An empirical study of critical factors of TQM in Palestinian organizations

Samir Baidoun

The authors

Samir Baidoun is an Assistant Professor in the Department of Business Administration, Birzeit University, Birzeit, Palestine.

Keywords

ISO 9000, Total quality management, Quality programmes, Implementation, Palestine

Abstract

This paper presents the results of a questionnaire survey to investigate factors of quality that are absolutely essential for successful implementation in Palestinian organizations. Out of a possible list of 78 names of organizations, 78 were targeted, with 78 usable questionnaires returned, thus giving a response rate of 100 per cent. The analysis led to the development of a criticality quality factor structure, comprising 19 factors sorted in descending order of criticality through three tiers. All of the factors were found to be supported by similar studies and quoted literatures.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0957-6053.htm

Logistics Information Management
Volume 16 · Number 2 · 2003 · pp. 156-171
 · ISSN 0957-6053
DOI 10.1108/09576050310467296

Introduction

To be successful in the marketplace, each part of the organization must work properly together towards the same goals, recognizing that each person and each activity affects and in turn is affected by others. To improve competitiveness, organizations are looking for a higher level of effectiveness across all functions and processes and are choosing TQM as a strategy to stay in business. The increased awareness of senior executives, who have recognized that quality is an important strategic issue, is reflected as an important focus for all levels of the organization (Oakland, 2000). This requires defining and implementing several factors (identified as quality factors in this paper). These quality factors include top management commitment and involvement, employee empowerment and culture. These factors are known by some writers as the soft aspects of management, while the hard aspects include factors such as improvement tools and techniques and systems (Wilkinson, 1992; Oakland, 2000). However, these quality factors for successful implementation of TQM cited in the literature are not formulated on the basis of empirical research (Black, 1993; Black and Porter, 1996; Thiagarajan *et al.*, 2001).

Factors such as top management commitment and leadership, people management, policy and strategy, partnership and resources management and management of processes, are generally considered as the initial inputs to the implementation of TQM. According to the European Foundation for Quality Management (1999), these factors are called the enablers. In this model of excellence, essentially customer satisfaction (results), employee satisfaction (results) and a favorable impact on society (results) are achieved through leadership driving and strategy, people partnership, resources and processes, which lead ultimately to excellence in business results (key performance results). The enablers deliver the results, which in turn drive innovation and learning (Oakland, 2000).

The purpose of this paper is primarily identifying the critical quality factors by interpreting the consensus amongst TQM organizations in Palestine as to the level of perceived importance of each of the 31 quality factors required for the success of TQM implementation in their organizations and

Logistics Information Management
Volume 16 · Number 2 · 2003 · 156-171

secondly to stratify these factors in a hierarchical structure in a descending order of criticality.

Literature review

Leadership and top management commitment

Promoting organizational commitment is achieved as a result of top management commitment (Everett, 2002; Buch and Rivers, 2002). Leiter and Maslach (2002) consider commitment of senior executives as a (more) important factor of TQM whereas, their doubts are the greatest enemy (Kano, 1993). Commitment of top management is also highlighted as a critical factor by several empirical studies (Ramirez and Loney, 1993; Zairi and Youssef, 1995; Ali, 1997; Ahire *et al.*, 1996; Ahire, 1996; Dayton, 2001; Saraph *et al.*, 1989; Flyn *et al.*, 1994; Thiagarajan, 1996; Rao *et al.*, 1999; Zhang *et al.*, 2000; Pun, 2001; Sureshchandar *et al.*, 2001; Lau and Idris, 2001; Li *et al.*, 2001).

People management

The revised (April 1999) EFQM model of excellence, and indeed the April 2000 revision of the UK investors in people standard, both place increased emphasis on the consideration of culture and employee motivation in terms of delivering organizational outcomes (Bowden, 2000; Wuagneux, 2002). Kanji (1998a) proposes people management including "team work" and people make quality, as one of the four principles of TQM. Employee involvement and commitment to the goals of the TQM process is a condition to its successful implementation (Buch and Rivers 2002; McAdam and Kelly, 2002). Recent studies identified employee empowerment as a critical factor of TQM implementation (Martinez-Lorente *et al.*, 1998; Li *et al.*, 2001; Claver *et al.*, 2001; Davidson *et al.*, 2001; Dale *et al.*, 2001; Zhang *et al.*, 2000; Rao *et al.*, 1999; Westlund and Lothgren, 2001).

Middle management involvement

Thiagarajan and Zairi (1997) consider the act of maximizing employee involvement in the quality process requires middle managers within the organization to make major adjustments. The middle management have a particular role to play, since they must not only grasp the principles of TQM, they must go on to explain them to the people for whom they are responsible, and ensure that their commitment is communicated (Oakland, 2000).

Training and education

For Mathews *et al.* (2001a, b) the training that underpins quality management determines the likely effectiveness of the quality initiatives undertaken. Zhang *et al.* (2000) consider investment in education and training vitally important for TQM success (also Cebeci and Beskese, 2002). Several recent empirical studies revealed that training and education are critical to successful TQM implementation (Thiagarajan and Zairi, 1998; Quazi and Padibjo, 1998; Rao *et al.*, 1999; Zhang *et al.*, 2000; Yusof and Aspinwall, 2000; Black and Porter, 1996; Tamimi, 1998; Pun, 2001; Calisir *et al.*, 2001; Dayton, 2001).

Rewards and recognition

According to Oakland (2000), TQM is user-driven. Kemp *et al.* (1997) consider the recognition procedure as basic to increasing the involvement of all employees in the operation of the business. Many other authors highlight the importance of rewards and recognition in the TQM process (Easton, 1998; Haksever, 1996; Rao *et al.*, 1996; 1999; Li *et al.*, 2001; Dayton, 2001; Martinez-Lorente *et al.*, 1998; Everett, 2002).

Teamwork

One of the most publicized aspects of the Japanese approach to quality has been the quality circles or kaizen teams (Oakland, 2000; Goh, 2000).

Reviewing the literature reveals that teamwork is a critical factor in Total Quality Management (Crosby, 1989; Kanji and Asher, 1993; Cebeci and Beskese, 2002; McAdam and Kelly, 2002; Everett, 2002). One of the major elements of the human resource focus that has been identified by Mehra *et al.* (1998) as a critical success factor to the success of TQM programs is teamwork.

Quality policy and strategy

Quality gurus and writers strongly emphasize the importance of strategic planning process based on total quality (Deming, 1986; Zairi, 1994; 1999a; Oakland, 1993; James, 1996; Ahire *et al.*, 1996; Sinclair and Zairi, 2001;

Dayton, 2001; Martinez-Lorente *et al.*, 1998; Sureshchandar *et al.*, 2001; Crepin, 2002; Hitchcock and Willard, 2002).

Communicating for quality
According to Kanji and Asher (1993) effective communication is part of the cement that holds together the bricks of the total quality process. Effective communication is important for the success of any quality initiative (Martinez-Lorente *et al.*, 1998; Sureshchandar *et al.*, 2001) and is critical from the beginning of a change effort. Every element of the change must be talked about, presented and discussed, across levels of the organization (Rao *et al.*, 1996; Claver *et al.*, 2001; Dayton, 2001; Tamimi and Sebastianelli, 1998; Salegna and Fazel, 2000).

Supplier management
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.*, 2000).

Many authors advocate that companies must establish supply chain partnerships to motivate suppliers to provide materials needed to meet customer expectations (Clifton, 2001; Jabnoun, 2000; Thakur, 2002; Wong *et al.*, 1999; Wong, 2000; David, 2002). Other recent studies support these findings (Dayton, 2001; Lau and Idris, 2001; Martinez-Lorente *et al.*, 1998; Thiagarajan *et al.*, 2001).

