

Awareness and Implementation of Total Quality Management: The case of Enterprises in Danang City

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ABSTRACT

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Implementation of quality management in accordance with advanced quality management models, especially the Total Quality Management (TQM) approach, is crucial to the outcome quality of organizations, customer satisfaction, organizational competitive advantages, and financial performance in the present integrating environment. This study aims to construct measures to assess the awareness and implementation situation of TQM among the enterprises in Danang city. The results show that despite a high level of quality awareness by the managers, the TQM implementation is still limited among the surveyed businesses.

Keywords:

Total Quality
Management, quality
management
implementation,
customer orientation,
business performance,
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1. Introduction

In the context of current deeper integration, effective quality management to create competitive advantage is regarded as one of the critical issues among businesses. Improvement in the outcome quality will help reduce costs, enhance customer satisfaction, and in the end lead to better financial performance. Currently, implementing quality management practices involves not only traditional quality management techniques but also a series of principles and programs with advanced management systems such as ISO 9000 or, particularly, the Total Quality Management (TQM).

Enhancing the competitiveness and business efficiency is the ultimate goal of quality management implementation. Among initial studies, the implementation of quality management is known as “basic practices” for high levels of business efficiency, based on experts’ personal experience of the typical quality, such as the “14 steps” proposed by Crosby (1980) for superb quality results, Juran’s “trilogy” for process-based management (Juran & Gryna, 1993), and Deming’s 14-point philosophy of management (Deming, 1986). Until the end of the 80s, publications on the impact of the quality management implementation on business performance became increasingly popular, but these were mainly dependent on subjective reasoning of investigators in the domain of management quality and qualitative analysis results. Then, a multitude of studies attempted to investigate its effects on business efficiency, starting with Saraph et al. (1989). Ismail and Maling (2002), in their synthesis of researches from 1988 through 2000, found a causal relationship between these two factors. Many recent studies have demonstrated that effective quality improvement is a direct result of the quality management implementation (Maiga & Jacobs, 2005).

There has been a rapid change in Vietnam’s business environment since the signing of a variety of free trade agreements as well as its deeper economic integration. International competition as for various products is becoming more and more intense; thus, the quality is growing as a vital element of enterprises. The role of corporate governance is indispensable in this marketplace. The management’s awareness of the factors of management quality implementation, however, has a significance influence on the conduct of them.

Many related studies in Vietnam focus on measuring quality through customers’ perception and evaluation of the outcome of enterprises, especially in the service sector. There has been none to address the issue of quality management implementation in

accordance with models of modern quality management practices applied among businesses. Therefore, this study is conducted with the primary goal of developing the scales of the quality management implementation in line with TQM models. On that basis it evaluates managers' awareness of the importance of TQM in quality management practices among Danang enterprises, and also estimates the practices in these firms.

From the research findings, several implications are proposed for managerial activities among enterprises in Danang in particular and across the country in general to improve and enhance the adoption of TQM. In this respect the study aims to address the following questions:

- Which scales can be used to measure quality management practices in accordance with TQM models among enterprises?
- To what extent are business managers aware of the factors to be implemented in accordance with TQM models?
- To what extent are the enterprises adopting the factors of TQM?

2. Theoretical bases and research model

An overview of TQM theories

The TQM approach has its origin from Japan and was initiated by several scholars (Crosby, 1980; Deming, 1986; Juran & Gryna, 1993; Ishikawa, 1990). According to Slack et al. (2007), TQM is a comprehensive approach to quality management, which stresses on the roles of all departments and staff within an organization to have impact on and improve the quality, and the model is considerably influenced by experienced experts in quality control (Slack et al., 2007).

TQM is not only known as one of the essential philosophies to increase the effectiveness of the organization and create competitive advantages for companies in developed nations, but it also becomes a greater concern and is widely adopted in countries like China and India (Zhang, 2000; Yusuf et al., 2007). The principles and content of the TQM philosophy help increase the organization's commitment to quality assurance and, if well applied, will assist in continuous improvement in the quality, increased efficiency of all processes within the organization, reduced costs, and enhanced productivity, thus improving the quality of output products and increasing

competitive position and business performance (Sharma & Kodali, 2008). TQM has been adopted in a great many countries around the world, and such a development is deemed the second industrial revolution (Kanji & Asher, 1993).

