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An investigation of Critical Success Factors and Thai cultural impact

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**An investigation of Critical Success Factors and Thai cultural impact
on Total Quality Management practices in Thailand:
A focus on the university and hospital sectors**

A thesis submitted in fulfillment of the
requirements for the award of the degree

DOCTOR OF PHILOSOPHY

from

THE UNIVERSITY OF WOLLONGONG

by

APINAN AUEAUNGKUL

School of Information Systems and Technology

2013

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Abstract

To remain competitive in the global market, organizations must continuously respond, adapt and evolve. It is essential for organizations to select approaches that allow them to do this effectively. Total Quality Management (TQM) practices are one such approach. With positive impacts on business performance at both national and international levels and across both the manufacturing and service sectors, practitioners and academic researchers are interested in how to best implement TQM to strengthen competitiveness (Zakuan et al., 2010). Numerous studies have attempted to identify and generalize the practices of TQM. Although these studies have recorded varied findings, an analysis of the common themes provides a set of critical success factors (CSFs) of TQM implementation. Culture is one of the main barriers to TQM adoption, with national culture recognized as a key factor in determining the success of quality initiatives (Jabnoun and Khafaji, 2005) due to its impact on organizational values, structures and member behaviors. Quality models must therefore consider the culture in which they are used. Despite broad agreement on this relationship between national culture and the implementation of quality models such as TQM, there is a lack of empirical research on the relationship between the CSFs of TQM implementation and national culture.

Despite extensive research on TQM generally, little empirical research has been conducted in developing countries such as Thailand. TQM has also received limited attention within the service sector. This research investigates TQM implementation in the Thai service sector through a study of the level of CSF practices, and the relationship between Thai cultural characteristics and the adoption of these CSF practices. This research is one of the first to explore the impact of Thai cultural characteristics on TQM adoption.

The study employed a survey methodology to gather perspectives from 127 respondents drawn from 84 hospitals and 43 universities in Thailand. The survey investigated the level of TQM implementation in each of these hospitals and universities, identified the CSFs, and collected information to explain how the prominent characteristics of Thai culture impeded or supported the implementation of TQM in each organisation. Two detailed case studies – Nakornthon Hospital and Songkhla Rajabhat University – were conducted to provide a more detailed analysis of the TQM practices and cultural

impacts in these organizations. In-depth interviews were used to collect rich information from the participants.

The survey results indicated a high level of TQM practice in Thai hospitals and universities. The ten CSFs for TQM implementation proposed by Antony et al. (2002) were shown to be valid in both the university and hospital sectors in Thailand, showing a high level of commitment to improve quality performance in these sectors. In addition, Thai cultural characteristics were found to both positively and negatively influence quality practices in organizations. Specifically, the Thai cultural characteristics of non-assertiveness, flexibility over principles, care and consideration, kindness and helpfulness, self-control, tolerance, restraint politeness, humbleness, calmness, cautiousness and pride of face and dignity had a significant impact on TQM adoption in both sectors. However, the sets of Thai cultural characteristics that impacted on TQM practices in the Thai hospital and university sectors were not similar.

This study contributes to prior TQM literature by comprehensively investigating the relationship between Thai cultural characteristics and CSFs of TQM implementation. The findings support existing literature and provide new knowledge specific to TQM implementation in Thailand and TQM adoption in the service sector. Future research into TQM CSFs in different industries, in the public and private sectors, and in very large organizations would further extend this knowledge. Analysis of the case studies indicates a link between TQM adoption and the concept of learning organizations, with participants viewing TQM practices as a way to become a learning organization. Future research could investigate the link between these concepts.

This research has practical values for management and policy makers in the Thai education and health sectors. Based on the identified level of TQM practices in these sectors and the outcomes suggested by updated academic literature, practitioners can reprioritize current practices. The results confirm the impact of culture on TQM adoption, and specifically that Thai cultural characteristics have both a positive and negative impact on TQM execution in hospitals and universities in Thailand. An understanding of the impact of Thai cultural characteristics will enable TQM practitioners in Thailand to more effectively develop their TQM approach, avoiding the negative implications of Thai culture and benefiting from the positive contributions of these characteristics.

Thesis Certification

I, Apinan Aueaungkul, declare that this thesis, submitted in fulfillment of the requirements for the award of Doctor of Philosophy, in the School of Information Systems and Technology, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution.

Apinan Aueaungkul

5 January 2013.

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List of Publications

Aueaungkul, A & Lau, SK 2010, 'An investigation of impact of Thai cultural characteristics on TQM implementation in the service industry in Thailand'. In *Proceedings of the International Economic and Business Management Conference 2010*, Kuantan, Pahang, Malaysia, 23-24 November.

Chapter 1 Introduction and purpose of the study

1.1 Introduction

This study investigates the impact of Thai culture on Total Quality Management (TQM) practices in Thailand. In general, TQM can be viewed as a management approach that focuses on improving the quality of an organization's products and services (Waddell et al., 2009). However, many researchers use variations on this definition of TQM. This research aims to investigate TQM implementation within the Thai service industry, with a focus on the ways in which Thai service firms apply CSFs, especially in the university and hospital sectors. In this chapter, the objectives and importance of the study are outlined, following an explanation of the background to this research. The chapter concludes with an outline of each of the chapters in this thesis.

1.2 Research background

The current age of globalization has transformed the landscape of commercial enterprise. In order to survive in this competitive environment, companies are being forced to increase their comparative advantage in three major areas: quality, price and delivery. When using pricing as the sole basis for competition, the organization with the lowest price will gain the greatest market share, provided that it delivers a product or service of comparable quality to its competitors (Yusof, 2003). Rather than taking this approach, many companies have opted to use quality management as a competitive strategy in order to avoid competing through price reduction.

1.2.1 TQM overview

TQM practices can be utilized as a method for securing competitive advantage by helping organizations to use their resources efficiently and to provide quality products that meet the needs of their customers. Khan (2003) asserts that in the long term companies that implement TQM effectively can offer more effective products and can increase profitability and market share. When evaluating organizational practices, it has been suggested that productivity should not be considered only in terms of efficiency. Rather, value should also be placed on effectiveness (Khan, 2003). For example, manufacturing firms can objectively measure the efficiency of their resource usage. However, if their products are not meeting the needs of customers, they are not

considered 'effective'. Hence, the organizations' resources may be used efficiently, but not effectively. In order to be profitable, companies must have both knowledge of, and the ability to meet, customer expectations. TQM provides organizations with the framework to be both efficient and effective, providing a broad competitive advantage in all three areas of quality, price and delivery.

TQM is an integrative organizational philosophy concerned with continuously improving the quality of products, services and internal processes in order to meet or exceed customer expectations (Baird, Hu and Reeve, 2011). TQM is based on embedding a customer focus in all organizational practices and processes, leading to the provision of high quality services and products that meet clients' needs. TQM proposes that customer satisfaction leads to loyal customers who repurchase. As the number of loyal customers that are acquired by a company increases, so does that company's chance of long-term success in the market. Khan's (2003) research into the impact of TQM on productivity concluded that organizations that correctly embrace the TQM philosophy can expect significant improvements in financial performance as well as customer and employee satisfaction. In this way, TQM can provide businesses with a long-term sustainable competitive advantage in a fiercely competitive environment (Khan, 2003).

Over the last three decades, there has been increasing acceptance of TQM as a philosophy of management and as an approach to company operation (Yusof, 2003). As the concept of TQM expands, defining and managing TQM has become increasingly complex (Kujala and Lillrank, 2004). In relation to fundamental issues of organization, management and economics, TQM has not been properly defined and its scientific foundations are limited (Kujala and Lillrank, 2004). The TQM approach was established in the early 1920s, stemming from quality control practices used in the manufacturing process (Sajjad and Amjad, 2011). Since the 1980s, its application has spread to business level management within organizations (Kujala and Lillrank, 2004). As TQM has evolved, it has drawn from the management practices and theories of many quality experts including J.M. Juran, W. Edwards Deming and Kaoru Ishikawa (Evans and Lindsay, 2008). However, no single theory provides a comprehensive framework for TQM (Kujala and Lillrank, 2004).

Despite the difficulties associated with defining and describing TQM, the practical approach applied by TQM practitioners does not signal an absence of management concepts such as customer focus or continuous improvement (Prajogo and McDermott, 2005). Rather, it is through the practices of stakeholder and customer focus, as well as process focus, supported by continuous improvement, and the involvement of all organizations' members, that firms acquire the ability to pursue performance excellence through TQM (Evans and Lindsay, 2008). The implementation of TQM requires companies to adopt a number of specific quality practices, such as top management commitment, continuous improvement and quality training and education. These practices are commonly referred to as critical success factors (CSFs) of TQM. In this study, the term 'CSFs' can be defined as the critical areas of accomplishment for an organization in order to achieve high quality performance; they are crucial to the successful implementation of TQM (Antony et al., 2002). In this study, the terms *CSFs*, *CSFs of TQM implementation* and *CSFs for TQM* have the same meaning. They are used interchangeably in this research. A number of empirical studies have focused on the identification of CSFs for TQM and TQM implementation (Kujala and Lillrank, 2004). This research studies TQM in Thailand, examining the implementation of TQM CSFs to date in the Thai service industry, with particular focus on the hospital and university sectors. This examination informs the identification of CSFs that require greater management attention. According to the National Economic and Social Development Board (NESDB) (NESDB, 2013), the service industry in Thailand covers many sectors. These are Electricity, gas and water supply; Construction industry; Transport, storage and communication; Wholesale-retail trades and repairing; Hotels and restaurants; Financial intermediation and Other services such as education and health. Thus, universities and hospitals are categorized as 'other' service sectors. In 2013, the GDP of Thailand increased by 5.3%, and service industry is one of the main drivers of this improvement. Although most services in the 'other' services sector are experiencing continued growth, education services and health services fell by 3.4% and 0.1% respectively. This can imply that there are troubles within the education and health sectors, which hinder overall improvement. In Thailand, the standard of the healthcare and education sectors lags behind global standards (Suwanprakorn, 2002). If healthcare and higher education are being neglected by private businesses, it is difficult for Thailand to realize the long-term benefits of quality hospitals and a well-educated labor force; both of these will have a negative impact on global competitiveness

