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Total quality management (TQM) strategy and organisational characteristics: Evidence from a recent WTO member

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This paper presents a comparative study on the relationship between implementing total quality management (TQM) and organisational characteristics (size, type of industry, type of ownership, and degree of innovation) in a newly industrialised country in South East Asia. Vietnam has become the 150th member of the World Trade Organisation (WTO) since January 2007, and this is the first empirical study to examine TQM practices in Vietnam. Analysis through Structural Equation Modelling, t-test and MANOVA of survey data from 222 manufacturing and service companies produced three major findings. First, this study supports previous research findings that TQM can be considered as set of practices. Second, industries in Vietnam have deployed certain TQM practices (*customer focus* and *top management commitment*) at much higher levels than others, namely *information and analysis system*, *education and training, employee empowerment*, and *process management*. Finally, MANOVA shows a clear difference in TQM practices by company size, industry type, and degree of innovation. Large companies had higher implementation levels across almost all practices except for *teamwork* and *open organisation* when compared to small- and medium-sized companies. TQM practices were statistically more significant in manufacturing companies compared to service companies, and firms having a higher degree of innovation also showed higher levels of TQM practice implementation. In particular, the low deployment of TQM practices in service industries, where TQM has been considered as order-qualifier, highlights the challenges for Vietnam's service industries that pursue TQM to successfully compete in the global marketplace.

Keywords: total quality management; organisational characteristics; Vietnam; WTO; MANOVA; empirical research; Structural Equation Modelling; manufacturing/service company

1. Introduction

The introduction of total quality management (TQM) has played an important role in the development of contemporary management. Quality, considered a key strategic factor in achieving business success, is more than ever required for competing successfully in today's global market place (Dean & Evans, 1994), and it has become the key slogan as organisations strive for a competitive advantage in markets characterised by liberalisation, globalisation and knowledgeable customers (Sureshchandar, Chandrasekharan, &

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Anantharaman, 2001). Following Millar's (1987) predictation that *there will be two kinds of company in the future – companies which have implemented total quality and companies which are out of business*, companies worldwide, large and small, both in the manufacturing and service sectors, have adopted quality strategies, and made TQM a well accepted part of almost every manager's 'tool kit' (Dow, Swanson, & Ford, 1999).

The main reason for considering Vietnam as a case study is that this country has become the 150th member of the World Trade Organisation (WTO), a milestone expected to launch an era of radical changes as the communist nation enters the global market place. Being Southeast Asia's second most populous country after Indonesia, Vietnam expects that the new status as a signatory member of the international trading system will accelerate rapid economic growth, making it the second biggest economy in East Asia after China. Under its membership terms, Vietnam needs to scrap a range of tariffs, subsidies and other barriers that protect local manufacturing and service industries. In turn, Vietnam, a major exporter of oil, textile, footwear, rice, seafood, and coffee, will face fewer hurdlers in selling its goods in the global markets and will have recourse through the WTO in case of trade disputes. In addition, strengthening its industries through the adoption of international manufacturing and operations strategies such as TQM, supply chain management, and research and development is also crucial for maintaining the nation's economic competitiveness.

Numerous Vietnamese companies that could not succeed in international contract biddings or exports because their products are of unacceptable quality (Hung, 2003) have recognized the important role TQM can play in facing the challenges of economic integration and globalisation. As certification statistics show Vietnam's industries consider TQM an effective strategy to improve their product and service quality: by August 2006, 1683 Vietnamese organisations were ISO 9001 certified (Vietnam Productivity Centre, http://www.vpc.org.vn) and had established an association called the 'ISO Club' to stimulate TQM adoption and share experiences among its members. Research on TQM in Vietnam, especially the benefits and managerial challenges for Vietnam's industries, however, is scarce.

Thus, the purpose of this study is to investigate the relationship between the firm's organisational characteristics and TQM implementation in Vietnamese companies. Two research questions are explored:

a) Can TQM strategy be considered as a set of practices?
b) Are there any differences in implementing TQM between companies according to size, ownership, type of industry, and degree of innovation (measured by the number of new products and services)?

It is important to note that we adopt a new perspective when examining the relationship between TQM and innovation (Prajogo & Sohal, 2003b; Hoang, Igel, & Laosirihongthong, 2006), where the degree of innovation is considered as an organisational characteristic (independent variable) that influences TQM practices (dependent variable).

The next section reviews literatures about the relationship between TQM and organisational characteristics, followed by the research methodology used in this study. After presenting the analysis of data gathered in the Vietnamese firms and a discussion of the results, several conclusions on the impact of firm size, industry type and innovation on TQM practices are drawn.

2. Literature review

2.1. *TQM as operational strategy*

The literature presents so many definitions and descriptions of TQM that sometimes it seems as if each author has its own definition and each organisation has its own implementation (Watson & Korukonda, 1995). However, no TQM discussion is complete without acknowledging the work of the five best known TQM experts, or 'quality gurus': Deming, Juran, Feigenbaum, Crosby and Ishikawa. In a recent study, Reed, Lemark, and Mero (2000) systematically reviewed the work and ideas of these TQM experts – Deming (1982, 1986), Juran (1974, 1988, 1989, 1992), Crosby (1979, 1996), Feigenbaum (1951, 1983, 1991), and Ishikawa (1985) – and pointed out the shared similarities on TQM elements. This review revealed that they all agreed on the importance of the following six key elements: customer satisfaction, cost reduction, leadership and top management commitment, training and education, teamwork and organisational culture. In addition to the complete agreement reflected in the above six elements, Reed et al. (2000) also found commonly shared differences regarding the other TQM elements. The role statistical tools play in improving quality control was emphasised by everyone except Crosby (1996), who implied that the use of statistical control was not a core quality management issue. Similarly, while Feigenbaum, Ishikawa, and Juran stressed product design, Deming and Crosby did not. With the exception of Crosby, all mentioned planning, but each dealt with different aspects of it. Juran covered all facets of planning, Deming was concerned mostly with the stages of planned action, while Feigenbaum and Ishikawa focused on feedback and control. Let us take a look at some of the definitions and TQM elements that other researchers have proposed.

TQM can be defined as a set of techniques and procedures used to reduce or eliminate variation from a production process or service-delivery system in order to improve efficiency, reliability, and quality (Steingrad & Fitzgibbons, 1993). Vuppalapati, Ahire, and Gupta (1995) stated that TQM is an integrative philosophy of management for the continuous improvement of product and process quality in order to achieve customer satisfaction. According to Dean and Bowen (1994), TQM is a management philosophy or an approach characterised by principles, practices, and techniques. They pointed out three principles that most quality frameworks had in common – customer focus, continuous improvement, and teamwork. Each principle is implemented through a set of practices, and these practices, in turn, are supported by a broad set of techniques. Anderson, Rungtusanatham, and Schroeder (1994) identified some core TQM components derived from Deming's 14-point programme using the Delphi method. These components reflect Deming's principles and are either explicitly or implicitly similar to the factors included in the other quality management frameworks. However, its weakness is the lack of a systematic scale development and content validity (Motwani, 2001). Joseph, Rajendran, and Kamalanabhan (1999) identified the following 10 TQM factors organisational commitment, human resource management, supplier integration, quality policy, product design, the role of the quality department, quality information systems, technology utilisation, operating procedures and training. They also developed a measurement that can be used to evaluate the extent to which these TQM practices are deployed in an organisation. According to Motwani (2001), the philosophy of TQM could be visualised as constructing a house with top management commitment being the foundation or base. On top of a solid foundation, four pillars are constructed that include process management, quality measurement and control, employee training, and customer focus.