Factors of TQM practices

Progressive quality management with the goal of quality assurance requires the management to penetrate procedures for effective governance in the global context. In practicing quality management, organizations over the globe are heavily engaged in pursuit of TQM philosophies as these have been acknowledged to create competitive advantages. That is an innovative approach in the sphere of quality (Escrig-Tena, 2004). Many corporations, such as Xerox and Motorola, have emerged as the market leaders in various industries thanks to their fruitful TQM implementation.

Initiators of TQM underpinned a set of governance activities which, if successfully done, will result in high efficiency. The focus of TQM is a few certain core ranges, commonly defined by different terms such as ‘TQM implementation/practices’ (Douglas & Judge, 2001), “critical factors of TQM” (Black & Porter, 1995; Motwani, 2001), “elements of TQM” (Powell, 1995), “TQM principles” (Morrow, 1997), or “values of TQM” (Detert et al., 2000). Within the scope of this study, the paper employs the term “TQM implementation.”

Although the TQM approach has been popularly known, there exist substantial differences in its concepts (Claver et al., 2003), and TQM implementation (Juergensen, 2000). Consensus can be reached in implementing TQM while the aggregate performance of the organization improves, yet there has been little consistence in the basic structure of its implementation or in those TQM perspectives (Zhang et al., 2000). Many studies contribute to the development of valid scales of TQM implementation. The constructs of TQM are differently referred to; these factors, as a summary, comprise top management commitment, quality measurement, management by process, continuous improvement, decentralization and staff training, supplier quality management, and customer focus and satisfaction.

Based on earlier theories and Douglas and Judge (2001), this study emphasizes two groups of soft and hard factors of TQM. Soft components cover behavioral aspects of TQM. In agreement with Powell (1995), Thiagarajan et al. (1997), and Douglas and Judge (2001), the present study considers including in this group several principles such

as involvement of top management, customer focus, supplier quality management, continuous improvement, and involvement of employees and training.

Hard components involve in the manufacturing process and thus have connection with the systems and the instruments and techniques they facilitate. They also set standards of performance, establish systematic control, and measure the tasks done (Wilkinson et al., 1992). Thiagarajan and Zairi (1997) noted that these components have profound impacts on internal efficiency (e.g., quality management systems, cost of quality and statistical process control) and external efficiency (e.g., surveys on customer satisfaction) of the organization. They often include benchmarking, performance measurement, management by fact, management by process, and quality control tools and techniques.

Top management involvement and commitment

One of the primary factors with decisive effect on the success of TQM is top management involvement and commitment, which has been openly acknowledged in previous research (Dean & Bowen, 1994), or in more of the different organizations in different countries in the world such as Asahi Breweries Ltd. (Japan), Xerox, Inc., Dunlop (US.), Dow-Corning Pvt. Ltd. (Australia), and Dunlop, Ltd. (Malaysia) (Das et al., 2008). Most quality management awards highlight the crucial role of top management in its creating objectives, values, and systems that meet customers' expectations and improving the organization's performance. The top management is to lead the implementation of TQM, develop and communicate a long-term vision, as well as motivate continuous improvement and customer orientation. Their exemplary action is to inspire and provide guidance for others (Anderson et al., 1994; Dean & Bowen, 1994). The leadership helps with clear identification of the vision, long-term orientation, employee empowerment, recognition, and human training and development (Anderson et al., 1994). Brown et al. (1994) argued that lack of top management commitment is one of the reasons for the failure of TQM application.

Customer focus

Customer satisfaction is the ultimate measure of performance, and it can predict success or failure of an organization in the future (Kanji & Asher, 1993). Penetrating the customers themselves and their demands for fitting product supply is crucial to TQM implementation (Ishikawa, 1985). For this reason customer orientation or focus is regarded as the most pivotal element of TQM (Dean & Bowen, 1994) and a primary

dimension in analyzing the essence of TQM practices (Ahire et al., 1996; Black & Porter, 1995).

Process focus

Organizational management in the traditional manner is to adopt a functional model. Work processes in an organization, however, usually follow a horizontal pattern with the participation of different functional groups. Therefore, it should take account of the links between departments as well as the penetration, interaction, and coordination within the whole system rather than between individual departments (Deming, 1986). Deming (1986) described a system as a horizontal flow, starting with input suppliers to the organization and going through the process of transformation into outputs, which are then provided to customers.

