality initiatives such as identifying major customer's dissatisfaction and ensures steps must be taken as another way to increase customer loyalty to the company.

Based on the recommendations of these reviewers, the questionnaire was modified. Numerous alternatives such as minor sentence changes were made. Finally, the result was a five-page questionnaire covering a wide aspect of TQM. Through this, the questionnaire has been validated and ready for a full-scale survey. The sample letter for full-survey is given in Appendix A-II and finalized questionnaire is given in Appendix A - IV.

### **4.4 Survey Administration**

After the initial pilot testing, prospective sample of about 300 manufacturing companies are randomly extracted from the list of companies in Industrial Training taken from UTM database. The sample size was decided after considering the expected response rate, the requirement for performing statistical analysis and the survey cost. From these 300 companies, only 32 companies returned the

questionnaire completely, 9 set of questionnaire is returned back due to company move to another place, and the rest of companies do not give any feedback.

A variety of techniques were used to boost the response rate such as return self-addressed envelope, self-stamped, and personalization e.g. hand written note on the covering letter. Follow-up letters were also sent approximately 6 weeks after the initial mailing. As a result of this, a response rate of 10.7% was obtained. The results were analyzed using Statistical Package SPSS version 11.0 and further elaborated in Chapter 5.

#### **4.5 Conclusions**

This chapter has described in detail the research methodology employed to collect and analyze the necessary data. The design of questionnaire was one of the major parts of this research since it is the medium of the information and data gathering. The findings of the survey will be discussed in the next chapter. From the output of this study, it is expected to provide assistance to the Malaysian quality practitioner and TQM providers particularly from the SMEs in identifying their respective needs for a more comprehensive training and consultancy support.

## **CHAPTER 5**

### **SURVEY RESULTS AND ANALYSIS**

#### **5.1 Introduction**

This chapter presents the information provided by the respondent companies and the survey results about TQM implementation for SMEs in Malaysia. This chapter begins with the general descriptive statistics of respondents. It consists of the response rate, percentage of responses, types of industry involved and the status of quality certification.

Secondly, it will highlight the quality activities implemented among Malaysian SMEs. On top of that, a discussion on the SMEs perception on the usefulness of quality activities implemented in their organization is carried out.

A closer look at the mean of quality management practices that SMEs have scored throughout the 8 principles will help to reveal their current level of involvement in TQM. By analyzing the results, it is expected to give a rough idea on the area lacking in implementation and the potential weaknesses among the SMEs that needed to be acted upon.

Tests of significance are carried out to investigate any difference between the levels of importance and practice of factors of implementing TQM. In addition, several significance test are carried out between SMEs and large companies.

Lastly, SMEs perception on success factors is presented. In doing so, the researcher will be able to identify common setback that SMEs face in adopting TQM. This chapter ends with some discussion on the findings to help provide some areas to explore for future research direction.

## 5.2 General Profiles of Respondent

The survey covered 300 companies all over Malaysia, which involved in small and medium industry. Thus, 32 useable responses were being analyzed for analysis. This constituted a response rate of 10.7 per cent. The questionnaire ensured to be completed by the person responsible for quality in the company. They were mainly the Managing Directors and Quality Managers since they directly involved in the process and have first hand knowledge of quality implementation in these small businesses. The results were analyzed using statistical package SPSS version 11.0. The first aspect to be investigated was the general profile of respondent, the company size, the type of industry and the number of years of TQM implementation.

Table 5.1: Breakdown of the respondents regarding to their size of industry  
(Appendix B-I)

<b>Size of Industry</b>	<b>No. of Respondent</b>	<b>Percent %</b>
Small Industry (<50 Employees)	5	15.6
Medium Industry (51-150 Employees)	10	31.3
Large Industry (>151 Employees)	17	53.1
<b>Total</b>	<b>32</b>	<b>100</b>

Breakdown of the respondents regarding to their size of industry is shown in Table 5.1. A large proportion (51.6%) of the organization was categorized as large industries with more than 151 employees, 32.3% of the organization were medium sized industries employing between 51 to 150 employees, while the small industries, those having less than 50 employees, represented only 16.1% of the total respondents. It was then categorized as SMEs with 46.9% from the total percentage of respondent against 53.1% of responses from large industries as depicted in Figure 5.1.



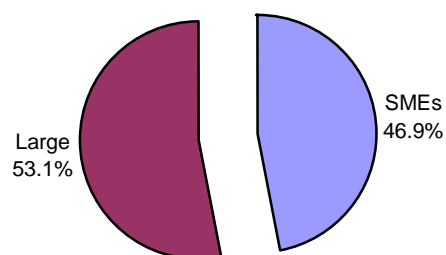


Figure 5.1: Percentage of SMEs versus large companies.

Table 5.2 shows the distribution of the types of industry involved by the respondent companies. As can be seen, most of the respondents from SMEs industries are involved in electric and electronics industry, which contributed 45.2 per cent.

Table 5.2: Types of Industry Involved by SMEs

Industry	No. of Companies	Percentage % of SMEs
Electrical and electronics	15	46.9
Metal-based industry	4	12.5
Chemical-based industry	4	12.5
Automotive related industry	2	6.3
Plastic and rubber related	1	3.1
Others	6	18.8
Total	32	100

### 5.3 The Level of Implementation for Quality Activities.

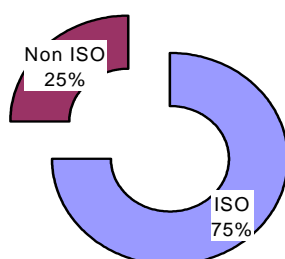


Figure 5.2: Breakdown of quality certification by SMEs

As it was the purpose of this study to find out where the Malaysian companies especially SMEs are in the quality race, the companies were asked whether they have been implementing TQM. Based on Figure 5.2, 75% of the respondent companies already have an ISO certification. This indicated that the involvement is high, where they realized the importance of TQM implementation at their company. There were only 25% of the respondent do not have an ISO certification. Perhaps, they (25%) are still in their infancy stage of getting used to the idea of TQM or to have ISO 9000 certification for their company. This is reflected on their number of years in TQM involvement of which is generally less than 3 years of involvement and 23% of them are never involved in any quality movement as shown in Figure 5.3.