Six studies by Saraph, Benson, and Schroeder (1989), Flynn, Schroeder, and Sakakibara (1994), Powell (1995), Ahire, Golhar, and Waller (1996), Black and Porter (1996), and Zeitz, Johannesson, and Ritchie (1997) are often cited as examples of a holistic approach to TQM. Although different in the terminologies used, these authors shared the common TQM factors in their models: the role of top management, customer satisfaction orientation, teamwork structures, employee empowerment, employee involvement, employee training, product/service design, supplier management, continuous improvement, process management/operating, quality improvement measurement systems, quality data and reporting, planning, benchmarking, SPC (statistical process control), corporate quality culture, and strategic quality management. These studies are more comprehensive in nature, seem to integrate most of the TQM implementation constructs and have proposed validating scales that take an integrated approach to TQM (Motwani, 2001).

Dow et al. (1999) developed a TQM model in order to explore the impact of TQM practices on the firm's quality performance. They indicated that quality practices can be categorised into nine dimensions: workforce commitment, shared vision, customer focus, use of teams, personnel training, cooperative supplier relations, use of benchmarking, advanced manufacturing systems, and use of just-in-time principles. These constructs were similar with those identified in the six above studies, except for the use of teams, and just-in-time principles.

Sila and Ebrahimpour (2002) analysed survey-based research on TQM conducted in different countries that was published in a variety of journals between 1989–2000. They found that the empirically researched TQM practices could be grouped under 25 categories. The first seven factors are considered to be the major elements of TQM and Sila and Ebrahimpour (2002) say this concurs with many authors' ideas. It is not surprising that issues related to customer focus and satisfaction received the most attention in the TQM survey literature because of the major push toward a customer satisfaction orientation in virtually all types of businesses. Two of the seven practices that received the highest coverage (training and employee involvement) relate to human resource management, and assign human resources a critical role in the implementation of TQM. In addition, great attention was paid to the role of leadership and top management commitment as well as to giving authority to employees – that is, empowerment – to make their own decisions (Spreitzer, 1995; Ahire et al., 1996; Ahmed, 1998; Motwani, 2001). Furthermore, issues related to quality information and performance measurement were also embraced by most studies.

Prajogo and Sohal (2003a) investigated the relationship between TQM and organisational performance by exploring six TQM practices proposed by Samson and Terziovski (1999). These practices are divided into two groups: mechanistic elements and organic elements. Mechanistic elements include customer focus, process management, strategic and planning, information and analysis, while the organic elements are leadership and people management. This categorisation was based on Kruger's (1998, 2001) proposition that TQM should include a combination of both people (soft element) and technical systems (hard element). The mechanistic elements (customer focus, process management, and so forth) could be considered the hard aspect and the organic elements (that is, leadership and people management) represent the soft aspect. Kruger (1998) emphasised the human aspect of TQM, because *only the humanistic orientation of TQM towards organisational analysis will allow successful TQM in actual practice*.

According to Prajogo and Sohal (2003a), justification for using Samson and Terziovski's model (1999) is that this model constitutes the criteria of the Malcolm Baldrige National Quality Award (MBNQA) that has been accepted to represent TQM

strategy by several scholars such as Evans and Lindsay (1993), Juran (1995) and Ahire, Landeros, and Golhar (1995).

In a recent empirical study, Rahman and Bullock (2005) also explored the relationship between TQM practices and organisational performance using data from 261 Australian manufacturing companies. Adopted from Dow et al. (1999) and Power, Amrik, and Rahman (2001), they formed a model with 10 TQM constructs: workforce commitment, shared vision, customer focus, use of teams, personnel training, cooperative supplier relations, computer base technologies, just-in-time principles, technology utilisation, and continuous improvement enablers. The first six constructs were considered as the soft elements, and the remaining four constructs as the hard elements of TQM. Elements of soft TQM are essentially dimensions of human resource management, like workforce commitment, training and so on, while hard elements relate to continuous improvement or treat organisations as total systems (Rahman & Bullock, 2005). The results of this study suggested that, in general, the soft TQM dimensions are significantly related to organisational performance. These findings are broadly similar to that of Samson and Terziovski (1999), Powell (1995), and Dow et al. (1999). In addition to direct effects, soft TQM elements also have an indirect effect on performance through their effect on hard TQM elements. This study also provided evidence that certain hard TQM elements have a significant impact on performance and suggested that for having such an impact, hard TQM elements need a support from elements of soft TQM.

2.2. *The relationship between TQM and organisational characteristics*

Many previous studies reveal that the size of a company (Gagnon & Toulouse, 1996; Germain, 1996) and principal ownership (Ahire et al., 1995; Swamidass & Kotha, 1998) are related to management practices in implementation of TQM. For example, organisational culture refers to attitudes, beliefs, and situational interactions. It has been influenced by different types of ownership. As a result, the degree of TQM use is different. To examine whether the organisational characteristics are considered important factors determining investment in TQM, literature reviews are summarised as following.

2.2.1 TQM and size of company

A number of previous studies have been published that directly examine the relationship between organisational characteristics – company size, ownership, and industry type – and TQM practices. Almost all studies only considered organisational characteristics as variables that moderate the relationship between TQM practices and organisation performance (Choong, 2004). Terziovski and Samson (1999) found that there were significant differences in the relationship between TQM and organisational performance when the size of the company was taken into account, particularly the effect on new product development. Larger companies tended to benefit more from TQM than smaller firms. These findings are consistent with some other studies (Garvin, 1988; GAO Study, 1991). However, Ahire and Golhar (2001) indicated that there were no operational differences in TQM implementation attributable to firm size, and that small and large firms that produced high quality products implemented TQM equally effectively. Recently, Haar and Spell (2008) examined the adoption rates of TQM by New Zealand firms, and the role that company size plays in determining adoption rates. To predict the TQM adoption, company size, workplace autonomy, performance standards, use of teams, and group problem solving were factors used, in which the company size was considered as a

moderating variable. The study's results show that firms with higher level of workplace autonomy, use of performance standards, use of teams, and use of group problem solving were more likely to adopt TQM, and this was more likely for larger companies than smaller companies. These findings demonstrated that although most small firms have some weaknesses such as limited markets, inadequate resources and lack of managerial expertise, they still had advantages in flexibility and innovation that could allow them to implement TQM as effectively as large firms.

2.2.2 *TQM and ownership*

Organisational culture or behaviour is influenced by the type of corporate ownership (Yavas & Rezayat, 2003; Hui, Au, & Fock, 2004). Therefore, management needs to understand how TQM strategy could be implemented effectively. Pun (2001) found no evidence that culture in Chinese-owned companies influenced employee involvement, which is one TQM practice. Noronha (2002) studied the impact of cultural values on TQM implementation in 385 companies in China, Hong Kong and Taiwan. The result of Structural Equation Modeling (SEM) analysis shows that the underlying Chinese values of abasement, addictiveness, harmony with people, harmony with the universe, interdependence, and respect for authority influenced the dimensions of TQM. It is also important to link cultural values (influenced by the different types or ownership) to TQM practice and business results. Recently, Feng, Prajogo, Tan, and Sohal (2006) compared the experience of organisations in Australia and Singapore with respect to the multidimensionality of TQM and its relationship with quality performance and innovation performance. They discovered significant differences of TQM implementation between Australian-owned and Singaporean-owned companies.

