Examining the effects of contextual factors on TQM and performance through the lens of organizational theories: An empirical study

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Abstract

Although much has been written about TQM, little attention has been paid to the potential effects of contextual factors on TQM and TQM–performance relationships. The use of organizational theory to formulate propositions regarding the effects of such factors is especially scarce in the TQM literature. This study uses institutional theory and contingency theory as the basis to test a number of such propositions. First, a model of TQM and organizational performance is developed. Then using survey data, the effects of five contextual factors – three institutional factors and two contingency factors – on the implementation of TQM practices and on the impact of TQM on key organizational performance measures are analyzed within a TQM–performance relationships model framework. The three institutional factors include TQM implementation, ISO 9000 registration, and country of origin, and the two contingency factors include company size and scope of operations. The results show that the implementation of all TQM practices is similar across subgroups of companies within each contextual factor. In addition, the effects of TQM on four performance measures, as well as the relationships among these measures, are generally similar across subgroup companies. Thus, for the five contextual factors analyzed, the overall findings do not provide support for the argument that TQM and TQM–performance relationships are context-dependent. The implications of the study for managers and researchers, as well as study limitations, are also discussed.

Keywords: Quality management; Organizational behavior; Interdisciplinary; Empirical research methods; Questionnaires/surveys/interviews

1. Introduction

In general, previous studies obtained mixed results about the success and failure rates of total quality management (TQM). Some of these studies reported estimates of TQM failure rates as high as 60–67% (Dooyoung et al., 1998). However, other studies yielded more optimistic results. For instance, according to a study conducted by Mohrman et al. (1995), 83% of the surveyed companies had a “positive or very positive” experience with TQM, and 79% planned to “increase or greatly increase” their TQM initiatives in the next 3 years.

One likely reason for some of the unsuccessful TQM implementations is the possibility that TQM is context-dependent. That is, contextual factors such as company size and scope of operations might play a role in the implementation of TQM practices and outcomes. However, this issue has largely been ignored in the literature. Thus, one of the objectives of this study...
is to empirically analyze and compare TQM practices across companies with different characteristics using several contextual factors. The study will also examine how these factors affect the relationships among TQM and key organizational performance measures. These analyses are intended to shed light on whether the universal or the context-dependent approach to TQM is warranted. The use of organizational theory to test the validity of these two approaches has been scarce in the TQM literature. To fill this void, this study uses two organizational theories, institutional theory and contingency theory, as the basis to formulate propositions regarding the effects of contextual factors on TQM practices and TQM–performance relationships.

There are differing views on whether a context-dependent or universal approach to TQM implementation is appropriate. However, despite a lack of empirical evidence, the assumption of universal applicability has permeated the literature with little attention being given to the context-dependent argument. Several recent studies (e.g., Sousa and Voss, 2002; Sila and Ebrahimpour, 2002, 2003) also emphasized the need to conduct contingency studies in the field of TQM.

One of the earlier empirical studies in the quality management area that analyzed the effects of several contextual factors on the implementation of TQM practices was conducted by Benson et al. (1991). This study obtained mixed results in that although company type explained the variation in the “actual quality management practices” implemented, other factors including company size and manager type did not. It can be argued that this study did not have a big following since very few similar studies were published in subsequent years. For instance, a study by Martinez-Lorente et al. (1998) used data from Spanish industrial companies to analyze the effects of several company characteristics such as size, nationality, conviction about the benefits of TQM, and perceived product value on the application of TQM. Most of the other empirical studies in this area mainly focused on cross-country comparisons of TQM practices (e.g., Adam et al., 1997; Solis et al., 2000; Rungtsanatham et al., 2005) or the effect of company size on these practices (e.g., Ahire and Golhar, 1996). In addition, Sousa and Voss (2001) analyzed manufacturing strategy as a contextual factor and found evidence that TQM practices were contingent on manufacturing strategy.

In these previous studies that analyzed contextual factors, either no performance measures or a limited number of measures were used, or the relationships among TQM and performance measures were not analyzed within a TQM–performance relationships model. Overall, a limited number of such empirical studies did not provide conclusive evidence for the validity of either the universal or context-dependent approach to TQM. This study develops a structural equation modeling (SEM) model, where the combined effects of seven TQM practices on four measures of organizational performance, as well as the effects of these performance measures on each other, are tested using survey data. This model is also tested using five contextual factors by conducting multiple group analysis to determine whether the model relationships are invariant (i.e., equivalent) across subgroups of companies within each contextual factor.

2. Model and hypotheses

An extensive review of the TQM literature showed that the TQM construct could be measured by seven general categories of practices including leadership, strategic planning, customer focus, information and analysis, human resource management (HRM), process management, and supplier management. A description of these practices and the supporting literature for them are provided in Table 1. These practices are also consistent with the Malcolm Baldrige National Quality Award (MBNQA) criteria as suggested by Sila and Ebrahimpour (2003), who analyzed the TQM practices extracted by 76 empirical TQM studies and categorized them under the 2002 MBNQA framework. The results of an empirical study by Curkovic et al. (2000a) also showed that using the MBNQA framework, companies could achieve the implementation of TQM, which also indicated that the MBNQA was compatible with TQM practices. However, in contrast to the MBNQA framework, supplier management was used as a separate practice in the current study since supplier management has been very critical for many organizations in recent years as a result of the growing importance of supply chain management. In addition, as shown in Table 1, this practice has been extracted as a separate TQM factor by a number of previous empirical studies. Using it as a separate practice in the proposed model would also make it possible to assess its significance for the TQM construct, as well as compare its implementation across companies with different characteristics.

The four performance variables used to measure organizational performance in four key business areas include human resource results, customer results, organizational effectiveness, and financial and market results. The items constituting each measure and the supporting literature for these items are listed in Table 1. Fig. 1 shows an SEM model of the nine hypotheses
Table 1
TQM practices and performance measures used in the model

<table>
<thead>
<tr>
<th>TQM practices and performance measures</th>
<th>Description of TQM practices and performance measures</th>
<th>Supporting literature for TQM practices and performance measures</th>
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<tr>
<td>Human resource results</td>
<td>Employee turnover rate; employee absenteeism; number of employee suggestions received; employee job performance</td>
<td>GAO (1991), Adam et al. (1997), Paauwe and Richardson (1997), McAdam and Bannister (2001), NIST (2002)</td>
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<td>Organizational effectiveness</td>
<td>Cost; quality; productivity; cycle times; number of errors or defects; supplier performance</td>
<td>Deming (1986), GAO (1991), Hendricks and Singhal (1997), Kim et al. (2002), Rust et al. (2002)</td>
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Fig. 1. A model of the relationships among TQM and key organizational performance measures and structural path analysis results for the full sample (*p < 0.001).
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<td>The role of the quality department</td>
<td>Customer involvement</td>
<td>Customer focus</td>
<td>Customer focus</td>
<td>Customer orientation</td>
<td>Strategic planning</td>
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<td>Quality data and reporting</td>
<td>Quality information usage</td>
<td>Internal quality information usage</td>
<td>Use of benchmarking</td>
<td>Quality information availability</td>
<td>Information and analysis</td>
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<td>Training</td>
<td>Workforce management</td>
<td>Employee training</td>
<td>Workforce commitment</td>
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<td>Human resource development and management</td>
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<td>Employee relations</td>
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<td>Product/service design</td>
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<td>Design quality management</td>
<td>Statistical process control usage</td>
<td>Internal quality results</td>
<td>Customer focus and satisfaction</td>
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<td>Process management</td>
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<td>Supplier quality management</td>
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developed using literature support. Table 2 suggests that the TQM practices included in this study are consistent with those used by previous studies. However, the items measuring each TQM practice is more comprehensive compared to these studies. This study also incorporates a greater number of performance measures and tests the relationships among them. Previous studies that integrated performance measures into their models mostly included one or two measures, each of which was operationalized by a single item. In addition, these measures were generally used as dependent variables. In this study, three of the four performance measures serve as both independent and dependent variables, each of which is measured by at least four items. Although this study incorporates most major TQM practices and a large number of key performance measures, no claim is made that they are exhaustive, if indeed such a claim is possible. The nine hypotheses formulated are discussed below.

2.1. The effect of TQM on human resource results

The implementation of TQM is one of the most complex undertakings for a company, as it entails changes in organizational culture and affects employees (Kanji and Barker, 1990). It is important to analyze how organizational changes brought about by TQM will affect employees simply because employees are key organizational stakeholders (Mohrman et al., 1995). However, research analyzing TQM’s effect on human results has been scarce (Guimaraes, 1996).