(Suwanprakorn, 2002). In the last 2 years, Thailand spent approximately 4.0% and 4.1% of GDP on the health and education sectors respectively (World Bank, 2012; 2013). In this study, hospitals and universities are selected as representatives of the service industry. Although these sectors do not provide significant direct contributions to economic growth in terms of GDP, they are fundamental to Thailand's development. Problems associated with inequality in Thai society could be solved by removing injustices in the society. These injustices mainly arise from a lack of opportunities in various aspects, such as access to education as well as access to healthcare (Asia News Monitor, 2010). Improving quality in these sectors can lead to economic opportunities such as higher income, rise of social status and better standard of living (Asia News Monitor, 2010). Moreover, hospitals and universities provide significant value to the Thai economy (Asia News Monitor, 2012). To enhance the sustainability of national prosperity, the improvement of these sectors needs to be emphasized

The two sectors chosen for examination have distinct and different characteristics. The Thai university sector has faced many problems relating to quality of service, which has led to significant Thai government investment in the sector. Currently, the government's investment in education accounts for 4.2% of GDP (Moe, 2011). Despite this, the performance of Thai students is still considered to be poor in the global context (Moe, 2011). The level of educational quality in Thailand is considered unsatisfactory and students' skills do not correspond with the needs of the Thai labor market. It is likely that this problem can be addressed through quality improvement in the education process. Conversely, the Thai hospital sector is currently a market leader in medical tourism for the Asian region (Amornivat et al., 2012). To remain in this competitive position, quality improvement is required in the sector. The variation in current performance between the education and hospital sectors will provide two perspectives on the current use and value of TQM, and the potential for TQM, in Thailand.

1.2.2 Critical Success Factors (CSFs) of TQM adoption

Effective implementation of TQM requires a strong commitment from all members of an organization to the CSFs. Thus, identification of these factors is a key component of successfully implementing TQM. A review of literature suggests that the key CSFs for TQM implementation include (Saraph, Benson and Schroeder, 1989; Black and Porter,

1996; Tamimi and Sebastianelli, 1998; Dale, 1999; Tsang and Antony, 2000; Claver, Tari and Molina, 2003; Tari, 2005; Das, Paul and Swierczek, 2008; Salaheldin, 2009):

- Availability of visionary managers in the firm;
- Commitment of all members to value TQM philosophies;
- Encouragement of team work;
- Increased employee involvement;
- Provision of effective quality training programs;
- Use of good performance measurement systems;
- Process focus orientation;
- Effective communication systems;
- A customer focus;
- Well performing, quality suppliers; and
- Use of continuous improvement methodologies and tools.

As the aim of TQM is to achieve perfection and performance excellence (Evans and Lindsay, 2008), some companies elect to practice more realistic and modern quality management applications such as Six Sigma, Just in Time, national quality awards, expert quality awards, and international quality certifications. The International Organization for Standardization (ISO) standards and quality award criteria (such as the Malcolm Baldrige National Quality Award (MBNQA) and European Quality award) are currently the most extensively applied methods of TQM (Kujala and Lillrank, 2004). Some scholars view Six Sigma as a new, more comprehensive version of TQM (Sajjad and Amjad, 2011). It is important to note that, in alternate discussions of the topic, striving for performance excellence via TQM methodologies is considered to be the next step once the achievements of Six Sigma and other quality methodologies are accomplished.

Research into the effects of implementing TQM has produced diverse findings. Although some studies suggest that TQM implementation does not lead to business

performance improvement, many studies conclude that it has positive effects on performance (Sajjad and Amjad, 2011). It has been argued that, rather than poor performance reflecting a failure of TQM, this outcome is a result of improper implementation of TQM by management. These mixed findings have led scholars to investigate the level of organizational and employee engagement with TQM, as well as factors that can contribute to TQM success (Baird, Hu and Reeve, 2011; Jung et al., 2008).

1.2.3 Cultural implications of TQM adoption

One such factor that has received much research attention is the importance of organizations having a culture that is suitable to TQM adoption (Baird, Hu and Reeve, 2011; Sarros et al., 2005). For instance, TQM implementation requires committed people who constantly evaluate how work is being undertaken to achieve superior performance (Jung et al., 2008). “Organizational culture represents the collective values, beliefs and principles of organizational members and is a product of such factors as history, product market, technology strategy type of employees, management style, national culture and so on” (French, 2010). The culture can be seen as a system of shared beliefs and values that develop within an organization, and it controls members’ interactions with each other and other people. In general, TQM necessitates a shift from a reactive to a proactive culture, which everyone is responsible for ensuring quality focusing on the customer expectations. Involvement and empowerment of all organization’s members are essential. It is claimed that effective TQM implementation requires fundamental change in organization culture (Jones and George, 2003).

Each TQM journey is unique to its respective cultural setting (Noronha, 2002). Although the values of TQM can mirror an organization’s existing culture, the culture is always more deeply rooted within the organization. It reflects a pattern of shared and stable beliefs and values that are developed within the firm itself (Baird, Hu and Reeve, 2011). While it has been claimed that TQM will be effectively adopted in organizations that have cultures aligned with the TQM values (Jung et al., 2008), such research has been inconclusive (Baird, Hu and Reeve, 2011).

TQM has its own set of cultural beliefs, norms, values and assumptions (Roney, 1997). Although TQM philosophy and organizational culture are related, they are distinct (Baird, Hu and Reeve, 2011). Ideally, the fusion of these two cultures would achieve

optimal hybridization, with the two systems combining to create a system incorporating the advantageous elements of both (Noronha, 2003). This perfect fusion can be witnessed in the quality management cultures of USA and Japan, although these cultures have taken considerable time to develop. It is worth noting, however, that the replication of a so-called total quality culture as seen in typical companies in USA and Japan does not necessarily lead to success (Abo, 1994).

Studies have also suggested that cultural factors play a role in the failure or success of TQM implementation. This is likely due to the fact that a given national culture operates as an influence on the organizational culture (Dastmalchian, Lee and Ng, 2000), which directly affects TQM adoption (Noronha, 2003). For transnational organizations, this means that the culture of the host country will dominate overseas operations (Adler, 1997). Noronha (2003) asserts that there have been many reports on the failure of TQM due to the direct implementation of techniques imported from foreign soil (Noronha, 2003). For this reason, national culture is an important consideration when identifying the factors that impact on the success of TQM practices (Jung et al., 2008). In this research, national culture can be defined as the collective programming of the mind, mental programming, and the pattern of thinking and feeling and potential acting of each nation, which distinguish one nation from another (Hofstede, 1990). In general, there has been a lack of investigation on the relationship between national culture and TQM, which will be the focus of this research.

In recent years there has been a shift in the focus of TQM studies from investigating the practical aspects (such as tools and techniques) to cultural influences (Prajogo and McDermott, 2005). Corresponding with the direction of the majority of published research in the TQM field, this thesis is designed to investigate the relationship between national culture and the implementation of TQM practices in Thailand, with the aim of reinforcing a cultural approach towards TQM implementation. In this research, Thai culture can be viewed as collective programming of the mind of Thai people, which distinguishes Thais from others (Hofstede, 2001). It is the way Thais solve problems. Thai cultural characteristics have been significantly shaped by Buddhist teachings. In Thai society, many notable cultural characteristics such as *Kreangjai* (taking other people's feelings into consideration), *flexibility over principles*, *care and consideration* can be observed. This thesis attempts to investigate ways in which such cultural characteristics can support or hinder the implementation of TQM practices.

The service sector accounts for 70% of Gross National Product (GNP) among developed countries (Beaumont and Sohal, 1999). In the case of Thailand, the service sector is a substantial and growing component of the economy, accounting for almost 50% of aggregate production (World Bank, 2012b). The Thai economy has changed from an agricultural-based economy to a service-oriented industry, with the service sector increasing its contribution from 48% in 1980 to 52% in 2004. The number of employees in this sector has increased from 32% in 1992 to 43% in 2004 (NESDB, 2010). Informing the effective provision of critical infrastructure for the hospital and university sectors is the focus of this research, as it is believed that improvement in these sectors would contribute to the growth of the Thai service industry in general.

During the 1990s, several related research studies were conducted in Thailand to examine the stages of TQM implementation. These studies focused primarily on small and medium business in the manufacturing sector (Krasachol, Willey and Tannock, 1998; Tannock and Krasachol 2000; Tannock, Krasachol and Ruangpermpool, 2002). Findings included recommended applications of TQM methods and tools in many types of Thai companies, the barriers to TQM implementation in Thailand, Thai government support of TQM implementation and the relevance of the Thai Quality Award (TQA). However, all such studies were focused outside of the service sector. This research aims to address such concerns for the growing Thai service industry.