2.2.3 *TQM and type of industry*

TQM was originally applied in manufacturing firms. Given its great success in manufacturing, academics and practitioners have explored the possibility of applying the TQM strategy to the service sector. Silvestro (1998) contended that although developed in different way in the service literature, the core TQM principles are highly relevant to services area. Woon (2000) also stated that several service sectors, known as mass service, have a similar process to manufacturing that would let them able to apply TQM practices. Moreover, the development of the 'soft' aspect of TQM that emphasises the human elements, such as empowerment, employee involvement, culture, also stimulated its application in the service area, the sector that was more applicable for these 'soft' elements of TQM (Prajogo, 2005). Woon (2000) found that there was no significant difference between manufacturing and service companies in the implementation of 'soft' TQM elements. Prajogo (2005) suggested that, *with the exception of people management, there is no significant difference between manufacturing and service firms in terms of TQM practices and quality performance*. He even identified the service sector has having higher scores in people management than the manufacturing sector. According to Prajogo, the plausible reason is that manufacturing firms essentially rely on advanced manufacturing technology to achieve high level of quality (precision) and other operational performance aspects. In service organisations, on the other hand, human resources play a pivotal role in determining the product quality, particularly on non-physical dimensions, such customer responsiveness, courtesy, and empathy. In addition, beyond tools and techniques, TQM now has developed into a management philosophy that comprises a set of generic core

principles applied in different industries (Dean & Bowen, 1994; Grant, Shani & Krishnan, 1994, Sitkin, Sutcliffe, & Schroeder, 1994). This argument shows a fundamental base to support the applicability of TQM in service firms that can benefit from implementing this management philosophy (Prajogo, 2005). However, scholars have also noted differences between manufacturing and service organisations that could limit applying TQM in services (Silvestro, 1998; Sureshchandar et al., 2001; Prajogo, 2005). Firstly, compared to the measurable, standardised characteristics of manufacturing products, the intangibility and heterogeneity of the service output makes a remarkable difference. Secondly, the concept of service quality is dominated by non-physical components (courtesy, responsiveness, and accessibility) (Zeithaml, Parasuraman, & Berry, 1990) that are more difficult to define and, therefore, more difficult to measure. Thirdly, the consumption and delivery processes in the service organisations usually take place at the same time, making it difficult to control the quality of services provided. The difference in TQM implementation between manufacturing and service companies has also been identified in a number of studies. Compared to manufacturing firms, service organisations generally use fewer quality tools and show a lower level of TQM implementation, particularly in 'hard' TQM elements such as statistical process control, information analysis, process management (Badri, Davis, & Davis, 1995; Beaumont, Sohal, & Terziovski, 1997; Woon, 2000). It is remarkable to note the slight difference with Prajogo's (2005) results mentioned above. One reason could be the different sets of variables used to measure TQM implementation. The other reason could be differences in defining the differences between manufacturing and service industries. For example, the construction industry contains a large portion of physical components in its products which can be mostly linked to manufacturing, while it was classified as service in some studies (Prajogo, 2005).

2.2.4 *TQM and degree of innovation*

Concerning the relationship between TQM and innovation in the literature, there are two opposing schools of thought. One school believes that TQM supports innovation, implying that organisations that implement TQM will be successful in innovation. The alternative school argues that TQM impedes innovation. The main debatable issue is whether or not the nature of TQM practices fosters innovation.

The supporting perspective is based on the argument that the TQM practices, in both its human and technology dimensions, help to create an environment and culture that support innovation. One of the core components of TQM is customer satisfaction. Companies that implement TQM have to explore and find ways to serve customer needs and expectations at the best. This creates the impetus for companies to be innovative in developing and launching new products or services to match the customer's needs. Several studies also identified a positive relationship between TQM and innovation in terms of the speed to market (Flynn et al., 1994), and the level of innovation in organisations (Baldwin & Johnson, 1996). Terziovski and Samson (2000) tested the strength of the relationship between TQM practices (independent variables) and organisational performance (dependent variables) in a large random sample of manufacturing companies in Australia and New Zealand. They considered innovation as a dependent variable that represents organisational performance measured by the number of new products produced, but could not confirm a significantly positive effect on innovation across the whole sample. However, when co-varied for industry type, the strength of the relationship between TQM and innovation changed from insignificantly positive to significantly positive, suggesting

that the relationship between TQM and innovation is strengthened when investigated for a specific industry type.

In a survey of 194 managers in Australia who worked in both manufacturing and service companies, although verifying that both mechanistic and organic elements can coexist under the umbrella of TQM, Prajogo and Sohal (2003a) concluded that each type of practice (mechanistic versus organic elements) has a different role in determining different performance measures. They found customer focus and process management (mechanistic elements) being associated with product quality while leadership and people management (organic elements) were related to innovation. With another research framework, Prajogo and Sohal (2003b) also found that TQM had a significantly positive relationship with all the product quality, process innovation, and product innovation, although the magnitude of the relationship appeared to be strongest with the product quality, followed by process innovation, and finally product innovation. Thus, they suggested that TQM has a higher explanatory power on quality performance than on innovation performance. Moreover, they also found three causal relationships among the three performance variables, although product quality demonstrated a stronger association with process innovation rather than with product innovation. They stated that these significant causal relationships among the three performance variables not only deny the theoretical proposition suggesting a negative relationship between quality and innovation performance, but also indicates cross-fertilisation between quality and innovation performance, particularly that involving process innovation. Their result indicated that process innovation is strongly related to both product quality and product innovation performance and, therefore, they come to an inference that process innovation mediates the relationship between the other two performance variables. Prajogo and Sohal (2006) investigate the co-alignment between TQM and technology/research and development (R&D) management in predicting an organisation's quality and innovation performances. They found TQM has a strong predictive power against quality performance but no significant relationship against innovation performance. On the other hand, technology and R&D management shows a significant relationship with both quality and innovation performances. It is noticeable that while the relationship between technology and R&D management and quality performance is at a somewhat lower level than that of TQM, a much stronger relationship with innovation performance was found out. An implication was drawn that technology/R&D management is an appropriate source to be used in harmony with TQM to enhance organisational performance, particularly innovation. Feng et al. (2006) present a comparative analysis on TQM between Australian and Singaporean organisations. They found the validity of the multidimensionality of TQM in terms of mechanistic and organic components, and conclude that the more organic practices, such as leadership and people management, are related to more innovation; and the more mechanistic practices, such as customer focus and process management, are associated more with quality performance. Therefore, they suggested that organisations should be concerned with both organic and mechanistic components of TQM since both innovation and quality performance are needed for organisational survival in today's competitive and fast changing market.

Although the above arguments propose a positive relationship between TQM and innovation, there is also an opposing school of thought (represented by Wind & Mahajan, 1997; Tidd, Bessant, & Pavitt, 1997; Slater & Narver, 1998; Kim & Marbougne, 1999), that claims TQM can actually hinder innovation. Atuahene-Gima (1996) argued that customer focus is concerned with product conformance (product quality), but not with product newness (product innovation). Research from 418 Australian manufacturing firms by Singh and Smith (2004) seems to confirm these earlier studies. Singh and Smith did not

find sufficient statistical evidence to suggest that TQM was related to the firms' innovation performance and suggested that there could be a more complex relationship between these concepts. This result seems to be quite different with Prajogo and Sohal's (2003a, 2003b) findings, although these studies were in the same context of the Australian companies and the authors used the same method of data analysis (structural equation modeling). The reasons could be due to different scales used to measure TQM practices and innovation performance in these studies. This, once again, reflects the debate among researchers on the complicated nature of the relationship between TQM practices and innovation performance. However, Prajogo and Sohal (2003b) also found that the weakest relationship between TQM and product innovation is consistent with the weakest association between product quality and product innovation. Therefore, they concluded that product is the area where TQM provides least support for innovation, and admitted that 'the more radical the product innovation, the less the contribution which can be expected from TQM' (Prajogo & Sohal, 2003b, p. 13). This could be considered as a common point in the findings of these studies. Recently, Pinho (2008) found no statistical evidence that confirms the effect of TQM on innovation.