Many TQM elements are people-oriented and include such practices as teamwork, employee empowerment and involvement in decision-making (Guimaraes, 1996). Making such practices part of TQM contributes positively to employee results such as employee satisfaction. This is because the new processes put in place as a result of TQM are more likely to be embraced by employees if they are actively involved in developing these processes (Mohrman et al., 1995).

A case study conducted by McAdam and Bannister (2001) suggested that the implementation of TQM in a company contributed to a positive working environment, in both physical and psychological sense, and resulted in reductions in employee absenteeism. Mohrman et al. (1995) reported that a composite of several core TQM practices such as quality improvement teams and cross-functional planning had a significant association with employee satisfaction and quality of work life. Other studies also showed that TQM practices had a positive correlation with employee satisfaction (Grandzol, 1998) and annual employee turnover rate (Adam et al., 1997). Consistent with these studies, a study by Boselie and van der Wiele (2002) indicated that employee perceptions of TQM concepts led to a higher level of satisfaction and less intention to leave the organization. In addition, according to a study conducted by Guimaraes (1996), employees had higher job satisfaction, job involvement, commitment to the organization, and intentions to stay with the company as a result of TQM. Thus we have the following hypothesis.

**H1.** TQM has a direct, positive effect on human resource results.

2.2. The effect of TQM on customer results

A company’s success in the long term depends on how effectively it satisfies its customers’ needs on a constant basis (Brah et al., 2002). Therefore, TQM’s success is determined by how willing the organization is to change and whether it uses customer satisfaction as a measure in assessing the success of its decisions and actions (Madu and Kuei, 1993). Although many companies may realize the significance of being customer-oriented, they usually face a challenge in monitoring and measuring their customers’ expectations, experience, and satisfaction with their products (Sebastianelli and Tamimi, 2002). Many companies implementing TQM attempted to meet this challenge by encouraging their employees to get actively involved in achieving customer satisfaction. For instance, they tied their employees’ performance evaluations to customer care indicators (Wilkinson et al., 1993).

Deming (1982) argued that customer satisfaction was the most important outcome of TQM practices. Most quality award models also recognize customer results as a significant TQM outcome. In fact, the customer results measure is assigned 20% of the overall scores in the European Foundation for Quality Management (EFQM) model (EFQM, 2004), the highest percentage for any criterion in the model. Several researchers including Filiatrault et al. (1996), Grandzol (1998) and Parzinger and Nath (2000) found a positive relationship between TQM practices and customer results. A study by Das et al. (2000) reported a positive relationship between TQM practices and customer satisfaction performance. Timeliness of delivery was also found to be a significant outcome of TQM practices by Anderson and Sohal (1999). Hence we have the following hypothesis.
**2.3. The effect of TQM on organizational effectiveness**

A commitment to quality over cost and schedule results in improvements in cost and delivery performance in the long run (Ferdows and Demeyer, 1990). TQM practices not only help to improve the quality of products but also reduce scrap, rework, and the need for buffer stock by establishing a stable production process. These in turn minimize production costs and throughput time. Consequently, reduction in throughput time enables a company to improve delivery performance. TQM practices can also help improve flexibility. For instance, workforce flexibility, where employees are trained in multiple skills and are empowered to make decisions, can enable a company to make changes in production volume without having any negative effects on production cost (Ahmad and Schroeder, 2002). Through continuous improvement, not only errors and defects can be prevented but also product cycle times can be reduced, thereby improving productivity (Huang and Lin, 2002). Improvements in manufacturing cycle times have been well documented in one company that implemented TQM. These improvements were partly attributed to teams’ focus on their internal customers and their knowledge of these customers’ requirements. These teams’ active involvement equipped them with the knowledge of what the production priorities were and how each process fit into the overall production process (McAdam and Bannister, 2001).

A study by the US Government Accounting Office (GAO, 1991) examined the effect of TQM practices on the performance of 20 US companies that won the MBNQA. The study found that these practices had a strong relationship with quality and productivity, among others. Similarly, Carter and Narasimhan (1994) argued that TQM’s emphasis on process improvement contributed to productivity increases through effective utilization of people and processes. Deming (1986) also suggested that TQM could be effective in achieving organizational effectiveness. That is, TQM could minimize total costs through sole sourcing. By concentrating on a small number of suppliers, providing them with the needed training and technology, and monitoring their performance, variability in suppliers’ products could be reduced, improving product quality; costs of delay and rework could also be minimized. Thus, TQM practices could be implemented to achieve superior supplier performance.

According to Anderson et al. (1998), several TQM practices including training, information, and supplier management had positive relationships with “operational results” measured by logistics cost performance, effectiveness and efficiency of transaction processes, and order cycle time. These findings were supported by Tata et al. (2000), who found that the effect of TQM practices on operational results were positive. Thus we have the following hypothesis.

**H3.** TQM has a direct, positive effect on organizational effectiveness.

**2.4. The effect of TQM on financial and market results**

According to Buzzell and Gale (1987), financial performance is an important measure of TQM outcomes. This is consistent with Deming’s (1986) argument that quality improvement leads to elimination of waste, reduction of costs, and improved financial performance. Juran (1992) contended that market share was the ultimate test of the results of TQM implementation since TQM led to higher sales. Anecdotal evidence also suggests that investments in quality can lead to improvements in sales, return on assets (ROA), and market share (Sankar, 1995). However, some of the previous studies found no relationship between TQM and financial and market results measures. For instance, Curkovic et al. (2000b) found no relationship between leadership, employee empowerment, cross-functional quality teams and performance measures such as ROA, return on investment (ROI), and market share growth. Some of the other studies that reported no linkages between TQM and financial results included those by Cunningham and Ho (1996) and Davis (1997). However, the literature review conducted for this study indicated that most of the studies found a positive relationship between TQM practices and measures of financial and market results. For instance, Curkovic et al. (2000b) and Wilson and Collier (2000) did report a number of such positive relationships. Mohrman et al. (1995) also found that TQM practices had a positive effect on profitability and competitiveness. Similarly, the findings of a study by Anderson and Sohal (1999) suggested that the effect of TQM practices on overall competitiveness, sales, and market share was positive. A more recent study by Hansson and Eriksson (2002) showed that a sample of quality award-winning Swedish companies that implemented TQM successfully had better financial performance than other
companies of comparable size and their biggest competitors. Several other studies that indicated a positive relationship between TQM and financial results included those by Hendricks and Singhal (1997), Handfield et al. (1998) and Tena et al. (2001). Therefore we have the following hypothesis.

**H4.** TQM has a direct, positive effect on financial and market results.

### 2.5. The effect of human resource results on customer results

The effect of employee fulfillment on customer satisfaction is implicit in the Deming management method, which views customer satisfaction as a natural consequence of pride of workmanship. Pride of workmanship is determined by how capable the employees feel of delivering quality products and services to customers (Anderson et al., 1994a).

Many service companies have also realized that there is a strong relationship between employee performance and customer satisfaction (Hartline and Ferrell, 1996). As a result, the potential role of job satisfaction in improving various work-related outcomes (Hellman, 1997), and especially customer satisfaction (e.g., Schneider and Bowen, 1985; Hallowell et al., 1996; Hartline and Ferrell, 1996), has drawn many researchers’ interest. Hoffman and Ingram (1992) found a positive relationship between job satisfaction and customer-related behaviors. Other studies reported both direct (e.g., Testa et al., 1998) and indirect (e.g., Hallowell et al., 1996) relationships between job satisfaction and customer satisfaction.

A number of studies (e.g., Heskett et al., 1994; Rucci et al., 1998; Harrison and Freeman, 1999) related employee results to customer satisfaction and loyalty, and business performance. This cause–effect relationship has been described as the“service-profit”chain by these studies and has been ascribed to successful human resource practices, which are an integral part of the TQM philosophy. A similar cause–effect relationship can also be seen in the model presented in Fig. 1, where human results directly affect customer results, which in turn directly affect financial and market results.

Retford (1998) emphasized the importance of integrating customer results with employee results. She argued that if employee satisfaction measures and customer measures were designed in unison so that they accounted for the interaction of customers and employees, customer defections could be prevented.

For instance, employee retention, one of the measures of employee results, could affect customer results because experienced employees are more knowledgeable about their organizations’ goals and the customers’ requirements (Schneider and Bowen, 1985). Hence, the next hypothesis is as follows.