Accredited quality management system
The ISO 9000 series certification can be defined as the starting point for entering the competition; the ongoing journey towards TQM must deliver the competitive advantage (Van der Weile and Brown, 1998; Quazi and Padibjo, 1997; 1998; Williams, 1997; Stahan, 2002; Kolka, 2002). Many organizations consider ISO 9000 certification as the first step in the implementation process of TQM (Oakland and Porter, 1994; Shipley, 2002). A documented quality system as part of a TQM strategy can contribute to TQM by managing the organization's processes in a consistent manner (Zhang *et al.*, 2000). Beattie and Sohal (1999) state that most firms will operate ISO 9000 concurrently with another quality activity, usually TQM (see also Quazi and Padipjo, 1998; McAdam and McKeown, 1999; Zhu and Schenerman, 1999; Beskese and Cebeci, 2001; Kanji, 1998b; Khan and Hafiz, 1999).

Organizing for quality
Moren-Lozon and Peris (1998) developed an integrated model for strategic management, organizational design and quality management. They classified quality organization into the quality assurance (characterized conformity) and the TQM organization (characterized by internal and external customer satisfaction, continuous improvement and employee involvement) indicating low formalization and centralization organizational structure (Jabnoun, 2000).

Oakland and Porter (1994) consider that one of the responsibilities of senior management at the early stage of initiating the TQM program is the set up of a quality organizational structure. Such structure is needed to create a framework, which will enable quality improvement to develop and flourish (also Easton, 1998; Oakland, 2000). They consider the quality organizational structure as a key element in ensuring successful implementation of TQM.

Managing by processes
To achieve customer satisfaction, Oakland (2000) emphasizes the importance of managing the internal-supplier relationship as the first step to support the process management. Through a process of translating the customer-supplier chain at all levels, better focus can be achieved and ultimately all work carried out will be of value (Zairi, 2000; McAdam and Kelly, 2002; Feigenbaum, 2002).

The importance of customer focus is also evident from the fact that it is assigned the highest weight among the Malcolm Baldrige Award criteria (NIST, 1999) and the European Quality Award (EFQM, 1999).

Benchmarking
Many authors see benchmarking as a vital tool in the development of TQM (Sinclair and Zairi, 2000; 2001). For Dow *et al.* (1999) benchmarking can be seen as a "hard" quality practice providing some systematic analysis of the achievement of quality goals. Benchmarking has also been demonstrated to be a catalyst for the success of a number of other organization change interventions, for example business process re-engineering

(Thor and Jarrett, 1999), improved operational performance and general changes in organizational thinking and action (Cassell *et al.*, 2001). Jarrar and Zairi (2000) state that benchmarking or best practice management is increasing being recognized as a powerful performance improvement effort for processes, business units, and for entire corporations.

Dervitsiotis (2000) states that it is noticeable that not only consulting firms but also organizations such as the American Productivity and Quality Centre, and the European Foundation for Quality Management are seriously engaged in the promotion of and training in benchmarking as a fundamental approach to achieve business excellence (McAdam and Kelly, 2002).

Self-assessment

Self-assessment highlights strengths and improvement opportunities, and drives continuous improvement (Oakland, 2000; Conti, 1999).

The introduction of various quality awards has provided impetus for the implementation of TQM (Sinclair and Zairi, 2001). The introduction of internationally respected quality awards (Deming Prize, 1951; MBNQA, 1987; EQA, 1992) has provided the opportunity for firms to assess, using the models of total quality management (TQM) and business excellence, which underpin these awards, the strengths and areas for improvement of their approaches to business improvement (Wilkes and Dale, 1998; McAdam and Kelly, 2002). Since the award criteria of MBNQA (1999) and the EQA (1999) are generic and well documented, they serve most often as the model for self-assessment (Kueng, 2000).

Cost of quality

Quality costs are used by management in its pursuit of quality improvement, customer satisfaction, market share and profit enhancement. It is the economic common denominator, which forms the basic data for TQM (Oakland, 2000; Bland *et al.*, 1998).

Quality costing is one measurement technique that has often been used to help justify the adoption of quality improvement efforts to senior managers (Sinclair and Zairi, 2001). A number of world-class organizations do employ quality-costing measures as an indication of internal quality performance (Dale and Plunkett, 1999).

Quality control techniques

Statistical process control is one of the cornerstones of the model for TQM developed by the European Centre for Total Quality Management (Sinclair and Zairi, 2000). Statistical Process Control is not only a tool kit; it is a strategy for reducing variability, part of never-ending improvement (Oakland, 2000).

The aim of statistical process control and control charts is first to achieve a stable process and then to reduce successively process variation (Stenberg and Deleryd, 1999).

Another statistical quality control tool to focus on customer satisfaction is the six-sigma (Munro, 2000; Coronado and Antony, 2002). Harry and Schroeder (2000) in Munro (2000) define the six-sigma strategy as:

> A disciplined method of using extremely rigorous data gathering and statistical analysis to pinpoint sources of errors and ways of eliminating them.

Measuring customer wants and satisfaction

Customers are an economic asset. They are not on the balance sheet, but they should be (Claes Fornell, 1994; in Kanji and Wallace, 2000). The emphasis on customer satisfaction or customer-driven quality is considered by many gurus and writers as a major success of the quality management effort (Deming, 1986; Crosby, 1989; Oakland and Porter, 1994; Rao *et al.*, 1996; Spring *et al.*, 1998; Oakland, 2000; Kanji, 1998a, b; Zairi, 1999a, b; Zairi, 2000; Winser and Corney, 2001; Li *et al.*, 2001; Nakata, 2002; Hitchcock and Willard, 2002).

A strategic concept, customer satisfaction is concerned with such achievements as customer retention and market penetration (Rao *et al.*, 1996; Allred, 2001). Zairi (1994) considers measuring customer satisfaction as a cornerstone of TQM. The highest per centages of the awards scores relate to customer focus and satisfaction (NIST, 2000; EFQM, 2000). Customer satisfaction should play a central role in the company's TQM (Eklof and Westlund, 1998). This requires listening to customers and trying to satisfy their needs (Eklof and Selivanova, 2000; Winser and Corney, 2001).

Logistics Information Management
Volume 16 · Number 2 · 2003 · 156-171

The study

Based on this literature review of the above major quality factors, 31 factors were derived to construct the questionnaire of this study. The questionnaire survey targeting the total population of ISO certified companies in Palestine aims at identifying the perception of these organizations of each of the 31 quality factors as to its level of criticality in successful implementation of TQM. The survey was designed primarily to allow objective identification of consensus amongst the organizations concerned.

Sample selection

The decision concerning the survey sample was made to target the total population of the Palestinian ISO 9000 certified organization. Therefore, the total population of 78 ISO 9000 certified organizations, selected using this criterion, are representative of the Palestinian case, permitting generalized use of the survey findings. The questionnaire was directed to the TQM manager, director, quality assurance manager, management representative for quality, etc.

Survey questionnaire design

The questionnaire was designed to specifically measure the perceived importance of the quality factors to the success of TQM in the respondent's organization. This emphasizes the use of the questionnaire used by Ramirez and Loney (1993) which is based on a measurement scale that solicits respondents to explicitly identify a quality factor as critical or not which permits objective judgments to be made. Respondents were asked to rate each of the quality factors (labeled as quality-related factors in the questionnaire) as to their level of importance to a successful implementation of quality management processes in their organization, using the following criteria:

(1) *Critical.* Factors that you feel are critical and absolutely essential. The process stands a good chance of ending in failure if these factors are not part of the quality management process.
(2) *Important.* Factors that you feel are important but not absolutely essential. The process will survive if these are not addressed, but the organization may experience some unnecessary delays to its quality management process until these factors are eventually addressed.
(3) *Minor importance.* Factors that you feel are of minor importance. These factors will not seriously affect the success or failure of the quality management process.

Response rate

Having the total population targeted; being the first study of this kind to be carried out in Palestine; and as the area of Palestine is very small (land area is 6,170km^2, 130km long and 40-65km in width), it was decided right from the beginning to achieve 100 per cent response rate. A total of 78 usable questionnaires were collected, achieving the 100 per cent response rate that was determined at the outset.