1.3 Research problems

A review of the literature on TQM in Thailand showed that most of the studies had been conducted in the manufacturing sector (Reis and Pati, 2007). There has been a lack of studies considering the implementation of TQM in Thailand (Phusavat and Kanchana, 2008). Moreover, there is a lack of research into the CSFs of TQM in Thailand in general, and in the Thai service industry in particular (Phusavat and Kanchana, 2008; Reis and Pati, 2007). In Thailand, hospitals are encouraged to increase their quality to enhance Thailand's competitiveness (MOPH, 2012), while universities are required to conduct internal and external quality evaluations (Yilmaz, 2010) and expected to achieve common quality standards (Kirtikara, 2002). Thus, these two particular service sectors are chosen as a focus of this research because of their importance to economic growth and Thailand's development.

Despite broad agreement that a relationship exists between national culture and the implementation of quality models (such as TQM), there is a lack of empirical research on the association between cultures and the adoption of TQM practices (Baird, Hu and Reeve, 2011). The relationships between cultural factors and TQM implementation are complex and unclear. As a result, this study can be considered as one of the first attempts to identify and generalize the CSF practices of TQM in particular types of Thai service organizations. Specifically, this thesis contributes to filling the existing gap in the literature through its exploration of the CSFs of TQM implementation in Thai hospitals and universities. As well as addressing these gaps in the literature, this research aims to investigate implications of Thai cultural characteristics on TQM practices. Since there is a lack of cases that provide knowledge on TQM implementation in service firms (Aly and Mack, 1993), this research also explores and seeks to understand the similarities and differences in terms of TQM adoption in a hospital and a university in Thailand.

1.4 Objectives and scope of the study

The level of awareness of TQM has increased considerably since 2000 (Yusof, 2003). Research has been conducted into many TQM related issues, including its principles, benefits of its application in various industries and barriers to implementation.

In this study, the Thai service industry consists of many sectors such as the telecommunications, banking, education and health sectors. The purpose of this thesis is to investigate TQM implementation within the specific Thai service industry, including university and hospital sectors, and investigate the ways in which Thai universities and hospitals apply CSFs. As cultural factors can influence the success of TQM implementation, this study also aims to investigate how Thai culture has impacted upon TQM practices in Thai universities, hospitals, and across both sectors. Specifically, this thesis aims to meet the following objectives:

1. To examine the current status of TQM implementation in the Thai university and hospital sectors;
2. To study the CSFs of TQM implementation in the Thai university sector, hospital sector and both sectors collectively;

3. To examine how Thai cultural characteristics can influence TQM implementation in the Thai university sector, hospital sector and both sectors collectively.

1.5 Research questions and hypotheses

To accomplish research objectives, three research questions are proposed. These are:

1. What are the current statuses of TQM implementation in the Thai university and hospital sectors?
2. What are the CSFs of TQM implementations in the university and hospital sectors in Thailand?
3. Which Thai cultural characteristics influence TQM efforts in the university and hospital sectors in Thailand?

To answer which Thai cultural characteristics influence TQM efforts in the university and hospital sectors in Thailand, the following research hypotheses are tested.

H0: there is a significant relationship between CSFs practices and Thai cultural characteristics

H1: there is no significant relationship between CSFs practices and Thai cultural characteristics

1.6 Research methods

The study commences with a detailed review of the published TQM and service literature. The main areas studied are the fundamental TQM concepts, CSFs of TQM implementation, the application of TQM in the service industry and the implications of culture on TQM adoption.

To address the research questions, the research employs a survey methodology, due to its low cost and flexible nature, allowing questionnaires to be sent from remote locations using postal and electronic mail. This method also allows for collection of as

much information as necessary, allowing for a large sample size and flexible data analysis. The survey utilized in this study was developed to investigate the stages of TQM implementation in hospitals and universities in Thailand, and to explain how the prominent characteristics of Thai culture would impede or support the implementation of TQM. 340 questionnaires were sent to participants and 127 responses were received. The response rate is 37.35 percent. It is important to note that 28 questionnaires were added since the low response rate was expected in the survey research. The expected sample size of this research is 312. Thus the response rate calculated from expected sample size is 40.71. The data was analyzed using the statistical software system SPSS version 19.0. Mean rating and standard deviation of statements in the questionnaires were computed to identify CSFs of TQM implementation in the sectors as well as to investigate the level of CSFs practices in the sectors. In addition, chi-square tests were conducted to investigate whether there were any significant relationships between each CSF and the Thai cultural characteristics. 55 hypotheses were developed and tested in this research (Referred to Appendix 1 for full details). In addition, two case studies, one each in the university and hospital sectors, were conducted to provide an in depth analysis of the relevance of TQM practices and cultural impact on CSFs practices of these organizations. These organizations are Nakornthon Hospital and Songkla Rajabhat University (SKRU). The case studies aim to examine how the organizations practice CSFs and to understand how Thai cultural characteristics affect the CSF practices. In-depth interviews were used to collect rich information from the participants. Flowcharts were developed to understand the patient journey within the hospital and the student journey within the university. Quality issues related to the patient and student journeys were also analysed.

1.7 Significance of the research

Despite the increase in research on TQM, many questions remain unanswered (Mehra and Ranganathan, 2008). For instance, various components of TQM must be explored. Moreover, the lack of theoretical foundation becomes an issue when TQM is applied beyond the manufacturing area (Kujala and Lillrank, 2004). Success stories from the service sector are relatively few in comparison to those in the manufacturing sector. It is evident that there is a need to conduct further research in these areas. In addition, it is important to investigate the TQM implementation level in service industry since TQM

practitioners are usually able to reprioritize resource allocation based on the priority suggested by the literature (Talib, Rahman and Qureshi, 2012).

Moreover, the applicability of TQM to the service sector in Thailand has not been adequately studied. Owing to the lack of empirical studies in the area of TQM implementation in the service sector, it is difficult for Thai service organizations to obtain sufficient information to support their TQM implementation process. As a result, these organizations are experiencing difficulties such as failures in implementing TQM. While the study of TQM implementation in the service sector has been documented, there has been a lack of literature covering TQM implementation in the hospital and education sectors. These two particular service sectors in Thailand were chosen as examples of the Thai service industry because of their importance to the population's well being and Thailand's development. The findings of this study provide details of the level of TQM implementation in Thai hospitals and universities. Thus, the outcomes of this research can help Thai hospitals and universities to evaluate their TQM implementation and identify critical areas requiring improvement efforts. This is expected to lead to an increase in the success rate of TQM adoption.

Furthermore, the rate of success can be enhanced through consideration of cultural implications. Although the impact of national cultures on TQM is evident (Anwar and Jabnoun, 2006; Jabnoun and Khafaji, 2005), the relationship between national culture and TQM has not been comprehensively discussed and explored (Noronha, 2002). Specifically, the impact of Thai cultural characteristics on TQM implementation has not been investigated. The outcomes of this study are expected to advance the literature regarding the relationship between TQM practices and cultural impact in specific sectors.

The findings are expected to help service management, specifically in hospital and university sectors, to approach their TQM journey in a way that improves their quality performance. This research provides a guide about the managerial implications of implementation of TQM, in particular those (professional) service organizations that have a high degree of labor intensity as well as a high degree of interaction and customization (Woon, 2000). Therefore, professional service organizations, including hospitals and universities, will be able to identify the critical quality practices that can lead to successful adoption of TQM. This thesis outlines the extent to which TQM

practices have proliferated in Thai service organizations, including hospitals and universities. As a result, the findings of this thesis can help decision makers to identify the potential areas of TQM practice requiring attention, to improve the total quality of the Thai service industry in general and Thai hospitals and universities in particular. Therefore, quality department managers will be able to use the findings of this research to evaluate their TQM implementation and identify critical areas requiring improvement efforts. Researchers will be able to use the findings as a contribution to a better understanding of TQM concepts in relation to cultural factors. Furthermore, this research will be useful to decision makers in the university and hospital sectors, informing guidelines for TQM implementation and evaluation of current TQM practices. Thai decision makers in these sectors can use this study to identify the areas of quality management where improvements should be implemented.

1.8 Thesis organization

The thesis is organized as follows:

Chapter 1 has introduced the background of the thesis, including the research objectives, research methods and organization of the thesis.

Chapter 2 provides on an overview of TQM, discusses the definitions of the concept, outlines the key principles of TQM as applied in industry sectors and identifies the barriers to TQM implementation.

Chapter 3 examines TQM in the service industry, specifically within Thailand. The impact of the service sector on the Thai development and economy and the influence of Thai cultural factors on TQM implementation in this sector are also considered. This chapter also includes a literature review of the use of TQM in hospitals and universities.

Chapter 4 presents the research methodology of this research. Both qualitative case studies and quantitative survey research were employed. Since this research incorporates both quantitative and qualitative components, it can be considered as mixed methodology research. This chapter presents the research methodology, questionnaire design, data collection and sample selection technique for both the survey research and the case studies.

Chapter 5 presents the results of the survey into CSFs for TQM implementation in universities and hospitals practicing quality management in Thailand. Data analysis and a discussion of the study results are also presented.

Chapter 6 presents a case study of Nakornthon Hospital. The objectives of this chapter are to understand how CSFs have been practiced and how Thai cultural characteristics affect CSF practices in one hospital. The hospital gives high priority to quality management practices, which is likely to be due to their current position of engagement with and moving toward the TQM journey to achieve excellent quality performance. This chapter includes a brief discussion of quality issues in hospitals, a background of Thailand's hospital sector and its quality control mechanisms, issues of quality in the case study hospital and detailed information about the organization. The impacts of Thai cultural characteristics on TQM practices in the hospital are also explored. In addition, the discussion of the case study findings is provided.