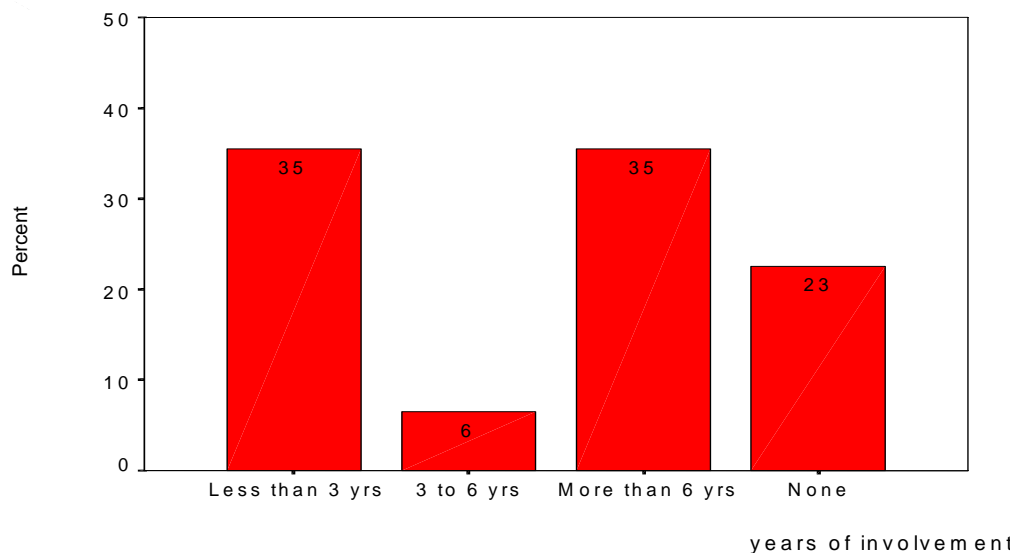


Figure 5.3: The number of years for respondents' involvement in TQM.

Next, we analyzed the SMEs certification to ISO 9000. Table 5.3 shows the status of SMEs certification to ISO 9000.

Table 5.3: The status of SMEs quality certification.

	No. of companies	Percent of total
ISO 9000	9	60.0
QS 9000	1	6.7
ISO 14001	3	20.0
None	4	26.7
Total no. of SMEs	15	

Note: some companies might have more than one certification

After an initial understanding of the status of SMEs qualification and involvement, it was felt important to identify whether they had been actually implementing TQM. According to Struebing and Klaus (1997), using quality control tools is very important for small businesses, since these firms may be competing with large companies and need a method to differentiate their products (Gulbro, 2000). In relation to this, a list of quality initiatives was included which required the companies to indicate which quality activities they had already implemented. The quality activities presented in the questionnaire are more inclined to the technical aspects of TQM. Table 5.4 summarized the mean degree of usefulness for the quality initiatives those respondent companies has been implemented. The statistic showed, almost all of the quality activities were implemented by all of the respondent companies. This indicates that they were quite advanced in their quality program.

Table 5.4: The mean degree of usefulness for quality activities implementation (Appendix B-II)

Degree of Usefulness	Quality Activities	Mean
High	Internal Quality Audit	4.44
	Production Planning and Control	4.31
	Problem solving technique	4.03
Moderate	Quality awareness program	3.88
	Acceptance Sampling	3.87
	ISO 9000 Standard	3.81
	Statistical Process Control	3.78

	5-S housekeeping	3.72
	Quality Circle / Quality Improvement Teams	3.19
	Supplier Improvement Activities	3.16
	Benchmarking	2.84
	Quality Costing	2.41
	Total Productive Maintenance (TPM)	2.10
Low	Failure Mode Effect Analysis (FMEA)	1.75
	Quality Function Deployment (QFD)	1.50
	Design of Experiment / Taguchi Method	1.50
	Six-sigma program	1.41

Overall, the three quality activities with the highest implementation rate were the *internal quality audit*, *production planning and control and problem solving technique*. Based on Table 5.4, the highest degree of practice was *Internal Quality Audit* with a mean of 4.44. Referring at the number of companies implementing ISO 9000, where 24 out of 32 of the respondent companies, proved this result. This indicates that they had actually embarked on the implementation of ISO 9000. By doing so, companies extracted information directly on the level of companies understands' and implement the requirements of ISO 9000. Appropriate action could be taken to ensure the companies are continuously qualified to the ISO certification, i.e. ensure customer satisfaction and good quality of product.

The second highest degree of practice is *Production planning and control*. Here, we can conclude that companies were trying to adopt this activity in their daily manufacturing operation. It also indicate that the companies are trying to produce quality products in line with maximizing their resources good enough to maintain a high margin of profit. While the third rank of usefulness activities was *Problem solving technique*. Some tools used in this technique such as work-study and line balancing, where the tool is simple, easy to implement and fast feedback.

The forth least implemented quality activities were *FMEA*, *QFD*, *Design of Experiment* and *Six-sigma program*. These quality activities with less than 2.0 averages are those, which are quite advanced and difficult to implement. They require special knowledge and skills, which probably these companies do not have.

## 5.4 The Level of Implementation for Quality Management Principles

Having described the quality activities, it is appropriate to begin analyzing the main area studied in this survey; the implementation of quality management practices. There are two aspects have been investigated in this section; perception on importance and extent of practice. Table 5.5 lists the individual mean on each item in the questionnaire and the overall mean of every factor.