Organizations breakdown

The 78 organizations targeted in this study are all Palestinian organizations. The breakdown of these organizations represents a heterogeneous mixture, where 53.8 per cent are manufacturers, 38.5 per cent service, 5.1 per cent producer and 2.6 per cent construction companies. Regarding the organizations' size in terms of the number of employers, 83.3 per cent of the targeted organizations have less than 500 employees, 10.3 per cent of the organizations have 500-999 employees, whereas 6.4 per cent of the organizations have more than 1,000 employees.

Methodology

The level of measurement used in the survey questionnaire is a three-point ordinal scale with critical, important, and minor importance as categories. Although the categories are ordered, they are non-numeric, i.e. there is no indication of distance between them. Integer scoring to assign numbers to the critical, important, minor importance categories (1, 2, 3 respectively) is used.

Weisberg (1992) suggests organizing the data into frequency distribution to allow examination and description on the patterns of the responses to be made which can be exhibited effectively in tabular or graphic form (see also Sekaran, 2000).

For this level of investigation, frequency distribution is most appropriate for the data organization as it allows the responses distribution for a variable to be summarized

by computing the typical value (point of central tendency) and it can be seen how typical this value is (measure of spread) (Weisberg, 1992; Carlson and Thorne, 1997). This is exactly what is needed to achieve the objective identification of consensus and the quantitative comparison of criticality of the quality factors.

According to the scale used in the questionnaire (three-point scale), there are only three possible range values. A zero value of the range occurs when all respondents give a quality factor the same rating (that is, one, two or three) where the maximum rating and the minimum rating will be the same. A zero value will mean no spread on the quality factor, which indicates a tendency for all the responses to cluster into any one of the three categories. A value of one will indicate that the tendency of responses is dispersed around two consecutive categories. A value of two will indicate a tendency for the responses to be dispersed around all three categories or two extreme end categories.

In the instances of a value of one or a value of two of the range, the range by itself tells little about the general agreement on the importance of a quality factor. Moreover, this makes the task of building a hierarchy of quality factors more difficult. This highlights the importance of looking at other complementary measures of spread to achieve the objectives of this investigation.

Variation ratio is the proportion (per centage) of responses that do not fall into the modal category. It is an appropriate measure of spread for the ordinal (non-numeric) data that we have in this investigation. Variation ratio (VR) is calculated using the following simple formula:

$$VR = 1 - \text{Frequency distribution of the mode.}$$

Unless the extent of consensus is indicated, knowing what the consensus is on a quality factor is not satisfactory as what the consensus is by itself says little. Because of that, a variation ratio is a very useful measure of spread for the purpose of this study as it shows how descriptive the mode is of the data (Weisberg, 1992). Therefore, variation ratio must be computed to show the extent of consensus on objective basis in identifying a quality factor as critical. A value of zero will mean unanimity (all respondents rated the quality factor as critical). Values of 0.5 or less mean majority consensus (more than 50 per cent of respondents rated the quality factor as critical), values of more than 0.5 indicate no majority consensus in rating a quality factor as critical. However, the variation ratio doesn't take into account the full distribution of responses. The measure of spread that does take such an account when dealing with non-metric data is the index of diversity.

The index of diversity is defined as a dispersion measure based on a proportion of responses in each category (Weisberg, 1992). In mathematical terms:

$$\text{Index of diversity} = 1 - (p_1^2 + p_2^2 + \ldots + p_k^2).$$

Where p_k = the proportion of responses in category k and k is the number of categories.

This index shows the degree of concentration of responses in a few large categories as squaring proportions emphasize the large proportion, much more than the small ones (Weisberg, 1992).

Thus, in the context of this investigation, the index of diversity can be considered as a surrogate measure of agreement amongst respondents concerning the response distribution of each of the quality factors.

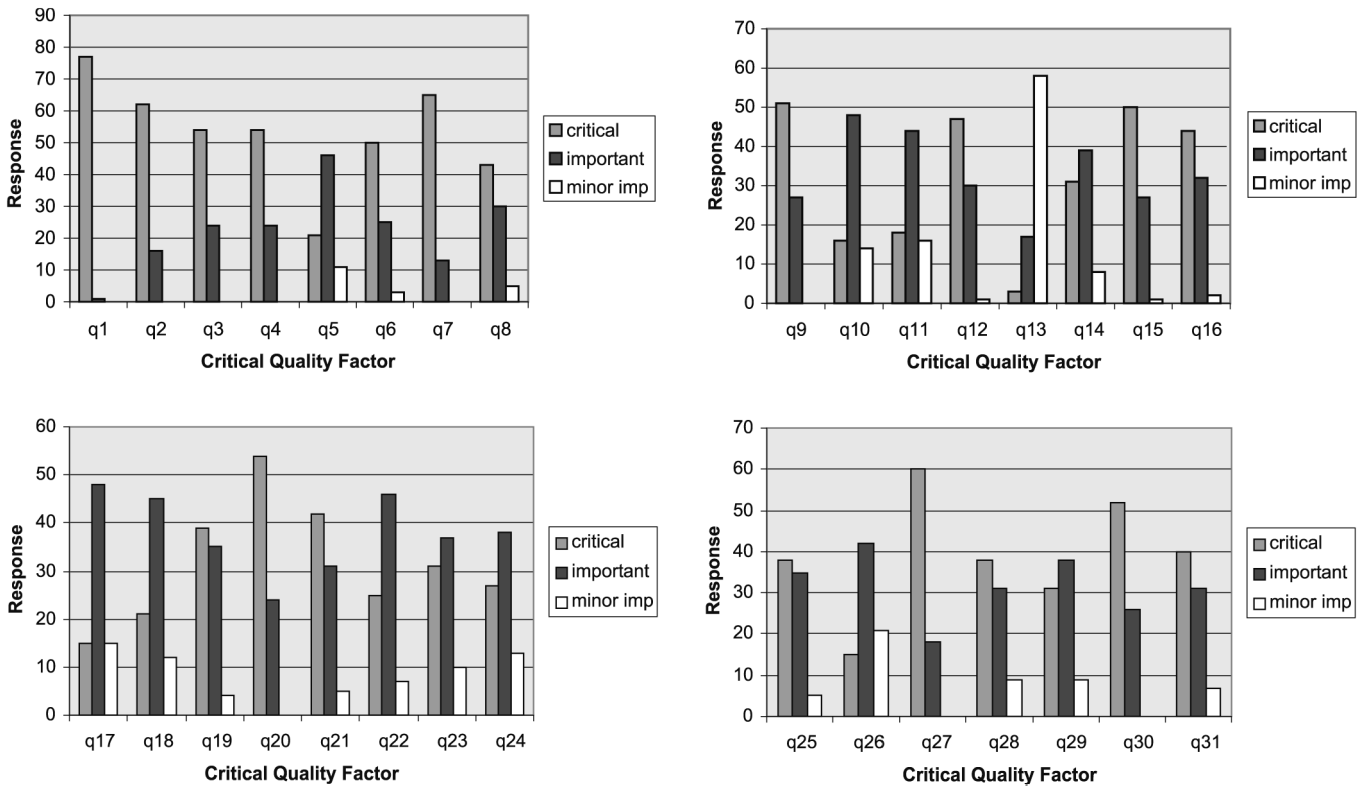
A low index value means general agreement on the importance of a quality factor, whereas, high index value means general disagreement on the importance of the quality factor. This means that an index value close to zero will imply near unanimity. A value close to 0.5 represents equal clustering (concentration) around two large categories. A near uniform distribution in the three categories will give a maximal value close to 0.667 (3-1/3), which in this case will mean high level of disagreement.

Analysis of responses

The use of mode as the measure of central tendency for this level of investigation is proved appropriate, as all of the quality factors response distributions are unimodal. Unimodal means that the most frequently occurring responses appear on one category, illustrated as a single peak in the bar charts representing the response distribution of each of the 31 quality factors (see Figure 1).