Supplier quality management

Ensuring a non-stop supply of quality materials as required is essential in all production stages of a business. The poor quality of inputs leads to rising costs of procurement and impairs the output quality of the firm. Development of a long-term cooperative relationship with the supplier, frequent participation in quality assurance activities, and comprehensive evaluation of suppliers' products are necessary for continuous provision of the inputs of high quality (Zhang et al., 2000).

Continuous improvement

In total quality management, continuous improvement is affirmed to be a substantive dimension by quite a few researches (Doughlas & Judge, 2001). According to Dean and Bowen (1994), continuous improvement is "a commitment to constant examination of technical and administrative processes in search of better methods." Deming (1986) referred it to constant and long-lasting innovation of manufacturing and service systems, or it can be done through both innovation and process management (Anderson et al., 1994). Continuous improvement can be "a company-wide process of focused and continuous incremental innovation" (Bessant et al., 1994), which will result in an increase (reduction) in successes (failures) (Juergensen, 2000).

Employee involvement and training

When employees participate fully in quality improvement activities, they will contribute greatly to improved results and expanded knowledge about the quality of the firm, and find it meaningful when dealing with quality related issues (Zhang et al., 2000).

The involvement of employees will help alter the negative attitudes and induce their further commitment to corporate success. Everyone's engagement in innovation processes brings about long-term success of the quality management of the organization (Rao et al., 1999). Hence, development of human resources must be appreciated with its strategic role in TQM (Ahire et al., 1995).

Management by objective fact

Some empirical studies highlighted the selection, management, and use of data for measuring the quality and results of an organization (Ahire et al., 1996; Black & Porter, 1995; Motwani, 2001). Kanji (2002) defines measurement as the task of the organization's collecting different data sources and developing suitable methods for quality evaluation, and comparing its present and past performance and also its performance with that of its rival. National quality rewards all emphasize the importance of prompt creation of quality data for a firm's effective decision-making stages.

Instruments/techniques for TQM

TQM methods are described as core values in Deming (1986) and Ishikawa (1990), comprising statistical techniques such as scatter plots, control charts, cause and effect diagram, Pareto principle, and so on. The instruments and techniques used for TQM allow organizations to get the data necessary and appropriate for decision making based on objective realities. These methods are expected to help detect changes in the quality, enabling research conducted to explore the key areas that need improving (Ahire et al., 1996).

Research model

It is important for organizations to implement good quality management practices in order to improve their performance at different stages so that it can help improve the outcome quality, enhance customer satisfaction, reduce operational costs, and thus strengthen competitiveness and business performance. On the other hand, how quality management practices function themselves in an organization heavily depends on management's awareness.

Studies on modern quality management conforming to TQM principles suggested that firms should adopt good practices of various activities. Therefore, this study seeks to measures managers' awareness among Danang enterprises and their implementation of TQM, whereby the implementation should be approached in the manner that these enterprises should variously follow the practices of overall aspects.

In this regard TQM implementation will be measured based on the arguments of Powell (1995), Thiagarajan et al. (1997), and Douglas and Judge (2001). Particularly, customer focus, process focus, and supplier quality management are closely related, representing the systematic feature of the organization. Input materials, outcome products, and processes are combined into a dimension of implementation for estimation.

Similarly, management on the basis of facts must be based on the usage of instruments and methods of quality management to collect and analyze information. Hence, they are incorporated in a dimension in measuring quality management implementation of the proposed research model. Accordingly, scales for evaluating awareness of TQM implementation are to include the following: (i) senior manager involvement and commitment to quality; (ii) system management with processes of customer focus; (iii) continuous improvement; (iv) employee involvement and training; and (v) management by the facts of the organization's operations.

3. Methodology

To achieve the research objectives, qualitative and quantitative approaches are incorporated, followed by discussions for expert opinions to clarify the research findings.

Qualitative research

Group interview was carried out with five senior managers of SMEs in Danang. A total of 30 variables pertaining to the factors of TQM implementation are synthesized using earlier findings besides group discussions to determine the relation between management variables and that of organizational quality, the clarification of each interpretation of the variable in association with its importance and/or necessity, and the extent to which Danang's enterprises implement their own TQM practices.

It is the author's duty to control for and present fully the objectives of the discourse and clarify the variables developed for subsequent measurement in quantitative research stages. For another, the findings from discussions provide further information in re-examining the obtained quantitative results.