**H5.** Human resource results have a direct, positive effect on customer results.

### 2.6. The effect of human resource results on organizational effectiveness

The HRM and TQM literature have become increasingly interlinked. This is partly due to the use of similar theoretical concepts and assumptions such as leadership, employee involvement and motivation, teamwork, and training, and partly because both HRM and TQM are being linked to business performance in theory and practice (Boselie and van der Wiele, 2002). Most of the previous studies (e.g., Huselid, 1995; Delaney and Huselid, 1996; Tsui et al., 1997) focused on the relationship between human resource practices and performance outcomes and paid little attention to the effects of human resource results on other performance measures. Some of these studies (e.g., U.S. Department of Labor, 1993; Youndt et al., 1996) found that human resource practices such as selection and training contributed to productivity and company performance. Ryan et al. (1996) also argued that if the employees in a unit shared positive attitudes and valued cooperation and collaboration, productivity could be improved.

Although there is no extensive empirical evidence on the effect of human resource results on various performance outcomes, several studies did examine such relationships. For instance, Paauwe and Richardson (1997) hypothesized that human resource activities affected human resource results such as turnover and absenteeism, which in turn contributed to productivity and product or service quality. In addition, a report prepared for the Canadian Policy Research Networks suggested that workplace practices such as job design, employee involvement, and training, which are strongly emphasized by TQM, had a favorable impact on employee satisfaction, absenteeism, tardiness, commitment, motivation, effort, and performance, which in turn had a positive effect on company performance, as well as productivity and competitiveness (Anonymous, 2002). In addition, an empirical study by Grandzol (1998) found that employee fulfillment had a positive impact on “operational results” measured by produc-
tivity, cycle time, scrap/waste, energy/efficiency, and material usage. Koys (2001) suggested that employee retention would improve organizational effectiveness in terms of lower costs, because a low turnover would result in less hiring and training activities. Arthur (1994) found that employee retention could also help improve productivity. Thus we have the following hypothesis.

H6. Human resource results have a direct, positive effect on organizational effectiveness.

2.7. The effect of organizational effectiveness on customer results

TQM is generally viewed as a process-oriented approach to improving customer satisfaction by offering goods and services of high quality (Mehra et al., 2001). The production of high quality products and services at a reasonable price has a direct effect on how external customers perceive their purchase-consumption experience (Gustafsson and Johnson, 2002). This level of quality can be attained through improved business processes that reduce defects, costs (Rust et al., 2002; Napolitano, 2003), as well as cycle times and inventories (Napolitano, 2003), which eventually improve customers’ perception of quality and increase customer satisfaction (Rust et al., 2002; Napolitano, 2003). Atkins et al. (2002) also argued that customer value was created through lowest cost, highest quality, fastest cycle time, and highest overall customer satisfaction.

The impact of TQM implementation on various performance outcomes has been documented in many companies. Among these outcomes, organizational effectiveness measures such as reduced cycle times, higher quality, and increased productivity were reported as contributing factors to increased customer satisfaction (Tan et al., 1999). A simulation study by Lai et al. (2001) also found a positive relationship between shorter cycle times and customer satisfaction. However, not many empirical studies examined the effect of organizational effectiveness measures on customer results. One such study was conducted by Anderson et al. (1998) who found that the effect of operational results on customer satisfaction was positive. Agus et al. (2000) reported that product quality had a major effect on customer satisfaction. In addition, Voss and Blackmon (1994) found a significant link between quality-in-use and customer satisfaction. Hence we have the following hypothesis.

H7. Organizational effectiveness has a direct, positive effect on customer results.

2.8. The effect of organizational effectiveness on financial and market results

Internal quality can directly affect costs and revenues. Making improvements to internal quality can result in higher productivity, reduced internal costs and thus have a direct, positive impact on profits (Gustafsson and Johnson, 2002; Shetty, 1987). Even though some quality improvements may concurrently lead to higher revenues and lower costs, improvements focused on affecting customer perception of quality usually increase profits through revenue expansion and those focused on streamlining internal processes increase profits through cost reduction (Rust et al., 2002). Shetty (1987) found that companies that improved the quality of their products realized increases in market share by five or six times faster than those companies that saw the quality of their products decline. In addition, the market share of these companies grew three times faster than the market share of companies that had product quality levels similar to those of their competitors.

Research conducted by Rogers et al. (1982) showed that adjustment of organizational effectiveness measures such as order cycle time, variability of delivery time, and communication time could help increase profits. Other studies (e.g., Kim et al., 2002; Gunasekaran, 2002) suggested that cycle time had a positive effect on competitiveness. In addition, reduction of cycle times and manufacturing costs, as well as elimination of waste, could help improve productivity and ROA (Omachonu and Ross, 1994).

Some of the previous empirical studies also examined the relationship between measures of organizational effectiveness and financial and market results. Studies on the profit impact of marketing strategies (PIMS), where the effects of various marketing strategies on financial performance at over 500 corporations were analyzed, revealed that there was a strong relationship between product or service quality and financial indicators (Buzzell and Gale, 1987). Curkovic et al. (2000c) also found that quality had a positive effect on financial and market performance measures such as market share, ROI, and ROA. Thus we have the following hypothesis.

H8. Organizational effectiveness has a direct, positive effect on financial and market results.

2.9. The effect of customer results on financial and market results

Most of the previous studies that examined the relationship between customer-related performance and
and Juran suggested that the quality management as the main measure of customer-related performance. However, some researchers (e.g., Crosby and Johnson, 2002; Wright and Snell, 2002) argued that it was not only customer satisfaction that led to positive financial results but customer retention as well. Although marketing theory and practice suggest that companies can improve their performance by satisfying their customers, this relationship is still being debated (Yeung et al., 2002). The general argument is that customer satisfaction creates customer loyalty and retention, which results in repeat purchases, growth in sales, a reduction in operating costs, and an increase in profits (Das et al., 2000; Yeung and Ennew, 2001). Increased retention rates can increase profits (Fornell and Wernerfelt, 1988; Reichheld and Sasser, 1990), because the selling costs to existing customers are much lower (Peters, 1987).

The PIMS studies also found a positive relationship between customer satisfaction and market share (Buzzell and Weirsema, 1981; Craig and Douglas, 1982). Other studies reported a significant positive relationship between customer satisfaction and revenues (e.g., Zeithaml et al., 1996; Rucci et al., 1998) and profitability (e.g., Anderson et al., 1994b; Hallowell, 1996; Bernhardt et al., 2000). Filiatrault et al. (1996) and Agus et al. (2000) also found a positive relationship between customer satisfaction and financial results. Therefore we have the following hypothesis.

H9. Customer results have a direct, positive effect on financial and market results.

3. Contextual factors

The pioneers of quality such as Deming, Crosby and Juran suggested that the quality management principles were universally applicable. However, more recently, other quality researchers (e.g., Dean and Bowen, 1994; Sitkin et al., 1994) questioned this argument suggesting that these principles could in fact be context-dependent, which could render certain TQM practices and tools inappropriate. Watson and Korukonda (1995) also stated that there was no empirical evidence to support the universal applicability of TQM practices.

The context-dependent approach to administrative innovations has also been discussed in the organizational theory literature. Administrative innovations are concerned with either changing the structure of an organization or its administrative processes and are mainly related to the management of the organization rather than its basic work activities (Damanpour, 1987). Damanpour (1987) conducted a comparative analysis of the relationships between six organizational factors (functional differentiation, specialization, professionalism, administrative intensity, organizational size, organizational slack) and several types of innovations using data from public libraries located in northeastern United States (US). His findings showed that these factors had a significant effect on the adoption of administrative innovations, although their effect on the adoption of technological innovations was much greater.

In another study, Damanpour (1991) conducted a meta-analysis of the relationships between 13 organizational attributes (mainly structural, process, resource, and cultural variables) and organizational innovation. An analysis of the effects of moderating variables on these relationships showed that differences in organizational types such as industry, sector, structure, and strategy could have different effects on the degree of innovativeness. This was mainly attributed to different environmental opportunities and threats that these companies faced, providing support for a contingency theory of organizational innovation.

Westphal et al. (1997) explored TQM in hospitals as an administrative innovation that is open to various interpretations and that can exhibit differences in adoption across organizations. The authors suggested that empirical evidence for the effects of TQM on overall performance and knowledge of ideal form or content of TQM programs were limited. Therefore, the question of whether the institutionalization of TQM in organizations should conform to normative forms of adoption, or whether TQM should be customized to the unique needs and capabilities of these organizations, remained unanswered. According to institutional theory, norms emerge based on the organizational performance motives of early adopters exerting pressure on later adopters to conform. Hence, Westphal et al. (1997) argued that later adopters of TQM would imitate the early adopters’ quality practices rather than customizing them to their unique needs and capabilities. In addition, the early adopters’ customization of these quality practices would be expected to yield superior organizational performance gains, whereas the later adopters’ conformity to normative TQM adoption would be negatively associated with organizational performance benefits (Westphal et al., 1997). These hypotheses were empirically supported by the analysis conducted by the authors. Thus, these studies provided evidence that the implementation of administrative innovation such as TQM and their effects on organizational performance could be affected by contextual factors.
In the next section, we present a discussion of the five contextual factors – three institutional factors and two contingency factors – that will be used to test the proposed model by drawing on institutional theory and contingency theory. The propositions related to institutional theory will be called institutional factors and those related to contingency theory will be called contingency factors.