A total of 30 quality factors were stacked on critical and important categories, while one quality factor was returned as of minor importance by the vast majority of the

Figure 1 Frequency distribution of responses



respondents. This factor is related to employees' union support of the organization's quality initiative. This is attributed to the fact that unionization is not a common phenomena in the Palestinian context due to the recent establishment of the Palestinian National Authority which took over late 1993 as a result of the peace treaty signed by the Palestinian Liberation Organization and Israel. Thus, the three types of modal categories are identified, that is, critical, important and of minor importance. These modal categories are presented in Table I.

Range analysis

This investigation reveals that the response distributions of the quality factors include only two possible types of ranges, which are one and two. Unfortunately a zero value of range was not exhibited. Few distributions exhibit a range of one (nine distributions), the majority of the distributions exhibit a range value of two (22 distributions), while no single distribution exhibits a range value of zero.

Distributions with a range value of one can be dispersed into two categories, that is, critical and important, whereas distributions with a range value of two can be dispersed into all three categories. However, in this investigation, distributions with a range value of one are clustered into one category, that is, critical. The other 22 distributions are dispersed into the three categories.

To illustrate these findings, Table II summarizes the categories of the quality factors by the range values.

It is apparent from this categorization of the quality factors that in practice organizations perceive the importance of the quality factors with heterogeneous patterns. This is supported in the literature, which indicates that the level of emphasis on many of the quality factors varies in practice.

Looking at Tables I and II permits an objective assessment of the implication of the response pattern. The quality factors with a range value of one were returned as critical indicating that these nine quality factors impact the successful implementation of TQM. The remaining 22 quality factors have a range value of two, implying that some respondents returned these factors as of minor importance. From these quality factors, the majority consensus returned 11 factors as important and one quality factor as of minor importance, namely, Q5, Q10, Q11, Q14, Q17, Q18, Q22, Q23, Q24, Q26, Q29; and Q13 respectively.

Table I Quality factors' modal category

Question	Quality factor
Modal category – critical	
Q1	1 – Senior executives assume active responsibility for evaluation and improvement of management systems, and leading quality drive
Q2	2 – Visibility of senior executive commitment to quality and customer satisfaction
Q3	3 – Clear, consistent communication of mission statement and objectives defining quality values, expectations and focus
Q4	4 – Comprehensive policy development and effective deployment of goals
Q6	5 – Effective top-down and bottom-up communication
Q7	6 – Elements of quality management structure in place to manage the organization's quality journey
Q8	7 – The entire organization understands that each individual and each process has internal customers and suppliers
Q9	8 – The entire workforce understands, and is committed to the vision, values, and quality goals of the organization
Q12	9 – Supervisors, unit heads and divisional managers assume active roles as facilitators of continuous improvement, coaches of new methods and leaders of empowered employees
Q15	10 – Training for employees to improve interactive skills (such as communication skills, effective meeting skills, empowerment and leadership skills)
Q16	11 – Training for employees in problem identification and solving skills, quality improvement skills and other technical skills
Q19	12 – Systematic review and analysis of key process measures that have a direct or indirect impact on value-addition to customer satisfaction
Q20	13 – Problem solving and continuous improvement processes based on facts and systematic analysis
Q21	14 – Application of total quality approach to the management of support service and business process
Q25	15 – Cost of quality process to track rework, waste, rejects and for continuous improvement
Q27	16 – A formal documented quality management system in place
Q28	17 – Reliance on reasonably few dependable suppliers who are evaluated and selected based on their capability and commitment to product and service quality, and value for money
Q30	18 – Comprehensive identification of customers and customer needs and alignment of process to satisfy the needs
Q31	19 – The use of customer surveys and feedback process, and tracking of other key measures to assess customer satisfaction
Modal category – important	
Q5	20 – Top management push decision-making to the lowest practical level
Q10	21 – The use of employee surveys and tracking of other key measures to assess employee support of and involvement in the quality initiatives
Q11	22 – Employees suggestion schemes in place, with target time scales for management response
Q14	23 – System for recognition and appreciation of quality efforts and success of individuals and teams
Q17	24 – Informal benchmarking and other forms of information acquisition and sharing with organizations in different sectors and industries to identify best practices for improvements and opportunities
Q18	25 – Competitive benchmarking made against primary competitors
Q22	26 – The use of self-assessment tools and other mechanisms to track and improve performance gaps in the implementation and effectiveness of systems, processes and practices
Q23	27 – A team approach (such as quality circles, cross-functional teams) in problem solving and continuous improvement
Q24	28 – The use of statistical process control, to control variability and improve processes
Q26	29 – Zero defects as the quality performance standard
Q29	30 – Long-term relationship and working partnership with key suppliers
Modal category – minor importance	
Q13	31 – Employees' union support of the organization's quality initiative

Table II Category quality factors by range value

Range value	No. of factors	Quality factor	Category
1	9	Q1, Q2, Q3, Q4, Q7, Q9, Q20, Q27, Q30	Critical
2	22	Q5, Q6, Q8, Q10 to Q19, Q21 to Q26, Q28, Q29, Q31	Critical, important, of minor importance

Therefore, it will be rational not to analyze these 12 quality factors and to treat all of them as non-essential quality factors in the implementation of TQM in the Palestinian context. This supports the conclusion from the literature review that there is little unanimity essentiality of many of the quality interventions to the success of TQM implementation. This highlights the need for stratifying the quality factors in terms of their importance (criticality).

Variation ratio and the index of diversity

Using the variation ratio will help to separate the quality factors with majority consensus from other quality factors with no majority consensus as perceived by some respondents as of no consequence to the success or failure of the implementation process of TQM.

The index of diversity shows the degree of concentration of responses in a few large categories. Table III shows the computed variation ratio and the index of diversity for the 19 quality factors returned by respondents as critical.

Table III shows that the index of diversity values support the level of agreement identified by the variation ratio. This is apparent, as the value of the index of diversity did not reach the maximal value of 0.667. This implies agreement among the respondents concerning the criticality of these quality factors.

Table III Variation ratio and the index of diversity

	Quality factor	Variation ratio	Index of diversity
1	Q1	0.012	0.024
2	Q7	0.167	0.278
3	Q2	0.205	0.326
4	Q27	0.231	0.355
5	Q20	0.308	0.426
6	Q3	0.308	0.426
7	Q4	0.308	0.426
8	Q30	0.333	0.444
9	Q9	0.346	0.453
10	Q15	0.359	0.469
11	Q6	0.359	0.480
12	Q12	0.397	0.488
13	Q16	0.436	0.513
14	Q8	0.449	0.544
15	Q21	0.462	0.549
16	Q31	0.487	0.571
17	Q19	0.500	0.546
18	Q25	0.513[a]	0.557
19	Q28	0.513[a]	0.592

Note: [a]Represents no majority consensus

The variation ratio values, however, identified 17 quality factors to have majority consensus (those with variation ratio value of 0.5 or less), and two quality factors of no majority consensus (those with variation ratio values greater than 0.5).

The findings, therefore, represent the fundamentals to build the stratified structure of the critical quality factors.

Stratification of the identified critical quality factors

Using the range, and the variation ratio provide an opportunity for objective judgment in the process of ordering and stratifying the critical quality factors, exactly as the mode did in the identification of these quality factors. Sorting and ordering these quality factors according to the level of consensus is measured by the variation ratio, which shows how descriptive the mode is of the responses.

Having identified the critical quality factors using the modal category, and developed the hierarchical structure using the variation ratio, the stratification of these critical quality factors becomes essential.

Many researchers stratified the hierarchical structure of the critical quality factors in the process of building their TQM implementation models (Ramirez and Loney, 1993; Black, 1993; Mann, 1992; Thiagarajan, 1996; Ali, 1997; Thiagarajan *et al.*, 2001). All of these researchers stratified the quality factors into three hierarchical tiers of importance to develop their models.

A three-tier structure is appropriate for these research objectives. Moreover, the range and the calculated variation ratio values impose a three-tier structure. That is, if several factors were returned with a range value of zero, and others with range value of one and two, and the calculated variation ratio values were between zero and greater than 0.5, then, most probably a four-tier structure might prevail.