The negative school of thought, however, does not completely reject arguments that TQM may support innovation and adherents concede that TQM may facilitate innovation, but only on a very limited basis. Kruger (1996) observed that the industry in Japan, besides practicing large-scale absorption of new technology, also invested heavily in people, recognising that technological innovation needs committed well-trained people, not only to make the technology work but also to maintain its advantage through Kaizen (a continuous improvement process, that is smaller-scale, and people-based). In addition, McAdam, Armstrong, and Kelly (1998) identified many cases in which learning associated with continuous improvement helped employees to increase their knowledge of customers, competitors and markets and resulted in generating new ideas for innovative products. Proponents of the negative school, however, still believe that the implementation of TQM is still more likely to impose more disadvantages than advantages in terms of fostering innovation.

3. Research methodology

3.1. *TQM measures*

The extensive literature review presented above provided the basis for operationalising the constructs for measuring TQM implementation (dependent variable). There are many definitions of TQM in the literature, and a variety of approaches have been used by researchers to assess its implementation at the firm level. By keeping all these contributions in mind, this study constructed a TQM model comprising of the following 11 dimensions: leadership and top management commitment, employee involvement, employee empowerment, education and training, teamwork, customer focus, process management, strategic planning, open organisation, information and analysis system, and service culture. These dimensions were selected because each of them matched the following criteria:

a) Represent the hard and soft aspects of TQM.
b) Included in the world recognised quality awards and in line with the practices proposed by the majority of TQM scholars and practitioners.
c) Correspond to the Vietnam Quality Award criteria, and therefore suitable for industry analysis in the context of selected country.
d) Considered critically important for implementing TQM in both manufacturing and service organisations (Powell, 1995; Samson & Terziovski, 1999; Sureshchandar

et al., 2001; Sila & Ebrahimpour, 2002; Prajogo & Sohal, 2003a, 2003b; Das, Paul, Swiersek, & Laosirihongthong, 2006; Hoang et al., 2006).

3.2. *Organisational characteristics*

The organisational characteristics (independent variable) adopted in this study were company size, ownership, industry type, and degree of innovation (measured by the number of new products/new services that the firm actually had developed and commercialised over the last three years). For a size of companies, this study refers to the Decree No. 681/CP/KTN issued by the Vietnamese Government on 20 June 1998, in Vietnam. Company size is distinguished within three categories: small firms with less than 50 employees, medium size with 50–200 employees, and large firms with more than 200 employees (Ministry of Planning and Investment, 1999). The Ministry does not make any difference in these measures for the manufacturing and service sectors.

3.3. *Data collection*

All the companies included in this survey had been ISO 9001 certified for at least 2 years. This condition ensured that managers in the companies sampled for the questionnaire survey had sufficient knowledge and experience with quality management practices. As Carr, Leong, and Sheu (2000) noted, many Asian firms are reluctant to participate in research surveys without first developing a personal relationship with the researchers. We encountered the same attitude among our target firms in Vietnam as managers very often hesitated to reply to the questionnaire sent by mail. For this reason, we had to select a sample of companies in Hochiminh City and adjacent provinces that offered us better conditions for data collection since we could rely on existing personal contacts and relationships with the managers. The majority of Vietnamese organisations that held the ISO 9001 certificate were located in Hochiminh City (Vietnam Productivity Centre, http://www.vpc.org.vn). Therefore, our sample chosen from the ISO 9001 certified firms in Hochiminh City region could be considered as sufficiently representative of Vietnamese companies that practice quality management.

Questionnaires were sent to the managers of 500 companies, resulting in a total of 222 questionnaires returned, which is a response rate of 44.4% and one and a half times the average response rate reported by previous research studies (Terziovski & Samson, 2000; Prajogo & Sohal, 2003a, 2003b; Loan, 2004). Due to missing data, 18 questionnaires had to be excluded, leaving 204 valid questionnaires for the analysis.

In accordance with the classification in Vietnam explained above, the companies in our sample were categorised into three groups: small firms with less than 50 employees, medium-sized firms with 50–200 employees, and large firms with more than 200 employees (Ministry of Planning and Investment, 1999). Characteristics of the company and respondents are shown in Table 1.

Since the small companies in our sample accounted for such a small share (2.04%), we finally divided the firms into two groups: small or medium-sized firms with less than or equal to 200 employees (32% of the sample), and large companies with more than 200 employees (68%). Laosirihongthong, Paul, and Speece (2003) used a similar classification in their study in Thailand. About 25% of all firms were either foreign-owned or joint ventures, 56% were state-owned companies and the remaining were privately owned. About half were in manufacturing, 17% were in the service sector and the remaining produced both manufactured products and services.

Table 1. Company and respondent characteristics.

Characteristics	Description	Percentage*
Company size (number of employees)	Small to medium: <= 200	32.1
	Large: > 200	67.9
	Missing	
Ownership	Foreign owned, and joint venture	25.8
	State-owned company	56.4
	Private company	17.8
	Missing	
Industry	Manufacturing	47.3
	Service	17.2
	Both manufacturing and service	35.5
	Missing	
Respondents' positions	Director/Vice Director	9.3
	Finance manager	15.8
	Marketing manager	5.5
	Technical/Production manager	22.2
	Research and development manager	11.8
	Quality control manager	25.8
	Human resource manager	9.6

Note: *Not including missing and incomplete responses.

In order to assess a possible respondent bias, 30 non-respondent companies were contacted by phone to collect the following information and compare this with the respondent firms:

- size (number of employees);
- type of industry (manufacturing or service);
- ownership type.

Similar to the respondent sample, the first two above dimensions were categorised into two groups: small or medium-sized firms and large companies; and manufacturing and service companies. Ownership was divided into three categories: 100% foreign-owned and joint venture, state-owned and private companies. The results of the comparison between the respondent and non-respondent samples showed a higher share of large companies, state-owned companies, and manufacturing companies in the non-respondent sample with 76.7% of the companies being large compared to 67.9% in the respondent sample; 76.7% being state-owned companies compared with 56.4% in the respondent sample; and 63.3% in manufacturing compared with 47.3% in the respondent sample (see Table 2). However, these differences are not large enough to indicate a substantial difference between respondents and non-respondents. All chi-squared values for size, type of industry and ownership were smaller than the chi-square table value for 0.05 significance (3.84 for 1 degree of freedom, and 5.99 for 2 degrees of freedom), and all p-values were greater than 0.05. Thus, the respondents and non-respondents can be considered as similar.

4. Data analysis and discussion

4.1. *Scale reliability and validity of constructs*

To assess the reliability of the collected data, the Cronbach's alpha reliability test was performed on all TQM constructs. Cronbach's alpha measures the degree to which a construct

Table 2. Comparison of respondents with non-respondents.

Organizational characteristics	Respondents (%)	Non-Respondents (%)	Chi-squared value	P-value
Small to medium (<= 200)	63 (32.1)	7 (23.3)		
Large (>200)	133 (67.9)	23 (76.7)	0.944	0.331
Foreign owned, and joint venture	52 (25.8)	3 (10)		
State-owned company	114 (56.4)	23 (76.7)	4.846	0.089
Private company	36 (17.8)	4 (13.3)		
Manufacturing	96 (47.3)	19 (63.3)	2.691	0.101
Service	107 (52.7)	11 (36.7)		

is internally consistent and reliable. Generally, variables that had items with a total correlation below 0.3 were dropped, while a reliability coefficient of 0.7 or more was considered good (Nunnally & Burnstein, 1994; Hair, Anderson, Tatham, & Black, 1998). The Cronbach's alpha for all TQM constructs found in this sample were well above 0.7, and all the item-total correlation coefficients exceeded 0.3. Therefore, the instrument developed for measuring TQM and organisational performance constructs was judged to be sufficiently reliable.