Chapter 7 presents a case study of a Songkla Rajabhat University (SKRU) along with the implications of Thai cultural characteristics on their quality practices. This chapter specifically aims to investigate how CSFs have been practiced and how Thai cultural characteristics affect CSFs practices in one public university. The case study presents issues of quality in the university and detailed information about the organization including an organizational profile, the adoption of CSFs of TQM implementation and SKRU's work processes. Moreover, the identified quality issues related to the journey and recommendations for quality improvement are discussed.

Chapter 8 is the concluding chapter of this thesis. It presents a summary of research findings, the contributions of this research, implications of the findings and the limitations of the study. It also suggests areas of further research that would contribute to a further understanding of TQM in the service sector and the cultural impacts on TQM practices.

Chapter 2 Literature review of Total Quality Management

2.1 Introduction

This chapter provides a detailed discussion of the concept of Total Quality Management (TQM). As organizations seek to create value for their customers, thereby enabling them to be competitive in both domestic and global markets, they require a structured approach to facilitate the identification of positive changes in their organizational environment and proactively respond to opportunities (Salaheldin, 2009). TQM, which is one form of operation management practice, is one such approach to continuous improvement that has received great attention in both research and industry over the last two decades (Jamali, Ebrahimi and Abbaszadeh, 2010; Salaheldin, 2009). This chapter will explore the concept of TQM. It commences with an overview of TQM, including its importance, history, definition and TQM application. A discussion of the Critical Success Factors (CSFs) that contribute to the construction of the TQM concept and its practical implementation is then presented. The chapter concludes with a review of the main barriers to successful TQM implementation.

2.2 Importance of TQM

Quality management is a key concern for many organizations, both in the public and private sectors. Consideration of quality management is typically included in an organization's business plan as a component of their strategy in the competitive global environment (Jamali, Ebrahimi and Abbaszadeh, 2010). TQM can be considered as the most important strategy for improving the quality of product and services and has been established as a key requirement for success in the global market (Talib, Rahman and Qureshi, 2011b). Several researchers have discussed the increasingly high profile role of the need for quality (Reis and Pati, 2007). Since the 1990s, TQM has been adopted and implemented by many organizations internationally. It is commonly practiced in Europe, North America and Japan. In the developing economies of East Asia and in the emerging markets of Central and Eastern Europe, firms are now seeking to benefit from the application of TQM to improve the quality of their goods and service (Anwar and Jabnoun, 2006). TQM development is considered as the second industrial revolution (Al-Zubi and Judeh, 2011). As a result, it is beneficial to recognize the importance of TQM.

TQM is often viewed as an advancement from early scientific management principles (Waddell et al., 2009) because TQM incorporates many key characteristics presented in contemporary management theories, such as performance management, customer focus and change management. These management theories and principles are applied in firms that adopt TQM, which naturally results in better business performance.

TQM adoption has a positive relationship to business performance. This has been proven by many empirical studies and case studies, and is supported by expert opinions. Comprehensive studies such as Nilsson, Johnson and Gustafsson (2001), Sun (2001) and Salaheldin (2006) agree that adoption of quality management leads to improvements in business performance. Taking this empirical evidence together with comprehensive studies by Hendricks and Singhal (1997), there is persuasive evidence that TQM impacts on financial performance. For instance, TQM programs are widely used by manufacturing companies in Malaysia to enhance their financial performance (Mehra and Ranganathan, 2008). Also, Eriksson and Hansson (2003) showed that organizations that have been successfully implemented TQM outperform other similar organizations. For example, Sohail et al. (2003), cited in Zakuan et al. (2010), compared the TQM practices and organizational performances between ISO certified companies and non-certified companies in Malaysia. The results indicate that certified firms significantly have better performance than non-certified firms (Zakuan et al., 2010). Furthermore, according to a study of TQM impact on the performance of SMEs in Qatar, results show that TQM implementation has substantial impact on both operational and organizational performance (Salaheldin, 2009). TQM is also recognized as an enabler for performance improvement in the construction industry (Kuo and Kuo, 2010). From the evidence presented above, it can be argued that TQM is capable of enhancing business performance regardless of industry and size.

Successful implementation of TQM can help organizations to run their businesses more effectively. It has been suggested that quality systems such as TQM could also lead to better service quality and organizational performance (Cook and Verma, 2002). There is a consensus that by properly implementing TQM, the overall effectiveness and performance of an organization can be improved (Prajogo and Sohal, 2003) because TQM is able to match the unique organizational resources with customer requirements in the market. Successful TQM implementation can provide benefits by improving quality and reducing rework as well as reducing the costs associated with poor quality

output, such as scrap, rework, late deliveries, warranty and replacement (Antony et al., 2002). TQM implementation has also been shown to have a positive impact on business performance by strengthening the effect of corporate culture to achieve excellent performance (Kuo and Kuo, 2010). It provides the basis for further improvement and motivation to the entire organization, creating a customer focused organization, which then establishes a successful organization culture.

TQM adoption can bring about competitive advantage. TQM's positive relationship with competitive advantage has been broadly accepted around the world, and particularly in developed countries (Dean and Bowen, 1994; Talib, Rahman and Qureshi, 2011a). For instance, a study of TQM adoption in small Chinese manufacturing firms by Lee (2004) cited in Zakuan et al. (2010), suggests that TQM adoption can lead to competitive advantage in both domestic and international markets. If TQM is properly implemented, better performance can be expected (Prajogo, 2005), as practicing TQM organizations tend to have better product and service quality. These kinds of improvements from TQM lead to higher value perception among customers, which can be a source of differentiation to the organization. Six characteristics of a strong competitive advantage have been identified (Waddell et al., 2009). These characteristics can be seen in total quality (TQ) organizations because TQM is driven by customers' wants and needs. The characteristics are:

- TQM makes a significant contribution to the success of the business;
- TQM is durable;
- TQM is hard for competitors to copy;
- TQM provides a basis for further improvement;
- TQM provides direction and motivation to the entire organization; and
- TQM matches the organization's unique resources with opportunities in the environment.

TQM adoption can therefore be seen as a key source of business success and a way to gain competitive advantage in the world market, enabling companies to be strengthened and stay competitive.

TQM can lead to enhanced market orientation focus in an organization. The main focus of market orientation has similar elements to TQM, such as management support and commitment, employee involvement, customer focus and employee empowerment (Samat, Ramayah and Saad, 2006). In recent years, research has also shown that one of the goals of TQM - customer satisfaction - has a significant positive impact on market value as well as accounting returns (Andersson, Eriksson and Torstensson, 2006). Furthermore, the impact of TQM on financial performance is mediated by customer satisfaction (Mehra and Ranganathan, 2008). Organizations implementing TQM have higher customer satisfaction, which leads to improvement in financial performance. TQM increases an organization's responsiveness to customer needs, which is a key component of market orientation and leads to a stronger relationship between the organization and the customer. For example, in a study of TQM in the service sector (Samat, Ramayah and Saad, 2006), TQM practices such as employee empowerment, information and communication, customer focus and continuous improvement were shown to have a significant effect on service quality, whereas only employee empowerment and customer focus had a significant effect on market orientation. Thus, it can be seen that TQM practices have an effect on service quality and market orientation.

TQM adoption can foster organizational learning capability, which facilitate organization learning and enable firms to be learning organizations (LO). LO refers to an organizational structure (such as related values, practices and system) that support organizational learning. It is important to note that to survive in the current competitive environment, organizations have to adapt to changing circumstances, learn from mistakes, anticipate and respond to problems and strive for innovation (Lam, Poon and Chin, 2006). Organization learning enables organizations to enhance efficiency, effectiveness and innovation, thereby facilitating organizations to meet the needs of the current competitive environment. A case study of vocational education in Hong Kong (Lam, Poon and Chin, 2006) showed a positive strong relationship between a quality culture and organizational learning capability, which is normally promoted and nurtured in learning organizations (Lam, Poon and Chin, 2006). Therefore, TQM can be seen as fundamental in learning organizations and can be used as an enabler for organization learning (Lam, Poon and Chin, 2006).

A study of TQM and knowledge management (KM) by Ooi (2009) suggests that there is also a relationship between TQM practices and knowledge management. The results show that TQM practices can lead to knowledge acquisition, dissemination and application (Ooi, 2009). KM can be defined as an automated process that increases the ability of a company to assemble, organize and distribute knowledge within the organization in order to improve managerial decisions (Ooi, 2009). It can be seen that KM behaviors encompass the concepts of knowledge acquisition, dissemination and application. The main concern of KM is how an organization acquires, distributes and applies knowledge within that organization. There are two types of knowledge: tacit and explicit knowledge. While tacit knowledge is acquired by imitation and practices, explicit knowledge can be seen as formal technical and academic information. This knowledge can be applied to create rules, guidelines and principles in the organization. Both tacit and explicit knowledge can be managed by an organization to improve performance.

TQM and LO are well-accepted approaches to transforming organizations so they become more effective, efficient and responsive (Lam, Poon and Chin, 2006). Although the concepts of TQM and LO are distinct, they share many common themes. For instance, LO concepts are largely similar to the categories assessed in quality awards such as Malcolm Baldrige National Quality Award (MBNQA) and European Foundation for Quality Management (EFQM) (Lam, Poon and Chin, 2006). Striving to be a LO, organizations can be grounded on TQM principles and culture. It has been suggested that TQM can provide the first step to transformation and the creation of organizations that continuously improve their abilities to outline the future (Lam, Poon and Chin, 2006). Adoption of TQM and the creation of an associated TQM culture can facilitate a positive environment and act as an enabler for organizational learning.

