

Chapter 9 Summary and Conclusions

9.1 Introduction

This chapter provides the summary of this thesis, research conclusions obtained from conducting this study, and a brief research evaluation. Section 9.2 presents a brief summary of this study. Section 9.3 provides conclusions obtained from conducting this research. Section 9.4 focuses on a brief research evaluation, such as research limitations and future research perspectives.

9.2 Brief Summary

In the field of total quality management, confusion was raised worldwide with the TQM concept and the effects of TQM implementation. In fact, much research dealing with the concept of TQM has been conducted. Different researchers have adopted different definitions of TQM; thus far, it has come to mean different things to different people. Concerning the effects of TQM implementation, different researchers have different findings. A number of researchers concluded that TQM implementation has effects on firms' business performance, whereas others stated that it does not lead to improvements in firms' business performance. Conflicting research findings have thus been reported surrounding the effects of TQM implementation. Similarly, conflicting results concerning the effects of TQM implementation on firms' business performance were also found in Chinese manufacturing firms. After the literature related to TQM implementation in Chinese manufacturing firms was studied, it became evident that no large-scale empirical research dealing with the effects of TQM implementation on firms' overall business performance had been systematically conducted. In addition, no research has been conducted for developing a TQM implementation model that can be used by Chinese manufacturing firms to improve their TQM implementation efforts. The lack of sufficient guidelines to assist firms' TQM implementation has led to a number of unsuccessful TQM implementations in China. Thus, the major objectives of this study are:

- To obtain the effects of TQM implementation on overall business performance in Chinese manufacturing firms;
- To obtain a TQM implementation model for Chinese manufacturing firms.

In order to achieve the two research objectives, five research questions were proposed as follows:

- *What is TQM?*
- *What is overall business performance within TQM?*
- *What are the effects of TQM implementation on overall business performance in Chinese manufacturing firms?*
- *What kind of TQM implementation model should be developed in order to guide Chinese manufacturing firms in implementing TQM?*

- *How can this TQM implementation model be demonstrated in practice?*

This study started with an extensive review of TQM literature from quality gurus (Deming, Juran, Crosby, Feigenbaum, and Ishikawa), the three quality award models (the Deming Prize, the European Quality Award, and the American Malcolm Baldrige National Quality Award), and the others conducting research in the field of TQM. Thus, the concept of TQM adopted in this study was defined as: A management philosophy for continuously improving overall business performance based on leadership, supplier quality management, vision and plan statement, evaluation, process control and improvement, product design, quality system improvement, employee participation, recognition and reward, education and training, and customer focus. In this study, TQM consists of 11 constructs. To implement TQM is merely to implement these 11 TQM constructs through a set of practices such as using relevant tools or techniques. The extensive review of the TQM literature provided a solid foundation for conducting this research.

The extensive literature review on overall business performance within TQM suggested that four constructs of overall business performance were considered important by firms: Employee satisfaction, product quality, customer satisfaction, and strategic business performance (annual sales, sales growth, profits, market share, and exports). Thus, a model of TQM implementation and overall business performance was formulated on the basis of the existing research results. This model consists of nine hypotheses. TQM implementation is an independent variable and the four constructs of overall business performance are dependent variables. TQM implementation is the combination of its 11 constructs. The links between TQM implementation and employee satisfaction, product quality, customer satisfaction, and strategic business performance are incorporated in a single model. Furthermore, in order to explore the effects of the 11 different TQM constructs, a model of TQM implementation constructs and overall business performance was developed on the basis of the existing research findings. In this model, the 11 TQM implementation constructs are independent variables. Similarly, the four constructs of overall business performance are dependent variables. This model is composed of 17 hypotheses. The links between the 11 TQM implementation constructs and the four constructs of overall business performance are incorporated in a single model. In order to empirically test the two theoretical models hypothesized in this study, the operationalization of the 11 constructs of TQM implementation and the four constructs of overall business performance was conducted on the basis of the literature review, the existing measurement instruments, and the specific characteristics of Chinese manufacturing firms. Finally, 79, 1, 7, 2, and 5 items were developed to measure TQM implementation, employee satisfaction, product quality, customer satisfaction, and strategic business performance, respectively.

In order to reach the research objectives and answer the research questions, the following strategies for collecting data were adopted: A questionnaire survey, structured interviews, and a case study. Three Liaoning provincial governmental agencies and the Liaoning Provincial Quality Control Association sent questionnaires to 900 manufacturing firms in the Liaoning region in China. Only firms with annual sales greater than RMB 10 million were selected to receive questionnaires; these 900 firms were randomly selected from 2,929 firms with this level of sales in the year 1997. Finally, 212 questionnaires were returned, with a response rate of approximately 23%. The information obtained from the questionnaire survey was used mainly in testing the two models hypothesized in this study.