Table 5.5: The mean result of each item in Section 2 of the questionnaire (Appendix B-III)

Factor	Importance			Practice		
	Item no.	Mean	Overall mean	Item no.	Mean	Overall mean
Management Leadership	F1.1	4.56	4.47	P1.1	3.94	4.05
	F1.2	4.69		P1.2	4.38	
	F1.3	4.62		P1.3	4.19	
	F1.4	4.53		P1.4	4.00	
	F1.5	4.31		P1.5	4.00	
	F1.6	4.09		P1.6	3.81	
Resources Management	F2.1	4.28	4.37	P2.1	3.75	3.93
	F2.2	4.28		P2.2	3.71	
	F2.3	4.41		P2.3	4.19	
	F2.4	4.59		P2.4	4.16	
	F2.5	4.29		P2.5	3.81	
Measurement and Feedback	F3.1	4.56	4.49	P3.1	4.03	3.98
	F3.2	4.59		P3.2	4.03	
	F3.3	4.56		P3.3	4.09	
	F3.4	4.56		P3.4	4.16	
	F3.5	4.16		P3.5	3.59	
Continuous Improvement	F4.1	4.41	4.27	P4.1	4.16	3.82
	F4.2	4.09		P4.2	3.66	
	F4.3	4.31		P4.3	3.75	
	F4.4	4.06		P4.4	3.45	
	F4.5	4.52		P4.5	4.09	
Supplier Quality Management	F5.1	4.44	4.36	P5.1	4.09	3.87
	F5.2	4.53		P5.2	4.00	
	F5.3	4.19		P5.3	3.47	
	F5.4	4.34		P5.4	3.91	
	F5.5	4.28		P5.5	3.87	
Systems and Processes	F6.1	4.66	4.52	P6.1	4.56	4.20
	F6.2	4.59		P6.2	4.25	
	F6.3	4.44		P6.3	4.16	
	F6.4	4.42		P6.4	4.03	
	F6.5	4.43		P6.5	3.93	
Education and Training	F7.1	4.31	4.41	P7.1	4.03	3.90
	F7.2	4.56		P7.2	4.19	
	F7.3	4.41		P7.3	3.63	
	F7.4	4.37		P7.4	3.73	
Work Environment and Culture	F8.1	4.31	4.33	P8.1	3.91	3.88
	F8.2	4.41		P8.2	4.00	
	F8.3	4.47		P8.3	4.16	
	F8.4	4.41		P8.4	3.88	
	F8.5	4.03		P8.5	3.47	

The various means for the perception of importance and practice were analyzed. First, an overall mean for each factor was obtained to look at the level of an importance perceived by the respondents. The overall mean score ranges from 4.27, between ‘important’ to 4.52, which is close to ‘very important’. Of these 8 quality management criteria (as ranked in Table 5.6) the two factors were perceived to be the most critical ones; *System and processes* (4.52) and *Measurement and feedback* (4.49). While *Work environment and culture* (4.33) and *Continuous improvement* (4.27), were the two least important. Based on this result, it can be concluded that the entire respondents rated at ‘agree’ for degree of TQM perception on importance.

Table 5.6: Ranking of TQM Factors Based on Importance

Rank	Factor	Description	Mean
1	F6	<i>Systems and processes</i>	4.52
2	F3	<i>Measurement and feedback</i>	4.49
3	F1	Management leadership	4.47
4	F7	Education and training	4.41
5	F2	Resources management	4.37
6	F5	Supplier quality management	4.36
7	F8	<i>Work environment and culture</i>	4.33
8	F4	<i>Continuous improvement</i>	4.27

Another aspect investigated in the factors for implementation of quality management section, was the level or extent of practice of each factor. The means for each factor are shown in Table 5.5 and as can be seen, the perception of practice is lower than that of importance in every case. The values range from 3.82 to 4.20, which corresponds to a ‘moderate’ to ‘high’ level of practice. *Systems and processes* (4.20) and *Management Leadership* (4.05) were the two highest practices in this study, while *Supplier quality management* (3.87) and *Continuous improvement* (3.82) were the bottom two (see Table 5.7). From this result, it can be observed that all the respondents rated at ‘moderate’ to ‘high’ for degree of TQM practices in their companies, indicating that companies are struggling to practice TQM successfully.

Table 5.7: Ranking of TQM Factors Based on Practice

Rank	Factor	Description	Mean
1	F6	<i>Systems and processes</i>	4.20
2	F1	<i>Management leadership</i>	4.05
3	F3	Measurement and feedback	3.98
4	F2	Resources management	3.93
5	F7	Education and training	3.90
6	F8	Work environment and culture	3.88
7	F5	<i>Supplier quality management</i>	3.87
8	F4	<i>Continuous improvement</i>	3.82

Next, an analysis on the reliability of the result on the eight proposed constructs was performed in the next section. Further comparative study was also carried out to achieve better understanding on the level of TQM implementation among SMEs and can be found in Section 5.6.

## 5.6 Test of Significance on difference of means

Having analyzed the first section of the survey, it was found that some statistical tests would be helpful to further justify the level of TQM implementation among the SMEs. Some tests are carried out to discover whether there was any significant difference between some aspect of TQM factors. These tests were analyzed using an ordinary comparison t- test. . In order to conduct the tests, the following hypotheses were set up.

i) To test for a significant difference between the importance and practice means on each of TQM factors (for overall respondents).

Ho :  $\mu_1 - \mu_2 = 0$ ; i.e. there is no significant difference between the two means

H<sub>1</sub> :  $\mu_1 - \mu_2 \neq 0$ ; i.e. there is significant difference between the two means

ii) To test for a significant difference in perceived level of importance expressed by SMEs and large companies

Ho :  $\mu_1 - \mu_2 = 0$ ; i.e. there is no significant differences between perceived importance of SMEs (on each of TQM factors) and large companies.

H<sub>1</sub> :  $\mu_1 - \mu_2 \neq 0$ ; i.e. there is a significant difference between the perceived

importance of SMEs practices (on each of TQM factors) and large companies.

iii) To test for a significant difference in the extent of practice between SMEs and large companies

Ho :  $\mu_1 - \mu_2 = 0$ ; i.e. there is no significant difference between SMEs practices (on each of TQM factors) and large companies.

H<sub>1</sub> :  $\mu_1 - \mu_2 \neq 0$ ; i.e. there is a significant difference between SMEs practices (on each of TQM factors) and large companies.

iv) To test for a significant difference in perception on usefulness of quality activities between SMEs and large companies

Ho :  $\mu_1 - \mu_2 = 0$ ; i.e. there is no significant difference between perception on usefulness of quality activities of SMEs and large companies.

H<sub>1</sub> :  $\mu_1 - \mu_2 \neq 0$ ; i.e. there is a significant difference between perception on usefulness of quality activities of SMEs and large companies.

### 5.6.1 Test for a significant difference between the importance and practice means on each of TQM factors (for overall respondents).

The first t-test was carried out to investigate if there are any significance difference between the importance and practice means on each of TQM factors. The result of the first t- test is presented in Table 5.8. The details of statistical analysis could be referred in Appendix B-IV.