3.1. Institutional factors

According to institutional theory, organizations create structures to look legitimate to important stakeholders. This is due in part to regulations, procedures, and structures imposed on them by environmental institutions. Organizations may be forced to change their structures due to governmental pressures, imitate the structures of other organizations as a result of competitive pressures, or conform to normative standards developed by such organizations as accreditation companies and consumer organizations (Wagner et al., 2001). ISO registration, which is one of the institutional factors in the current study, is an accreditation process that seeks to standardize systems for quality around the world. Thus, companies need to conform to a number of normative standards to obtain registration. However, since there is no certification for TQM, there are no official guidelines for implementation. In spite of this, companies implementing TQM may imitate early adopters to improve the quality of their products, services, and processes in response to competitive pressures. As suggested by Westphal et al. (1997), this imitation would be expected to lead to similar TQM practices across TQM implementers. As a result, TQM implementers would differentiate themselves from non-implementers.

The last institutional factor analyzed, country of origin, represents a cultural factor that may become institutionalized at the country level (Homburg et al., 1999). Different societies have different traits at the regional or national level such as a “normative institutional order”, as well as unique cultural characteristics and economic and industrial structures. Therefore, the organizational practices of companies that originate from different countries or regions may diverge (Harzing and Sorge, 2003). This divergence might also be witnessed in these companies’ approaches toward the implementation of TQM practices.

Institutional theory also suggests that organizations that conform to norms of acceptable practice can achieve high levels of production efficiency and effectiveness (DiMaggio and Powell, 1983; Carruthers and Espeland, 1995). Hence, companies, for instance, that implement TQM and are registered to ISO 9000 would be expected to have superior performance compared to those companies that do not implement TQM or are not ISO-registered.

3.2. Contingency factors

Contingency theory suggests that successful organizations choose structures and process characteristics that “fit” to the degree of uncertainty in their environment (Duncan, 1972; Miller, 1992). Contingency factors that may affect the establishment of this fit include both internal and external factors. Theorists have used various constructs to operationalize internal contingency factors, but these factors generally had three dimensions in common: task variability, task difficulty, and task interdependence (Gupta et al., 1994). In the marketing literature, Homburg et al. (1999) used differentiation and cost-leadership strategy, and distribution and customer base as internal contingency factors, and market growth, market-related uncertainty, and technological turbulence as external contingency factors. In health care quality management area, Wagner et al. (2001) used contingency factors such as centralization of decision-making, formalization of regulations, and organizational size. Organizational size, used as an external contingency factor by Gupta et al. (1994), is one of the factors analyzed in the current study. The other contingency factor included in this study is scope of operations (i.e., domestic operating versus international operating companies), which affects the degree to which companies are exposed to uncertainty as a result of the different environments they operate in.

Structural contingency theory is an extension of contingency theory and attempts to explain context–structure–performance relationships (Melan, 1998). The theory suggests that organizations that can establish a fit between organizational structure and environmental uncertainty will achieve higher organizational performance results (Schlevogt and Donaldson, 1999; Ellis et al., 2002), while a misfit would have a negative effect on organizational performance (Donaldson, 2001). Within the context of contingency propositions, using the practice of Reed et al. (1996), this study assumes that it is fit that determines organizational performance, and not the independent effects of environmental uncertainty and TQM. The propositions for each of the institutional and contingency factors are discussed below.
3.3. Institutional propositions

3.3.1. TQM implementation

TQM has become a recognized philosophy in the US since the 1980s as a result of the success of Japanese companies with the implementation of TQM practices, as well as the early success of several US companies such as Motorola and Ford with this philosophy. Consequently, many US companies increasingly implemented TQM programs (Ahire et al., 1996a). As previously mentioned, the literature is not in agreement with the benefits of implementing TQM. In this study, however, approximately 70% of the companies that implemented TQM stated that their program was successful whereas 14% stated that it was unsuccessful. The other 16% did not respond, while the 3% did not know the results of their program. Thus, a big percentage of TQM implementers (TQM companies) rated their programs as being successful.

One of the objectives of this study is to compare TQM companies with companies that never implemented a TQM program (non-TQM companies) using the proposed model. The companies were classified into two groups as TQM companies and non-TQM companies based on their response to a question included in the survey asking them whether they implemented TQM. If they did implement TQM, the companies were also asked to state the duration of their implementation and whether they considered their TQM program as being successful. However, since non-TQM companies may still be implementing TQM practices either as part of another continuous improvement program or as part of their regular business operations, the term “non-TQM company” only suggests that these companies never implemented a TQM program.

The implementation of TQM practices is expected to be more rigorous in TQM companies than in non-TQM companies, because TQM companies allocate more resources for the implementation of these practices and focus their efforts on their effective implementation (Lascelles and Dale, 1990; Ahire et al., 1996a; Brah et al., 2002). In addition, TQM companies are generally expected to achieve better business performance than non-TQM companies as a result of implementing these TQM practices more rigorously (Powell, 1995; Ahire et al., 1996a; Brah et al., 2002). In fact, Hendricks and Singhal (1997) found that companies that effectively implemented TQM achieved better performance results than non-TQM companies in terms of profitability, revenues, costs, capital expenditure, and total assets. In addition to such financial performance measures, this study will use a broader range of business performance measures to compare the two groups within the proposed TQM–performance relationships model framework.

**Proposition 1.** TQM practices are different across TQM companies and non-TQM companies.

**Proposition 2.** The structural model relationships are different across TQM and non-TQM companies.

3.3.2. ISO 9000 registration

ISO 9000 can be considered to be a subset of TQM. ISO 9000 mainly deals with quality management systems for the design, development, purchasing, production, installation, and servicing of products and services. However, the eight TQM practices added to the 2000 version of ISO 9000 brought ISO 9000 and TQM closer together than ever before (Goetsch and Davis, 2003). Overall, the literature suggests that many ISO-registered companies view the registration process as a prerequisite to TQM implementation (Escanciano et al., 2001). Yusof and Aspinwall (2000) argued that ISO registration contributed to a company’s achievement of the “total system” associated with TQM. Thus, ISO-registered companies would be expected to have more effective TQM practices in place than non-ISO-registered companies as a result of their ISO 9000 efforts.

The literature is not in unanimous agreement with the effects of ISO 9000 registration on organizational performance. Some of the previous studies (e.g., Terziouk et al., 1997; Simmons and White, 1999; Lima et al., 2000) found that ISO registration did not necessarily improve companies’ performance. On the other hand, according to the International Organization for Standardization, ISO 9000 can increase customer satisfaction, provide cost and risk-management benefits, and result in improved competitiveness (Goetsch and Davis, 2003). In fact, Rao et al. (1997a) found that ISO-registered companies had better quality management practices and quality results than those companies that were neither ISO-registered nor interested in obtaining registration. Ismail and Hashmi (1999) also reported better performance for ISO-registered companies compared to non-ISO-registered companies. A study by McAdam and McKeown (1999) found that 37% of the surveyed companies reported improvements, such as increases in productivity and sales and reductions in costs and customer complaints. Overall, 77% of the companies reported being pleased or very pleased with ISO. Lee and Palmer (1999) also reported improvements in performance as a result of ISO registration. Thus we have the following proposition.
Proposition 3. TQM practices are different across ISO-registered and non-ISO-registered companies.

Proposition 4. The structural model relationships are different across ISO-registered and non-ISO-registered companies.

3.3.3. Country of origin

Although several cross-country studies were conducted, where the similarities and differences in TQM practices and performance measures across countries were analyzed, this is still an area of research in quality management that needs to be explored further. The results of these studies were inconsistent. For instance, some of the studies found that TQM practices were similar across the compared countries (e.g., Adam et al., 1997; Rao et al., 1997b), whereas others reported differences (e.g., Raghunathan et al., 1997; Tata et al., 2000). Most of these empirical studies used data collected from companies operating in different countries. However, the data in the current study were collected from local and foreign companies operating in the same country (i.e., the US). In fact, studies comparing the TQM practices and performance of local and foreign companies operating in the host country using organizational theory and a TQM–performance relationships model are nearly non-existent.