As suggested by the results, a total of 30 variables are employed to estimate the five dimensions of the research model, which are deemed significant to the outcome quality of the firm. A few managers, nevertheless, frankly acknowledged the insufficient

awareness of the factors of TQM implementation in accordance with modern theories. The importance of a few ones was dimly perceived, and these factors have not been seriously considered in the practices of Danang's enterprises in particular and Vietnam's in general. Additionally, mistakes in wording were suggested to be rectified for further clarification and comprehension. Participants in group interview are also experts, who concurrently assisted in the phase of result discussion.

Quantitative research

Survey questionnaires for quantitative research were sent to the management involved in qualitative research as a pilot test for later improvement. The improved questionnaire was used to collate data of managers' awareness of the factors of TQM implementation as had been discussed in qualitative research stages.

Convenience sampling (non-probability) approach was adopted. The reason for this was to reduce costs due to time constraints in case the entire list would not be obtained. The researched managers included second-degree students, graduate majors in business administration, and other managers working for enterprises affiliated to Danang's Association of Small- and Medium-sized Enterprises and its Young Entrepreneurs Association.

Factor analysis requires that the sample size be large enough. According to Hair et al. (2010), it should be larger than 100 and at least five times the number of measured variables. Due to certain hardship in surveying senior executives, the study determines the sample size by the ratio of 5/1. So, with 30 variables to estimate TQM practices developed in the research, the population for data analysis would be 150.

The conduct of this research featured facilitation of full-time majors in business administration serving their internship and having been trained in data collection in addition to the support of members of Danang's Association of Small- and Medium-sized Enterprises. The data collection stage ended in the first week of October 2015.

The dataset was processed using SPSS. Exploratory Factor Analysis (EFA), as well as the estimation of Cronbach's Alpha, was to test validity and reliability of the scales of TQM implementation. Also, calculating the average values of the variables of TQM practices has helped assess the level of manager's awareness of the importance of TQM implementation and the level of TQM implementation among the businesses within the studied area.

4. Research results

Sample description

The data of 150 questionnaire forms, obtained from managers of Danang's enterprises, were then checked and confirmed to be suitable for analyses. In this sample there are 36 (24%) enterprises in the manufacturing sector, 107 (71.33%) in the service sector, and 7 (4.67%) in others, whereas 29 (19.3%) are small-sized enterprises, 118 (78.67%), medium-sized enterprises, and 3 (2%), large-sized enterprises. Most of them (102 enterprises, 68%) have been in operation for over 10 years; the others include those established for five years (22 enterprises, 14.7%) and for 5–10 years (26 enterprises, 17.3%).

Results of EFA and Cronbach's Alpha

With 30 measured variables of TQM implementation, analysis of principal factors with Varimax rotation and Cronbach's alpha is used to eliminate irrelevant variables, identify latent ones, and check the reliability of the scales. KMO reaching 0.728 and the Bartlett test with $p < 0.5$ suggest that the data are suitable for EFA. The 30 variables are combined into six key factors with their Cronbach's Alpha coefficients of greater than 0.7 and the total variance explained of 73.399% ($> 50\%$). Each of the variables has high factor loading (> 0.5), so they are suitable for measuring TQM implementation. The six key factors, based on their characteristics, comprise: (i) senior manager involvement and commitment; (ii) management by fact; (iii) employee involvement and training; (iv) customer focus and supplier relationship management; (v) management by process; and (vi) continuous improvement (Table 1).

Table 1

EFA results for the scales

Variable	Key factor					
	F1	F2	F3	F4	F5	F6
BQTCC1	0.798					
BQTCC2	0.865					
BQTCC3	0.854					
BQTCC4	0.879					

Variable	Key factor					
	F1	F2	F3	F4	F5	F6
BQTCC5	0.78					
BQTCC6	0.716					
BQTCC7	0.819					
QTBTT1		0.851				
QTBTT2		0.881				
QTBTT3		0.915				
QTBTT4		0.834				
QTBTT5		0.639				
TGNV&DT1			0.811			
TGNV&DT2			0.853			
TGNV&DT3			0.891			
TGNV&DT4			0.887			
TGNV&DT5			0.819			
QTQT&DHKH1				0.789		
QTQT&DHKH6				0.803		
QTQT&DHKH7				0.85		
QTQT&DHKH8				0.725		
QTQT&DHKH9				0.776		
QTQT&DHKH2					0.821	
QTQT&DHKH3					0.905	
QTQT&DHKH4					0.873	
QTQT&DHKH5					0.894	
CTLT1						0.77
CTLT2						0.869
CTLT3						0.881

