CHAPTER 2
LITERATURE REVIEW

2.1 REVIEW OF THE LITERATURE ON THE CRITICAL SUCCESS FACTORS AND MEASUREMENT OF TQM

The critical success factors for TQM are now much better known and understood (Curry et al., 2002). One of the difficulties of critical success factors is the basis of defining these elements before they become critical (Rahman, 2004). A study conducted by the US General Accounting Office (1990) between June 1990 and February 1991 examined the impact of formal TQM Programmes of 20 MBNQA finalists on their performance. Performance was examined in four areas including employee relations, operating procedures, customer satisfaction and financial performance. This study was undertaken with the initiative of a number of US Congressmen who believed that there was a lack of available data about the impact of formal Quality improvement practices on US firms’ performance (Usaiianer and Dulworth 1992). The GAO study (1991) attempted to measure the effect of TQM implementation on these selected companies’ performance. It also examined the process though which quality was achieved and attempted to determine whether these companies experience with TQM were applicable to other US companies. The GAO used the MBNQA criteria as a framework to determine whether the 20 companies TQM programmes were well-designed and implemented.

The conference board (1993) also released a report that examined 20 studies and surveys conducted to determine the impact to TQM on US companies. According to most of these studies, TQM could improve company performance on measures such as customer satisfaction, market share, employee performance, profits, return on investments, cycle times and process costs.
2.1.1 THE FIRST INSTRUMENT FOR MEASURING TQM CRITICAL SUCCESS FACTORS

The first empirical study that attempted to identify the critical success factors of TQM that must exist in a business unit to achieve effective quality management is that by Saraph et al. (1989). This study used organizational and managerial aspects of the works of a number of quality management gurus such as Deming, Juran and Crosby to organize and synthesize the critical success factors identified by them. Saraph et al. also developed measures of each critical factor and overall organizational quality management. They argued that this measurement instrument could be used for both manufacturing and service organizations. This study was originally conducted in the USA and was later replicated in three other countries including India by Motwani et al. (1994), the United Arab Emirates by Badri et al. (1995) and Singapore by Quazi et al. (1998). A comparison of the test of construct validity of the measures of these studies showed similar result between Saraph et al. (1989) and Badri et al. (1995). That is, seven of the factors in Saraph et al. were unifactorial (i.e. the items within each of the seven measures formed only one factor) and one was bifactorial. All the eight critical success factors of Badri et al. were unifactorial. On the other hand, only three factors in Quazi et al. (1998) were unifactorial and the other five factors were multifactor forming a total of 16 factors. Motwani et al. (1994) did not report the result of the construct validity test. Overall, despite certain differences, all three studies found the Saraph et al. (1989) instrument to be valid and reliable. Motwani et al. also stated that the factors were "somewhat universally acceptable and consistent with the findings of Garvin, Saraph, and other quality philosophers"

2.1.2 QUALITY INSTRUMENTS BASED ON DEMING'S PRINCIPLES

Study conducted by Anderson et al. (1994) developed a theory of quality management using only the Deming principles for quality management as a framework. Seven TQM factors or critical success factors were proposed to represent the 'Deming Management Method'. The relationships between these critical success factors were later empirically analyzed by
Anderson et al. (1995) using path analysis. This study was also replicated in Italy by Rungtusanatham et al. (1998) using the same seven factors and a sample of Italian firms comparable with that of the US sample. The replication study revealed that five of the eight hypothesized relationships between the factors were consistent in both studies. That is, four of the hypotheses were supported and one was not in both studies. The other three relationships yielded conflicting results in the two studies, were one study supported a particular hypothesis while the other one did not. Rungtusanatham et al. (1998) argues that more replication studies must be conducted using different US and Italian-based samples to determine whether or not the hypothesized relationships are generalizable.