The issue of convergence versus divergence of various practices across companies with different countries of origin has not yet been resolved in the international management literature, regardless of whether the companies compared were located in the same country or in different countries. Researchers supporting the convergence hypothesis (e.g., Tung, 1981; Mendenhall and Oddou, 1985) argued that global, industrial, and economic pressures would outweigh cultural factors, resulting in convergence of structures, processes, and practices across companies with different countries of origin. On the other hand, researchers supporting the divergence hypothesis contended that cultural differences played an important role in shaping these structures and practices differently (e.g., Whitley and England, 1977; Hofstede, 1983). However, Child (1981) argued that there was evidence in support of both the convergence and divergence hypothesis, where convergence mostly applied to macrolevel variables such as structure and technology, and divergence applied more to microlevel variables such as human behavior within companies.

The convergence hypothesis and institutional theory are congruent in that they both suggest that external forces will compel companies to adopt similar practices. Chung et al. (2000) analyzed the control practices of multinational companies (MNCs) operating in Australia related to knowledge flows, product flows, and capital flows. The authors reported that these control practices were similar across MNCs, indicating that they converged due to normative and mimetic pressures as suggested by institutional theory. Rungtusanatham et al. (2005) also found evidence for the convergence hypothesis by comparing Deming management principles across companies located in several different countries. This study also takes the position that US companies and foreign companies operating in the US will mimic each other’s TQM practices and create similar structures to look legitimate to important stakeholders. As a result, these companies will also be expected to have similar business performance. Thus we have the following proposition.

Proposition 5. TQM practices are similar across US-owned and foreign-owned companies operating in the US.

Proposition 6. The structural model relationships are similar across US-owned and foreign-owned companies operating in the US.

3.4. Contingency propositions

3.4.1. Company size

TQM was first developed by large Japanese companies and subsequently adopted by large US companies (Powell, 1995). As a result, much of the literature focused on the implementation of TQM in large companies (Ghobadian and Gallear, 1997). However, companies with different sizes have distinguishing characteristics that may have different effects on how TQM is implemented and how TQM contributes to organizational performance. For instance, small and medium-sized companies (SMCs) have flatter management structures and higher flexibility than large companies (McAdam and McKeown, 1999) and have more customer orientation, less complexity and better communication due to informal relationships (Cagliano et al., 2001) and are more likely to use innovative work practices (Osterman, 1994; Walley, 2000), which may make the implementation of TQM easier. On the other hand, large companies are more formalized, specialized, and decentralized (Germain and Spears, 1999) and have more abundant resources than SMCs that allow them to undertake TQM activities (Ghobadian and Gallear, 1997; van der Wiele and Brown, 1998). However, since it is difficult to achieve major change in large companies, these companies may be less willing
to undertake such change or may even give up on TQM if problems arise early during implementation (Mohrman et al., 1995).

Large companies and SMCs also differ in terms of the reasons why they implement TQM practices. Although large companies implement these practices due to corporate decision, company survival, and to reduce costs, SMCs’ main goal is to meet customer requirements. Accordingly, large companies emphasize structural and organizational components of TQM, such as training, feedback, and supplier management, whereas SMCs focus on the soft sides of TQM such as leadership and employee involvement (Sun and Cheng, 2002). A detailed analysis of the differences between SMCs and large companies as they pertain to the design and implementation of TQM is provided by Ghobadian and Gallear (1997). These differences range from structure, procedures and behavior to processes, people, and contact.

There is also some evidence in the literature that there are differences among large companies and SMCs in terms of the benefits they obtain from TQM. For instance, according to Hendricks and Singhal (2001), small companies are more likely to realize greater improvements in operating income and sales as a result of implementing TQM practices. In addition, some practices, such as employee participation, can be implemented more successfully in smaller companies, resulting in greater employee satisfaction (Manochehri, 1988). Overall, the literature suggests that the fit of TQM practices and the TQM results achieved are different in large companies and SMCs. Thus we have the following proposition.

**Proposition 7.** The fit of TQM practices is similar across small and medium-sized companies and differs from the fit for large companies.

**Proposition 8.** The structural model relationships are similar across small and medium-sized companies and differ from those in large companies.

Note that, in this study, small companies were those companies with less than 100 employees, medium-sized companies included those with 101–500 employees, and large companies had more than 500 employees.

### 3.4.2. Scope of operations

The extent to which companies operate in the global marketplace (i.e., domestic versus international) may have an effect on their TQM practices. However, no studies were found that examined the effect of this contingency factor on TQM practices and TQM–performance relationships. Nonetheless, a somewhat comparable study conducted by Das et al. (2000) used international competition as a contingency factor. Their study compared high involvement work practices and quality practices across three groups of North American companies that faced low, medium, and high levels of competition from Japanese companies, as well as these practices’ effects on company performance and customer satisfaction. The study found differences in high involvement practices and quality practices across these three groups. It also found differences across the three groups in terms of the effect of quality practices on customer satisfaction. However, the effect of customer satisfaction on company performance was similar across these groups. Even though the effect of high involvement work practices on company performance was similar across low and high competition conditions, this relationship was nonsignificant for companies facing medium level competition.

The current study is different from the Das et al. (2000) study in that it compares companies that have only domestic customers (domestic operating companies) to those that have customers worldwide (international operating companies). International operating companies are generally more exposed to new ideas and practices than domestic operating companies and are therefore in a better position to learn from the experiences of similar plants and adopt new management techniques more rapidly. This learning also comes as a result of the intense competitive pressures that these companies face from their foreign competitors to implement these techniques (Osterman, 1994). For instance, a study conducted by González-Benito and Spring (2000) found that international companies were more likely to implement just-in-time purchasing practices. Bayo-Moriones and Merino-Díaz de Cerio (2003) argued that companies that belonged to a multinational group generally positioned their quality departments at a higher level in the organizational structure, which suggested that the level of implementation of TQM practices at these companies was probably greater.

The HRM literature also suggests that companies that have international presence have superior management practices such as employee relations, recruitment, and the use of innovative human resource practices compared to domestic operating companies (Chambers et al., 1998; Holbeche, 1999; Hiltrop, 2002). There are a number of reasons for the differences in human resource practices across these companies. For instance, international companies have to deal with a greater range of complex issues such as the coordination of international training activities, relocation of expatriates, and
adjustment of pay policies to the regulations of different countries (Hiltrop, 2002). Data collected from Chinese and Slovakian domestic and global companies also showed that companies that had global presence were more market-oriented in their emphasis on training and allocated more resources for sales training (Honeycutt et al., 1999). Since international operating companies allocate more resources for the effective implementation of their various TQM practices, these investments in quality would be expected to lead to higher levels of performance in these companies (Das et al., 2000).

**Proposition 9.** The fit of TQM practices is different across domestic operating and international operating companies.

**Proposition 10.** The structural model relationships are different across domestic operating and international operating companies.

### 4. Methodology

#### 4.1. Measurement instrument

The initial measurement instrument was created using an extensive review of the literature. Most of the items were adopted from the measurement instruments of previous TQM studies such as Saraph et al. (1989), Flynn et al. (1994) and Samson and Terziovski (1999) and supplemented by the general quality management literature. Some items that were not covered sufficiently in the literature were also added using the 2002 MBNQA criteria (NIST, 2002). A similar practice was also used by Black and Porter (1996) who supplemented the 1992 MBNQA items with issues in the TQM literature that were not adequately covered in the MBNQA. The measurement instrument was then tested and refined based on the feedback of several companies’ general managers, quality experts, and Executive MBA students at a major public university. The final instrument had 114 items measuring the TQM construct and 19 items measuring the four performance variables. A 1–7 Likert scale was used for the items that measured the TQM construct, where 1 was strongly disagree and 7 was strongly agree. Regarding the performance items, the respondents were asked to rate the level of their site’s performance during the past 3 years compared that of their major industry competitors. A 1–7 Likert scale was used for these items, where 1 was below average and 7 was above average.

#### 4.2. Sample

The instrument was administered to 2000 manufacturing and service companies (SIC codes 28, 34–38, 50, 51, 73, 87) randomly selected from the American Society for Quality mailing list. One key informant from each organization who was deemed to be...
knowledgeable about the issues discussed in the survey was identified. These informants included the vice president, general manager, quality manager, engineer, coordinator, director, and supervisor. Six of the surveys were returned as undeliverable, and within 1 month of mailing, 302 completed surveys were returned. After eliminating those surveys with missing data, 286 usable surveys remained.