In order to examine the TQM construct validity, the confirmatory factor analysis (CFA) method using AMOS 4.0 with a maximum likelihood procedure was used, since the summary statistics of the analysis variables showed that the variables exhibited a relatively normal distribution with the values of skewness and kurtosis not exceeding very much the absolute value of 1 (Anderson & Gerbing, 1988; Hair et al., 1998). First, a CFA model was applied for each construct to eliminate items with weak loading coefficients (smaller than the cut-off point of 0.5) and to validate the measurement model. During this validation process, five items (the first item of Teamwork measures; the first, second, and third items of Process Management measures; and the first item of the Information and Analysis measures) were deleted because of poor loading on their respective latent variables. After excluding these items, the Goodness of Fit Indexes (GFI) for all constructs well exceeded 0.9 and the Standardised Root Mean Squared Residual (SRMR) coefficients were less than 0.1. These criteria met the requirement for an acceptable model (Kline, 1998). Table 3 presents the Cronbach's alpha, the goodness of fit (GFI), the Bentler

Table 3. Reliability and validity of TQM constructs.

TQM constructs	No. of items	Cronbach's alpha	GFI	CFI	SRMR
Top management commitment	6	0.8065	0.921	0.90	0.0625
Employee involvement	7	0.8311	0.946	0.932	0.0491
Employee empowerment	4	0.7531	0.998	1	0.0123
Education and training	5	0.8450	0.959	0.957	0.0377
Teamwork	3	0.8189	0.990	0.997	0.0000
Customer focus	7	0.8559	0.907	0.92	0.0590
Process management	4	0.8321	0.941	0.929	0.0556
Information and analysis system	5	0.8575	0.968	0.975	0.0365
Strategic planning	5	0.8989	0.900	0.918	0.0512
Open organisation	4	0.8865	0.982	0.987	0.0226
Service culture	4	0.8142	0.926	0.902	0.0705

comparative fit index (CFI), and Standardised Root Mean Squared Residual (SRMR) of the final TQM constructs that safeguard the reliability and validity of the constructs under investigation.

Next, a CFA model was used to assess the means of the 11 TQM constructs. According to Kline (1998), besides the Chi-square to degrees of freedom ratio (χ^2/df ratio), the widely used measures of fit for the model include the goodness of fit index (GFI), the Bentler comparative fit index (CFI), the Bentler-Bonett non-normed fit index (NNFI), and the standardised root mean squared residual (SRMR). It is desired that the χ^2/df ratio is less than 3; the GFI, the CFI, and the NNFI are at least 0.90; and the SRMR is less than 0.1. The standardised estimates and the fit indexes of the CFA model shown in Figure 1 indicate that the measurement model satisfied these requirements. All variables had high factor loading coefficients and highly statistical significance (all p-values equal 0). Thus, all variables that measure latent constructs achieved convergent validity (Anderson & Gerbing, 1988). This indicates the validation of the measurement model, and also demonstrates that TQM is generally considered as a set of practices, as proven in previous studies (Ahire et al., 1996; Samson & Terziovski, 1999; Prajogo & Sohal, 2003a). In summary, these results provide the safeguard for the reliability and validity of the TQM constructs under investigation.

4.2. *MANOVA tests on organisational characteristics*

MANOVA tests for the set of TQM practices being the dependent variables were conducted to examine the effects of the organisational characteristics (industry, company size, type of ownership, and degree of innovation) on TQM practices deployed by the firm. The key assumption was that the dependent variables were normally distributed with equal variances. As mentioned above, the variables in the analysis had a relatively normal distribution. In addition, MANOVA is robust, so small violations of the above assumption would have little impact (Hair et al., 1998). MANOVA results presented in Table 4 indicate that innovation, company size, and industry type had an impact on TQM practices and that extent of innovation in particular had a significant effect.

However, TQM practices did not show any significant differences across the four types of ownership. As shown in Table 5, all firms, regardless of their ownership had a high mean score for customer focus and top management commitment, and the lowest rates were given for the information and analysis system, employee empowerment, education and training, and process management. However, the mean values for the TQM constructs were all greater than 3.3. Ranked second after customer focus, with a value of 4.02, top management generally expressed a high commitment to quality management, followed by employee involvement, teamwork, open organisation, strategic planning, and service culture, with mean values ranging from 3.5–3.9. The information and analysis system, education and training, employee empowerment, and process management were ranked lowest with values of less than 3.5.

Contrary to our expectations, no difference was discovered. The reason could be that TQM implementation in Vietnam is still in an early stage, because the national industry has only recently discovered quality as an imperative in the competition for both domestic and international markets. Thus among the types of ownership, the pattern has not been clearly distinguished from each other.

For the degree of innovation, the number of product/service innovations developed by the sample firms was tested for a normal distribution (Kolmogorov-Smirnov test with p-value = 0.16), and the mean approximate to 7 was taken as the cut-point to form two

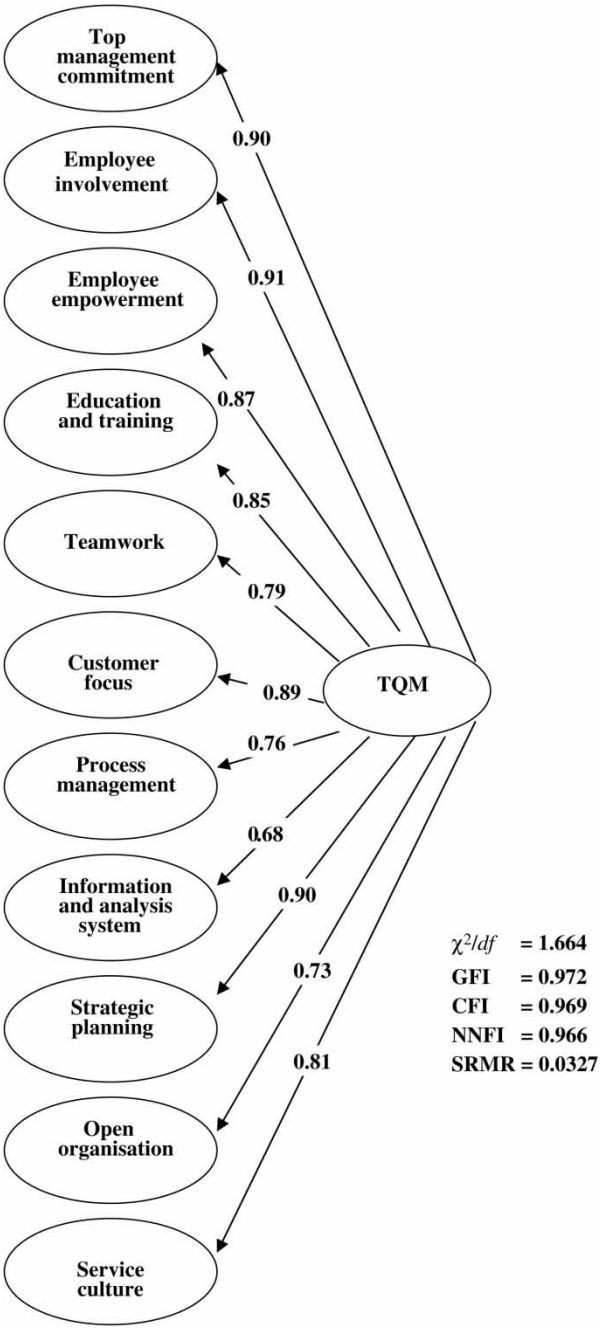

Figure 1. The CFA model of TQM constructs.

groups: companies with a high or a low amount of innovation. Table 6 shows that all TQM constructs were significantly different between these two groups. Highly innovative companies showed a higher rate of implementation for all TQM constructs compared to the less innovative companies. This finding suggests that TQM constructs are likely to facilitate conditions for innovation.