Table 5.8: Paired sample statistics for mean importance and practice

Factor	Mean importance	Mean practice	p-Value	t <sub>calc</sub>	Results
Management leadership	4.4688	4.0521	0.000	4.516	Sig.
Resources management	4.3533	3.9067	0.000	3.999	Sig.
Measurement and feedback	4.4875	3.9813	0.000	4.926	Sig.
Continuous improvement	4.3161	3.8516	0.000	5.452	Sig.
Supplier quality management	4.3742	3.8645	0.000	5.243	Sig.
Systems and processes	4.4867	4.1600	0.001	3.895	Sig.
Education and training	4.4167	3.8833	0.000	5.047	Sig.
Work environment and culture	4.3250	3.8813	0.000	4.783	Sig.



The t-test showed that there was a significant difference between perceived importance and the extent of practice for each factor by the companies at 0.05 significant level. Since all the factors have exhibited p-value less than 0.05, it means the result is significant, so that we reject the null hypothesis that chance alone for the data. In this, it tells us that the mean perceived importance were better than the mean extent of practice. It can be conclude that the important placed by the companies on all the factors has not been translated into practices successfully, i.e. the companies know the important of the TQM factors but have failed to execute them to any great extent. The results of this t-test is similar to a study carried out by Yusof and Aspinwall (2000).

### 5.6.2 Test for a significant difference in perceived level of importance expressed by SMEs and large companies

Table 5.9 summarized the details of t-test results in perceived on importance of TQM factors between SMEs and large companies.

Table 5.9: T-test result in perceived level of importance on TQM factors between SMEs and large companies (Appendix B-V)

Factor	$\mu_{SME}$	$\mu_{LARGE}$	$p$ -Value	$t_{calc}$	Results
F1 Management leadership	4.3556	4.5686	0.202	-1.304	Not Sig.
F2 Resources management	4.3143	4.4118	0.654	-0.452	Not Sig.
F3 Measurement and feedback	4.4000	4.5647	0.371	-0.908	Not Sig.
F4 Continuous improvement	4.1467	4.4750	0.128	-1.566	Not Sig.
F5 Supplier quality management	4.2667	4.4353	0.373	-0.904	Not Sig.
F6 Systems and processes	4.4533	4.5200	0.740	-0.335	Not Sig.
F7 Education and training	4.4107	4.4219	0.958	-0.053	Not Sig.
F8 Work environment and culture	4.1733	4.4588	0.185	-1.355	Not Sig.

The statistical results indicated that there were no significant difference between SMEs mean perceived of importance and large companies at 0.05 significant level. Since all factors have exhibited the p-value more than 0.05, meaning the result is not significant, so that we accept the null hypothesis. This tells us that both of SMEs and large companies knew and agreed on the importance of TQM factors. The three factors rated among the top priorities by large companies

were *Management leadership* (4.5686), *Measurement and feedback* (4.5647) and *Systems and processes* (4.5200). Compared to SMEs, the three factors were *Systems and processes* (4.4533), *Education and training* (4.4107) and *Measurement and feedback* (4.4000).

### 5.6.3 Test for a significant difference in the extent of practices between SMEs and large companies

As it was already anticipated that quality management practices among the large companies are supposed to be higher and well established than SMEs was proven to be true at all. This is indicated from the statistical results (see Table 5.10) that not all the factors are significant, when SMEs mean of practices are compared to large companies.

Table 5.10: T-test result in the extent of practices on TQM factors between SMEs and large companies (Appendix B-VI)

Factor	$\mu_{\text{SME}}$	$\mu_{\text{LARGE}}$	<i>p</i> -Value	$t_{\text{calc}}$	Results
F1 Management leadership	3.6889	4.3725	0.003	-3.217	Sig.
F2 Resources management	3.5714	4.2000	0.013	-2.661	Sig.
F3 Measurement and feedback	3.6800	4.2471	0.047	-2.074	Sig.
F4 Continuous improvement	3.4933	4.1875	0.008	-2.826	Sig.
F5 Supplier quality management	3.6133	4.1000	0.066	-1.914	Not Sig.
F6 Systems and processes	3.9600	4.3600	0.115	-1.628	Not Sig.
F7 Education and training	3.6429	4.0938	0.079	-1.821	Not Sig.
F8 Work environment and culture	3.6533	4.0824	0.090	-1.750	Not Sig.
Grand Mean	3.6629	4.2054			

Based on the *p*-value of the *t*-test, the significant factors are identified and ranked from the most significant; *Management leadership* (0.003), *Continuous improvement* (0.008) *Resources management* (0.013), and *Measurement and feedback* (0.047). While the other factors are found to be not significant.

Referring to the mean value, we can see that the mean practices of large companies are, on average better than the mean of practices among SMEs. *Management leadership* (4.3725), *Systems and processes* (4.3600), *Measurement*

*and feedback* (4.2471) and *Resources management* (4.2000),) proved to be rated among the top priorities by large companies. The lowest degree of quality management practices by large companies was found to be *Work environment and culture* (4.0824). While SMEs given the priorities to *Systems and processes* (3.9600), *Management leadership* (3.6889) and *Measurement and feedback* (3.6800). It can be concluded that both of SMEs and large companies emphasized in practicing on the same TQM factors.

As such, it helps to explain the findings in this survey that large companies are better at adopting in the TQM journey. For example, the grand mean of practices from the large companies (4.2054) are a little between the 'high' and 'very high' practiced indicating that they could have started on the TQM journey but there are still room for improvement towards achieving business excellence. In contrast for the SMEs (3.6629), their mean practice revealed that they are only moderate in pursuing excellence in the market through TQM. Thus, the results agree with the statements that given by Idris (1996) about Malaysian SMEs are still having the attitude of "wait and see". Based on this evidence, the results indicated that SMEs might have problems in competing with large companies in using continuous improvement to achieve total quality.

The most logical reason for the outcome is that perhaps the local SMEs have started to have initiatives to compete large companies who are quite advanced in TQM implementation.

#### **5.6.4 Test for a significant difference in perception on usefulness of quality activities between SMEs and large companies**

To better illustrate the perception on the extent of usefulness for the quality activities which have been implemented, Table 5.11 summarized the t-test on usefulness of the different quality activities comparing the opinions of both SMEs and large companies.