Stratification of the quality factor, therefore, describes the identified quality factors with regard to their degree of impact in the successful implementation of TQM applying prioritization process of these quality factors according to their perceived criticality. Table IV presents the quality factors ranked in a descending order of their variation ratio

Table IV Quality factors clusters

	Quality factor			
	Range =1	Range = 2	Variation ratio value	Stratification into tier
1	Q1		0.012	1
2	Q7		0.167	1
3	Q2		0.205	1
4	Q27		0.231	1
5	Q20		0.308	1
6	Q3		0.308	1
7	Q4		0.308	1
8	Q30		0.333	1
9	Q9		0.346	1
10		Q15	0.359	2
11		Q6	0.359	2
12		Q12	0.397	2
13		Q16	0.436	2
14		Q8	0.449	2
15		Q21	0.462	2
16		Q31	0.487	2
17		Q19	0.500	2
18		Q25	0.513	3
19		Q28	0.513	3

and the range of these factors. The criteria to be used in the stratification process is as follows.

Critical quality factors stratified in tier 1

The tier 1 critical quality factors are those that are essential to successful TQM implementation as perceived by all respondents to impact on the success of TQM implementation. This tier includes nine quality factors, which are (in order):

(1) Senior executives assume active responsibility for evaluation and improvement of management system, and leading quality drive.
(2) Elements of quality management structure in place to manage the organization's quality journey.
(3) Visibility of senior executive commitment to quality and customer satisfaction
(4) A formal documented quality management system in place.
(5) Problem solving and continuous improvement processes, based on facts and systematic analysis.
(6) Clear, consistent communication of mission statement and objectives defining quality values, expectations and focus.
(7) Comprehensive policy development and effective deployment of goals.
(8) Comprehensive identification of customers and customer needs and alignment of processes to satisfy the needs.
(9) The entire workforce understands, and is committed to the vision, values, and quality goals of the organization.

Critical quality factors in tier 2

The tier 2 quality factors are absolutely essential as perceived by the majority of the organizations while some organizations perceive them to be of no consequence with regard to the success of TQM implementation.

Tier 2 includes eight quality factors, which are arranged in order of their majority consensus level as follows:

(1) Training for employees to improve interactive skills (such as communication skills, effective meeting skills, empowerment and leading skills).
(2) Effective top-down and bottom-up communication.
(3) Supervisors, unit heads and divisional managers assume active roles as facilitators of continuous improvement, coaches of new methods, mentors and leaders of empowered employees.
(4) Training for employees in problem identification and solving skills, quality improvement skills and other technical skills.

(5) The entire organization understands that each individual and each process has internal customers and suppliers.
(6) Application of total quality approach to the management of support services and business processes.
(7) The use of customer surveys and feedback process, and tracking of other key measures to assess customer satisfaction.
(8) Systematic review and analysis of key process measures that have a direct and indirect impact on value-addition to customer satisfaction.

Critical quality factors in tier 3

The tier 3 quality factors are those that have the lowest impact on the implementation process of TQM. Tier 3 includes the remaining two critical quality factors, which are arranged in order of their majority consensus as follows:

(1) Cost of quality process to track rework, waste, rejects and for continuous improvement.
(2) Reliance on reasonable suppliers who are evaluated and selected based on their capability and commitment to product and service quality, and value for money.

Discussion

Most of the critical quality factors stratified in tier 1 are known in the TQM literature as fundamental components to be emphasized in the early stages of the implementation process. Particularly:

- top management commitment to lead the quality drive and their visible involvement in quality and customer satisfaction;
- communication of mission statement;
- strategic quality planning (policy development an effective deployment of goals);
- organizing for quality to manage the organization's quality journey;
- maximizing employees' commitment and understanding of the vision, values and quality goals of the organization; and
- management by fact to solve problems and continuous process improvement and aligning process to improve customer satisfaction.

The vast majority of organizations returned the critical quality factor (senior executives assume active responsibility for evaluation and improvement of management system, and leading quality drive) as absolutely essential to the success of the implementation process. Almost unanimity of consensus (77 out of 78 respondents) was achieved returning this factor as critical.

This is in tandem with all previous studies (Saraph *et al.*, 1989; Mann, 1992; Ramirez and Loney, 1993; Flyn *et al.*, 1994; Black and Porter, 1996; Thiagarajan, 1996; Ali; 1997; Ahire *et al.*, 1996; Tamimi, 1998; Rao *et al.*, 1999; Zhang *et al.*, 2000; Thiagarajan *et al.*, 2001), with the literature review and all major quality awards (EQA, MBNQA, and Deming's prize). This is evident as there is unanimity in opinions amongst all quality gurus and every author of TQM on the importance of top management commitment, involvement and leadership (Zairi, 1999b).

A formal documented quality management system in place is considered as the communication means of the standards of organizational practice through documented procedures and records. James (1996) considers accredited quality management system, as a major pillar supporting the development and operations of TQM in an organization. Moreover, several case studies (see Whitford and Bird, 1996; Quazi and Padibjo, 1997) and empirical work (Quazi and Padibjo, 1998) pointed out the importance of a formal documented quality system in the journey towards TQM. Nonetheless, it is not surprising that this critical quality factor was ranked highly and stratified in tier 1 as all respondent organizations are ISO 9000 certified.

Clear and consistent communication of mission statement and objectives defining quality values, expectations and focus is considered the major indication of top management commitment giving priority to customer satisfaction based on a comprehensive identification of customers and customer needs and alignment of processes to satisfy the needs (Zairi, 1999a; Oakland, 2000; Feigenbaum, 2002). In harmony with this, development of comprehensive policy and deployment of the goals effectively is the essence of strategic quality planning to be assumed by top management (Deming, 1986; Zairi, 1999a; Oakland, 2000; Crepin, 2002; Leiter and

Maslach, 2002). Consequently, organizing for quality to manage the quality journey of the organization required to achieve the commitment to the vision, values and quality goals by the entire work force through effective communication so that they understand them (Kanji and Asher, 1993; Salegna and Fazel, 2000).

This is a natural prerequisite to maximize employees' commitment and involvement, which is stratified in tier 2 critical quality factors. A systematic approach to problem-solving and continuous process improvement as an essential factor of TQM is identified to emphasize the concept of management by facts (Oakland, 2000; Kanji, 1998a) where a formal documented management system appears to be one of the means.

As for tier 2 critical quality factor, maximizing employees commitments and involvement starts by middle management buy-in as supervisors, unit heads and divisional managers assume active roles as facilitators of continuous improvement, coaches of new methods, mentors and leaders of empowered employees (Thiagarajan and Zairi, 1997; Crosby, 1989; Ishikawa, 1985; Oakland, 2000; Wuagneux, 2002; Buch and Rivers, 2002). This leads to a common understanding by the entire organization that each individual and each process has internal customers and suppliers (Oakland, 1993; 2000).

To empower employees and to develop an appropriate culture for continuous improvement requires training employees to improve interactive skills (such as communication, effective meeting, empowerment and leadership skills), and training in problem identification and solving skills, quality improvement skills, and other technical skills (Deming, 1986; Rao *et al.*, 1999; Oakland, 1993; 2000; Cebeci and Beskese, 2002).

To support continuous process improvement and improve customer satisfaction, systematic review and analysis of key processes (Rao *et al.*, 1996); measures that have a direct or indirect impact on value-addition to customer satisfaction (Oakland, 2000); the application of total quality approach to the management of support service and business processes and the use of customer surveys and feedback process, and tracking of other key measures to assess customer satisfaction (Zhang *et al.*, 2000; Kanji and Asher, 1993; McAdam and Kelly, 2002) are all required.

However for tier 3 critical quality factors, the emphasis is on the operational level of the organization, which is related to having a system for measuring key indicators that impact the way the organization operates to add value to customers. This is apparent from applying cost of quality process to track rework, waste, rejects and for continuous improvement and reliance on reasonably few dependable suppliers who are evaluated and selected based on their capability and commitment to product and service quality, and value for money.