Table 4. MANOVA tests on TQM constructs.

Effect	Model	F	Sig.
Innovation	Pillai's Trace	10.887	*0.000***
	Wilks' Lambda	10.887	*0.000***
Ownership	Pillai's Trace	0.975	0.520
	Wilks' Lambda	0.974	0.522
Company size	Pillai's Trace	1.747	*0.067**
	Wilks' Lambda	1.747	*0.067**
Industry types	Pillai's Trace	1.859	*0.048**
	Wilks' Lambda	1.859	*0.048**

Notes: **Italicised characters represent significance at 0.05 level; *Italicised characters represent significance at 0.10 level.

Table 5. Descriptive statistics for implemented TQM constructs.

TQM constructs	Mean (ranked)	S.D.
Customer focus	4.08	0.69
Top management commitment	4.02	0.69
Service culture	3.88	0.68
Strategic planning	3.87	0.79
Open organisation	3.73	0.80
Teamwork	3.66	0.84
Employee involvement	3.56	0.75
Process management	3.49	0.80
Employee empowerment	3.49	0.81
Education and training	3.49	0.85
Information and analysis system	3.39	0.90
Valid N (listwise)	181	

Note: S.D. = standard deviation.

Table 6. TQM constructs and innovation.

TQM Constructs	ANOVA sig.*	Low product/service innovation		High product/service innovation	
		Mean	S.D.	Mean	S.D.
Top management commitment	*0.00*	3.52	0.76	4.31	0.49
Employee involvement	*0.00*	3.03	0.74	3.87	0.57
Employee empowerment	*0.00*	2.86	0.72	3.81	0.62
Education and training	*0.00*	2.78	0.79	3.79	0.58
Teamwork	*0.00*	3.11	0.82	3.89	0.62
Customer focus	*0.00*	3.69	0.78	4.37	0.44
Process management	*0.00*	2.91	0.82	3.76	0.60
Information and analysis system	*0.00*	2.81	0.83	3.66	0.78
Strategic planning	*0.00*	3.34	0.90	4.15	0.54
Open organisation	*0.00*	3.19	0.86	3.97	0.53
Service culture	*0.00*	3.54	0.69	4.16	0.51
Valid N (listwise)		54		61	

Notes: *Italicised characters represent significance at 0.05 level. S.D. = standard deviation.

Large companies scored higher in all quality management practices except for teamwork and open organisation, compared to smaller companies (see Table 7). In terms of service culture and strategic planning, large companies rated significantly higher than small- and medium-sized companies. As shown in Table 1, 68% of the companies were large, which explains the high ranking (third and fourth rank) of service culture and strategic planning (see Table 5 for the descriptive statistics). It is likely that large companies would have access to more resources (finance, technology, human) needed in implementing TQM practices than smaller companies. Beaumont and Sohal (1999) found no statistically significant relationship between company size (measured in terms of number of employees or total sales) and quality management practices (measured in terms of the total number of quality management practices used) in the Australian service industry. However, as the authors admitted, this non-correlation was surprising because a larger firm would be better equipped with resources to afford investment of resources into quality management. Nevertheless, the reported use of benchmarking quality practices was significantly related to company size and found that larger service companies are more likely to use benchmarking.

Manufacturing companies generally had implemented all quality management practices to a higher extent than companies in the service sector (see Table 8). Information and analysis system and customer focus meant manufacturing companies tended to have a more statistically significant score compared to service companies. This finding is similar to previous studies, and can be explained by the fact that quality management practices were developed for and applied in manufacturing companies long before service organisations adopted TQM. In a survey of United Arab Emirate firms, Badri et al. (1995) reported that manufacturers were much more inclined than service providers to use quality management practices. In a study of Australian manufacturing and service industries, Beaumont et al. (1997) found a statistically significant difference between these two sectors in the number of quality management practices used: on average, manufacturers used more quality management practices than service organisations, even when techniques specific to the manufacturing companies were not counted. According to the

Table 7. TQM constructs and company size.

TQM constructs	ANOV Asig.	Small and medium company		Large company	
		Mean	S.D.	Mean	S.D.
Top management commitment	0.359	3.95	0.77	4.05	0.66
Employee involvement	0.498	3.51	0.79	3.59	0.74
Employee empowerment	0.837	3.47	0.82	3.50	0.81
Education and training	0.917	3.47	0.86	3.49	0.85
Teamwork	0.618	3.71	0.87	3.64	0.85
Customer focus	0.548	4.03	0.65	4.10	0.70
Process management	0.101	3.31	0.74	3.54	0.83
Information and analysis system	0.798	3.36	0.93	3.40	0.89
Strategic planning	*0.039***	3.67	0.97	3.94	0.72
Open organisation	0.901	3.74	0.77	3.72	0.82
Service culture	*0.047***	3.72	0.76	3.94	0.63
Valid N (listwise)		48		148	

Note: **Italicised characters represent significance at 0.05 level. Sig = significant.

Table 8. TQM constructs and industry type.

TQM Constructs	ANOVA Sig.	Manufacturing		Service	
		Mean	S.D.	Mean	S.D.
Top management commitment	0.217	4.08	0.61	3.96	0.74
Employee involvement	0.607	3.58	0.72	3.53	0.78
Employee empowerment	0.871	3.47	0.84	3.49	0.78
Education & training	0.364	3.54	0.79	3.43	0.89
Teamwork	0.458	3.70	0.77	3.61	0.90
Customer focus	**0.051***	4.19	0.62	4.10	0.73
Process management	0.497	3.54	0.81	3.46	0.80
Information and analysis system	*0.011***	3.56	0.85	3.23	0.93
Strategic planning	0.658	3.89	0.76	3.84	0.83
Open organisation	0.948	3.73	0.75	3.72	0.85
Service culture	0.604	3.85	0.67	3.90	0.70
Valid N (listwise)		94		107	

Notes: **Italicised characters represent significance at 0.05 level; *Bold characters represent significance at 0.10 level. S.D. = standard deviation.

authors, this may be because manufacturers have had more experience with quality management practices. This wider experience may be because product characteristics in manufacturing are more tangible than those of services or because manufacturers have been exposed to fiercer competition. In terms of the use of individual quality management practices, the most significant difference pertains to statistical process control, which was used by nearly half the manufacturers but only few service providers.

5. Conclusions

This study investigated whether there is a difference in the TQM constructs implemented by Vietnamese manufacturing and service companies of different ownership, size, industry type, and innovation performance. While MANOVA was the main technique applied, the measurement model for TQM constructs was examined with the help of structural equation modeling. Several conclusions can be drawn from the above results.

Fist, in manufacturing and service companies, customer focus and top management commitment have been implemented at a quite high rate while information and analysis system, education and training, employee empowerment, and process management were found to be just average. This result suggests that Vietnamese companies still have a lot room for improving their TQM strategy.