Table 5.11: T-test result in perception on usefulness of quality activities between SMEs and large companies (Appendix B-VII)

Quality Activities	$\mu_{SME}$	$\mu_{LARGE}$	<i>p</i> -Value	$t_{calc}$	Results
Internal quality audit	4.07	4.76	0.050	-2.040	Sig.
Quality awareness program	3.60	4.12	0.330	-0.990	Not Sig.
Problem solving techniques	3.40	4.59	0.006	-2.991	Sig.
Acceptance sampling	3.27	4.41	0.024	-2.386	Sig.
Statistical process control	3.13	4.35	0.014	-2.625	Sig.
Supplier improvement activities	2.33	3.88	0.013	-2.627	Sig.
Production planning and control	4.07	4.53	0.195	-1.325	Not Sig.
Quality costing	2.20	2.59	0.616	-0.506	Not Sig.
Quality circle/Quality improvement teams	2.80	3.53	0.309	-1.035	Not Sig.
Total productive maintenance	1.64	2.47	0.301	-1.053	Not Sig.
5-S housekeeping	2.93	4.41	0.006	-2.926	Sig.
Benchmarking	2.07	3.53	0.045	-2.089	Sig.
Six-sigma program	1.00	1.76	0.291	-1.075	Not Sig.
ISO 9000 standard	3.07	4.47	0.019	-2.471	Sig.
Failure Mode Effect Analysis	0.53	2.82	0.002	-3.373	Sig.
Quality Function Deployment	0.60	2.29	0.023	-2.400	Sig.
Design of Experiment/Taguchi Method	0.53	2.35	0.009	-2.791	Sig.

Based on Table 5.11, we discovered that 11 out of 17 quality activities were significant. The most significant quality activities are ranked as follows; *Failure Mode Effect Analysis (FMEA)* (0.002), *5-S housekeeping* (0.006) and *Design of experiment/Taguchi method* (0.009), where the *p*-value close to zero. This indicates that there are 0.002 (2 in 1 000) probability of having SMEs have higher degree of implementation of FMEA than large companies.

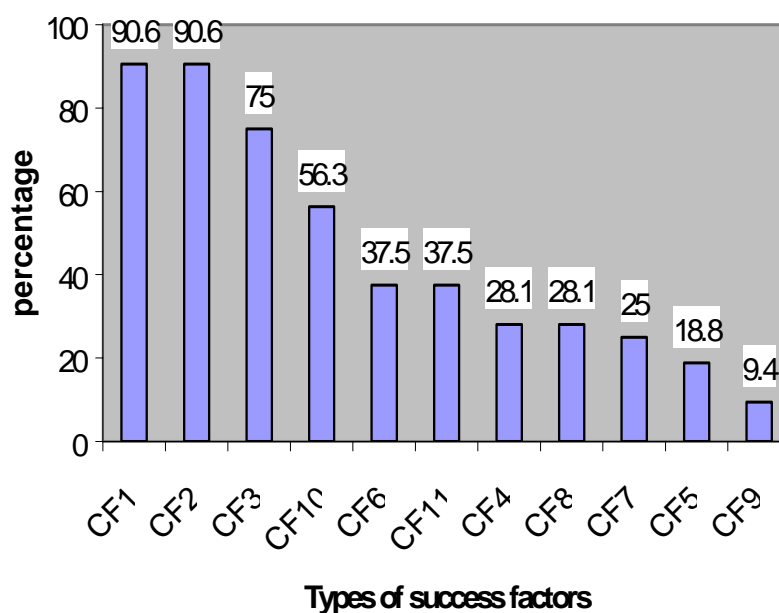
As we compared the mean of perception on usefulness of quality activities between SMEs ( $\mu_{SME}$ ) and large companies ( $\mu_{LARGE}$ ), we can see that the mean of SMEs is always lower than mean large in every case. Thus indicated that large companies are advanced in implementing the 11-quality activities as mentioned. Perhaps, SMEs companies still in the early stage in practicing the quality tools.

The top quality activities implemented among SMEs were *Internal quality audit* (4.07), *Production planning and control* (4.07), *Quality awareness program* (3.60) and *Problem solving techniques* (3.40). For large companies, they are emphasized on implementing *Internal quality audit* (4.76), *Problem solving techniques* (4.59), *Production planning control* (4.53), *ISO 9000* (4.47), *5-S housekeeping* (4.41) and *Acceptance sampling* (4.41). This indicated that the

usefulness of *Internal quality audit* and *Production planning control* as powerful tools for both SMEs and large companies.

### 5.7 SMEs' Perception on Success Factors for TQM Implementation

On top of what had been measured so far by the author on the status of TQM implementation among SMEs, the author was also interested to explore the five most critical success factors for TQM in SMEs. The outcome of the survey is ranked from highest to lowest percentage as can be seen in to Figure 5.4. (Appendix B-VIII)



CF1- Leadership and support from top management	CF6- Desirable human resource practice
CF2- Conducting continuous improvement	CF7- Adopting quality assurance system
CF3- Measuring results and performance	CF8- Sufficient financial resources
CF4- Selective application of tools and technique	CF9- Providing relevant training for senior management
CF5- Involving supplier in activities	CF10- Providing effective and appropriate training for employees
	CF11- Favourable work environment and culture

Figure 5.4: SMEs perception on TQM critical success factor (Appendix B- VIII).

Referring to Figure 5.4, few success factors have been identified. They are;

- There are two factors have been agreed by 90.6% of the respondents; *Management leadership and support from top management* and *Conducting continuous improvement*.
- *Measuring result and performance* had the support of 75.0% of the respondents.
- The remaining top factors were *Providing effective and appropriate training for employees* (56.3%), *Desirable human resource practice* (37.5%) and *Favourable work environment and culture* (37.5%).

The author believes that the SMEs understand what it takes to excel in the quality race because the top most favourable success factors are among the voices of SMIs from other countries. For instance, survey result by Yusof (2000), the four top most critical success factors was the same as Yusof's findings except for the 'Favourable work environment and culture' where was taken over by the need for a quality assurance system.

However, further analysis undertaken, confirmed that SMEs need to cross various barriers in order to achieve TQM. The result from Table 5.12 showed that *Resistance to change* (3.58) is the main concerns for the SMEs. This followed by *Emphasis on short-term objectives* (3.48) and *Lack of resources* (3.42).