Summary and conclusion

The increasing acceptance of TQM as a management philosophy for improving organizational competitiveness and effectiveness left the development of empirical research behind. The problem is much more apparent in the developing countries where knowledge of TQM is in the very early stages. This research attempted to make the distance between the existing body of literature and approaches of effective TQM in a newly established Palestine context.

The results of this investigation suggest that addressing the 19 critical quality factors as part of the quality management process increases its chance of success in the Palestinian context. The discussion of the findings reveals that about 17 out of 19 critical quality factors identified in this investigation share most of the values covered by the key principles espoused by the Malcolm Baldrige National Quality Award (2000) and the European Quality Award (2000) in the following:

- *Top management commitment and involvement.* Top management commitment and responsibility for sustainable quality environment. Top management commitment and involvement are demonstrated by providing role models, developing clear mission and defining quality values (strategic quality planning), developing comprehensive policy and goal setting and planning process, promoting quality awareness, and creating the elements of quality management structure.

- *Employee involvement and empowerment.* Directing active involvement of employees to the vision, values and quality goals of the organization to meet its expectation. Maximizing employee empowerment by training and education, and active roles of middle management.
- *Continuous process improvement.* Using quality tools (systematic approach to problem identification and solving) to create a culture of continuous process improvement emphasizing management by facts.
- *Importance of external customer focus* and understanding the internal customer concept.
- *Selecting reasonably few dependable suppliers* based on evaluation of their capability and commitment to product and service quality.
- *Having systems for measuring key indicators* that impact the way the organization adds value to customers (cost of quality and the use of customer surveys).

The findings of the survey questionnaire also proved that TQM is a generic philosophy of management as all the quality factors identified as important by TQM organizations in the West (Thiagarajan and Zairi, 1998) were returned as critical or important except one factor (the role of labor unions) by Palestinian TQM organizations. Therefore, the stratified critical factors can be used to construct a framework for TQM implementation in the Palestinian context. Such a framework is based on the implementation of the 19 critical quality factors ordered according to their criticality.

Moreover, it is evident that TQM organizations aim to excel in certain areas, regardless of their place of incorporation. This supports Juran (1993) when he says that the culture does not influence the approaches to TQM implementation. However, this study confirms that there are differences in the order and degree of emphasis of the quality factors. This is evident by comparing the identified critical quality factors in this study with other similar studies (Thiagarajan and Zairi, 1998; Thiagarajan *et al.*, 2001).

Finally, the study assessed information only from the perspective of the participating organizations. Consequently, it offers a self-reported, one-dimensional focus. For the purpose of the study, this approach was deemed appropriate. However, the success of a business practice like TQM depends on its ability to satisfy the interests of multiple stakeholders. It may, therefore, be appropriate to consider gathering information from various stakeholders such as customers, employees, competitors and suppliers in future research.

References

Ahire, S.L. (1996), "An empirical investigation of quality management in small firms", *Production and Inventory Management Journal*, 2nd quarter, pp. 44-50.

Ahire, S.L. Golhar, D.Y. and Waller, M.A. (1996), "Development and validation of TQM implementation constructs", *Decision Sciences*, Vol. 27, pp. 23-56.

Ali, M. (1997), "An empirical study of total quality management in the Middle East: a proposed model for implementation'', unpublished PhD thesis, University of Bradford, Bradford.

Allred, A. (2001), "Creating customer service worth advertising at Browning Arms", *The TQM Magazine*, Vol. 13 No. 1, pp. 6-11.

Beattie, K. and Sohal, A. (1999), "Implementing ISO 9000: a study of its benefits among Australian organisations'', *Total Quality Management*, Vol. 10 No. 1, pp. 95-106.

Beskese, A. and Cebeci, U. (2001), "Total quality management and ISO 9000 applications in Turkey'', *The TQM Magazine*, Vol. 13 No. 1, pp. 69-73.

Black, S. (1993), *Measuring the Critical Factors of Total Quality Management*, unpublished PhD thesis, University of Bradford, Bradford.

Black, S. and Porter, L. (1996), "Identification of critical factors of TQM", *Decision Sciences*, Vol. 27, pp. 1-21.

Bland, F.M., Maynard, J. and Herbert, D.W. (1998), "Quality costing of an administrative process", *The TQM Magazine*, Vol. 10 No. 5, pp. 367-77.

Bowden, P. (2000), "Delivering organisational excellence by employee values management", *Total Quality Management*, Vol. 11 No. 4/5/6, pp. 636-40.

Buch, K. and Rivers, D. (2002), "Sustaining a quality initiative", *Strategic Direction*, Vol. 18 No. 4, pp. 15-17.

Calisir, F., Bayraktar, C. and Beskese, B. (2001), "Implementing the ISO 9000 standards in Turkey: a study of large companies' satisfaction with ISO 9000", *Total Quality Management*, Vol. 12 No. 4, pp. 429-38.

Carlson, W. and Thorne, B. (1997), *Applied Statistical Methods for Business, Economics and the Social Sciences*, Prentice Hall, Upper Saddle River, NJ.

Cassell, C., Nadin, S. and Older Gray, M. (2001), "The use and effectiveness of benchmarking in SMEs", *Benchmarking: An International Journal*, Vol. 8 No. 3, pp. 212-22.

Cebeci, U. and Beskese, A. (2002), "An approach to the evaluation of quality performance of the companies

in Turkey", *Managerial Auditing Journal*, Vol. 17 No. 1/2, pp. 92-100.

Claver, E., Gasco, J., Llopis, J. and Gonzalez, R. (2001), "The strategic process of a cultural change to implement total quality management: a case study", *Total Quality Management*, Vol. 12 No. 4, pp. 469-82.

Clifton, N. (2001), "System suppliers: towards 'best practice'?", *Benchmarking: An International Journal*, Vol. 8 No. 3, pp. 172-90.

Conti, T. (1999), "Vision 2000: positioning the new ISO 9000 standards with respect to total quality management models", *Total Quality Management*, Vol. 10 No. 4/5, pp. 454-64.

Coronado, R.B. and Antony, J. (2002), "Critical success factors for the successful implementation of six sigma projects in organizations", *The TQM Magazine*, Vol. 14 No. 2, pp. 92-9.

Crepin, D. (2002), "From design to action: developing a corporate strategy", *Quality Progress*, Vol. 35 No. 2, pp. 49-56.

Crosby, P. (1989), *Let's Talk Quality: 96 Questions You Always Wanted to Ask Phil Crosby*, McGraw-Hill, New York, NY.

Dale, B. and Plunkett, J. (1999), *Quality Costing*, 3rd ed., Gower, Aldershot.

Dale, B., Y-Wu, P., Zairi, M., Williams, A. and Van der Wiele, T. (2001), "Total quality management and theory: an exploratory study of contribution", *Total Quality Management*, Vol. 12 No. 4, pp. 439-49.

David, J. (2002), "Strategic sourcing: benefits, problems and a contextual model", *Management Decision*, Vol. 40 No. 1, pp. 26-34.

Davidson, A., Chelson, L., Stern, L. and Janes, F. (2001), "A new tool for assessing the presence of total quality", *The TQM Magazine*, Vol. 13 No. 1, pp. 12-24.

Dayton, N.A. (2001), "Total quality management critical success factors, a comparison: the UK versus the USA", *Total Quality Management*, Vol. 12 No. 3, pp. 293-8.

Deming, W.E. (1986), *Out of the Crisis*, Cambridge University Press, Cambridge.

Dervitsiotis, K.N. (2000), "Benchmarking and business paradigm shifts", *Total Quality Management*, Vol.11 No. 4/5/6, pp. 641-6.

Dow, D., Samson, D. and Ford, D. (1999), "Exploring the myth: do all quality management practices contribute to superior quality performance", *Production and Operations Management*, Vol. 8 No. 1, pp. 1-27.

Easton, G. (1998), *Learning from Case Studies*, 3rd ed., Prentice Hall, Hemel Hempstead.