2.1.3 QUALITY INSTRUMENTS THAT ESTABLISHED RELATIONSHIP BETWEEN TQM CRITICAL SUCCESS FACTORS AND PERFORMANCE OUTCOMES

In addition to the replication studies mentioned above, various other empirical studies attempted to develop an appropriate set of critical success factors representing an integrated approach to TQM implementation (e.g. Adam 1994, Flynn et al. 1994, 1995, Powell 1995, Cunningham and Ho 1996, Black and Porter 1996, Ahire et al. 1996, Kuei et al. 1997, Ruggieri and Merli 1998, Rungtusanatham et al. 1998, Quazi et al. 1998, Anderson et al. 1998, Samson and Terziovski 1999, Kannan et al. Dow et al. 1999, Yusof and Aspinwall 2000a, Curkovic et al., 2000, Kaynak 2003, Rahman & Bullock 2005). These studies used the quality management prescriptions of the quality pioneers mentioned before along with other quality management literature and award criteria such as the MBNQA and the EFQM to develop measurement items. Most of these studies’ primary goals were to identify the critical success factors of TQM and determine the relationships between these factors and firm performance outcomes. The objective of Adam (1994) was to identify the quality improvement and productivity improvement techniques that have the greatest impact on performance quality (e.g. total cost of quality, return and warranty costs) and operational and financial performance. Adam (1994) used the studies of Saraph et al. (1989) and
Benson et al. (1991) as the primary sources for his survey questions. He also included items from the 1991 MBNQA criteria. This study found a strong relationship between quality improvement approach and performance quality. Quality improvement approach also had a significant relationship with operating and financial performance. In addition the results of the study indicated that productivity improvement approaches were significant predictors of quality, operating, and financial performance.

This study (Adam 1994) was expanded by Adam et al. (1997) to compare the relationship between TQM factors and product quality and financial performance across three regions, Asia/South pacific (Australia, New Zealand, Hong Kong, Korea, Taiwan), Europe (UK, Spain) and North America (USA, Mexico). One of the objectives of this study was to test the 'culture-free' hypothesis that the relationships between quality improvement and performance are the same across and within geographical regions. The study found that the nine TQM factors extracted across three samples followed a similar pattern, were factors most important in one region were also the most important factors in other regions. Thus, these nine TQM factors were applicable in Europe, Asia and North America showing some support for the 'culture-free' hypothesis. However, all three regions were different from each other in terms of the relationships between the TQM factors and performance. Therefore, the authors concluded that there study supported the 'culture-specific' hypothesis in international management as far as the factor-performance relationships were concerned rather than the 'culture-free' hypothesis.

Curkovic et al., (2000), studied the impact of QAPs on quality performance and firm performance in USA. They concluded that not all QAPs have pervasive direct effects, but many have indirect effects. Fynes & Voss (2001) developed a path analytical model of quality practices, quality performance and business performance. Kaynak (2003) conducted a study in USA to investigate the relationship among TQM practices and to identify the direct and indirect effects of TQM practices on the various dimensions of performance using structural model testing. They found that a positive
relationship exists between the extent to which companies implement TQM and firm performance. Rahman & Bullock (2005) investigated the relationship between soft TQM and hard TQM on organizational performance. They found that the elements of soft TQM are significantly related to organizational performance.

2.1.4 CROSS-COUNTRY QUALITY INSTRUMENTS

The large scale cross-country study was conducted by Rao et al. (1997a) in India, China and Mexico, which found that the importance given to various TQM factors was consistent in the three countries. In addition, this study found that quality results measured by levels of scrap and rework, productivity, market share, and so on, were not significantly different in the three countries. Rao et al. (1999) tested the validity of a TQM instrument consisting of 13 TQM factors using samples of companies from the USA, India, China, Mexico and Taiwan. Their analysis yielded that all the fit indices were at acceptable levels across all the five samples representing each of the five countries. The authors used this result as the basic to develop and validate a common TQM instrument that could be used in various countries for other comparative international studies. In a related article, using the same samples of USA and Mexican companies, Solis et al. (2000) tested the relationship between seven TQM factors and quality performance in Mid-West USA, and north and central regions of Mexico. They found that although the seven TQM factors and quality performance were indeed related, the strength of these relationships varied from region to region, Customer focus and top management support were especially highly correlated with quality performance in all three regions. The study's results also showed that only customer focus and employee training were the common TQM factors in all three regions, which led them to reject the hypothesis that TQM factors are universal. In addition, the authors found that different sets of demographic (e.g. workforce education and age) factors contributed to better quality performance in each of the three regions. In another related article, Rao et al. (1999) examined 14 human resource development practices of Chinese, Indian and Mexican companies within a TQM context. They found that all three countries commonly showed strength in three of these practices:
training in specific work skills, building quality awareness and availability of resources for employee training. In addition, the three countries commonly displayed weaknesses in four human resource development practices (training in basic statistical techniques, training in advanced statistical techniques, employee involvement programmes and employee participation in quality decisions).