Perhaps, the above three barriers has been resulted or reflected by the lack of objectives and strategies and lack of commitment from the top management. This could be due to the reluctance of top management to fully commit them towards the idea of total quality for they are still fighting from day to day for their continued survival in the market place where cost and time frame matters most.

Having realized these findings, the researcher hopes that the outcome will prove beneficial for those trying to build a framework for implementing quality in SMEs in Malaysia. A short discussion and conclusion will be drawn up in the next chapter to sum up all that has been presented.

Table 5.12: Perception on Barriers to TQM for SMEs (Appendix B - IX)

	Barriers of TQM	$\mu_{\text{Barriers}}$	Rank
DF1	Resistance to change	3.58	1
DF2	Lack of commitment from top management	2.89	8
DF3	Lack of experience in quality management	2.96	7
DF4	Excessive reliance on quality manual	2.85	9
DF5	Lack of resources	3.42	3
DF6	Emphasis on short term objectives	3.48	2
DF7	Lack of objectives and strategies	3.19	4
DF8	Quality system based on detection	3.15	6
DF9	Production dept. given sole responsibility for quality	2.46	11
DF10	Quality dept. given sole responsibility for quality	2.85	10
DF11	Lack of evaluation procedures and benchmark indices	3.19	5

## 5.8 Summary

Statistical result of all the analysis has been successfully presented in this chapter. It was appropriate to summarize them in point form so that the author can be able to highlight the fundamental fact of the study. They were breakdown into five main section which is the: General profiles of respondent, result on implementation of quality activities, result on level of quality management practices among the SMEs, test of significance on difference of means and perception on success factors for TQM implementation.

### *General Profiles*

This section dwells primarily on the general survey result that will be helpful in addressing certain important points in the later analysis.

- The response rate of the survey was 10.7% where, 53.1% was from large companies and 46.9% was from SMEs industry.
- Years of involvement in TQM are generally low. 35% of SMEs are involved in TQM for less than 3 years and 23% are never involved in TQM before even though it has been introduced since 1987 (14 years ago).

- There was 75% of the respondents have a certified quality assurance system, i.e. ISO 9000 series of standards.

### ***Result on Implementation of Quality Activities***

This section is the summary of 17-quality activity analysis result that was introduced in the survey. Based on the statistics, almost all of the respondents are adopting all the quality activities. Besides that, the degree of usefulness of these activities was also carried out. The results are as follows:

- *Internal quality audit* (4.44) has the highest degree of usefulness as perceived by the respondents. It was followed by *Production planning and control* (4.31) and *Problems solving technique* (4.03).
- There are 4 quality activities categorized in low degree of usefulness with mean value less than 2.0; *FMEA* (1.75), *QFD* (1.50), *DOE* (1.50) and *six-sigma program* (1.41).

### ***Result on Level of Quality Management Practices among SMEs.***

This section summed up the mean of practice and perceived level of importance on eight quality management practices among the SMEs. It can be concluded as followed;

- The highest score in perceived level of importance towards TQM factors is *Systems and processes* (4.52) and followed by *Measurement and feedback* (4.49).
- The highest score in practices of TQM factors is *System and processes* (4.33) and *Management leadership* (4.27) placed at the second highest.
- *Work environment and culture* (4.33) and *Continuous improvement* (4.27) were the two lowest rated in perceived level of importance.
- While, *Supplier quality management* (3.87) and the usage of *Continuous improvement* (3.82) was rated as the lowest degree in practice among the respondents companies.



### *Test of Significance on difference of means*

This section reports briefly on the result of four t-tests, which have been carried for the purpose of the study. Several pertinent facts were obtained from the analysis and will be outlined below.

- The first t-test was carried out to investigate if there is any significance difference between the importance and practice means on each of TQM factors. The results indicated that the mean of quality management practices is *statistically significant* on all the TQM factors at 0.05 significant levels.
- The second t-test intended to check in perceived level of importance expressed by SMEs and large companies revealed that the mean of quality management practices is *statistically not significant* on all the TQM factors at 0.05 significant level.
- The three factors rated among the top priorities by large companies were *Management leadership* (4.5686), *Measurement and feedback* (4.5647) and *Systems and processes* (4.5200). Compared to SMEs, the three factors were *Systems and processes* (4.4533), *Education and training* (4.4107) and *Measurement and feedback* (4.4000).
- The third test of significance is to investigate the difference in the extent of practices between SMEs and large companies. There are 4 factors are significant and another 4 factors are not significant.
- The significant factors are identified and ranked from the most significant based on the p-value; *Management leadership* (0.003), *Continuous improvement* (0.008), *Resources management* (0.013), and *Measurement and feedback* (0.047).
- While the other factors are found to be not significant; *Systems and processes* (0.115), *Work environment and culture* (0.090), *Education and training* (0.079) and *Supplier quality management* (0.066).
- The last significant test is perception on usefulness of quality activities between SMEs and large companies. The test discovered that 11 out of 17 quality activities were significant.

- The most significant quality activities are ranked as follows; *Failure Mode Effect Analysis (FMEA)* (0.002), *5-S housekeeping* (0.006) and *Design of experiment/Taguchi method* (0.009), where the p-value close to zero

***Perception on Success Factors for TQM implementation.***

After conducting all the analysis to identify the level of TQM implementation among the SMEs, this section intends to seek the top 5 most success factors as perceived by the respondents. It came out that

- There are two factors have been agreed by 90.6% of the respondents; *Management leadership and support from top management* and *Conducting continuous improvement*.
- *Measuring result and performance* had the support of 75.0% of the respondents.
- The remaining top factors were *Providing effective and appropriate training for employees* (56.3%), *Desirable human resource practice* (37.5%) and *Favourable work environment and culture* (37.5%).
- Resistance to change (3.58) has the highest degree of agreement among the SMEs, which indicated that it was the biggest barrier to overcome for successful TQM implementation.

This chapter has explained the results of the survey conducted on TQM implementation and the critical success factors in SMEs.

## CHAPTER 6

### DISCUSSIONS AND CONCLUSIONS

#### 6.1 Introduction

Having described the survey results, this chapter attempts to present a broad evaluation of the current status of TQM amongst SMEs in Malaysia. The findings is anticipated to satisfy these pertinent questions:

- a) What has been the most accepted quality activities implemented so far?
- b) Which of the eight constructs or critical factors have the highest degree of practice?
- c) How do the findings on the level of practice compare with results from other countries?