To test for nonresponse bias, the data were split into two groups, where the surveys received late (90) represented the nonrespondents and those received early (196) represented the respondents. Then t-tests were conducted on the two groups’ mean responses to ten randomly selected questions (Armstrong and Overton, 1977), and the results showed that the two groups were identical. The two groups were also not significantly different in terms of demographic variables such as sales, number of employees, unionization (Ahire and Dreyfus, 2000), and ISO 9000 registration. In addition, a multiple group analysis was conducted, which showed that that the proposed model was equivalent across respondents and nonrespondents (Curkovic et al., 2000a). These tests showed that there was no nonresponse bias in the data. Table 3 provides a descriptive summary of the respondents.

4.3. Scale reliability and validity

The corresponding items of each of the seven TQM practices and those of the four performance measures were parceled to reduce them to a manageable level and to meet sample size requirements for multiple group analysis (Hall et al., 1999). A parcel is simply the average of responses on items corresponding to an indicator. However, before the items constituting each TQM practice were parceled, they were screened by

Table 4
Summary of goodness-of-fit statistics for CFA of model constructs

<table>
<thead>
<tr>
<th>Model constructs and their indicators</th>
<th>$\chi^2$</th>
<th>d.f.</th>
<th>$\chi^2$/d.f.</th>
<th>p-Value</th>
<th>CFI</th>
<th>SRMR</th>
<th>Factor loading</th>
<th>Cronbach’s alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>TQM</td>
<td>57.58</td>
<td>14</td>
<td>4.11</td>
<td>0.0000</td>
<td>0.95</td>
<td>0.035</td>
<td>0.94</td>
<td>0.78</td>
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<td>Leadership</td>
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<td>Strategic planning</td>
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<td>Customer focus</td>
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<td>Information and analysis</td>
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<td>Human resource management</td>
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<td>Process management</td>
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<td>Supplier management</td>
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<tr>
<td>Human resource results</td>
<td>8.20</td>
<td>2</td>
<td>4.10</td>
<td>0.0646</td>
<td>0.93</td>
<td>0.075</td>
<td>0.72</td>
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<td>Employee turnover</td>
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<td>Employee absenteeism</td>
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<td>Number of employee suggestions</td>
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<td>Employee job performance</td>
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<td>Customer results</td>
<td>2.87</td>
<td>2</td>
<td>1.44</td>
<td>0.2377</td>
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<td>Customer retention</td>
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<td>Reliability and timely delivery of products/services</td>
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<td>Personalized service</td>
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<td>Value for the money spent</td>
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<td>Organizational effectiveness</td>
<td>32.38</td>
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<td>3.60</td>
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<td>0.074</td>
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<td>Cost</td>
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<td>Product/service quality</td>
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<td>Cycle times</td>
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<td>Supplier performance</td>
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<td>Financial and market results</td>
<td>15.40</td>
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<td>3.08</td>
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<td>0.93</td>
<td>0.059</td>
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<td>Profit</td>
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<td>Return on total assets</td>
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<td>Overall competitive position</td>
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<td>Number of successful new product/service introductions</td>
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* This factor loading was significant at $p < 0.01$. All other factor loadings were significant at $p < 0.001$. 
conducting a confirmatory factor analysis (CFA) for each TQM practice to determine whether they indeed measured their assigned practices. All the items had statistically significant factor loadings on their assigned TQM practices and were therefore retained in the model. Then the unidimensionality and reliability of the scales were analyzed before their convergent validity, discriminant validity, and criterion-related validity were assessed (Anderson and Gerbing, 1982). EQS 6.1 for Windows was used for the following analyses.

4.3.1. Unidimensionality analysis
The unidimensionality of the TQM construct and the four performance measures was analyzed using CFA. In the SEM literature, a comparative fit index (CFI) cutoff value of 0.90 (e.g., Bentler and Bonnet, 1980; Kline, 1998) or “close to” 0.95 (Hu and Bentler, 1999), and a standardized root mean square residual (SRMR) value of less than 0.08 (Hu and Bentler, 1998, 1999) have been recommended for adequate model fit. Table 4 indicates that the CFI values ranged from 0.92 to 1.00, and the SRMR values ranged from 0.018 to 0.075, suggesting that all the constructs were unidimensional.

4.3.2. Reliability analysis
The reliability of the constructs was assessed using Cronbach’s alpha (Cronbach, 1951). Alpha values equal to or greater than 0.70 indicate high construct reliability (O’Leary-Kelly and Vokurka, 1998). The alpha values for the seven TQM practices ranged from 0.76 to 0.90 (see Table 4), yielding an overall reliability of 0.94 for the TQM construct, and the alpha values for the four performance measures ranged from 0.72 to 0.87. These results suggested that all constructs were highly reliable. In no case would any of these constructs’ reliabilities increase substantially if items were to be deleted from them.

4.3.3. Convergent validity analysis
Convergent validity is defined as “the degree to which two or more attempts to measure the same concept ... are in agreement” (Bagozzi and Phillips, 1982, p. 468). According to Bagozzi et al. (1991), CFA can be used to assess convergent validity. The authors suggested that if all the factor loadings of indicators on their constructs were significant, convergent validity was attained. Table 4 shows that the factor loadings ranged from 0.28 to 0.89 and were all statistically significant, indicating strong convergent validity.

4.3.4. Discriminant validity analysis
Discriminant validity measures the degree to which a construct and its indicators are different from another construct and its indicators. Discriminant validity can be assessed by conducting a series of \( \chi^2 \) difference tests between nested CFA models for all pairs of constructs. CFA is run on each pair of constructs, where the two constructs are allowed to

<table>
<thead>
<tr>
<th>Table 5</th>
<th>Discriminant validity analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construct scale pairs</td>
<td>Unconstrained</td>
</tr>
<tr>
<td></td>
<td>( \chi^2 )</td>
</tr>
<tr>
<td>TQM</td>
<td></td>
</tr>
<tr>
<td>Human resource results</td>
<td>295.66</td>
</tr>
<tr>
<td>Customer results</td>
<td>189.54</td>
</tr>
<tr>
<td>Organizational effectiveness</td>
<td>277.34</td>
</tr>
<tr>
<td>Financial and market results</td>
<td>235.38</td>
</tr>
<tr>
<td>Human resource results</td>
<td></td>
</tr>
<tr>
<td>Customer results</td>
<td>146.07</td>
</tr>
<tr>
<td>Organizational effectiveness</td>
<td>265.77</td>
</tr>
<tr>
<td>Financial and market results</td>
<td>261.03</td>
</tr>
<tr>
<td>Customer results</td>
<td></td>
</tr>
<tr>
<td>Organizational effectiveness</td>
<td>125.11</td>
</tr>
<tr>
<td>Financial and market results</td>
<td>155.47</td>
</tr>
<tr>
<td>Organizational effectiveness</td>
<td></td>
</tr>
<tr>
<td>Financial and market results</td>
<td>197.14</td>
</tr>
</tbody>
</table>

* \( p < 0.001 \).
** \( p < 0.005 \).
*** \( p < 0.01 \).
correlate freely (called the unconstrained model). The \( \chi^2 \) obtained from this model is subtracted from the \( \chi^2 \) obtained from another CFA run, where the correlation between the two constructs is constrained to 1 (the constrained model) (Bagozzi et al., 1991). Table 5 lists the \( \chi^2 \) for the constrained and unconstrained models. The table shows that the \( \chi^2 \) difference tests between all pairs of constructs are significant, suggesting strong discriminant validity (Bagozzi et al., 1991).

4.3.5. Criterion-related validity analysis

Criterion-related validity evaluates the extent to which items in a construct scale are correlated with an external criterion (Nunnally, 1978). In this study, the TQM construct is the predictor and the four performance measures are the relevant criteria. The bivariate correlations between TQM and human resource results, customer results, organizational effectiveness, and financial and market results were 0.49, 0.61, 0.60, and 0.50, respectively. These correlations were statistically significant at \( p < 0.001 \), indicating strong criterion-related validity.

Based on the above analyses, the reliability and validity of all scales were established. In addition, the assumptions of multivariate analysis including normality, linearity, multicollinearity, and singularity were tested for the variables used in the proposed model. The results showed that there were no statistically significant violations of these assumptions.