Second, TQM principles that have been generally considered as a set of practices, in previous studies, could be confirmed as valid for the industries in Vietnam for both manufacturing and service sectors. Third, the MANOVA results indicate that company size, industry type, and degree of innovation influenced the degree of TQM implementation. Large companies showed a higher implementation rate in almost all quality management practices except for teamwork and open organisation when compared to small- and medium-sized companies. Particularly, for service culture and strategic planning, large companies were statistically significantly stronger than small- and medium-sized companies. Highly innovative companies showed a higher rate of implementation for all TQM constructs compared to companies with a low innovation performance, which suggests that TQM supports conditions for innovation. This finding contributes to the literature

pondering the question whether TQM support the firm's innovation. This study shows evidence in Vietnam that TQM most likely enhances conditions for innovation to happen. Therefore, in order to create more product and service innovations, companies may align innovation projects with their efforts to improve the firm's TQM strategy.

The small sample size of service companies is the major limitation of the study. In addition, further research should focus on more innovative industries, such as electronics, automotive and food industries and should also explore the relationship between TQM being a competitive manufacturing/operational strategy and other business strategies such as differentiation and cost leadership. Finally, an industry specific, cross-country analysis in Southeast Asia could help policy makers in these newly industrialising countries to understand how to maintain their industries' competitiveness while facing increasing global competitions.

References

Ahire, S.L., & Golhar, D.Y. (2001). Quality management in large versus small firms. *Journal of Small Business Management*, *27,* 1–13.

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

Ahire, S.L., Landeros, R., & Golhar, D.Y. (1995). Total quality management: A literature review and an agenda for future research. *Production and Operations Management*, *4*(3), 277–306.

Ahmed, P.K. (1998). Culture and climate for innovation. *European Journal of Innovation Management*, *1*(1), 30–43.

Anderson, J.C., & Gerbing, D.W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, *103,* 411–423.

Anderson, J.C., Rungtusanatham, M., & Schroeder, R.G. (1994). A theory of quality management underlying the Deming management method. *Academy of Management Review*, *19*(3), 472–509.

Atuahene-Gima, K. (1996). Market orientation and innovation. *Journal of Business Research*, *35*(2), 93–103.

Badri, M.A., Davis, D., & Davis, D. (1995). A study of measuring the critical factors of quality management. *International Journal of Quality & Reliability Management*, *2*(2), 36–53.

Baldwin, J.R., & Johnson, J. (1996). Business strategies in more and less-innovative firms in Canada. *Research Policy*, *25*(5), 785–804.

Beaumont, N.B., & Sohal, A.S. (1999). Quality management in Australian service industries. *Benchmarking: An International Journal*, *6*(2), 107–124.

Beaumont, N.B., Sohal, A.S., & Terziovski, M. (1997). Comparing quality management practices in the Australian service and manufacturing industries. *International Journal of Quality & Reliability Management*, *14*(8), 814–833.

Black, A.S., & Porter, L.J. (1996). Identification of the critical factors of TQM. *Decision Sciences*, *27*(1), 1–21.

Carr, A.S., Leong, G.K., & Sheu, C. (2000). A study of purchasing practices in Taiwan. *International Journal of Operations & Production Management*, *20*(12), 1427–1445.

Choong, Y.L. (2004). Perception and development of total quality management in small manufacturers: An exploratory study in China. *Journal of Small Business Management*, *42*(1), 102–115.

Crosby, P.B. (1979). *Quality is free*. New York: McGraw-Hill.

Crosby, P.B. (1996). *Quality is still free: Making quality certain in uncertain times*. New York: McGraw-Hill.

Das, A., Paul, H., Swiersek, F.W., & Laosirihongthong, T. (2006). A measurement instrument for TQM implementation in the Thai manufacturing industry. *International Journal of Innovation and Technology Management*, *3*(4), 1–17.

Dean, J.W., & Bowen, D.E. (1994). Management theory and total quality: Improving research and practice through theory development. *Academy of Management Review*, *19*(3), 392–418.

Dean, J., & Evans, J. (1994). *Total quality management, organization and strategy*. St Paul, MN: West Publishing.

Deming, W.E. (1982). *Quality, productivity and competitive position*. Cambridge, MA: MIT Press, Massachusetts Institute of Technology, Center for Advanced Engineering Study.
Deming, W.E. (1986). *Out of the crisis*. Cambridge, MA: Massachusetts Institute of Technology, Center for Advanced Engineering Study.
Dow, D., Swanson, D., & Ford, S. (1999). Exploding the myth: Do all quality management practices contribute to superior quality performance? *Production and Operations Management*, *8*(1), 1–27.
Evans, J., & Lindsay, W. (1993). *The management and control of quality* (2nd ed.). St Paul, MN: West Publishing.
Feigenbaum, A.V. (1951). *Quality control: Principles, practice, and administration*. New York: McGraw-Hill.
Feigenbaum, A.V. (1983). *Quality control* (3rd ed.). New York: McGraw-Hill.
Feigenbaum, A.V. (1991). *Total quality control*, 40th anniversary edition (3 rev ed.). New York: McGraw-Hill.
Feng, J., Prajogo, D.I., Tan, K.C., & Sohal, A.S. (2006). The impact of TQM practices on performance: A comparative study between Australian and Singaporean organizations. *European Journal of Innovation Management*, *9*(3), 269–278.
Flynn, B.B., Schroeder, R.G., & Sakakibara, S. (1994). A framework for quality management research and an associated measurement instrument. *Journal of Operational Management*, *11,* 339–366.
Gagnon, T., & Toulouse, J. (1996). The behavior of business managers when adopting new technologies. *Technological Forecasting and Social Change*, *52,* 59–74.
GAO Study (1991). Report to the House of Representatives on Management Practices, US Companies Improve Performance through Quality Efforts. United States General Accounting Office, Washington, DC.
Garvin, D.A. (1988). *Managing quality: The strategic and competitive edge*. New York: The Free Press.
Germain, R. (1996). The role of context and structure in radical and incremental logistics innovation adoption. *Journal of Business Research*, *35,* 117–127.
Grant, R.M., Shani, R., & Krishnan, R. (1994). TQM's challenge to management theory and practice. *Sloan Management Review*, *35*(2), 25–35.
Haar, J.M., & Spell, C.S. (2008). Predicting total quality management adoption in New Zealand: The moderating effect of organizational size. *Journal of Enterprise Information Management*, *21*(2), 162–178.
Hair, J.F., Anderson, R.E., Tatham, R.L., & Black, W.C. (1998). *Multivariate data analysis*. Upper Saddle River, NJ: Prentice-Hall International Inc.
Hoang, D.T., Igel, B., & Laosirihongthong, T. (2006). The impact of total quality management on innovation: Findings from a developing country. *International Journal of Quality & Reliability Management*, *23*(9), 1092–1117.
Hui, M.K., Au, K., & Fock, H. (2004). Empowerment effects across cultures. *Journal of International Business Studies*, *35*(1), 46–60.
Hung, B.N. (2003). Assesement the effect of ISO certificate on performance of companies in Hochiminh City. Ho Chi Minh City, Vietnam: Department of Science, Technology, and Environment, HCMC.
Ishikawa, K. (1985). *What is total quality control?* Englewood Cliffs, NJ: Prentice-Hall.
Joseph, I.N., Rajendran, C., & Kamalanabhan, T.J. (1999). An instrument for measuring total quality management implementation in manufacturing-based business units in India. *Internal Journal of Production Research*, *37,* 2201–2215.
Juran, J.M. (1974). *Quality control handbook* (3rd ed.). New York: McGraw-Hill.
Juran, J.M. (1988). *Juran on planning for quality*. New York: Free Press.
Juran, J.M. (1989). *Juran on leadership for quality: an executive handbook*. New York: Free Press.
Juran, J.M. (1992). *Juran on quality by design: The new steps for planning quality into goods and services*. New York: Free Press.
Juran, J.M. (1995). *A history of managing for quality: The evolution, trends and future direction of managing for quality*. Milwaukee, WI: ASQC Quality Press.
Kim, W.C., & Marbougne, R. (1999). Strategy, value innovation, and the knowledge economy. *Sloan Management Review*, (Spring), 41–54.