EFQM (1999), *The EFQM Business Excellence Model*, The European Foundation for Quality Management, available at: www.efqm.org

EFQM (2000), *The EFQM Business Excellence Model*, The European Foundation for Quality Management, available at: www.efqm.org

Eklof, J. and Selivanova, I. (2000), "Corporate quality management practice in Russia: with international comparisons", *Total Quality Management*, Vol. 11 No. 4/5/6, pp. 714-19.

Eklof, J. and Westlund, A. (1998), "Customer satisfaction index and its role in quality management", *Total Quality Management*, Vol. 9 No. 1, pp. 80-5.

Everett, C. (2002), "Penn states commitment to quality improvement", *Quality Progress*, Vol. 35 No. 1, pp. 44-9.

Feigenbaum, A. (2002), "The power behind consumer buying and productivity", *Quality Progress*, Vol. 35 No. 4, pp. 49-50.

Flyn, B., Schroeder, R. and Sakakibara, S. (1994), "A framework for quality management research and an associated measurement instrument", *Journal of Operations Management*, Vol. 11, pp. 339-66.

Goh, M. (2000), "Quality circles: journey of an Asian public enterprise", *International Journal of Quality & Reliability Management*, Vol. 17 No. 7, pp. 623-31.

Hakesever, C. (1996), "Total quality management in the small business environment", *Business Horizons*, March-April, pp. 33-40.

Hitchcock, D. and Willard, M. (2002), "Sustainability: enlarging quality's mission", *Quality Progress*, Vol. 35 No. 2, pp. 43-8.

Ishikawa, K. (1985), *What is Total Quality Control? The Japanese Way*, Prentice-Hall, Englewood Cliffs, NJ.

Jabnoun, N. (2000), "Restructuring for TQM: a review", *The TQM Magazine*, Vol. 12 No. 6, pp. 395-9.

James, P. (1996), *Total Quality Management: An Introductory Text*, Prentice-Hall, Englewood Cliffs, NJ.

Jarrar, Y. and Zairi, M. (2000), "Best practice transfer for future competitiveness: a study of best practices", *Total Quality Management*, Vol. 11 No. 4/5/6, pp. 734-40.

Juran, J.M. (1993), "Made in USA: a renaissance in quality", *Harvard Business Review*, Vol. 71 No. 4, pp. 42-50.

Kanji, G.K. (1998a), "Measurement of business excellence", *Total Quality Management*, Vol. 9 No. 7, pp. 633-43.

Kanji, G.K. (1998b), "An innovative approach to make ISO 9000 standards more effective", *Total Quality Management*, Vol. 9 No. 1, pp. 67-78.

Kanji, G.K. and Asher, M. (1993), "Total quality management process – a systematic approach", *Advances in Total Quality Management Series*, Carfax Publishing, Abingdon.

Kanji, G.K. and Wallace, W. (2000), "Business excellence through customer satisfaction", *Total Quality Management*, Vol. 11 No. 7, pp. 979-98.

Kano, N. (1993), "A perspective on quality activities in American firms", *California Management Review*, Vol. 35 No. 3, pp. 12-31.

Kemp, A., Pryor, S. and Dale, B. (1997), "Sustaining TQM: a case study at Aeroquib Iberica", *The TQM Magazine*, Vol. 9 No. 1, pp. 21-8.

Khan, M.K. and Hafiz, N. (1999), "Development of an expert system for implementation of ISO 9000 quality systems", *Total Quality Management*, Vol. 10 No. 1, pp. 47-59.

Kolka, J. (2002), "ISO 9000 and 9004: a framework for disaster preparedness", *Quality Progress*, Vol. 35 No. 2, pp. 57-62.

Kueng, P. (2000), "Process performance measurement system: a tool to support process-based organisations", *Total Quality Management*, Vol. 11 No. 1, pp. 67-85.

Lau, H. and Idris, M. (2001), "The soft foundation of the critical success factors on TQM implementation in

Malaysia", *The TQM Magazine*, Vol. 13 No. 1, pp. 51-60.

Leiter, M. and Maslach, C. (2002), "Beating burn-out", *Human Resource Management International Digest*, Vol. 10 No. 1, pp. 6-9.

Li, E., Zhao, X. and Lee, T-S. (2001), "Quality management initiatives in Hong Kong's banking industry: a longitudinal study", *Total Quality Management*, Vol. 12 No. 4, pp. 451-68.

McAdam, R. and Kelly, M. (2002), "A business excellence approach to generic benchmarking in SMEs", *Benchmarking: An International Journal*, Vol. 9 No. 1, pp. 7-27.

McAdam, R. and McKeown, M. (1999), "Life after ISO 9000: an analysis of the impact of ISO 9000 and total quality management on small business in Northern Ireland", *Total Quality Management*, Vol. 10 No. 2 pp. 229-41.

Mann, R.S. (1992), "The development of a framework to assist in the implementation of TQM", unpublished PhD thesis, University of Liverpool, Liverpool.

Martinez-Lorente, A., Dewhurst, F. and Dale, B. (1998), "Total quality management: origins and evolution of the term", *The TQM Magazine*, Vol. 10 No. 6, pp. 378-386.

Mathews, B., Ueno, A., Kekale, T., Repka, M., Periera, Z. and Silva, G. (2001a), "Quality training: needs and evaluation-findings from a European survey", *Total Quality Management*, Vol. 12 No. 4, pp. 483-90.

Mathews, B., Ueno, A., Periera, Z., Silva, G., Kekale, T. and Repka, M. (2001b), "Quality training, findings from a European survey", *The TQM Magazine*, Vol. 13 No. 1, pp. 61-68.

Mehra, S., Sirias, D. and Hoffman, J. (1998), "A critical analysis of total quality management implementation", *International Journal of Applied Quality Management*, Vol. 1 No. 1, pp. 12-26.

Moren-Lozon, M.D. and Peris, F.J. (1998), "Strategic approach, organisational design and quality management", *International Journal of Quality Science*, Vol. 3 No. 4, pp. 328-47.

Munro, R. (2000), "Linking six sigma with QS-9000", *Quality Progress*, May, pp. 47-53.

NIST (1999), *MBMQA Criteria 1999, Malcolm Baldrige National Quality Award 2000 Criteria for Performance Excellence*, National Institute for Science and Technology, available at: www.quality.nist.gov/

NIST (2000), *MBMQA Criteria 2000, Malcolm Baldrige National Quality Award 1999 Criteria for Performance Excellence*, National Institute of Standards and Technology, available at: www.quality.nist.gov/

Nakata, C. (2002), "Activating the marketing concept in a global context: an MNC country managers' perspective", *International Marketing Review*, Vol. 19 No. 1, pp. 39-64.

Oakland, J.S. (1993), *Total Quality Management*, Butterworth-Heinemann, Oxford.

Oakland, J. (2000), *Total Quality Management – Text With Cases*, 2nd ed., Butterworth Heinemann, Oxford.

Oakland, J.S. and Porter, L. (1994), *Cases in Total Quality Management*, Butterworth Heinemann, Oxford.

Pun, K-F. (2001), "Cultural influences on total quality management adoption in Chinese enterprises: an empirical study", *Total Quality Management*, Vol. 12 No. 3, pp. 323-42.

Quazi, H. and Padibjo, S. (1997), "A journey towards total quality management through ISO 9000 certification a Singapore experience", *The TQM Magazine*, Vol. 9 No. 5, pp. 364-71.

Quazi, H.A. and Padibjo, S.R. (1998), "A journey toward total quality management through ISO 9000 certification: a study on small and mediumsized enterprises in Singapore", *International Journal of Quality & Reliability Management*, Vol. 15, pp. 489-508.

Ramirez, C. and Loney, T. (1993), "Baldrige award winners identify the essential activities of a successful quality process", *Quality Digest*, January, pp. 38-40.

Rao, S., Solis, L. and Raghunathan, T. (1999), "A framework for international quality management research: development and validation of a measurement instrument", *Total Quality management*, Vol. 10 No. 7, pp. 1047-75.

