

Critical success factors for total quality management implementation in small and medium enterprises

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Introduction

Total quality management (TQM) has grown to become an established field of research. The need for an improved understanding of the critical factors for successful TQM implementation is becoming more important. Much of the work to date has concentrated on large businesses, very little has been done in small and medium enterprises (SMEs). This paper reviews and analyses those critical success factors (CSFs) developed by previous authors such as Saraph *et al.* (1989), Ahire *et al.* (1996) and Black and Porter (1996). Some studies in SMEs are also discussed and the two sets compared to investigate potential weaknesses which could be further improved upon.

A set of CSFs for TQM implementation believed to be appropriate to SMEs is proposed. The paper culminates in a discussion of the development of a questionnaire to meet the purpose of this study, which is to investigate CSFs which are relevant to SMEs. Only through such an understanding can the task of TQM implementation in SMEs be made easier.

One of the main difficulties in studying critical factors of TQM is how to define and measure them before they become critical (Zairi, 1996). A study of CSFs was pioneered by Saraph *et al.* (1989) in which they derived a set of eight critical factors of quality management mainly from literature published by the quality gurus. They defined critical factors as those "critical areas of managerial planning and action that must be practised to achieve effective quality management in a business unit" (Saraph *et al.*, 1989). The study of CSFs was later pursued by other authors who approached the problem using different methodologies for factor derivation (e.g. Ahire *et al.*, 1996; Porter & Parker, 1993; Tamimi & Gershon, 1995), using a different set of factors (Black & Porter, 1996; Ramirez & Loney, 1993) and replicating the instrument in different cultures and countries (Badri *et al.*, 1995; Zairi, 1996). Table 1 presents a comparative summary of some of these main aspects.

Saraph *et al.*'s (1989) main objective was to develop an instrument to measure quality management practices in companies. They did not incorporate the perceived importance level for the factors proposed. Earlier, Garvin (1988) conducted a specific empirical study on the different quality practices that existed between Japanese and US air-conditioner manufacturers. From this he was able to determine certain practices, which contributed towards quality excellence, that were undertaken by the Japanese manufacturers. They

Table 1. *Comparison of some previous CSF studies*

Author	Purpose	Source of factors	Results/final instrument	Study on business size
Saraph <i>et al.</i> (1989)	To develop an instrument for studying critical factors of quality management	Mainly from concepts and prescriptions of quality gurus	Eight factors with 66 elements	Size arbitrarily set where small company defined to be 1000–5000 employees. Less than 1000 not considered
Black & Porter (1996)	To identify critical factors of TQM	Malcolm Baldrige Award model	10 factors with 32 elements	Not indicated
Ahire <i>et al.</i> (1996)	To develop implementation constructs of TQM	Mainly from the literature, including best practices in case studies (large businesses)	12 factors with 50 elements	Considered only plants with more than 100 employees
Tamimi & Gershon (1995)	To develop a tool for assessing TQM practices	Used Deming's 14 points	14 factors with 50 elements	Not indicated
Quazi & Padibjo (1998)	To assess training and consultancy support needs	Malcolm Baldrige/ Singapore Award model	Seven factors with 39 elements	For SMEs (mainly < 100 employees)

included management commitment for quality, quality programmes policies and systems, comprehensive product design, a system for vendor selection and management, production and workforce management and an integrated system of quality management. Clearly, these were the practices that supported and promoted quality excellence in those organizations.

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. However, they reported some factors with a very low practice rating, such as awareness among top management about quality improvement, training in basic as well as advanced statistical techniques and using statistical quality control techniques. Not only this, they also reported on several weaknesses of the instrument used, in which there were some factors which needed further explanation, one such example being effectiveness of the quality department in improving quality. Most service managers in their study reported that some quality factors such as technical assistance to suppliers and use of sampling techniques were irrelevant to their operations. Even though they compared manufacturing against service organizations' practices, they fell short of comparing small and large business practices. It can be argued that the factors used are large company-focused as well as being more suitable for manufacturing rather than the service sector, particularly when the 66 elements presented in the instrument are scrutinized.

Several authors have attempted to derive the critical factors using different methods. Black and Porter (1996) developed their factors using the Malcolm Baldrige Award criteria, on the basis that it is the best established and recognized framework for quality management. Tamimi and Gershon (1995) developed an instrument to measure quality management practices from Deming's approach. They used his 14 points as critical factors. It can be argued that these are essentially a list of things to do, prescribed by Deming, and not, in themselves, CSFs for TQM adoption.

Ahire *et al.* (1996) proposed a set of 12 implementation constructs of quality management strategies derived mainly from the literature. Their instrument is more applicable to manufacturing industry and, in fact, was tested and validated in this sector. Their main purpose was to develop a reliable and valid instrument for measuring quality management practices that affect product quality—rather a narrow view of TQM! It is not only product quality that is affected by proper quality practices, but also customer and human resource satisfaction and, above all, organizational quality performance.