5. Results

5.1. Structural path model analyses for the full sample and subgroup samples

Before testing the proposed model in Fig. 1 using the full sample and each of the subgroup samples, two of the recommended approaches in the SEM literature were used to test whether sample size requirements were met. These included the number of cases (\( n \)) per free parameter (\( t \)) (i.e., the \( n:t \) ratio) rule and power analysis. When the number of cases per free parameter rule is used, Bentler (1989) recommends a 5:1 ratio as an “over-simplified guideline”, and Bollen (1989) argues that using “at least several cases per free parameter” would be a useful suggestion since there is “no hard and fast rule” (Marsh et al., 1998). Table 6 shows that there are indeed several cases for each of the 27 free parameters estimated in the model. The ratios ranged from 3.04 to 10.59, and most of them were either close to or greater than 5. In addition, power analysis was conducted for each of the structural path models shown in Table 6 using the framework presented by MacCallum et al. (1996). First, a test of not-close fit was carried out for each model. The root-mean square error of approximation (RMSEA), a measure of model residuals, is used in conducting this test. Since the upper bound of the RMSEA confidence interval for all of the models was below 0.10, the hypothesis of not-close
fit could be rejected (MacCallum et al., 1996). Thus, it could be inferred that none of the models had a poor fit. The power value for the test of not-close fit for each model was computed using the SAS program created by MacCallum et al. (1996) and has been listed in Table 6. Since all the values were equal to or greater than 0.80 (MacCallum et al., 1996), all models had adequate power.

Furthermore, to minimize the effect of sample size in assessing model adequacy, CFI and SRMR were used to assess model fit in addition to the \( \chi^2 \) significance test, because CFI and SRMR are relatively unaffected by sample size (Hu and Bentler, 1998). Table 6 shows that the CFI values for subgroups ranged from 0.92 to 0.96, and the SRMR values ranged from 0.031 to 0.049, indicating adequate model fits. To save space, parameter estimates including the factor loadings of TQM practices on the TQM construct, path coefficients for the structural paths, and the amount of explained variance (\( R^2 \) values) for the dependent variables are shown only for the full sample in Fig. 1. All the hypotheses except H4 and H5 were statistically significant at \( p < 0.001 \). The \( R^2 \) values for the four performance measures (23.7%, 47.5%, 40.5% 43.2%) were either greater than or comparable to those reported by other quality management studies (e.g., see Flynn et al. (1995) and Pannirselvam and Ferguson (2001)).

### 5.2. Multiple group analyses to test the propositions

In Section 5.1, the testing of the proposed model involved the use of single samples. When the researcher’s goal is to determine whether the components of the measurement model and the structural model are invariant across multiple samples, multiple group analysis is used. Multiple group analysis is needed for direct comparisons of particular model parameters across subgroups. In multiple group analysis, the sets of parameters analyzed to determine subgroup invariance depend on the model and hypotheses to be tested and typically include factor loadings, structural paths, factor variances/covariances, factor residuals, and error variances/covariances (Byrne, 1994). In the current analysis, factor loadings, and structural paths were of interest based on the proposed model and hypotheses and therefore equality constraints were imposed only on these parameters. EQS estimates these parameters simultaneously to get “efficient estimates”. Since EQS tests equality constraints multivariately rather than univariately based on the Lagrange multiplier (LM) test, there is no need to compare a series of restrictive versus nonrestrictive models to detect where noninvariance lies in the model. As a result, it is not required to test for the measurement model’s equality first before testing the structural model (Byrne, 1994).

Invariance testing for the subgroups of each contextual factor was conducted separately. EQS was run for the subgroups of each contextual factor by setting the parameters for factor loadings and structural paths equal across subgroups. The EQS output provides a LM \( \chi^2 \) associated with each constraint. The probability value for each LM \( \chi^2 \) can be checked to find out whether any of the tests are statistically significant. A probability value greater than 0.05 indicates that the hypothesized equality of factor loadings and structural paths holds (Byrne, 1994).

The results are shown in Tables 7 and 8. Table 7 indicates that the \( n/t \) ratios (ranging from 4.40 to 7.53) and power values (ranging from 0.96 to 0.99) were high, suggesting that sample size requirements were met. It also shows that the CFI values ranged from 0.93 to 0.95, and the SRMR values ranged from 0.040 to 0.055, suggesting adequate model fits. The results of factor loading invariance tests were used to determine whether the seven TQM practices were invariant across subgroups (addressing the odd-numbered propositions). These results showed that the probability value associated with each LM \( \chi^2 \) exceeded 0.05, indicating that all of the seven practices were invariant across the

<table>
<thead>
<tr>
<th>Contextual factor</th>
<th>( \chi^2 )</th>
<th>d.f.</th>
<th>( \chi^2/\text{d.f.} )</th>
<th>( p )-Value</th>
<th>CFI</th>
<th>SRMR</th>
<th>RMSEA</th>
<th>( n )</th>
<th>( n/t ) ratio(^a)</th>
<th>Power(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TQM implementation</td>
<td>232.41</td>
<td>93</td>
<td>2.50</td>
<td>0.00000</td>
<td>0.93</td>
<td>0.044</td>
<td>0.055</td>
<td>286</td>
<td>7.53</td>
<td>0.99</td>
</tr>
<tr>
<td>ISO registration</td>
<td>226.31</td>
<td>93</td>
<td>2.43</td>
<td>0.00000</td>
<td>0.94</td>
<td>0.054</td>
<td>0.060</td>
<td>286</td>
<td>7.53</td>
<td>0.98</td>
</tr>
<tr>
<td>Country of origin</td>
<td>188.81</td>
<td>93</td>
<td>2.03</td>
<td>0.00000</td>
<td>0.94</td>
<td>0.055</td>
<td>0.063</td>
<td>284</td>
<td>7.47</td>
<td>0.96</td>
</tr>
<tr>
<td>Company size</td>
<td>279.89</td>
<td>147</td>
<td>1.90</td>
<td>0.00000</td>
<td>0.94</td>
<td>0.051</td>
<td>0.050</td>
<td>286</td>
<td>4.40</td>
<td>0.99</td>
</tr>
<tr>
<td>Scope of operations</td>
<td>171.04</td>
<td>93</td>
<td>1.84</td>
<td>0.00000</td>
<td>0.95</td>
<td>0.040</td>
<td>0.061</td>
<td>284</td>
<td>7.47</td>
<td>0.97</td>
</tr>
</tbody>
</table>

\(^a\) The number of free parameters to be estimated for the multiple group analysis of the three subgroups of company size was 65 and that for each of the other four analyses was 38.

\(^b\) \( \alpha = 0.05 \) and the null hypothesis value for RMSEA = 0.10 for all power analyses.
subgroups of each contextual factor. Table 8 shows the results of structural path invariance tests that were used to evaluate whether the structural model relationships were invariant across subgroups (addressing the even-numbered propositions). These results provided support for the invariance of most of the constrained model parameters across subgroups within each institutional and contingency factor. As can be seen from Table 8, all the structural paths were invariant across the subgroups of both TQM implementation and ISO registration. The country of origin factor had two noninvariant paths (although one of the paths was nonsignificant); company size and scope of operations each had one noninvariant path.

5.3. Summary of results

The results of structural path model analyses using each sample showed that the data had a good fit to the proposed model and thus provided support for the system of relationships among TQM and business performance measures. The seven TQM practices and all the hypotheses except H4 and H5 were statistically significant. TQM had a significant direct effect on all measures except financial and market results. However, TQM did have a significant indirect effect on financial and market results through the mediating effects of the other three measures.

The multiple group analyses results showed that there were not many statistically significant differences across the subgroups of each institutional and contingency factor. This provided more support for the universal applicability of the TQM practices and their effects on performance rather than the context-dependent argument. This support was valid at least for the contextual factors analyzed in this study. Propositions 1–4 were not supported in that all the TQM practices and structural model relationships were similar across TQM and non-TQM companies, as well as across ISO-registered and non-ISO-registered companies.

The study’s results largely supported Propositions 5 and 6 indicating that US and non-US companies did not have statistically significant differences except H5 and H8. In partial support of Proposition 7, all the TQM practices were found to be similar across small and medium-sized companies. However, contrary to this proposition, these practices were also found to be similar across SMCs and large companies. Proposition 8 was partly supported, because all the structural model relationships except the effect of TQM on financial and market results were similar across small and medium-sized companies. However, since most of these
relationships were also similar across SMCs and large companies, this proposition was partly not supported. Overall, the results showed that large companies and SMCs were similar in terms of the fit of their TQM practices and the structural model relationships. Finally, the fit of all the TQM practices was similar across domestic and international operating companies, which did not provide support for Proposition 9. Only H3 was different across these companies, providing minimal support for Proposition 10.

6. Discussion and study implications

The synergies among TQM and performance measures in the tested model provide support for Deming’s (1982) quality chain reaction theory, which states that focus on quality will lead to outcomes such as employee and customer satisfaction, efficiency, and profitability. One of the contributions of this study is that it uses institutional and contingency factors as moderator variables providing extensions to this theory and empirically tests the effects of these variables on TQM–performance relationships using a model. Overall, the results suggest that the holistic implementation of the seven TQM practices contributes to improved performance similarly across subgroups of companies within each institutional and contingency factor.