The findings of this study are examined by comparing these results with those from other countries to the closest possible criteria, which was presented in the questionnaire.

#### 6.2 Discussions

It was the main purpose of this study to find out where Malaysian companies are in the quality race compared to other countries like Turkey, Australia, Ireland and European countries. Based on the survey result, it appeared that 75% of the SMEs studied had obtained a certified quality assurance system while 25% of the total respondent admitted of having involved in implementing TQM in their organizations. A study conducted by Cebeci et.al (2000) in Turkey revealed that almost 75% organizations have ISO 9000 certification. Nevertheless, those that were found

implementing TQM actively constitute a low of percentage of 30.3% and correspondingly 60% in Australian manufacturing companies (Mandal et al., 1999). A study in Irish manufacturing industry reported of having 66% of its respondent have ISO 9000 accreditation but only 19% reported of implementing TQM (Ismail et al., 1999).

It looks like SMEs in Malaysia have shown a very keen interest in implementing TQM but the rate of registration for a quality system is still quite low. Possibly, SMEs are faced with obstacles such as lack of resources; i.e. financial, technical, resources (Wilkinson et al., 1994, Lee and Oakes, 1995, Ismail, 1999, Gulbro et al., 2000) while applying for certification. Another reason could be the years of involvement are still generally low. This can be seen from the result of the survey where 35% of the SMEs have been involved in TQM three years ago while 23% have never been involved in TQM.

The implementation of quality initiatives can obviously bring significant improvement in productivity and competitiveness in various organizations (Mandal et.al, 1999). In this case, a majority (75%) of Malaysian SMEs are actively involved in the Production and planning control activities. This activity has been proven useful, as the mean from respondents were 3.97 out of 5 on the Likert scale. It has also appeared to be a popular activity among the Malaysian SMEs found by Idris (1996) survey with a 60% rate of implementation about 5 years ago.

Statistical sampling and Quality awareness program were also found to be the top five most popular quality activities in Idris's survey. However, both of these activities are found to be less useful for the SMEs in this study although both were rated the second most implemented among SMEs companies. Thus, the researcher feels that these findings ought to be highlighted to ensure that measures are taken so that SMEs will benefit from implementing these activities.

According to other surveys (Siti, 2000, Idris, 1996), Total Productive Maintenance (TPM) has always been the least favoured quality activities adopted in Malaysian manufacturing companies. TPM is a system of maintenance covering the entire life of the equipment in every division, including planning, manufacturing,

maintenance and all other divisions (HAMzah et.al.,1994). Hence it was important to SMEs and should not be ignored. SMEs in Malaysia should be given more exposure in TPM; and TQM service providers should give particular attention to this subject.

Next, in USA, almost 60% of the companies have quality circles while findings from a survey in Turkey demonstrated that only 38% exist. Malaysian SMEs are found in between Turkey and USA by having 45% of its respondent has quality circles in their companies. Interestingly, Malaysian SMEs fared better than Turkey even though it was amongst the least implemented activities. This means that Malaysian companies are actually not left out entirely in the quality race.

In terms of the implementation aspects of quality management, the researcher tried to investigate the level of adoption of manufacturing philosophies in this study with a number of surveys reported in literature. This study has proposed 8 constructs modeled around from literature review. It comes as no surprise that all the Malaysian SMEs surveyed understand the importance of involvement of top-level management that they actively practiced it (4.05). These figure however reflects a lower degree of practice compare to Singaporean SMEs which has an overall mean rating 4.36 and UK SMEs (3.75) in a survey conducted by Quazi et.al, 1997 and Yusof, 1999. In Australia, 82% of the companies have also identified the active involvement of top management as the most important factor in implementing quality concepts in their organizations (Mandal et. al, 1999). This finding implies that Malaysian SMEs still have a long way to go in the journey towards TQM.

Subsequently, in our study, continuous improvement system appeared to be second highest in degree of practice (3.82), which is found a little higher than UK companies (3.35). There is however still considered well behind of SMEs in USA where it appeared to have approximately as high as 4.01 in practice for continuous improvement system.

Many research results have revealed that education and training are one of the most important elements in a successful implementation of TQM (Mann et al., 1994, Zhang et al., 1999). 79% of the Australian manufacturing companies stated that they have an on going quality-training program, which suggests that they also consider

quality as an important business strategy (Mandal et.al, 1999). Findings from a European survey in UK, Portugal and Finland also indicate that adequate training determines the likely effectiveness of the quality initiatives undertaken. Among the three countries survey, Finish organizations were found to provide the least training and UK the most. Portugal was second behind UK (Matthews et.al, 2001). Nevertheless, as direct comparisons cannot be made from these findings, it is concluded that Malaysian SMEs have not been left behind in this initiatives based on a mean practice of 3.57 as compared to Yusof's 2000 survey results.

Eventually, there is some evidence that may raise some concerns on the supplier quality management because most reference from literature was discovered to have low level of practice. Take for example this study, where it is recorded as lowest (3.87) among the 8 constructs presented. Similar survey results were obtained in Australia and UK manufacturing companies. In Australia, 47% of the respondents have conducted supplier evaluation while UK companies recorded a mean of 3.26 on a 5-point Likert scale. The above findings suggest that some drastic measures must take place to increase awareness among organizations. Supplier quality management is an important aspect of TQM since materials and purchased parts are often a major source of quality problems (Zhang et al., 1999). Hence, organization that pursues good supplier quality management will be able to reduce total quality costs and improve product quality in the long run.

From all the findings discussed in this chapter, the level of TQM implementation among Malaysian SMEs has clearly been defined. Although these results are not directly comparable to each other, nevertheless it helps to provide some indication on the extent of achievement for Malaysian SMEs in the journey towards excellence. It has indicated and identified crucial issues for organizations to consider especially on areas found lacking in implementation. Thus, a systematic approach towards TQM is suggested so that SMEs can sustain the changes in the new era of business environment.

### 6.3 Limitations Of this Study

As to other studies, there are shortcomings that could not be avoided in this research. For example, the scope of this study was limited to the manufacturing organizations. In addition, it was conducted only for manufacturing companies in Malaysia such as electrical, food, metal-based, and automotive industry.