Variable	Key factor					
	F1	F2	F3	F4	F5	F6
CTLT4						0.737
Eigenvalue	5.68	4.271	3.901	3.172	2.535	2.46
Total variance explained	16.498	29.13	41.731	53.238	64.017	73.399
Cronbach's Alpha	0.916	0.898	0.912	0.849	0.901	0.839

Table 2

Mean and standard deviation values of the measures of managers' awareness and implementation of TQM

Key factor	Awareness	Implementation
F1. Senior manager involvement and commitment	4.366	3.566
F2. Management by fact	4.092	3.534
F3. Employee involvement and training	3.965	3.433
F4. Customer focus and supplier relationship management	4.105	3.363
F5. Management by process	4.158	3.03
F6. Continuous improvement	4.148	2.994

The results of Table 2 suggest that most of the managers are well aware of the importance of TQM implementation; particularly, senior manager involvement is perceived as being more critical than the others, whereas employee involvement and training is the least significant.

Despite managers' high awareness of the importance of TQM to outcome quality, the levels of its implementation are very low among the enterprises. Specifically, the two dimensions of senior manager involvement and commitment and management by fact are better implemented; nevertheless, the worst implemented factors are found to include management by process and continuous improvement.

5. Discussion of results and conclusion

Through the synthesis of extant literature on TQM implementation, this study has proposed several measures in accordance with modern perspectives that allow for higher competitiveness and improved performance of Vietnamese enterprises. Based on these

scales, the evaluation is made of managers' awareness of the importance of TQM dimensions as well as the levels of its implementation among the businesses in Danang City.

Most of the manager participants have clear perception of the importance of these dimensions, which can be subject to the fact that the matter of fierce competition and deeper integration has aroused attention that should be specially paid to quality, one component of competitiveness with a decisive impact on business efficiency or the survival of the firm. Managerial practices resulting in high outcome quality are, therefore, more fully and comprehensively perceived.

However, TQM practices for better outcome quality among the enterprises are recorded with certain limitations. Some of the management criteria reveal below average levels, implying that they, albeit essential as considered, have not been given proper consideration. Plainly, effective implementation speaks louder than perception of importance, which agrees with expert opinions that quality, as a bare essential, has further been taken into account by senior managers although the strategies to implement good practices to achieve it are vague and not as expected. Additionally, little instruments and/or techniques of TQM have been provided for employees and middle management.

6. Implications

Vietnam has now made a greater integration into the world's market, and many agreements have been signed with various countries, which offers numerous favorable opportunities for Vietnamese enterprises in general and those in Danang City in particular. Yet, these firms are facing risk of fierce rivalry as the quality of goods and services is poorer than that in other neighbor ASEAN countries, and seems vastly inferior to that in developed countries.

The proposed model for full measurement of TQM in this research is highly useful in business operations. To be tougher in market competition with higher outcome quality, reduced costs, and thus expected business performance, it is urgent that management be not only fully aware of several basic dimensions of TQM implementation in accordance with updated management principles, but the implementation should also be supervised comprehensively.

The study findings also demonstrate a few dimensions perceived with low levels of importance and implemented in an inadequate manner at Danang's enterprises. As a result, firms should plan necessary changes in their managerial practices to improve the outcome and thereby business efficiency during the coming years ■