6.1. Managerial implications

By implementing these practices effectively, managers can expect to realize improvements in all of the four performance areas. However, improvements in human resource results, customer results, and organizational effectiveness would be more immediate than those in financial and market results. This finding supports the argument that a long-term view should be taken in implementing TQM and that TQM initiatives should not be terminated if there are no significant improvements in the bottom line in the short-term. Managers can use the items constituting TQM in this study to assess where their companies stand with regard to the use of these TQM practices or as a guideline in implementing them. In addition, they can use the items constituting the four performance measures as an audit tool to evaluate the results of their TQM initiatives over time.

The similar model relationships between TQM companies and non-TQM companies show that for a company to be a TQM company, it does not have to formally implement TQM. This result agrees with the findings of Ahire et al. (1996a). There was also no difference between ISO-registered companies and non-ISO-registered companies. These results could be explained by the fact that a large number of companies responding to the survey had a number of other quality initiatives such as kaizen, lean manufacturing, constraint management, Juran training, as well as other quality initiatives with no formal name. Therefore, the important question is how effectively these companies are implementing the various components of TQM in the absence of a TQM program. This finding has managerial implications in that companies need to decide whether significant resources and effort should be allocated to the implementation of a TQM program to achieve desired performance outcomes. Companies that already have other quality initiatives in place have to determine whether they will reap extra benefits by implementing a separate TQM program. The results suggest that similar performance outcomes can be achieved by either undertaking other quality initiatives or simply establishing organizational systems that incorporate these TQM practices. Those companies that already have quality initiatives other than TQM can use the practices constituting TQM in this study as an assessment tool to determine whether additional practices could be incorporated into their existing programs to cover the range of principles supported by TQM. Such an assessment could significantly reduce investment that would be required for a full-blown TQM program. Thus, companies should align their various quality initiatives to reduce spending, effort, and duplication.

This study provides support for the convergence hypothesis and indicates that the TQM practices of US and non-US companies operating in the US are similar. This finding should be useful to the managers of these companies in planning and implementing the appropriate TQM practices. However, as suggested by the few noninvariant structural model relationships across these companies, they should expect to see different results in some of the performance areas.

As far as the contingency propositions are concerned, the results show that the fit of the TQM practices and most of the structural model relationships produced by this fit are similar across the subgroups of each contingency factor. These results suggest that tailoring that may be needed to implement TQM practices under these contingencies is minimal. Although TQM practices were first implemented in large companies, this study shows that SMCs have come a long way in planning and implementing the appropriate TQM practices. However, as suggested by the few noninvariant structural model relationships across these companies, they should expect to see different results in some of the performance areas.
in place would be a good benchmark for later implementers. These findings support those of Ahire and Golhar (1996) who reported that small companies could implement TQM practices as effectively as large companies and obtain high product quality.

Similarly, the fit of TQM practices and the structural model relationships are similar across domestic and international operating companies. This suggests that domestic operating companies have developed comparable TQM practices. Even though learning and adoption of new management techniques in international companies may be faster, the fact that the TQM philosophy has been in practice for a long time may have narrowed the TQM knowledge gap between the two subgroups.

6.2. Research implications

The results have implications for the applicability of institutional theory and contingency theory to the analyzed contexts. These results indicate that, to a great extent, US and non-US companies are similar, which provides support for the argument that institutional theory is effectual in explaining the convergence of their practices. However, as mentioned above, a few structural model relationships were different across these companies, suggesting different results in some of the performance areas. Future studies should attempt to identify the potential factors that may produce such differences. The model used in this study can also be tested by conducting cross-country studies. Such studies would shed more light on whether the convergence hypothesis also holds for the TQM practices and TQM–performance relationships of companies operating across different country boundaries.

The premise of the first two institutional propositions was that TQM implementation and ISO registration would distinguish companies from other companies in terms of their TQM practices and the structural model relationships. However, the fact that this premise has not been supported suggests that the mimicry or conformance involved in the implementation of TQM practices transcends beyond TQM and ISO 9000 initiatives and should be explained by a more complex set of regulations, procedures, and structures imposed on companies by environmental institutions. Therefore, future studies should incorporate other potential factors as control variables into the analysis. Conducting case studies would especially be useful in gathering the extent of data needed for such an analysis.

In addition, the finding that the subgroups within the two contingency factors, size and scope of operations, do not have many differences indicates that these factors are not significant for the implementation of TQM practices. However, the fact that one structural relationship for each of the two factors is noninvariant suggests that not all the performance results can be expected to be similar across subgroup companies within each contingency factor. Therefore, companies should be aware that some of the desired outcomes of TQM may not be realized due to lack of fit and that a more appropriate fit should be established based on companies’ unique characteristics. Overall, the results suggest that the nature of TQM practices in companies with different sizes and scopes of operations is not dictated by their unique environments or characteristics as suggested by contingency theory but rather by institutional factors as suggested by institutional theory that force them to imitate or conform. However, the analysis does not show whether these different groups of companies are achieving their potential performance levels by adopting the same TQM practices. It could be possible to attain higher levels of performance by establishing practices with a more optimal fit. However, this may be a difficult task since the pressure exerted by institutional factors to conform and thus apply TQM practices universally may deter companies from such an undertaking.

6.3. Research limitations

This study also has some limitations. First, it relies on the perceptions of the respondents to operationalize the survey instrument. Although the survey participants were asked to report their actual and not desired responses, some of them may not have done so. This may have introduced bias into the data, which could bring up potential concerns regarding generalizability, reliability, and validity. Therefore, it is important that construct reliability and validity analyses be conducted to see if such concerns are warranted. However, although all the constructs were found to be reliable and valid, the presence of bias in data might not be completely ruled out.

In addition, the data on performance measures were based on the respondents’ perceptions and not on hard data. Objective measures of performance such as actual financial performance could provide a better test of the proposed hypotheses. Furthermore, the independent and dependent constructs were measured using the same survey instrument, which may have resulted in common method variance and potential common method bias. That is, the use of a single method results in the confounding of method variance with trait variance,
which may bias the estimates of relationships among the model constructs. However, this could be overcome using multiple methods, which make it possible to partition the observed variation between construct and methods variance so that the correlations among the constructs are not confounded. As a result, the accuracy of population parameter estimates could be improved (Doty and Glick, 1998). Thus, multiple methods should be used in collecting data in future studies to make a stronger case for the generalizability of findings.

Another potential limitation is the bias that may be introduced into the data by the use of single informants. Although the use of single informants is widespread in operations management research, using multiple informants produces better quality data (Hogarth, 1978; Hill, 1982) since it “reduces the correlation between systematic error components, averages out random error in individual responses, provides the opportunity to analyze the impact of error sources, and provides a method to correct for systematic error in informants’ responses” (Bruggen et al., 2002, p. 471). However, to alleviate the potential problems associated with using single informants, accepted methodological guidelines were followed. For instance, the measurement scales and the survey instrument were created and pre-tested to maximize the validity of the data to be collected and the appropriate key informants were identified by name and job title before the surveys were sent out (Huber and Power, 1985).

Finally, this study does not establish causality between the model variables, because it uses cross-sectional data. One of the basic requirements of establishing causality is temporal ordering (i.e., a cause must be shown to unambiguously precede an effect), which necessitates the use of longitudinal data (Bullock et al., 1994).

7. Conclusions

Empirical evidence in this study suggests that a context-dependent argument for TQM and its effects on key organizational performance measures is not warranted for the contextual factors analyzed. However, findings suggest that although the same TQM practices will mostly yield similar performance results across subgroups of companies within each contextual factor, some of these results can be different. Reasons for such differences should be explored in future studies. The model developed and tested in this study should also be replicated using other contextual factors to make stronger assertions about the effects of institutional and contingency factors. This study’s findings on the effects of company size are similar to the findings of Benson et al. (1991) and Ahire and Golhar (1996) who also reported that this contextual factor was insignificant in explaining variation in TQM practices. However, since the contextual factors and research designs used were different across these studies, replication studies should be conducted to shed more light on the effects of contextual factors. In addition, future research should examine theoretically plausible moderating effects. For example, the relationship between company size and TQM practices may be moderated by unit level strategy.

Overall, this study contributes to the discussion in the literature over whether a universal or a context-dependent approach to TQM is needed by drawing on institutional theory and contingency theory. So far, these discussions have been scant and mainly prescriptive. The use of organizational theory in this context has been especially rare. This empirical study will hopefully lay the groundwork for more such studies.

References