From the above, it can be summarized that TQM is accepted as an important element in increasing organizational effectiveness, competitive advantage, customer satisfaction and business performance, as well as facilitating a positive environment for organization learning (Al-Zubi and Judeh, 2011; Lam, Poon and Chin, 2006; Saravanan and Rao, 2006). In many cases, TQM has been demonstrated to enhance firms' performance (Kuo and Kuo, 2010). This is the result of TQM requiring the entire organization to operate effectively in the assessment of quality requirements of a product, the integration of

quality to the product and the evaluation of the product offering to achieve customer satisfaction.

Service organizations can also embrace TQM principles to enhance their performance. In this research, a service organization is a firm for which the primary or complementary activity does not directly produce a physical product (Evan and Lindsay, 2008). For instance, the education sector has been increasingly adopting TQM over the last 20 years (Lam, Poon and Chin, 2006). TQM has been claimed to have a strong relationship to business performance in service organizations (Huq and Stolen, 1998; Lagrosen and Lagrosen, 2003; Rönnbäck and Witell, 2008; Sun, 2001). Practicing TQM within service organizations can create improvement in operating results and operating procedures. These organizations also achieve greater customer satisfaction, increased market share and profitability (Andersson, Eriksson and Torstensson, 2006).

From the definition of service organizations above, operations include all non-manufacturing activities, real estate, financial services, retailers, transportation, health, education and public utilities. Using this definition, agriculture, mining and construction are not included as service organizations (Evan and Lindsay, 2008).

In this study, all service organizations are considered to represent the service sector or service industry in general, and the terms 'service industry' and 'service sector' are used interchangeably to represent all service organizations. Although mining and construction are considered as the main service sectors in Thailand (NESDB, 2013), this research excludes the mining, construction and agriculture sectors from the service industry. The expected benefits of TQM implementation in the service industry can be observed from a Singaporean advertising industry case study (Ghosh and Ling, 1994). The case study shows how service firms can select TQM as a solution to sustain business success. TJW Singapore adopted TQM as a strategy to build competitive advantage to increase its market share. TQM helps to focus the organization on the needs of its clients, achieve top quality performance in all areas and manage procedures necessary for achievement of quality performance. It also assisted TJW Singapore to continuously examine all processes to remove non-productive activities and waste, ensure required improvements were attained, develop measurements of performance and reward quality improvement efforts. It developed a team approach to problem solving, good procedures for communication and acknowledgement of good

performance. Due to its quality reputation, TJW established a climate that supported and encouraged teamwork and lead to a more satisfying, motivating and meaningful workplace for employees. Together, these changes established a differentiated position for TJW in the marketplace (Ghosh and Ling, 1994). This case study shows that TQM can facilitate meaningful and significant changes in a service sector organization, leading to the provision of services that exceeded the expectations of clients.

In general, it can be concluded that the appropriate implementation of TQM contributes strongly to better service quality and the improvement of overall effectiveness and organizational performance (Prajogo, 2005; Prajogo and Sohal, 2003). It has been suggested that as a result of quality practices in the United Kingdom (UK) construction industry, companies have won repeat business, increased their market shares and improved their customer satisfactions level (Delgado-Hernandez and Aspinwall, 2008). The following diagram demonstrates how TQM affects organizations' performance.

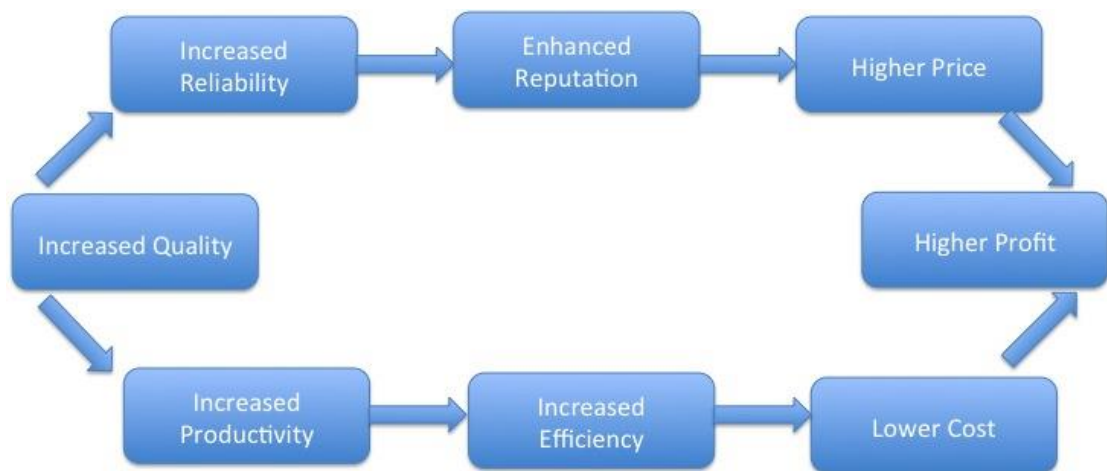


Figure 2.1 The impact of increased quality on organizational performance (Adapted from Evans and Lindsay, 2008)

If organizations require quality improvement of their products/services, they must increase the reliability of their production process. Organizations often establish their reputation by offering high quality products. By improving the quality of the products/services offered, an organization can gain a higher reputation from their customers. An enhanced reputation allows organizations to charge a higher price than their competitors. High product quality can lower operating costs by increasing employee productivity (see Figure 2.1). In addition, higher product quality can lead to an increase in efficiency through increased productivity, and thereby lower operating costs

and boost profit. The advantage of having a non-defective product is that it is error free and has enhanced reliability. This can increase the reputation in the market, allowing a higher price to be charged and higher profits achieved (see Figure 2.1). Naturally, customers prefer higher quality products/services. Given the same price offering, customers will usually select services or goods of higher quality. In general, better quality is positively related to increased market share and profitability (Evans and Lindsay, 2008).

TQM incorporates the practices of cost reduction, enhanced productivity and improved product/service quality. It seeks continual improvement in the quality of performance of all processes in the organization (Al-Zubi and Judeh, 2011). As a result, TQM can be beneficial in improving production efficiency, creating cultural change, introducing teamwork, gaining management commitment to quality and achieving other business improvements.

Quality management is a complex phenomenon and measuring the impact of such practices on organizational performance has been a challenge for researchers (Parast, Adams and Jones, 2011). Previous empirical studies regarding the relationships between TQM, organizational performance and quality have shown significant and positive results (Brah, Serene and Rao, 2002; Litton, 2001 cited in Samat, Ramayah and Saad, 2006). However, in general, TQM implementation can produce mixed outcomes. Reasons for these varied outcomes may include: different measurements used for quality-related performance, the period of study and the revision of confidential information of organizations (Hackman and Wageman, 1995). To overcome this problem, perceptual judgment can be used as an alternative approach for obtaining a valid measure for performance in quality management (Ahire and Golhar, 1996 cited in Temtime and Solomon, 2002; Douglas and Judge, 2001; Powell, 1995). This approach perceives both managements' perceptions and employees' opinions on TQM practices within their organizations as valuable.

2.3 TQM overview

A generally accepted TQM theory is yet to be developed (Sila and Ebrahimpour, 2002). A significant contributing factor is that quality is defined from many viewpoints, including transcendent quality, product and valued base quality, fitness for use and conformance to specifications (Evans and Lindsay, 2008). In USA, one broadly

accepted definition of quality is “the totality of features and characteristics of a product or service that bears on its ability to satisfy given need” (Evans and Lindsay, 2008, p. 15). This definition is concerned with both the quality of the product/service and customers’ perception. To produce a quality product, firms need to strive to contribute value to customers and therefore influence customers’ satisfaction and preference. Most businesses today simply define quality as “meeting or exceeding customer expectations” (Evans and Lindsay, 2008, p. 15). Based on the quality definition, TQM efforts need to emphasize continuous achievement of customer satisfaction.

Well-developed quality assurance systems have existed in the manufacturing sector since around 1980, however these quality systems are restricted to technical issues such as inspection, defect measurement and process control (Prajogo, 2005). The majority of empirical studies on quality management have been conducted in the manufacturing sector (Agus and Abdullah, 2000; Ronnback and Witell, 2008). TQM’s impact on the manufacturing sector has been confirmed by many scholars (Mehra and Ranganathan, 2008; Parast, Adams and Jones, 2011; Sila, Ebrahimpour and Birkholz, 2006; Talib, Rahman and Qureshi, 2011b). A study of the impact of TQM programs on organizational performance in the Australian manufacturing industry found that these organizations typically had high levels of customer satisfaction and business performance (Terziovski and Samson, 1999). In general, TQM has been proven to have a positive relationship with business performance in the manufacturing sector (Evans and Lindsay, 2008). Among the six TQM practices, service firms exhibit scores that are relatively equal to those achieved by manufacturing firms except in people management practices, where service firms record a higher score than their manufacturing counterparts (Prajogo, 2005). This suggests that, in the manufacturing sector, quality management efforts should focus more on the human aspects. These results also imply that despite the fact that TQM originated in the manufacturing area, its principles and practices have also pervaded the service sectors.

It has been suggested that there are two approaches to effective quality management, namely Quality Assurance (QA) and TQM (Jabnoun and Khafaji, 2005). QA is a systematic approach to the pursuit of quality. It aims to achieve the conformance of products, services and processes to certain requirements and standard. Systematic measurement and control, strategic quality planning, defect prevention and process standardization are fundamental to QA adoption. ISO is the most popular QA standard

(Jabnoun and Khafaji, 2005). For example, TQM is a more comprehensive approach with the aim of customer satisfaction. The most cited components that distinguish TQM from QA include continuous improvement, empowerment and customer satisfaction (Jabnoun and Khafaji, 2005). Customers are the starting point of the production process. Internal customer satisfaction can be enhanced through teamwork and empowerment as well as by satisfying employees' expectations. In addition, continuous improvement is required in TQ organizations. The main enabler of continuous improvement is the supporting culture. Furthermore, empowerment is essential for internal customer satisfaction. It can be used to encourage employees to make decisions (Jabnoun and Khafaji, 2005).