2.1.5 QUALITY INSTRUMENTS BASED ON MBNQA AWARD CRITERIA

As mentioned before, most of the studies related to TQM factors developed quality management critical success factors based on an extensive literature review. However, other studies (e.g. Shortell et al. 1995, Black and Porter 1996, Caminos 1996, Anderson et al. 1998, Samson and Terziovski 1999) used various award criteria as a framework for analysis and to develop critical success factors. One of the most widely used award structures is that of MBNQA.

Black and Porter (1996) attempted to develop a framework for TQM using the perception of industry and commerce practitioners. To measure these perceptions, the study took the 1992 MBNQA model as the basis to come up with items for the 'non-results' categories of TQM. After literature review, Black and Porter also decided that there were a few aspects of TQM that were not addressed sufficiently in the MBNQA framework. These included 'management of suppliers', 'determination of quality costs', 'encouragement of a company quality culture' and 'active leadership by management'. Additional items representing these issues were included in the questionnaire. Using factor analysis, a total of 10 factors were extracted in this study, which represented the critical success factors of TQM.

Anderson et al. (1998) also used the MBNQA as framework to develop quality management (QM) critical success factors. The study examined the casual relationships between QM practices and logistics operational performance and customer service using data from a sample of 340 shipper members of the American Society of Transportation and Logistics. Anderson
et al. argued that the CSFs extracted from previous studies such as those by Saraph et al. (1989) and Black and Porter (1996) were similar to the MBNQA criteria. They also contented that the works of quality gurus including Deming, Juran, and Crosby and the perspective of the MBNQA all suggest that QM is a process made up of casual relationships. Therefore, a causal model based on the MBNQA criteria could be tested using path analysis.

Like Anderson et al. (1998), Samson and Terziovski (1999) argued that although the TQM factors established by various studies were somewhat different, these differences were not substantial. Therefore they chose to use the MBNQA framework categories, which they referred to as 'well established factor set'. The objective of this study was similar to that of the other studies mentioned above in that it examined the effect of TQM practices of manufacturing firms on performance.

Wilson & Collier (2000) developed a MBNQA causal model and hypothesized the general MBNQA theory that “leadership drives the system that creates results”. The results of their study confirmed the existence of strong evidence that the general MBNQA theory and criteria are consistent predictors of organizational performance.

2.2 THE PRESENT STATE OF TQM

TQM of tomorrow presents a different scenario. Market dynamics are changing on a continuous basis. New global markets are presenting newer challenges that change constantly, causing stressful competitive environments (Mehra et al., 2001). There is no doubt that the era of TQM is upon us, but whether it is making a lasting impact on organizations or is just a passing fad remains a much-debated topic within management circles. On the one hand, its advocates (e.g. Dale, 1994; Oakland, 1993) see quality as the most important competitive weapon for organizational survival: quality management proponents like Oakland (1993) went as far as calling TQM the ‘way for managing for the future’. Of the twenty-nine TQM companies examined, Zairi et al. (1994) reported that twenty-two of these companies outperformed their industry averages in profit margin, return on total assets,
turnover per employee, fixed asset trends and average remuneration. Amid such popularity, quality management has however not been spared its share of criticisms. Among its critics are management academics that have not been converted by the quality ‘religion’ and have seen quality management as the latest management fad to go out of fashion.

2.3 FULL TQM (OR) PARTIAL TQM?

The problem with TQM is not whether companies have been converted to the philosophy: many surveys have shown the philosophy being embraced by organizations (Yong & Wilkinson, 1999). The issue relates more acutely to whether these supposedly TQM companies are actually practising ‘total or partial TQM’ (Wilkinson et al., 1998). Many studies have indicated a ‘scarcity of full or proper TQM and the widespread adoption of TQM practices in a partial manner’ (Hill and Wilkinson, 1995: 10).

Like many other recent management ideas, TQM suffers from this same predicament and is expected to bring about instant financial results, but, as the TQM philosophy has continuously emphasized, a ‘quick fix’ approach will not work for it (Wilkinson and Witcher, 1991); the true benefits of TQM will be longer term. To expect tangible cost savings from quality programmes within a year of introducing the TQM initiative may be unrealistic and perhaps accounts for a proportion of the less-than-positive outcomes of TQM. Indeed, Japanese companies successful mastery of quality management can be seen as reflecting their tenacity and experience.