Ten structured interviews were conducted in ten different manufacturing firms. The information obtained from these interviews was used in developing the TQM implementation model and interpreting the findings from the questionnaire survey. The case study was conducted in a state-owned machinery firm in order to demonstrate how to use this TQM implementation model in practice. In this study, all investigated firms were from Liaoning province due to practicality.

In order to empirically test the two theoretical models, the two measurement instruments measuring TQM implementation and overall business performance for Chinese manufacturing firms were evaluated for reliability and validity. Only based on reliable and valid measurement instruments could model testing be conducted. The measurement instruments were empirically evaluated using the data from 212 Chinese manufacturing firms. Reliability analysis (internal consistency), item analysis, and validity analysis (construct analysis) were used for instrument evaluation. Finally, it was concluded that the instruments for measuring TQM implementation and overall business performance are reliable and valid. The data obtained using the two instruments can be used in testing the two theoretical models hypothesized in this study. Note that one item measuring TQM implementation was deleted after the evaluation. Thus, 78 items were used to measure TQM implementation.

Data from 212 Chinese manufacturing firms were used to test the two theoretical models. The LISREL technique was used for data analysis. The Pearson correlation matrix was selected as the input matrix for LISREL. The maximum likelihood was employed for model estimation. One-tailed significance levels were used to estimate structural model fit. The Chi-square, goodness-of-fit index, adjusted goodness-of-fit index, root mean square error of approximation, and root mean square residual were selected for estimating overall model fit. Contrary to what was hypothesized in the two models, some hypotheses were not confirmed by the data. The results obtained from the ten structured interviews were used to interpret the research findings obtained from the questionnaire survey, which have a number of practical implications. First, TQM implementation has positive effects on overall business performance and implementing TQM does payoff. Second, leadership is the decisive factor in determining the success of organizational overall business performance. In other words, without strong leadership, it is impossible for the firm to achieve good overall business performance. Third, the research findings can imply that it is not necessary for all TQM elements to be present to ensure the success of the TQM programs and overall business performance. In other words, even if a few elements are not present, it is still possible to obtain the required level of overall business performance. Finally, in this study, several hypotheses were not confirmed by the questionnaire survey data. This disconfirmation does not imply that these constructs are unimportant or useless. Instead, firms should identify the problem areas of these constructs and implement them more effectively.

Based on the existing TQM literature, the ten structured interviews, and the findings from the questionnaire survey, a TQM implementation model was developed for Chinese manufacturing firms. The model consists of a framework of TQM, a set of implementation practices, a set of indicators of overall business performance, processes of using this model in practice, and practical guidance to assist users in formulating the most effective TQM implementation plans. This model shows that the application of these TQM practices in combination can lead to improvements in overall business performance. Please note that

there is no single or best way of implementing this TQM implementation model. Firms are different in terms of their people, culture, history, goals, structure, products, services, technologies, processes, and operating environments. Therefore, they should combine their uniqueness with this model and consequently develop their own ways to excellence. Thus, firms can optimize the use of this model by blending with it and applying it to their own situations. Thus, their own methods can better suit their situations. Implementing TQM is a never-ending process. Investing in TQM implementation often implies a choice for a long-term effort that requires a great deal of energy, management attention, money, patience, and tenacity. Although this model was initially developed for manufacturing firms in China, firms in other countries also can use it as reference, since the existing quality management knowledge was used extensively to develop this model. Therefore, many principles and practices presented in this model can be used for firms in other countries. However, some practices are particularly applicable to Chinese manufacturing firms, and may not be so to firms in other countries. It should be noted that there are many types of firms in terms of ownership in China. Additionally, different firms are involved in different businesses. Some practices presented in the model cannot be applicable to all kinds of Chinese firms. Therefore, they must tailor some practices to meet their own requirements. Although this model was initially developed for Chinese manufacturing firms, it is hoped that it can also be helpful for service and public organizations in China. This is due to the fact that the basic philosophy of TQM is applicable to any type of organization. It is not surprising that some principles and practices presented in the model are key to the success of any organization. That is not to say, however, that they are a panacea or can be implemented without attention to specific circumstances and characteristics.

In order to provide an example of using this TQM implementation model in practice, a case study was conducted in a state-owned Chinese machinery firm. The firm's current TQM implementation and overall business performance were compared with the TQM implementation model. The strengths and weaknesses of the firm's TQM implementation and overall business performance were identified, the weak areas being used in formulating the improvement plan. Finally, it was concluded that the TQM implementation model developed in this study is applicable in practice. It can be used by Chinese manufacturing firms at the different stages of TQM implementation. For Chinese manufacturing firms that are implementing TQM or have had a TQM process, the model can provide additional ideas on how to improve their implementation efforts. For firms that are planning TQM, the model can provide detailed information on the elements and practices of TQM, and indicators of overall business performance. For firms that have not decided whether to implement TQM, the model can provide specific benefits of a number of TQM practices, positively encouraging them in implementing TQM.