References

- Ahire, S. L., Golhar, D. Y., & Waller, M. A. (1995). Development and validation of TQM implementation constructs. *Decision Sciences*, 27(1), 23–56.
- Anderson, J. C., Rungtusanatham, M., & Schroeder, R. G. (1994). A theory of quality management underlying the Deming management method. *The Academy of Management Review*, 19(3), 472–509.
- Bessant, J., Caffyn, S., Gilbert, J., Harding, R., & Webb, S. (1994). Rediscovering continuous improvement. *Technovation*, 14(1), 17–29.
- Black, S., & Porter, L. J. (1995). An empirical model for total quality management. *Total Quality Management*, 6(2), 149–164.
- Claver, E., Tari, J. J., & Molina, J. F. (2003). Critical factors and results of quality management: An empirical study. *Total Quality Management*, 14(1), 91–118.
- Crosby, P. B. (1980). *Quality is free*. NY: New American Library.
- Das, A., Paul, H., & Swierczek, F. W. (2008). Developing and validating total quality management (TQM) constructs in the context of Thailand's manufacturing industry. *Benchmarking: An International Journal*, 15(1), 52–72.
- Dean, J. W., & Bowen, D. E. (1994). Management theory and total quality: Improving research and practice through theory development. *The Academy of Management Journal*, 19(3), 392–418.
- Deming, W. E. (1986). *Out of the crisis*. Cambridge, MA: Massachusetts Institute of Technology, Center for Advanced Engineering Study.
- Detert, J., Schroeder, R., & Mauriel, J. (2000). A framework for linking culture and improvement initiatives in organizations. *The Academy of Management Journal*, 25(4), 850–863.
- Douglas, T. J., & Judge, W. Q. Jr. (2001). Total quality management implementation and competitive advantage: The role of structural control and exploration. *Academy of Management Journal*, 44(1), 158–169.
- Escrig-Tena, A. B. (2004). TQM as a competitive factor: A theoretical and empirical analysis. *International Journal of Quality & Reliability Management*, 21(6), 612–637.
- Ishikawa, K. (1990). *What is total quality control? The Japanese way* (translated by David J. Lu.). NJ: Prentice-Hall.

- Ismail, S., & Maling, E. (2002). An investigation of the total quality management survey based research published between 1989 and 2000: A literature review. *The International Journal of Quality & Reliability Management*, 19(6-7), 902–970.
- Juergensen, T. (2000). *Continuous improvement: Mindsets, capability, process, tools and results*. IN: The Juergensen Consulting Group, Inc.
- Juran, J. M., & Gryna, F. M. (1993). *Quality planning and analysis: From product development through use*. NY: McGraw-Hill.
- Kanji, G. K. (2002). *Measuring business excellent*. London, UK: Routledge.
- Kanji, G. K., & Asher, G. (1993). Total quality management process: A systematic approach. *Journal of Total Quality Management*, 4, 132–144.
- Maiga, A. S., & Jacobs, F. A. (2005). Antecedents and consequences of quality performance. *Behavioral Research in Accounting*, 17(1), 111–131.
- Morrow, P. C. (1997). The measurement of TQM principles and work related outcome. *Journal of Organizational Behaviour*, 18, 363–376.
- Motwani, J. (2001). Critical factors and performance measures of TQM. *Measuring Business Excellence*, 6(2), 27–30.
- Powell, T. C. (1995). Total quality management as competitive advantage: A review and empirical study. *Strategic Management Journal*, 16(1), 15–37.
- Rao, S., Solis, L., & Raghunathan, T. (1999). A framework for international quality management research: Development and validation of a measurement instrument. *Total Quality Management*, 10(7), 1047–1075.
- Sharma, M., & Kodali, R. (2008). TQM implementation elements for manufacturing excellence. *The TQM Journal*, 20(6), 599–621.
- Slack, N., Chambers, S., & Johnston, R. (2007). *Operations management* (5th ed.). Harlow, UK: FT Prentice Hall.
- Thiagaragan, T., Zairi, M., & Dale, B. G. (2001). A proposed model of TQM implementation based on an empirical study of Malaysian industry. *International Journal of Quality & Reliability Management*, 18(3), 289–306.
- Wilkinson, A., Snape, E., & Allen, P. (1993). *Quality and the manager*. Corby, UK: Institute of Management.
- Yusuf, Y., Gunasekaran, A., & Dan, G. (2007). Implementation of TQM in China and organization performance: An empirical investigation. *Total Quality Management*, 18(5), 509–530.
- Zairi, M. (1994). Leadership in TQM implementation: Some case examples. *The TQM Magazine*, 6(6), 9–16.

- Zhang, Z. H. (2000). *Implementation of total quality management: An empirical study of Chinese manufacturing firms* (unpublished doctoral thesis). Groningen, the Netherlands: University of Groningen,
- Zhang, Z. H., Waszink, A., & Wijngaard, J. (2000). An instrument for measuring TQM implementation for Chinese manufacturing companies. *International Journal of Quality and Reliability*, 17(7), 730–755.