Proper or ‘full’ TQM is unlikely to work on a pick-and-mix basis. In the 1980s, many US and British firms borrowed and transplanted piecemeal many Japanese ideas into their own Western environment. Quality control circles and statistical process quality were two such techniques that the Americans and Europeans singled out as main contributors to the Japanese success and which they attempted to duplicate at their own organizations - but without much success (Hill, 1991). Although cultural differences were first blamed for their failures, management practitioners and academics eventually came to the conclusion that the failures did not boil down to the Eastern culture or any
other peculiarly Japanese characteristics, but to a misunderstanding of the philosophical orientation underlying Japanese management. The company-wide approach to quality management, as practiced by the Japanese, is seen as a comprehensive and integrated approach that starts with rigorous planning and goal-setting by top managers, which is then deployed downwards through the organizational hierarchy to involve all employees. Besides long-term planning as its basis, Japanese TQM includes company-wide QC (that also includes their suppliers and sub-contractors); regular QC audits; education and training; quality circles; the application of statistical methods; and nation-wide quality activities (Dale, 1994; Ishikawa, 1985).

2.4 OBSTACLES TO ACHIEVING TQM

Instead of realizing total quality management, a partial approach to quality management seems to be increasingly widespread in companies. Following are some of the obstacles to achieving full TQM.

2.4.1 LACK OF TOP MANAGEMENT SUPPORT

A key tenet in TQM is the need for the chief executive and senior management team to create the right organizational climate, values, behavior and culture for TQM (Crosby, 1979; Deming, 1986; Garvin, 1991; Ishikawa, 1985; Juran, 1989). Far from being a common practice, lack of senior management commitment appears in reality to be the fatal flaw of many TQM initiatives (Wilkinson et al., 1993). This commitment deficit from senior managers transpires in many ways. Lack of a long-term strategy or vision TQM, like most change-management processes, requires a clear and long-term strategy or vision (MBNQA criteria, 1994). Financial measures like profits, costs, sales turnover, return on investments, and so on, still dominate the agendas of CEOs over longer-term issues such as quality improvements, technological investments, customer satisfaction or market share. This short-term approach may be due to the importance of institutional investments, and the way in which companies are rated by their ability to generate shareholders' value (Storey and Sisson, 1990); and when companies do well on such financial fronts, senior management may not see the need to
implement TQM. Further, TQM activities may not always generate a 'quick buck' and sometimes their benefits are intangible in nature.

In a business climate where fast profits are deemed as paramount, the absence of quick tangible results can be the death-knell to TQM activities as critics question the apparent lack of relationship between outcome and the large inputs of time, money and labor employed in TQM (Walsh, 1995). For this reason, Dale and Cooper (1994) argue for the adoption of TQM activities that produce some early financial gains in order to keep quality management going. However, longer-term notions of continuous improvement, quality improvement and customer satisfaction may need to form the basis of organizational strategies, if short-term idea is not to obstruct the successful implementation of TQM. Lack of time, or rather the lack of it, is often cited as a key reason for organizations not pursuing quality management initiatives (Dale and Cooper, 1994).

If top management adopts TQM because other firms have, the understanding of TQM and how it can be used to improve performance of the firm will be low. If understanding is low, commitment will also be low and will lead to early abandonment (Beer, 2003). These resource constraints apply not just to physical and human resources but also to managerial resources for TQM. Apart from the daily quality assurance activities practiced by companies, it is seen as important that management set up a TQM steering committee and a network of facilitators to guide the TQM process, as, without such longer-term planning and improvements, employees will focus their efforts on daily activities (Dale and Cooper, 1994). Thus management needs to ensure that the infrastructure for quality is built into the mainstream of planning and everyday activities of the company (Wilkinson and Witcher, 1991), and that employees are aware of their personal responsibility for ensuring quality in their work.

2.4.2 LACK OF TRAINING

Training is another activity that most management views as a cost rather than an investment (Dale and Cooper, 1994). However, TQM
proponents have pointed out that training of managers and employees is paramount if TQM is to succeed, as, without a quality-versed work-force, most improvement efforts will be short-lived, even if embarked upon: especially for the managerial level, training can help overcome fears of employee empowerment, as well as offering these managers the opportunity to develop their abilities to be involved in management decisions (Hyman, 1996).