However, some scholars have included QA as one of the main components of TQM implementation. According to a contingency model developed by Anwar and Jabnoun (2006), there are four components of TQM implementation: quality control, quality assurance, continuous improvement and total customer satisfaction. TQM is a broad management approach focusing on achieving customer satisfaction. It is not restricted to the QA dimension of standardization or formalization of quality products and processes; it also requires the effective application of continuous improvement and total customer satisfaction.

It is evident that TQM includes both learning and control mechanisms (Jabnoun and Khafaji, 2005; Anwar and Jabnoun, 2006). Interestingly, more control is needed to reduce variation and achieve conformance with efficient control of the process. On the other hand, empowerment and learning requires uncontrollable decisions aiming to satisfy customers. The incompatibility of the management of employees' learning and the effective control of staff requires a critical balance to match the environment and the organizational priorities.

From the above discussion, it can be seen that TQM is grounded in certain core principles: a focus on customers, participation and teamwork, continuous improvement, education and learning, visionary leadership, employee empowerment and quality partnerships (Dahlgaard and Dahlgaard-Park, 2006; Evans and Lindsay, 2008). Practices such as customer focus, continuous improvement and organizational teamwork can be implemented to improve product and service quality (Zu, 2009). Organizations need to offer products/services that meet or exceed customer

expectations. In order to achieve this and to successfully adopt TQM, organizations must have a conducive structure, a vibrant and empowering corporate culture and committed leadership with a top down commitment to thrive (Huq and Stolen, 1998; Jabnoun and Khafaji, 2005).

2.3.1 TQM history

TQM originated in the USA in the early 1980s (Talha, 2004). The appearance of the term was a consequence of the performance comparison between Hewlett-Packard (HP) and Japanese competitors. HP realized that the US chip manufacturers had lower quality than many Japanese organizations. As a result of its history, TQM adopts elements of both American and Japanese business culture (Kaluarachchi, 2010, p. 41). When Deming initially introduced TQM, Japanese firms adopted the principles while US organizations rejected the philosophy. Since Deming, Juran, Taguchi and other quality gurus had introduced TQM to Japanese companies, the quality of Japanese products and services has constantly increased (Evans and Lindsay, 2008). One of the first Japanese organizations to move in the direction of quality improvement in the late 1950s was Toyota. Total quality control subsequently evolved to TQM (Dahlgaard and Dahlgaard-Park, 2006). Japanese firms moved through four quality improvement stages (Dahlgaard and Dahlgaard-Park, 2006):

- Awareness of the need to learn about quality control and improvement methods (1945-).
- Importation, adoption and learning about quality control and improvement methods through systematic education and training (1950-).
- Digestion, implementation, Japanisation, internalization, people involvement and participation.
- Company wide quality control; mastery of quality (1975-).

From the evolution of quality management in Japan, it can be seen that quality issues have been addressed and researched for many years. To achieve high quality standards, management must invest significant time and attention to move through the quality improvement stages. This evolution has led to the creation of different management practices, such as TQM, Six Sigma and lean production. Lean philosophy and Six

Sigma are essentially the same. Both have developed from TQM practices (Dahlgaard and Dahlgaard-Park, 2006). The principles, concepts and tools of lean production and Six Sigma can be considered as a collection of concepts and tools that support the TQM principles. From the successes of Japanese companies during 1980s, companies worldwide have recognized the importance of effective quality management enabling firms to stay competitive (Kaluarachchi, 2010). It can be seen that the development of the TQM concept is a consequence of intense global competition (Zakuan et al., 2010).

Varied concepts have been derived from TQM by quality experts. These studies provide complementary research and contribute in different ways to the TQM literature (Al-Zubi and Judeh, 2011). These derived concepts include steps for quality improvement, zero defect philosophy, quality principles in organizations and the importance of quality circles to achieve continuous improvement (Al-Zubi and Judeh, 2011). After its origin in Japan and broader application in the USA and UK across non-manufacturing sectors (Moghaddam and Moballeghi, 2008), the concept of quality management was recognized by many management scholars in 1990s. Numerous studies and books have been devoted to total quality in the realms of both product and service quality management (Moghaddam and Moballeghi, 2008). As supported by the literature, in this study TQM is considered to exceed the concepts of quality control, quality assurance, quality management and total quality. TQ firms are expected to ensure high level of command of quality management. In addition, TQM philosophies are seen as a way of life for the members of TQM organizations (Anwar and Jabnoun, 2006) with Fotopoulos, Psomas and Vouzas (2010) explaining that the focus of TQM adoption should go beyond its implementation: TQM should be practiced, lived and nurtured within organizations. Managers must understand that is a continuously and never-ending improvement process.

2.3.2 TQM definition

There is not a broadly accepted definition of TQM; defining the term has been a controversial issue debated in the literature, with no single organization identifiable as the originator of the TQM term. Discussion about the definition of TQM is ongoing. The main criticism leveled against TQM is the prevalent confusion surrounding its definition (Boaden, 1997; Hellsten and Klefsjo, 2000). The inability of TQM researchers to reach consensus on the key elements of its definition provide grounds for

those who challenge the value of TQM. This section will review samples of TQM definitions and consider the common and varying elements.

Common definition elements are the presence of *a structure* and a focus on *customer satisfaction*. Hellsten and Klefsjo (2000) explain TQM as a constantly evolving management system consisting of values, methodologies and tools. The system aims to increase external and internal customer satisfaction with an improvement in organization efficiency. Similarly, TQM can be defined as an integrated approach consisting of principles and practices whose goal is to improve the quality of an organization's goods and services through continuously meeting and exceeding customer's needs in most competitive ways (Talib, Rahman and Qureshi, 2011a), focusing on TQM's requirement for continuous improvement in all aspects and activities in organizations. ISO defines TQM as "a management approach of an organization, centered on quality, based on the participation of all its members and aiming at long-term success through customer satisfaction, and benefits to all members of the organization and to society" (Gauttam, 2010, p. 59). In contrast, Anwar and Jabnoun (2006) define TQM as a single integrated approach to the organizational functions, and a mechanism seeking to attain consistency and harmony. These aspects are vital for the effectiveness of corporate strategy and its impact on the external market. This definition does not refer to the key element of customer satisfaction highlighted in the previous definitions.

TQM as a *philosophy* influencing whole organizations and as a *management style* is a common element of definitions. The importance of *employee participation* is also noted. Foley (2004) illustrates TQM as "a management revolution, a revolutionary philosophy of management, a new way of thinking about the management of organizations, a paradigm shift, a comprehensive way to improve total organizational performance, an alternative to management by control or as a framework for competitive management" (Foley, 2004 cited in Andersson, Eriksson and Torstensson, p. 283). TQM has also been defined as an organization-wide philosophy requiring all employees at every level of an organization to focus his/her efforts to help improve each business activity of the organization (Mehra and Ranganathan, 2008). Moghaddam and Moballeghi (2008) broadly defined TQM as the art of managing the whole to achieve excellence, where TQM can be considered as both a philosophy and a set of guiding principles that represent the foundations of a culture of continuous improvement. In this definition,

management must apply qualitative methods, and staff must be committed to improving all the processes within an organization, in order to exceed customer expectations. Dahlgaard and Dahlgaard-Park (2006) assert that TQM is a corporate culture characterized by increased customer satisfaction through continuous improvements, in which all employees actively participate. Therefore, total quality organizations need to define their culture, which then supports constant achievement of customer satisfaction through an integrated system of tools, techniques and training. The aim of this management philosophy is to change the corporate culture from a passive and defensive culture to a pro-active and open culture. This preferred corporate culture is designed to support the basic TQM principles of increased customer satisfaction, continuous improvement and participation. In total quality firms, specifying the culture is completed to ensure enhanced customer satisfaction. This involves a systematic method for continuous improvement of organizational processes, resulting in high quality products and services (Waldman, 1994). All these definitions view TQM as an influencer and creator of a specific organizational culture, with this culture integral to TQM's success.

Despite the varied proposed definitions of TQM, a significant amount of commonality can be seen. TQM definitions can be categorized into various perspectives:

1. TQM as a continuously evolving management system consisting of values, methodologies and tools.
2. TQM as a management revolution, a revolutionary philosophy of management and competitive management.
3. TQM as a management philosophy concerned with corporate culture as a main principle; however with an ultimate focus on increasing external and internal customer satisfaction effectively and efficiently. This achievement requires the involvement of all satisfied employees, each of whom are committed to TQM values.

In this thesis, TQM can be defined as an evolving version of quality management approaches, which encompasses many management concepts and mechanisms. It includes efficient and effective process management, quality philosophy, methods and tools. The focus is on how to effectively and efficiently satisfy all customers. This

implies that TQM is a set of management and control processes designed to focus an entire organization and all of its employees on providing products or services that do the best possible job of satisfying the customer. As a result, all members of a TQM organization strive to systematically manage the improvement of the organization through the ongoing participation of all employees. The achievement is completely based on the involvement of all satisfied employees, each of whom are committed to the TQM values. In other words, TQM can be seen as the art of leading a company to achieve excellence in managing quality (Moghaddam and Moballeghi, 2008).