Finally, it is necessary to review this study in light of the five research questions. The first question, "What is TQM?" was answered on the basis of the extensive literature review. The defined concept of TQM was used throughout this study, which laid a solid foundation for conducting this research. The second question, "What is overall business performance within TQM?", was also answered on the basis of the extensive literature review. The third question, "What are the effects of TQM implementation on overall business performance in Chinese manufacturing firms?", was answered using the data from 212 Chinese manufacturing firms in the Liaoning region. The effects of TQM implementation and different TQM constructs were identified. The fourth question, "What kind of TQM

implementation model should be developed in order to guide Chinese manufacturing firms in implementing TQM?”, was answered by developing a TQM implementation model, which combined the existing TQM theory, the questionnaire survey findings, and the ten structured interviews in Chinese manufacturing firms. The fifth question, “How can this TQM implementation model be demonstrated in practice?”, was answered by conducting a case study in a Chinese state-owned manufacturing firm. The case study showed that the TQM implementation model developed in this study is applicable to this typical Chinese manufacturing firm. In summary, the five research questions were answered and the two research objectives achieved through conducting this study.

9.3 Conclusions

A number of conclusions have been obtained from this research. Thus, a quality management theory related to Chinese manufacturing firms has been developed.

First, the instruments for measuring TQM implementation and overall business performance are reliable and valid, and can be used by other researchers to test the effects of TQM implementation on overall business performance. The reliable and valid instruments can also be used in testing the time dimension of TQM implementation.

Second, several conclusions have been obtained from testing the two theoretical models, which are listed as follows: (1) TQM implementation has positive effects on employee satisfaction, product quality, customer satisfaction, and strategic business performance; (2) Leadership has positive effects on employee satisfaction and strategic business performance; (3) Employee participation, recognition and reward have positive effects on employee satisfaction; (4) Education and training does not have a positive effect on employee satisfaction; (5) Supplier quality management, evaluation, product design, and quality system improvement do not have positive effects on product quality; (6) Vision and plan statement, process control and improvement have positive effects on product quality; (7) Quality system improvement has a positive effect on strategic business performance; (8) Customer focus has a positive effect on customer satisfaction; (9) Employee satisfaction has positive effects on product quality and customer satisfaction; (10) Product quality has positive effects on customer satisfaction and strategic business performance; and (11) Customer satisfaction does not have a positive effect on strategic business performance.

Third, the case study reveals that the TQM implementation model developed in this study is applicable in practice. This model can be used by Chinese manufacturing firms to improve their TQM implementation efforts. The case study further shows that this TQM implementation model can be used to self-assess firms' quality improvement efforts and measure their progress over time. Through using this model, firms can quickly identify which areas urgently need improvement. Thus, the resources can be allocated more wisely and more effective improvement plans can be formulated.

9.4 Research Evaluation

Research Limitations

The research has been completed. It is necessary to evaluate this study in the context of its limitations. First, data used to test the theoretical models came from only 212 manufacturing firms with annual sales more than RMB 10 million in the Liaoning region. One of the potential disadvantages was their relatively high degree of commitment to quality. In particular, the variances of the variables were reduced. Strictly speaking, the generalization is limited. Second, the measure of perceived employee satisfaction in particular is relatively weak, because it asked respondents for their general perception of employee satisfaction in their respective firms. Due to the secondary nature of the data, it cannot conclude that asking alternative sources is equivalent to asking the individuals directly about their job satisfaction. Thus, research findings might have been biased. Third, customer satisfaction data were obtained from respondents rather than customers. Due to the secondary nature of the customer satisfaction data used in this study, the data would not be very reliable and the research findings might have been biased to a certain degree. Finally, another weakness of this research was the issue of the common method variance. In each firm, only one respondent filled in the questionnaire.

Future Research Perspectives

In an exploratory study such as this, recommendations for future research would address the issues generated from this study. Based on these findings, future research may start from a relatively higher level of knowledge. First, a replication of this study would be helpful in re-examining the validity of its findings. Further empirical studies using larger sample sizes, greater geographical diversity, and firm type diversity would be helpful in validating specific parts of the theoretical models proposed in this study. Second, subsequent research needs to be engaged in the development of more valid and reliable operational definitions for the proposed constructs, overcoming the limitations posed by the data source used in this study. For example, more categories could be developed in order to score the responses for strategic business performance. The data of employee and customer satisfaction would be obtained from employees and customers, respectively, rather than from respondents. Third, the relationships found in this study would be investigated in different countries to test whether they go in the same or different directions. Fourth, a set of longitudinal studies would be very valuable in studying the time dimension of TQM implementation. Fifth, more structured interviews would be conducted in different kinds of Chinese manufacturing firms in order to continuously improve the TQM implementation model. Thus, model could better meet the requirements of different Chinese industries. Sixth, an in-depth case study would be conducted in a Chinese manufacturing firm to gain more insight into using this TQM implementation model in practice. Finally, the influence of external environment could be studied in order to explore how external environment affects firms' TQM implementation.