Where companies have tailored their own quality management implementation, their initiatives were seen to be poorly conceived and bolted on, rather than integrated with key management policies (Wilkinson et al., 1992), leading quickly to disenchantment and failure. In such circumstances, it is probably not the senior management’s lack of action that led to less than ‘total’ TQM, but rather their lack of managerial responsibility and pragmatic judgment.

In situations where supervisors are less educated or are not as informed about new management practices, these staff may also be uncomfortable with their new roles as coaches and facilitators to the new problem-solving teams. Having adapted to a routine, this group of managers sees TQM - which advocates a change in work patterns and the need to adopt new skills - as an intrusion into the status quo (James, 1996). Training for TQM may include programmes dealing with elements of process improvement such as team skills, communication, interpersonal relations and team building (Curry et al., 2002). Cynicism may also contribute to the managerial resistance from this level. Failures of previous initiatives with similar broad objectives to TQM may be partly to blame for this pessimism.

2.4.3 LACK OF EMPLOYEE EMPOWERMENT

Indeed, instead of greater autonomy and worker discretion, employees have found that under a TQM manufacturing system, management can delegate responsibility to teams and individuals while still retaining authority and disciplinary control over employees through its sophisticated structure of electronic surveillance and information management.
While management might see TQM as the route to competitive advantage for the company, perspectives of other organizational players may be different. Especially in societies where the emphasis is on individualism and where there is a weak sense of corporate community, employees and managers may choose to pursue their own sectional interests. While senior managers may talk of quality as the top priority, supervisors place it as a secondary objective behind meeting production schedules (Garvin, 1986). A study of attitudes towards quality found that there was greater belief in 'quality is free' philosophies at top management, than at lower managerial levels. Often, in the haste of trying to put a TQM framework together, senior management fail to consult employees about their plans. Instead, quality initiatives are forced on employees, and employers expect their subordinates' compliance and participation by stressing 'make-or-break'.

When there is limited employee involvement and the emphasis on trust is overlooked, it is not surprising that such TQM initiatives, after initial enthusiasm, fail, as managers are disappointed about the lack of progress, while workers are disenchanted by their lack of involvement (Wilkinson et al., 1992). Although the TQM organization is supposedly characterized as one in which employees are trusted and empowered to take on more responsibilities, the reality can be centralization of power and control by management, rather than the reverse (Sewell and Wilkinson, 1992). In a TQM context, supportive social environment is likely to encourage employees' TQM practices (Yeh, 2003).

Barriers between departments/functions, TQM calls for employees to work together and this requires both teamwork and open communications throughout the organization.

2.4.4 LACK OF CUSTOMER FOCUS

A misunderstanding of customer satisfaction, a lack of feeling for what drivers customer loyalty, and an improvement in areas that add little or no value to the customer also can lead to TQM failure (Tatikonda et al., 1996). Customer satisfaction is a moving target and changes continuously. To be
successful, the TQM effort must focus on understanding expectations and developing programs to meet and exceed them.

2.4.5 QUALITY CERTIFICATION ISSUES

Running in parallel with the growth of TQM has been the promotion of quality certification systems, like the ISO 9000 series of quality standards. While these international quality systems can play an important role in ensuring that company procedures and practices run consistently to meet needed quality standards, thus leading to increased competitiveness and profitability for companies, there is a growing body of evidence which is suggesting that quality certifications are being used by companies as marketing gimmicks to increase sales (Wilkinson et al., 1993) rather than being genuine commitments to quality or continuous improvement. The concept of TQM is broader and deeper than ISO 9000. TQM is identified to be for internal organizational use and tends to go beyond customer satisfaction, while ISO 9000 is only for external assessment needs in order of achieving customer satisfaction (Magd and Curry, 2003).

Other criticisms being directed against quality certification have included its tendency to be too bureaucratic and systems-based (Ashton, 1993). Instead of bringing about continuous improvements, some companies even see quality certifications as an ‘end in themselves’. The high level of paperwork and administrative work tied to ISO 9000 quality systems have been perceived as adding little value to quality improvement (Street and Fernie, 1992).