Furthermore, the questions addressed in the survey were designed more on the principle and concept of TQM. It does not contain much of technical aspects towards implementation of TQM except for which the researcher tries to measure some quality activities that were frequently adopted by the SMEs. However, the researcher feels that if a framework was to be developed, the level of TQM implementation in the technical aspects must not be overlooked. Perhaps, future researcher could continue to conduct a survey on how the implementation on the technical aspects of TQM can be assimilated into the SMEs. This research carried out was mainly a guideline to see the current involvement of SMEs in TQM.

The other limitation is the time factor. Since the study was to be completed within 7 months, it was not possible for the young researcher to produce a good piece of work enough to cover a strong hold about TQM implementation in SMEs. The researcher who conducts the survey was an “alien” to the subject when she first started out. The design of questionnaire and analysis of data were very time consuming where a thorough literature review of TQM philosophies and quantitative methods of data analysis in the related software has to be carried out simultaneously. So, it should not be denied that the research actually contains unintentional weaknesses than can further be improved upon.

The limited time allocated for this study may have resulted in the inability for a larger sample size and longer duration of survey to take place. The larger the sample size, the better it can represent the situation. Hence, the result of the survey is dependent upon time and constraint of the particular outcome and could only provide some indication to the level of TQM implementation among the samples of SMEs conducted based on the statistical test and not necessary be relied 100% upon.

#### **6.4 Suggestions for Future Research**

Prior to conducting the research, it is important for the researcher to acknowledge certain shortcomings in this research that ought to be taken in careful consideration for future research undertaken.

The main concern for the research was only limited to investigating the level of TQM adoption. It has found only the level and extent of the prerequisites for TQM as well as area lacking in implementation in electrical and electronics industries in Malaysia. It is suggested that studies on other manufacturing sectors should be carried out simultaneously. In doing so, the researcher hopes that future research will involved a group of researchers who are responsible for studying different types of manufacturing sectors together. This will certainly increase the chances of obtaining a thorough and accurate outcome on the level of TQM implementation in Malaysia with shorter time, resources and costs needed.

Meanwhile, it is believe important to know how effective the implementation process is towards TQM. Most surveys have avoided addressing how various quality initiatives have influenced the company's operational and business performance. Again, this will prove meaningful, if one can understand how TQM contributes to the changes of organizational culture such as positive changes in behavior of employees, policies emphasis on prevention rather than detection and commitment from all levels in the organization that results in process improvement. Hence, further study should be carried out to find the level of success in TQM implementation

Above all, it is therefore suggested that the frame of reference for TQM be built upon. Future survey researcher must be able to design an effective and integrated framework easier for adoption in SMEs. Besides that, he must be able to work closely, preferably with the SMEs companies to monitor the changes in helping the companies to cope with changing needs and difficulties that may have surfaced with TQM.



Finally, it should be emphasized here that longitudinal studies over a long period of time such as 10 years or more is much encouraged. A continuous study from time to time, say once in 2 years, will help a lot in identifying new trends and needs in SMEs. Greater in-depth understanding on the subject matter will help researchers, decision-makers, and practitioners to contribute towards building a framework that will prove beneficial to the SMEs in the long term.

## **6.5 Conclusions**

In considering the important contribution of SMEs to the economy, this research is designed to identify the current level of TQM implementation among SMEs and large companies in Malaysia.

This research has successfully revealed the level of implementation of TQM principles. It has also pinpointed areas lacking in implementation in the TQM program. It is suggested that further research be carried out immediately on those organizations that are willing to participate in the development of a suitable framework for SMEs.

Above all, this project enables the author to make use of some survey techniques, which are not included in the engineering field. Of course, the awareness of TQM concepts is even more beneficial. Drawing from discussions and ideas presented has helped the author to achieve a better understanding of TQM herself.

In conducting the research, it has indirectly trained the author to constantly improve herself, which is also the core concept of TQM: Continuous Improvement for life. Lastly, valuable lessons gained in this research will assist the author towards looking for new opportunities in the Quality field.

**APPENDIX A-I**  
**Sample letter for pilot study**

<name>  
 <title>  
 <company>  
 <add>  
 <postcode>

Attention to : \_\_\_\_\_

**Re: Pilot Study for Research on Quality in Small and Medium Industries**

I am currently conducting a research on the level of Total Quality Management I implementation in various industries in Malaysia.

Prior to conducting a full survey, it is prudent to carry out a pilot study to evaluate the suitability and general understanding of the questionnaire. I would be most grateful if I could seek your honest opinion regarding the questionnaire about level of TQM implementation in Malaysian industries. The questionnaire is designed in such a way that most questions require a tick or yes / no type of answer. You are free type write any comment you wish on the question itself.

Your assistance in completing the questionnaire and commenting upon it would be very crucial as the success of my research depend s upon a good level of response at this stage. I would be grateful if you could let me have your response by Saturday (23.03.02).

I would like to thank you for your kind cooperation. Thank you.

Yours sincerely,

.....  
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## APPENDIX A-II

### Sample letter for full survey

25 March 2002

Quality Control Manager,  
Syquest Technology (M) Sdn. Bhd.,  
Plot 557, Lorong Perusahaan 4,  
Prai Free Trade Zone Phase 1,  
13600, Prai,  
Penang.

Dear Sir / Madam,

#### Survey on TQM implementation

I am currently conducting a research on Total Quality Management under the university's grant (Vot 71663). The purposes of the study are to investigate the current level of TQM implementation as well as to identify the critical success factors (CSFs) for quality adoption. The information gained from the survey will hopefully be of use in developing suitable strategies and guidelines for successful TQM programme.

I would be very grateful if you could spend a few minutes answering the attached questionnaire. All the questions are designed for quick and easy response; they just require a tick or a circle only.

I would also like to assure you that all responses given will be treated as **STRICTLY CONFIDENTIAL** and used for research purposes only. If you need further clarification, please feel free to contact me at address below.

I would like to thank you for your kind cooperation. Thank you.

Yours sincerely,

.....  
Associate Professor Dr. Sha'ri bin Mohd Yusof  
Head, Department of Manufacturing and Industrial Engineering,  
Faculty of Mechanical Engineering  
Universiti Teknologi Malaysia  
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Tel : 607-550-4850  
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