Rao, A., Carr, L., Dambolena, I., Kopp, R., Martin, J., Rafii, F. and Schlesinger, P. (1996), *Total Quality Management: A Cross-functional Perspective*, John Wiley and Sons.

Salegna, G. and Fazel, F. (2000), "Obstacles to implementing quality", *Quality Progress*, Vol. 33 No. 7, July, pp. 53-7.

Saraph, J.V., Benson, P.G. and Schroeder, R.G. (1989), "An instrument for measuring the critical factors of quality management", *Decision Sciences*, Vol. 20 No. 4, pp. 810-29.

Sekaran, U. (2000), *Research Methods for Business. A Skill Building Approach*, 3rd ed., John Wiley and Sons, New York, NY.

Shipley, D. (2002), "Destination: ISO 9000", *Quality Progress*, Vol. 35 No. 3, pp. 32-9.

Sinclair, D. and Zairi, M. (2000) "Performance measurement: a critical analysis of the literature with respect to total quality management", *International Journal of Management Review*, Vol. 2 No. 2, pp. 145-68.

Sinclair, D. and Zairi, M. (2001), "An empirical study of key elements of total quality-based performance measurement systems: a case study approach in service industry", *Total Quality Management*, Vol. 12 No. 4, pp. 535-50.

Spring, M., McQuater, R., Swift, K., Dale, B. and Booker, J. (1998), "The use of quality tools and techniques in product introduction: an assessment methodology", *The TQM Magazine*, Vol. 10 No. 1, pp. 45-50.

Stahan, J. (2002), "Transition ISO 9000:2000", *Quality Progress*, Vol. 35 No. 3, pp. 27-30.

Stenberg, A. and Deleryd, M. (1999), "Implementation of statistical process control and process capability studies: requirements or free will?", *Total Quality Management*, Vol. 10 No. 4/5, pp. 439-46.

Sureshchandar, G.S., Chandrasekharan Rajendran and Anantharaman (2001), "A conceptual model for total quality management in service organisations", *Total Quality Management*, Vol. 12 No. 3, pp. 343-63.

Tamimi, N. (1998), "A second order factor analysis of critical TQM factors", *International Journal of Quality & Reliability Management*, Vol. 14 No. 1, pp. 71-9.

Tamimi, N. and Sebastianelli, R. (1998), "The barriers to total quality management", *Quality Progress*, June, pp. 57-60.

Thakur, D. (2002), "9 Reasons to switch to a single supplier system", *Quality Progress*, Vol. 35 No. 3, pp. 61-5.

Thiagarajan, T. (1996), "An empirical study of total quality management (TQM) in Malaysia: a proposed framework of generic application", unpublished PhD thesis, University of Bradford, Bradford.

Thiagarajan, T. and Zairi, M. (1997), "A review of total quality management in practice: understanding the fundamentals through examples of best practice applications, part 1", *The TQM Magazine*, Vol. 9 No. 4, pp. 270-86.

Thiagarajan, T. and Zairi, M. (1998), "An empirical analysis of critical factors of TQM: a proposed tool for self-assessment and benchmarking purposes", *Benchmarking for Quality Management & Technology*, Vol. 5 No. 4, pp. 291-303.

Thiagarajan, T., Zairi, M. and Dale, B. (2001), "A proposed model of TQM implementation based on an empirical study of Malaysian industry", *International Journal of Quality & Reliability Management*, Vol. 18 No. 3, pp. 289-306.

Thor, C. and Jarrett, J. (1999), "Benchmarking and reengineering: alternatives or partners?", *International Journal of Technology Management*, Vol. 17 No. 7/8, pp. 786-96.

Van der Wiele, T. and Brown, A. (1998), "Venturing down the TQM path for SME's", *International Small Business Journal*, Vol. 16 No. 2, pp. 50-68.

Weisberg, H.F. (1992), *Central Tendency and Variability*, Sage University Paper Series on Quantitative Applications in the Social Series on Quantitative Applications in the Social Sciences, Sage, Newbury Park, CA, pp. 7-83.

Westlund, A. and Lothgren, M. (2001), "The interactions between quality, productivity and economic performance: the case of Swedish pharmacies", *Total Quality Management*, Vol. 12 No. 3, pp. 385-96.

Whitford, B. and Bird, R. (1996), *The Pursuit of Quality*, Prentice Hall, Englewood Cliffs, NJ.

Wilkes, N. and Dale, B.G. (1998), "Attitude to self-assessment and quality awards: a study in small and medium-sized companies", *Total Quality Management*, Vol. 9 No. 8, pp. 731-9.

Wilkinson, A. (1992), "The other side of quality: 'soft' issues and the human resource dimension", *Total Quality Management*, Vol. 3 No. 3, pp. 323-9.

Williams, N. (1997), "ISO 9000 as a route to TQM in small to medium-sized enterprises: snake or ladder?", *The TQM Magazine*, Vol. 9 No. 1, pp. 8-13.

Winser, J. and Corney, W. (2001), "Comparing practices for capturing bank customer feedback: Internet versus traditional banking?", *Benchmarking: An International Journal*, Vol. 8 No. 3, pp. 240-50.

Wong, A. (2000), "Integrating supplier satisfaction with customer satisfaction", *Total Quality Management*, Vol. 11 No. 4/5/6, pp. 427-32.

Wong, A., Tjosvold, D., Wong, W. and Lin, C. (1999), "Relationships for quality improvement in the Hong Kong-China supply chain", *International Journal of Quality & Reliability Management*, Vol. 16 No. 1, pp. 24-41.

Wuagneux, D. (2002), "Quality from the inside out", *Quality Progress*, Vol. 35 No. 4, pp. 60-5.

Yusof, S. and Aspinwall, E. (2000), "Critical success factors in small and medium enterprises: survey results", *Total Quality Management*, Vol. 11 No. 4/5/6, pp. 448-62.

Zairi, M. (1994), *Measuring Performance for Business Results*, Chapman & Hall, London.

Zairi, M. (1999a), "Managing excellence: policy and strategy", *The TQM Magazine*, Vol. 11 No. 2, pp. 74-9.

Zairi, M. (1999b), "Managing excellence: leadership", *The TQM Magazine*, Vol. 11 No. 4, pp. 215-20.

Zairi, M. (2000), "Managing customer satisfaction: a best practice perspective", *The TQM Magazine*, Vol. 12 No. 6, pp. 389-494.

Zairi, M. and Youssef, M.A. (1995), "Benchmarking critical factors for TQM: part I: theory and foundation", *Benchmarking for Quality Management & Technology*, Vol. 2 No. 1, pp. 5-20.

Zhang, Z. Waszink, A. and Wijngaard, J. (2000), "An instrument for measuring TQM implementation for Chinese manufacturing companies", *International Journal of Quality & Reliability Management*, Vol. 17 No. 7, pp. 730-55.

Zhu, Z. and Schenerman, L. (1999), "A comparison of quality programmes: total quality management and ISO 9000", *Total Quality Management*, Vol. 10 No. 2, pp. 291-7.

Further reading

EFQM (1992), *Total Quality Management: The European Model for Self-Appraisal*, European Foundation for Quality Management, Brussels.

Kanji, G. and Wong, A. (1999), "Business excellence model for supply chain management", *Total Quality Management*, Vol. 10 No. 8, pp. 1147-68.

Van der Weile, T., Williams, R., Kolb, F., Dale, B., Luzon, D., Wallace, M. and Schmidt, A. (1996), "Self-assessment: a study of progress in Europe's leading organizations in quality management practices", *International Journal of Quality & Reliability Management*, Vol. 13 No. 1, pp. 84-104.

Wong, A. and Fung, P. (1999), "Total quality management in the construction industry in Hong Kong: a supply chain management perspective", *Total Quality Management*, Vol. 10 No. 2, pp. 199-208.

Zairi, M. (1996), *Benchmarking for Best Practice*, Butterworth-Heinemann, Oxford.