However, the criticisms leveled at ISO 9000 are not to say that its standards are entirely redundant. Its objectives and advantages have been well documented but the confusion is often with companies who seek registration to ISO 9000 for the wrong reasons and, in the process, end that these standards are failing them. As Wickens (1995) puts it, the ISO is useful as it ‘adds more control to [the company] s commitment to quality, but if [the company] does not already have this commitment, it will be putting the cart before the horse’.
2.4.6 QUALITY MEASUREMENT ISSUES

There are two extremes to the problem of measuring quality. At the one end, there are the companies who measure too many indicators, many of which are not very useful and do not pertain significantly to quality improvements (Brown, 1993). When companies take on too many performance indices to monitor, control will inevitably be lost and the company may end up being more bureaucratic. At the other end of the spectrum are the companies that do not measure their quality, thus being without any knowledge of where their quality improvement effort is heading. Or, if they do measure, they measure the wrong things (Brown, 1993). In recognition of the difficulties in measurement and attribution of the impact of TQM implementations, a self-reported, self-referenced indicator of overall perceived success was used ((Taylor and Wright, 2003).

According to the literature, companies should select the quality measurements that will enhance customer satisfaction and improve their performance (AQF and Ernst & Young, 1991). Brown suggests measures should not be adopted just ‘because the Baldrige criteria or ISO standards tell you they are important, unless they impact upon the key results for [the] company’ (1993: 86). When indicators are measured without any substantive reasons behind them or are seen to be of little use in improvement efforts, employees are going to be skeptical and measures are not going to provide accurate or timely information.

The proponents of TQM have not given much attention to the nature of uncertainty faced by organizations and propagated TQM as a universally applicable methodology. As a result, TQM is in danger of being oversold, inappropriately implemented, and ineffective (Rahman, 2004). Among the strongest impetus for companies to adopt TQM is the presence of a business crisis (Oliver and Davies, 1990). Inevitably, without such sense of urgency, companies and their management are rarely motivated to implement TQM or stick with the rigors of such change-management strategies. While there are many reports and commentaries declaring the death of quality management,
there are also studies that are more optimistic, heralding the many benefits and values of such a management approach (Yong & Wilkinson, 1999).

2.5 REVIEW OF LITERATURE ON SUSTAINABLE DEVELOPMENT OF TQM

Gladwin et al., (1995) defined sustainable development as 'development, which meets the needs of the present, without compromising the ability of future organizations to meet their own needs'. TQM is an integrated approach for the pursuit of customer satisfaction (Chin et al., 2001). However facing intense pressure of global competition, organizations need to consider incorporating the idea of sustainability in TQM in order to sustain competitive advantage and improvement (Zairi, 2002).

Dale et al. (1997) used fieldwork and the academic literature to identify a number of issues which impact negatively on sustaining TQM in manufacturing organizations. The issues reflect a variety of business operations perspectives including continuous improvement, organizational behavior, human resources management, industrial relations, and the labor process. Dale et al. grouped the issues into the following five categories:

(1) internal/external environment;
(2) Management style;
(3) Policies;
(4) Organization structure, and
(5) The process of change.

They suggested that during the long-term change process toward TQM, there could be inconsistencies between policies and operations within each of these five categories, which can impede the quality journey. Various authors mention factors, which they consider contribute to the failure of TQM. These factors might give ideas about what to do in order to help the survival of TQM. Fuchs (1993) identified two root causes, which he calls roadblocks in the path of companies that strive to use TQM for competitive advantage, namely: (1) lack of focus on strategic planning and core competencies, and
An approach to effectively countermeasure these root causes should lead to better deployment of TQM. The authors argue that the success of a TQM plan depends on the congruency that exists between the plan and the organization's goals and culture. And this, according to these authors, requires that companies follow some basic guidelines when approaching TQM implementation, including:

- The implementation process is not done in a piecemeal fashion, but as an integrated systems approach.
- There is congruency between TQM goals and organizational goals.
- The choice of TQM tools is based on its contribution to achieve goals.
- There is congruency between the implementation strategy and the culture.

Matta et al. (1996) developed propositions for research which fall into four groups dealing with

- Cultural change,
- Focus of the TQM approach,
- Employee ownership of the processes, and
- Strategic partnering with customers and suppliers.

Each of these four issues is critical to the implementation and sustainability of TQM in organizations, according to these authors.