From the above, it is evident that successful TQM implementation depends on the effective application and adoption of its philosophy, methodology and tools. Generally, TQM incorporates the concepts of product quality, process control, quality assurance, quality improvement and continuous improvement of organizational processes, resulting in high quality products and services. These principles are supported by an organizational infrastructure or business functions including customer relationship management, leadership and strategic planning, human resources management, process management and data and information management, as well as a set of management practices and tools (Evans and Lindsay, 2008). This innovative evolving management of way for improving operational performance to increase customer satisfaction thorough high quality product and service has been recognized as TQM throughout this thesis.

2.4 TQM construction

The TQM definitions discussed in the previous section entail that TQM could be broadly divided into three components: TQM philosophy, TQM methodology and TQM tools. The following sections will review each of these three components of TQM.

2.4.1 Philosophy

TQM is an enterprise-wide philosophy encompassing suppliers and customers. It emphasizes a commitment by the organization to strive for excellence in the production of services and products wanted by customers. TQ firms must proactively understand, meet and then strive to exceed customer expectations (Wisner, Leong and Tan, 2005). The TQM technique is at the forefront of the drive to improve product and service quality and service. Improving the quality of an organization's product and/or service requires that the organization's members commit themselves to achieving this (Waddell et al., 2009).

The goals of TQM (Evans and Lindsay, 2008; Rad, 2006) are to:

- Satisfy customers
- Prevent poor quality rather than correcting a problem
- Develop an attitude of continuous improvement
- Understand the value of measuring performance to identify opportunities and maintain improvements, and
- Eliminate chronic sources of inefficiencies and costs.

TQM can be seen as a management philosophy characterized by empowerment, continuous improvement, customer focus orientation and elimination of waste (Talib, Rahman and Qureshi, 2011b). Its aim is establishing a pro-active and open corporate culture in which the basic TQM principles of increased customer satisfaction, continuous improvement and full participation are applied throughout the organization. This focus on culture has become a key factor for TQM organizations because corporate culture can support the constant attainment of customer satisfaction through an integrated system of tools, techniques, and training.

Application of the principles and content of the TQM philosophy can enhance organization commitment to quality. When applied correctly, the organization's competitive position can be increased (Al-Zubi and Judeh, 2011), with successful implementation leading to improved employee involvement, improved communication, increased productivity, improved quality and less rework, improved customer satisfaction, reduced cost of poor quality and improved competitive advantage (Antony et al., 2002).

2.4.2 Methodologies

After acceptance of TQM values with an organization, there is a need to identify how the entire organization can become committed to the TQM philosophy. TQM methodology is a way to work within an organization to reach the desired values. It consists of a number of activities performed in a certain way. Current QM techniques have been mutually developed by Japan, USA, European countries and developing nations (Gauttam, 2010). A brief discussion of TQM methodology is provided in this

section. It can be treated as guidelines for organizations to follow to assist them to start practicing TQM, and hence to improve the overall organizational performance. The discussion below provides a brief explanation to inform practitioners' understanding of the general concept. It does not address more detailed issues such as Hellsten and Klefsjo's (2000) claims that TQM contains a number of methodologies.

2.4.2.1 Improvement cycle

The improvement cycle is one of the most common TQM methodologies applied by quality practitioners (Evans and Lindsay, 2008). The circuit emphasizes the importance of effective collaborations in quality improvement efforts between the elements of design, production and detachment in the process (Dulhai, 2008). The improvement cycle is composed of four stages: plan, do, check and act (PDCA). PDCA is a successive cycle methodology that leads to targeted change and is based on the fundamental principle of improvement (Evans and Lindsay, 2008). The PDCA plans document improvement processes. They can apply to all types of projects and improvement activities because of the objective measurement based on the scientific methods. The application of PDCA (represented graphically in the PDCA cycle) should be taken into management consideration (Dulhai, 2008). This suggests that for improving quality, an organization should continually advance along the PDCA cycle.

2.4.2.2 System of suggestions

The collection of stakeholders' suggestions is a basic methodology for continuous improvement. The application of this system is similar to the principle of brainstorming (Dulhai, 2008). Managers should accept all possible suggestions of improvement from organizational members, without resistance to change. This promotes organizational development and community improvement (Dulhai, 2008). The system is improved by collecting suggestions, which can be regarded as error detection.

2.4.2.3 Just-In-Time (JIT)

The Just-In-Time (JIT) method emphasizes the importance of coordination in the production processes through which the manufacture and delivery of parts (subassemblies) is ensured in due time based on incoming orders of activities (Dulhai, 2008; Evans and Lindsay, 2008). Consequently, "only the precise number of parts needed at a certain moment is inputted in the process" (Dulhai, 2008, p. 116). JIT

focuses on continuous improvement in investment, quality and efficiency. The main considerations of JIT include waste reduction, working with customers to achieve mutual goals to eliminate errors as well as improve service, efficient movement of people and material, reduction of inventories, scheduling in small batches of products, continuous improvement, organizational members' commitment and an extension of quality supplier alliance development (Wisner, Leong and Tan, 2005).

2.4.2.4 The '5S' system of rules

The improvement proposed in the '5S' system of rules derives from a sequence of activities leading to continuous improvement in performance: Seiri, Seiton, Seiso, Seiketsu, Shitsuke (in Japanese). These activities translate into English as: sort (tidiness), set (orderliness), shine (cleanliness), standardization and sustain (discipline) (Dulhai, 2008; Evans and Lindsay, 2008). By following '5S' best practices, work areas become organized, clutter free, safe, efficient and easy to work in. The application focuses on workplace organization and standardization. It is concerned with the basics of efficiency improvement for companies. This practice lays the lean groundwork and develops the lean discipline for quality assurance in the workplace (Quality Assurance Solutions, 2012).

2.4.2.5 Total productive maintenance

Total Productive Maintenance (TPM) aims to increase the lifetime of equipment involving the participation of all workers rather than only the maintenance team (Dulhai, 2008). This methodology requires that employees receive special training for the specific equipment with which they are going to work. TPM enables companies to identify possible problems and to plan for prevention before these problems occur.

2.4.3 Tools

Concrete and well-defined tools, some of which have a statistical basis, can be used to support decision-making and facilitate data analysis. There are many TQM tools such as statistical process control, statistical sampling, quality circles, team building, problem-solving techniques, internal audits, quality costing, leadership development, system optimization, removal of barriers in quality improvement efforts, staff empowerment, workforce quality training and benchmarking of quality results (Krasachol and Tannock, 1999; Wisner, Leong and Tan, 2005).

Statistical and analytical tools are used as TQM management tools. Among others, the seven quality control tools and the seven management tools are frequently applied in total quality organization (Andersson, Eriksson and Torstensson, 2006). These tools, including flowcharts, check sheets, histograms, cause and effect diagrams, Pareto diagrams, scatter diagrams and control charts are used to support quality continuous improvement and problem solving efforts (Evans and Lindsay, 2008). Statistical process controls can be seen as one of the TQM tools (Evans and Lindsay, 2008). They allow firms to visually monitor process performance, compare performance against desired levels or standards, and take corrective action to get the process under control. It is important to note that, as an extension to quality systems and statistical tools, TQM tools usually incorporate a quality vision and the infusion of a quality culture.

2.5 TQM implementation overview

Successful implementation of TQM can help an organization run more effectively. TQM as an organizational system is important today, having emerged as a management paradigm for enhancing organizational effectiveness and competitiveness (Parast, Adams and Jones, 2011). Implementation of TQM takes time and effort. Although there are many studies on TQM practices in different parts of the world, it is evident that TQM adoption and its impact vary from one country to another (Jabnoun and Khafaji, 2005).

To enhance the likelihood of success of a TQM implementation program, it is necessary to investigate an organization's readiness to apply TQM. Although TQM practices theoretically lead to improvements in business performance, many organizations have faced problems implementing their quality program (Rad, 2006). Successful TQM implementation is problematic. An open and cooperative culture has to be introduced by top management. Employees need to be committed to delivering customer satisfaction, which can be achieved through the practice of employee involvement. The development of an organization's mission, vision and strategies should involve all members. While management is responsible for TQM initiatives, employees tend to be in charge of quality efforts (Moghaddam and Moballeghi, 2008). The success of TQM implementations appears to depend more on their effective implementation than on the length of time an organization has used TQM (Brah, Serene and Rao, 2002). It is therefore important to study the critical success factors for TQM implementation since this is a significant determinant in the value derived from TQM in any organization.

2.5.1 Pre assessment

Research and experience in quality management has identified seven key characteristics critical to organizations striving to develop excellent quality processes. These characteristics are: influence, responsibility/autonomy, innovativeness, desire to change, satisfaction, teamwork and common vision/benchmarking (Weeks, Helms and Etkin, 1995). The perceptions of managers and workers are important in the measurement of organizations' characteristics.

To increase the probability of TQM success, the TQM philosophy must be accepted and driven by the managers who are responsible for its implementation. If top management provides weak or no support, the process is likely to fail. The assessment of an organization's readiness for TQM must begin with top management attitudes. Top management must be willing to invest as much energy and time into the TQM process as is needed to make it succeed. Likewise, employees must have input into the design and implementation of the TQM process. Within an organization, key groups must be formed to determine the organization's approach to TQM. These core groups will develop the foundation on which a successful quality initiative can be built. Figure 2.2 below shows the factors that should be considered by companies prior to commencing the process of TQM.



Figure 2.2 Pre-assessment model prior to TQM implementation (Adapted from Weeks, Helms and Ettkin, 1995)

By diagnosing and identifying potential ways to remove hurdles to TQM, organizations are in a better position to explore and address impediments to their quality improvement process. This also improves their ability to outperform their competitors using this information and their quality efforts.