Kline, R.B. (1998). *Principles and practice of structural equation modeling*. New York: The Guilford Press.

Kruger, V. (1996). How can a company achieve improved levels of quality performance: Technology versus employees? *The TQM Magazine*, *8*(3), 11–20.

Kruger, V. (1998). Total quality management and its humanistic orientation towards organisational analysis. *The TQM Magazine*, *10*(4), 293–301.

Kruger, V. (2001). Main schools of TQM: 'the big five'. *The TQM Magazine*, *13*(3), 146–155.

Laosirihongthong, T, Paul, H., & Speece, M.W. (2003). Evaluation of new manufacturing technology implementation: And empirical study in the Thai automotive industry. *Technovation*, *23*, 321–331.

Loan, N.T.Q. (2004). Assesment of the quality management system of ISO companies. *Economic Development Review*, University of Economics, Ho Chi Minh City, No. 8–9.

McAdam, R., Armstrong, G., & Kelly, B. (1998). Investigation of the relationship between total quality and innovation: A research study involving small organizations. *European Journal of Innovation Management*, *1*(3), 139–147.

Millar, R.M.G. (1987). In foreword to J. Cullen & J. Hollingham. *Implementing total quality*. Bedford: IFS Publications.

Ministry of Planning and Investment. (1999). Research report: Improving macroeconomic policy and reforming administrative procedures to promote development of small and medium enterprises in Vietnam.

Motwani, J. (2001). Critical factors and performance measures of TQM. *The TQM Magazine*, *13*(4), 292–300.

Noronha, C. (2002). Chinese cultural values and total quality climate. *Managing Service Quality*, *12*(4), 210–223.

Nunnally, J., & Burnstein, I.H. (1994). *Pschychometric theory* (3rd ed.). New York: McGraw-Hill.

Pinho, J.C. (2008). TQM and performance in small medium enterprises: The mediating effect of customer orientation and innovation. *International Journal of Quality & Reliability Management*, *25*(3), 256–275.

Powell, T.C. (1995). Total quality management as competitive advantage: A review and empirical study. *Strategic Management Journal*, *16,* 15–37.

Power, D.J., Amrik, S.S., & Rahman, S. (2001). Critical success factors in agile supply chain management. *International Journal of Physical Distribution and Logistics Management*, *31*(4), 247–265.

Prajogo, D.I. (2005). The comparative analysis of TQM practices and quality performance between manufacturing and service firms. *International Journal of Service Industry Management*, *16*(3), 217–228.

Prajogo, D.I., & Sohal, A.S. (2003a). The multidimensionality of TQM practices in determining quality and innovation performance – an empirical examination. *Technovation*, *24,* 443–453.

Prajogo, D.I., & Sohal, A.S. (2003b). The relationship between TQM practices, quality performance, and innovation performance: An empirical examination. *International Journal of Quality & Reliability Management*, *20*(8), 901–918.

Prajogo, D.I., & Sohal, A.S. (2006). The integration of TQM and technology /R&D management in determining quality and innovation performance. *The International Journal of Management Science, Omega*, *34,* 296–312.

Pun, K.F. (2001). Cultural influences of TQM adoption in Chinese enterprises: An empirical study. *Total Quality Management*, *12*(3), 323–342.

Rahman, S., & Bullock, P. (2005). Soft TQM, hard TQM, and organisational performance relationship: An empirical investigation. *Omega*, *33,* 73–83.

Reed, R., Lemark, D.J., & Mero, N.P. (2000). Total quality management and sustainable competitive advantage. *Journal of Quality Management*, *5,* 5–26.

Samson, D., & Terziovski, M. (1999). The relationship between total quality management practices and operational performance. *Journal of Operations Management*, *17,* 393–409.

Saraph, J.V., Benson, G.P., & Schroeder, R.G. (1989). An instrument for measuring the critical factors of quality management. *Decision Sciences*, *20*, 810–829.

Sila, I., & Ebrahimpour, M. (2002). An investigation of the total quality management survey based research published between 1989 and 2000 – a literature review. *International Journal of Quality & Reliability Management*, *19*(7), 902–970.

Silvestro, R. (1998). The manufacturing TQM and service quality literatures: Synergistic or conflicting paradigms? *International Journal of Quality & Reliability Management*, *15*(3), 303–328.
Singh, P.J., & Smith, A.F.R. (2004). Relationship between TQM and innovation: An empirical study. *Journal of Manufacturing Technology Management*, *15*(5), 394–401.
Sitkin, S.B., Sutcliffe, K.M., & Schroeder, R.G. (1994). Distinguishing control from learning in total quality management: A contingency perspective. *Academy of Management Review*, *19*(3), 537–564.
Slater, S.F., & Narver, J.C. (1998). Customer-led and market-led: Let's not confuse the two. *Strategic Management Journal*, *19*(10), 1001–1006.
Spreitzer, G.M. (1995). Psychological empowerment in the work place: Dimensions, measurement, and validation. *Academy of Management Journal*, *38*(5), 1442–1465.
Steingrad, D.S., & Fitzgibbons, D.E. (1993). A postmodern deconstruction of total quality management. *Journal of Organization Change Management*, *6*(5), 27–42.
Sureshchandar, G.S., Chandrasekharan, R., & Anantharaman, R.N. (2001). A conceptual model for total quality management in service organizations. *Total quality management*, *12*(3), 343–363.
Swamidass, P.M., & Kotha, S. (1998). Explaining manufacturing technology use firm size and performance using a multidimensional view of technology. *Journal of Operation Management*, *17,* 23–37.
Terziovski, M., & Samson, D. (1999). The link between total quality management practice and organizational performance. *International Journal of Quality & Reliability Management*, *16*(3), 226–237.
Terziovski, M., & Samson, D. (2000). The effect of company size on the relationship between TQM strategy and organizational performance. *The TQM Magazine*, *12*(2), 144–148.
Tidd, J., Bessant, J., & Pavitt, K. (1997). *Managing innovation: Integrating technological, market, and organizational change*. Chichester: John Wiley & Sons Ltd.
Vuppalapati, K., Ahire, S.L., & Gupta, T. (1995). JIT and TQM: A case for joint implementation. *International Journal of Operations & Production Management*, *15*(5), 84–94.
Watson, J.G., & Korukonda, A.R. (1995). The TQM jungle: A dialectical analysis. *International Journal of Quality & Reliability Management*, *12*(9), 100–109.
Wind, J., & Mahajan, V. (1997). Issues and opportunities in new product development: An introduction to the special issue. *Journal of Marketing Research*, *34*(1), 1–12.
Woon, K.C. (2000). TQM implementation: comparing Singapore's service and manufacturing leaders. *Managing Service Quality*, *10*(5), 318–331.
Yavas, B.F., & Rezayat, F. (2003). The impact of culture on managerial perceptions of quality. *International Journal of Cross Cultural Management*, *3*(2), 213–234.
Zeithaml, V.A., Parasuraman, A., & Berry, L.L. (1990). *Delivering quality service: Balancing customer perceptions and expectations*. New York: Free Press.
Zeitz, G., Johannesson, R., & Ritchie, J.E. Jr. (1997). An employee survey measuring total quality management practices and culture. *Group and Organization Management*, *22*(4), 414–444.

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