Shani et al. (1994) conclude that the major lessons learned from companies experiences of successfully implementing TQM programs are: (1) work toward congruence between company strategy and quality strategy, (2) create arenas and mechanisms that foster on-going organizational dialogues about quality and quality improvement, and (3) build the company culture with stories and myths concerning how the organization addressed quality problems and issues related to quality. These lessons have to be followed in order to get sustainable TQM.

Garvare & Isaksson (2001) define sustainable development as 'the process to reach a steady state where both humanity and nature thrive'.
Sustainable development is based on perceived need to address environmental deterioration and to maintain the vital functions of natural systems for the well-being of present and future generations. Zairi & Liburd (2001), define sustainability as the ‘ability of an organization to adapt to change in the business environment to capture contemporary best practice methods and to achieve and maintain superior competitive performance’. This concept implies that sustainability is a means for an organization to maintain its competitiveness.

Garvare & Isaksson (2001) suggest that many different concepts can be applied as measurements and indicators of sustainable development. They propose four categories of indicators divided as: 1) Driving force; 2) State; 3) Reactive response; and 4) Active response. They argue that excellence for sustainable development can be built on the triangle ‘person-organization-society’. In other words, TQM effectiveness and organizational performance can be measured by using the self-assessment framework of quality management such as EFQM award, MBNQA award, Deming prize of Japan (Kunst & Lemmink, 2000). Sustainability of TQM is determined by the successful implementation of CSFs as proposed by the award criteria (Zairi, 2002).

2.6 THE IMPORTANCE OF TQM SUSTAINABILITY MODEL

Increasingly organizations accept that TQM is a way of managing activities to gain efficiency, effectiveness and competitive advantage, thereby ensuring longer-term success in meeting the needs of their customers, employees, financial and other stakeholders and community at large (Zairi, 2002). The implementation of TQM programmes can achieve significant benefits, such as increased efficiency, reduced costs and greater satisfaction, which all lead to better business results. Regardless of business sector, size, structure or maturity, organizations establish a management system to achieve long-term success and sustainability. Organizations need to adapt a TQM process and the critical success factors if they are to achieve business excellence. Measurement gives strength, continuity and sustainable performance. As excellent organizations develop and improve, and regularly
upgrade their strategic 'scorecard', over time this will translate into effective leadership at all levels that practices management by fact, and inculcates a continuous improvement culture that enhances people performance that produces customer delight and good business results (Zairi, 2002).

2.7 THE REVIEW OF TQM SUSTAINABILITY STUDIES

Zairi (2002) proposed the following critical success factors (CSFs) thought to be impinging mostly on TQM sustainability. The CSFs were grouped under the broad criteria of the MBNQA and EQA models.

1. Leadership and top management commitment
2. Strategic planning and policies
3. Information analysis
4. Customer services
5. Partnership and resources
6. People management
7. Process management

Zairi proposed the TQM maturity and sustainable performance model (TQM-MSPM). The model proposes the creation of an organizational system that fosters cooperation, learning and innovation in order to facilitate the implementation of process management practices. This in turn, according to the author, will lead to continuous improvement of processes, products and services and ultimately to the survival of the organization.

Ton Van Der Wiele et al., (2002) conducted a longitudinal study of quality management activities in five large Australian organizations over a decade and presented the basis for an insight into the factors which impact on the sustainability and direction of the quality management over the longer term. Findings identify a number of factors which impact on the continuity of quality management over the longer term. These include:

1. The tenure of the CEO and the executive board;
2. The quality foundations which have been created through quality initiatives in the past;
The driving force behind the quality management journey;

The management system and the extent to which quality is integrated into the system;

The role of audits and assessments;

The role of quality frameworks; and

Customer orientation and information systems.

The authors found that the significant factor impacting on quality in all cases is the role of top management.

Ahmad & Schroeder (2002) used part of data collected from Germany, Italy, Japan and the USA by the world class manufacturing (WCM) project (Flynn et al., 1996) and studied the importance and selection of employees in sustainability of total quality management. According to the results, the authors found that the organizations concentrate on employees' technical skills without simultaneously evaluating their behavioral skills. The findings emphasized that checking employees' behavioral traits during the recruitment and selection process is crucial for achieving superior plant competitiveness and sustainable development.

Yeh (2003) through a study in USA concluded that a successful TQM implementation requires employees' engagement in extra-role behaviors. This study identified critical success factor embedded in the organizational system that may enhance or hinder employees' participation in TQM activities. According to the author, factors including training and project involvement, job characteristics, organizational structure, social support, and employees' self-efficacy were expected to influence employees' extra-role behaviors.