From all these studies, there are two main areas of focus. The first centres around attempting to present systematically the factors within TQM, and the second, on the factors critical for implementation. They each represent a different concept. Critical factors for TQM, as proposed by Saraph *et al.* (1989), were developed because no one had attempted at that time to 'theorize and formalize' TQM. Most of the TQM practitioners were 'preaching' according to their understanding of the guru's teachings, which made TQM too philosophical. The authors believe that the set of critical factors formulated by Saraph *et al.* (1989) was intended to address this problem. The second approach on CSFs for TQM implementation as proposed by authors such as Black and Porter (1996) and Ahire *et al.* (1996) hinges around those important and necessary for making TQM adoption a success. Within the context of this research, the second area will be the focus of attention.

Another important aspect to be recognized is that although studies on CSFs of implementation were conducted for companies of all sizes, very few were found for SMEs. Quazi and Padibjo (1998) conducted a study in Singapore on those SMEs which are attempting to move towards TQM through the certification route. Their main objective was to help organizations identify their respective needs for training and consultancy support. Towards that end, they developed a survey instrument to measure quality management practices using the Malcolm Baldrige/Singapore Award criteria. Thirty-nine elements were produced from seven 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 the success of TQM and customer satisfaction is an implicit goal of the TQM process. Both of them are actually outcomes of TQM, and not critical factors. Blindly following the award criteria for CSFs 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.

Analysis of developed critical factors

The first important point to note is that most of the authors (Ahire *et al.*, 1996; Black & Porter, 1996; Saraph *et al.*, 1989) have derived their set of CSFs based on a large company approach. For example, Ahire *et al.* (1996) have used factors and elements which are not all deemed suitable for SMEs. One of them is 'design quality management'. They provided this factor with elements including:

- Our design engineers are required to have some shop-floor experience.
- Our design engineers are required to have some marketing experience.
- We use Taguchi methods extensively.
- We use error prevention techniques such as *shingo* in designing the manufacturing process.

These elements are believed by the authors not to be suitable for SMEs since not all of them are involved in design activities. For example, the statement, "... use error prevention techniques such as *shingo* ..." is too specific since it relies on a particular technique, namely

poka-yoke. It is believed that a much more general approach in describing elements to represent a certain factor be constructed, to reflect better an instrument that is applicable for SMEs. Design activities may not necessarily be a critical factor but it should certainly be included as elements within other factors such as systems and processes or quality tools and techniques.

The factor 'SPC usage' (Ahire *et al.*, 1996) is also thought to be too specific. 'Improvement tools and techniques', as proposed by the authors, would probably be much more appropriate. Another point is that SPC usage as a critical factor for TQM implementation can be misleading. The authors believe that SPC is just one of the many quality tools used for controlling, improving and monitoring product and process quality. In general, Ahire *et al.*'s instrument has not considered SMEs' characteristics. There are other factors which have not been taken into account, such as resources, which could be much more important in SMEs when implementing TQM. Such factors will be discussed in the next section.

Proposed CSFs for SMEs

This section of the paper describes the factors which were thought to be critical for SMEs. Without doubt, one should take into account their characteristics when developing CSFs for this sector. SMEs have certain problems that could hinder their progress towards implementing quality initiatives. One of the main problems faced by small businesses is their lack of resources, financial, human and technical (Yusof, 1998). Only through a proper understanding of those factors that contribute to implementation will the process of adoption be made easier.

Through the examination of previously proposed factors, there are some common ones which were thought to be applicable for SMEs. It is not the purpose of this paper to describe in detail those common factors, but rather to highlight and emphasize the ones which are believed to be important and have not been addressed before. The common factors are:

- management leadership, commitment and support;
- supplier quality management;
- employee relations, human resource management;
- training and education.

For our model, 10 factors are proposed, which are shown in Table 2. Even though there are some similarities with previous studies, there are some new factors which have been included. Resources, for example, has not previously been specifically identified as a critical factor. To date, authors have only described it as an element within a factor (e.g. Saraph *et al.*—availability of resources for employee training in the division—training factor). The working environment and culture is also an important factor for successful TQM implementation. Included in this factor are elements such as positive values being fostered by management, attitudes and behaviours being reinforced through a caring culture, and teamwork and involvement, all of which should be normal practices in a company. Only by having a working environment conducive to excellence will there be a positive attitude towards it.