Taylor & Wright (2003) conducted a longitudinal study in a cohort of 109 firms in UK over a 5 years period to find out the link between TQM implementation and successful outcomes. The data suggested that the size of the firm, the nature of the customer base and the holding of ISO 9000 series certification has had no significant effect on TQM outcomes for this cohort. The research has highlighted some necessary antecedents for TQM
success. In particular, managers need to understand the nature and purpose of TQM, its relationship to ISO 9000 and the potential benefits that accrue from its implementation.

2.8 GAPS IN THE LITERATURE AND THE MOTIVATING FACTORS FOR THE PRESENT RESEARCH

The first empirical study that attempted to identify the critical success factors of TQM that must exist in business unit was published by Saraph et al. in 1989. Since then, various empirical studies were conducted and as a result, a large number of critical success factors were reported. TQM literature review studies that were published so far had a broader focus and hence reviewed all the empirical studies published during the period under their review and reported most of the CSFs of the studies reviewed. However, CSFs corresponding to the rigorous scale development or performance measurement studies undergo statistical analysis like reliability analysis and validity analysis and hence are highly grounded in TQM when compared to the CSFs reported based on literature, or the teachings of quality gurus. Such distinctions of CSFs were not seriously made so far and hence literature review based on this concept will yield a new dimension to the compilation of CSFs. It was observed that application of QC tool ‘Pareto analysis’ to sort the CSFs in the order of ‘vital few’ and ‘trivial many’ was not attempted so far. Such analysis will yield CSFs arranged in the order of criticality.

So far, the empirical studies were conducted and quality instruments were developed in various countries by postal ‘mail interviewing’. The present time period is ‘Information Technology’ era. Web-site addresses and e-mail IDs are common among business units and are widely used for communication and transfer of files. It appears that the use of Internet and e-mail is yet to occupy the ‘interviewing’ role in empirical studies. Therefore it is expected that the development of critical success factors and quality instrument based on internet will open a new gateway for future empirical studies.
From the review of literature on scale development studies, it appears that attempts have not been made so far to develop critical success factors and quality-related action programs by applying quality function deployment methodology (QFD). QFD is a proven technique to visualize the relationship among input performance measures and output performance measures in a matrix format. Deriving critical success factors and quality-related action programs through QFD will add a new approach in the vast arena of TQM literature.

Sustainability studies in TQM are in budding stage even after 2 decades of existence of TQM in manufacturing industries. Systematic methodologies, mathematical models or algorithms to identify the less developed areas of TQM are yet to gain momentum even after reporting of large number TQM failures. Presentation of a methodology for sustainable development of TQM and its validation in a manufacturing industry will help TQM organizations to reach a sustenance and maturity stage. Quantification of TQM implementation will help organizations to sort the critical success factors and quality-related action programs in the order of development. Such exercise will enable the organizations to focus attention on the less developed areas of TQM.
2.9. AN OVERVIEW OF THE RESEARCH PROJECT

An overview of the present research project is presented in Fig. 2.1. Step 1, the literature review, several research publications on TQM CSFs and QAPs were reviewed. In step 2, CSFs and QAPs from the existing literature were identified and their development process was documented.

The following three alternate methodologies were proposed in step 3 to benchmark and consolidate CSFs and QAPs for the sustainability program.

1. Pareto analysis of existing CSFs and QAPs identified from the literature.
2. Derivation and benchmarking of CSFs and QAPs through QFD approach.
3. Web-based empirical survey and development of quality instrument to measure CSFs and QAPs.

In step 4, CSFs and QAPs were consolidated and documented. CSFs and QAPs were reviewed through brainstorming sessions in step 5 and checked whether the list is comprehensive enough for sustainability of TQM. If yes, the process is continued to step 6, otherwise the steps 2 to 4 were repeated. The present level of TQM implementation was assessed by TQM implementation index (TQMII) calculation algorithm in step 6. TQMII quantifies and sorts the implementation level of QAPs and CSFs in ascending order. The organization can work out an action plan in step 7 based on TQMII to reactivate and develop the CSFs and QAPs towards a long term sustainability of TQM program.
Fig. 2.1 Studies on critical success factors and sustainability of TQM