A noticeable difference in the proposed set of factors from those of previous authors is in not identifying 'quality in design' as a critical factor. This aspect has been included as an element within 'systems and processes' (Element 7.1—systems and procedures on quality assurance are implemented) and 'improvement tools and techniques' (Element 4.1—statistical techniques used in design processes). As explained earlier, SMEs can be involved in design activities, but this should not be regarded as being a critical concern for TQM implementation success.

Table 2. Comparison of critical factors of previous authors against authors' model

Generic critical factor	Saraph <i>et al.</i> (1989)	Ahire <i>et al.</i> (1996)	Black & Porter (1996)	Authors' model
Management leadership	1. Role of divisional top management and quality policy 2. Role of quality department	1. Top management commitment	1. Corporate quality culture 2. Strategic quality management 3. Teamwork structures	F1. Management leadership F2. Continuous improvement system F9. Education and training
Education and training	3. Training	2. Employee training		
Quality in design	4. Product/service design	3. Design quality management 4. Supplier quality management	4. External interface management 5. Supplier partnerships	F5. Supplier quality management F7. Systems and processes
Quality in suppliers	5. Supplier quality management			
Quality in process	6. Process management/operating procedures 7. Quality data and reporting	5. Internal quality information usage	6. Operational quality planning 7. Quality improvement measurement systems 8. Communication of improvement information	F3. Measurement and feedback
Human resource management	8. Employee relations	6. Employee involvement 7. Employee empowerment 8. Customer focus	9. People and customer management 10. Customer satisfaction orientation	F6. Human resource management
Customer focus				
Tools and techniques		9. Benchmarking 10. SPC usage 11. Product quality (output construct) 12. Supplier performance (output construct)	F4. Improvement tools and techniques F8. Resources F10. Work environment and culture	
	Eight factors with 66 elements	12 factors with 50 elements	10 factors with 32 elements	Proposed 10 factors with 58 items

Pilot study

In order to investigate further CSFs in SMEs, a questionnaire was developed using some general rules as provided by Fowler (1998). The questionnaire was divided into three main sections: (i) background information; (ii) perception of TQM; and (iii) perceived importance and practices of the 10 critical factors. The first section was intended to determine some basic information, such as business size (to confirm its classification as a SME), types of certification gained and the year in which it was obtained, and also whether the company has embarked on any TQM initiative. The second section on TQM perception provided 15 different statements on which respondents were asked to rank their level of agreement. This was purposely put forward to gauge their level of understanding of the major aspects of TQM. It was not intended to test the respondents. These results will be important for correlating with the responses regarding critical factors.

A pilot study was conducted to validate and improve the questionnaire, in terms of its format and layout, the wording of statements and also the overall content. A total of 18 forms were distributed to two groups of quality experts: quality practitioners in small businesses and quality professionals (consultants and academics) specializing in SMEs. Eight responses were received (nearly a 45% response rate) and analyzed.

Some concern was expressed on sentence structure and the description of some of the elements. For example, "Management improve communication" was changed to "Communication links established between employees and management", and "Critical processes are identified and measured for improvement" was broken down into two elements, "Critical processes are identified for improvement" and "Measurements from critical processes are taken for improvement purposes". In this way, the questionnaire was greatly improved, providing clarity and ease of understanding for the full survey. Two additional elements were included to give a total of 58 elements within the 10 critical factors proposed.

Another point worth mentioning here was a change in the wording of a question asking whether TQM had been implemented or not. The initial question was worded directly as 'Has your company started implementing TQM?', with a yes/no response. A comment from one consultant provided the authors with ideas to change it into one giving a range of 10 minor quality initiatives and asking the respondents to indicate which they had implemented. Examples included setting up a quality department, applying statistical process control, developing strategies for total quality, adopting a cultural change programme, etc. This would provide a better indication of what a company had implemented in the way of TQM initiatives.

In short, the questionnaire was validated through this pilot study and provided the authors with improvement opportunities before launching the main survey.

Conclusions and future research

CSFs, which reflect the small business sector, have not been systematically investigated to date. Many of the studies have focused on large companies, very few were found relating to smaller businesses. Most have incorporated previously developed instruments which were not really intended for this sector. The CSFs for small organizations may well be similar to these, but without any attempt systematically to identify or validate them, it is still uncertain as to whether they are.

Through a detailed examination of previous studies and the ongoing research on TQM in small businesses (see Yusof, 1998), the authors have proposed a set of 10 CSFs which are believed to be more suitable for SMEs. A questionnaire to be used as the instrument for

investigating the proposed CSFs was developed. It was piloted using quality experts and practitioners in SMEs. This pilot study gave the opportunity for the questionnaire to be validated and improved upon before being used in the main survey, the next stage of this research. Future research will focus on a systematic investigation of the critical factors for TQM implementation and provide a basis for developing a TQM implementation framework that will be useful for the small business sector.

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