2.5.2 TQM implementation

It has been asserted that the failure of TQM is not only due to its ambiguous concepts; TQM's low rate of success is also a consequence of the approaches used to implement TQM and the ways that TQM is practiced by organizational members (Fotopoulos, Psomas and Vouzas, 2010). TQM implementation incorporates four mechanisms: quality control, quality assurance, continuous improvement and total customer satisfaction. Each of these mechanisms needs to be applied effectively for successful implementation of TQM (Anwar and Jabnoun, 2006). Quality control and quality assurance reflect the control dimension, while continuous improvement and total

customer satisfaction mirror the learning dimension of organizations (Anwar and Jabnoun, 2006). Quality control activities include supervision, inspection and control. The main concept of quality assurance is to develop a quality system. Continuous improvement aims to establish a vision, programs and cultures of commitment to quality and learning (Anwar and Jabnoun, 2006). Total customer satisfaction requires an emphasis on both internal and external customer satisfaction. Empowerment, teamwork, cooperation, commitment and responsiveness are fundamental to achieve total satisfaction.

Moreover, Guattam (2010) suggests that in order to systematically implement TQM, it is necessary to develop a conceptual model. He proposed the TQMEX model to guide organizations in their TQM implementation processes. TQMEX is a sequential model that aligns with the quality principle of 'Keep It Short and Simple (KISS)'. This model provides a universally applicable step- by-step guideline by including recognized practices in TQM. These steps include: 5S, Business Process Reengineering (BPR), Quality Control Circles (QCCs), ISO and Total Productive Maintenance (TPM) (Guattam, 2010). 5S is the key to a TQ environment. Therefore, it should be Step 1. BPR is concerned with re-defining and designing business processes in order to meet the needs of customers effectively. It is concerned with business objectives and systems, and should followed as Step 2. QCCs are concerned with encouraging employees to participate in continuous improvement and act as a guide for employees. QCCs improve human resource capability to achieve business objectives. Therefore they should be Step 3. ISO certification can be used to develop a QMS based on the good practices established in the previous three steps; ISO application is the fourth step to TQM. TPM is a result of applying 5S to equipment based on a sound QMS. Therefore TPM should be implemented as Step 5. It is claimed that if the above five steps are implemented successfully, an organization is already very close to achieving TQM (Guattam, 2010). This model presents the elements that form the base for understanding the TQM philosophy and implementing the process company-wide. It has been suggested that companies starting to implement TQM should follow TQMEX step-by-step. Companies that have already gone through some degree of improvement using some of these steps should review the steps that were not completed and implement these as their next step of improvement (Guattam, 2010).

It can be seen that the effective implementation process depends on various management factors such as committed leadership, a quality training program, continuous improvement and customer focus orientation. There are many critical success factors that should therefore be taken into their consideration by management when developing an implementation program. In this research, TQM implementation is considered to be successful if an organization can effectively and efficiently apply these factors to improve its performance. Embracing TQM requires corporate transformation since it impacts on mission and core values, affects the power distribution in the organization, impacts on structures, systems and procedures, affects interaction patterns and communication networks, and requires transformational leadership to implement.

To understand the impact among those practices as well as the consequences of such practices on business, the Malcolm Baldrige National Quality Award (MBNQA) Criteria Framework can be used (see Figure 2.3). MBNQA is an award criteria developed by the United States Chamber of Commerce to be used as a tool for performance benchmarking. For healthcare organizations, this award criteria consists of seven categories: leadership; strategic planning; patient (customer) and market (stakeholder) focus; measurement, analysis and knowledge management; human resource (staff) focus; process management; and business results (organizational performance) (Wardhani et al., 2008).



Figure 2.3 Malcolm Baldrige National Quality Award criteria framework (Adapted from Evans and Lindsay, 2008)

The seven categories form an integrated management system as illustrated in Figure 2.3. The umbrella over the seven categories reflects the focus that organizations must have on customers through their strategy and action plan for all key decisions. Leadership, strategic planning, and customer and market focus represent the leadership triad and suggest the importance of integrating these three functions. Human resource focus and process management represent the way the work in an organization is accomplished, leading to business results. These functions are linked to the leadership triad. Information and analysis support the entire framework by providing the foundation for performance assessment and management based on fact. The Japanese view of TQM encompasses four fundamental steps: identification of a visible repeatable and measurable organizational process and application of continuous improvement to this process; optimization of the process by emphasizing intangible effects and reducing errors; examination of the way products and services are consumed for further continuous improvement; and consideration outside the immediate product (Gauttam, 2010). The adoption of quality standards and awards such as ISO and MBNQA can also be beneficial to the TQM journey. The quality practices embedded in these standards are significant in TQM implementation (Fotopoulos, Psomas and Vouzas, 2010; Parast,

Adams and Jones, 2011; Zakuan et al., 2010). TQM aims to embed the awareness of quality into all organizational processes. TQM adoption requires the organization to pursue quality standards in all aspects of its business. With this requirement, things are done correctly the first time, thereby reducing defects and waste in the process (Gauttam, 2010).

Quality management practices are developed around two dimensions (Yeh, 2011; Zu, 2009):

- Core or hard quality practices: technique- and methodology-oriented practices including use of quality data and information, product design process, the use of statistical process control (SPC) and other process improvement techniques
- Infrastructure or soft quality management practices: people- and culture-oriented practices focusing on organization change and development in the areas of management commitment and leadership, relationships with external customers and suppliers, and the management of human resources (Zu, 2009). In a study of soft TQM and national culture implications by Yeh (2011), soft elements of TQM included management leadership, employee fulfillment, employee involvement, training and education, a strategic quality policy and customer focus. The constructs of soft TQM are variable based on different scholars' practices (Yeh , 2011).

Zu (2009) proposed a research model of the relationship between infrastructure and core QM practices and their direct and indirect effects on quality performance, as shown in Figure 2.4.



Figure 2.4 Structural model of relationship between infrastructure quality management and core quality management (Adapted from Zu (2009))

In the structural model above, two integrated factors are used to represent the two types of quality management practices. The infrastructure QM includes top management support, customer relationship, supplier relationship and workforce management. The core QM consists of quality information, product/service design and process management. The model shows that the core QM leads directly to improved quality performance and the infrastructure QM contributes to quality performance by supporting core QM. According to a study of the relationships between TQM practices and ISO certification in organizations (Fotopoulos, Psomas and Vouzas, 2010), although the hard aspects of TQM are important, employees will not be convinced of the importance of their participation in the system and process if there is no substantial support from top management. It is also difficult to achieve quality data management without management support (Fotopoulos, Psomas and Vouzas, 2010). A study of TQM practices prioritization (Talib, Rahman, and Qureshi, 2012) suggested that top management commitment, continuous improvement and innovation, quality culture, quality systems, training and education are the most important TQM practices. In relation to strategic factors, top management commitment, continuous improvement,

innovation and quality culture are important for achieving business goals and organization effectiveness. With respect to tactical factors, training and education, teamwork and communication are crucial for TQM implementation. In regard to operational factors, product and service design as well as process management can affect business results in the short term (Talib, Rahman, and Qureshi, 2012). It can be concluded that only some elements of TQM contribute to performance excellence (Kuo and Kuo, 2010). It has also been suggested that performance improvement derived from TQM adoption is a consequence of the collective practice of TQM components.

2.5.3 Critical success factors (CSF)

Strong competitive pressure has forced organizations to offer higher quality products and services as a way to attract and keep their customers. Therefore, many organizations have implemented TQM in order to improve their positions in the market place. As long as TQM is adopted fully and practiced effectively in an organization many advantages will be delivered (Evans and Lindsay, 2008). To implement TQM more effectively, management should study the factors that can contribute to success. CSFs are the factors that contribute to the success of TQM implementation within organizations. CSFs can be defined as the critical areas in which organization must accomplish to achieve high quality performances. CSFs can be identified as being crucial to the successful implementation of TQM (Antony et al., 2002). Thus, in the current study they can be viewed as those things that must go right in order to ensure the successful implementation of TQM.

Since effective implementation of total quality systems, such as TQM, continuously increases the quality and performance of an organization (Sajjad and Amjad, 2011), several efforts have been made to identify and confirm the CSFs of TQM implementation for many years (Ooi, 2009). The factors related to TQM implementation have been identified based on reliable and empirically validated TQM constructs proposed by many quality experts such as Deming, Crosby, Juran and Ishikawa (Talib, Rahman and Qureshi, 2012). For example, Deming developed 14 principles of successful quality management that included high level of management commitment to quality, the use of statistical tools in process design and control, continuous identification and correction of quality problems, a purchasing policy focused on quality, encouraging employees' participation and team work, effective

communication, elimination of financial goals and quotas, and quality training and education (Kuo and Kuo, 2010).

Previous research showed that CSFs have been categorized in a few different ways and these categorizations complement each other (Ooi, 2009; Prajogo and Sohal, 2003). There are different ways developed by many scholars to measure the successful implementation of TQM (Kuo and Kuo, 2010). Different sets of CSFs are presented by many quality experts due to their different qualification, background and work experience (Fotopoulos, Psomas and Vouzas, 2010). Also, different methods of study, different participant characteristics and differences in TQM implementation status in participant organizations can contribute to the different findings. In general, research on the impact of CSF on TQM adoption has presented mixed results.

Although the CSFs of TQM implementation are different depending on the authors' opinions (Reis and Pati, 2007), it has been accepted that there are common themes formed by the following requirements: top management commitment, continuous improvement and innovation, customers' requirements, employee involvement, teamwork, supplier quality management, process management and employee training (Claver, Tari and Molina, 2003; Kaynak, 2003; Sila and Ebrahimpour, 2002; Tari, 2005). Effective implementation of these practices can bring about preferred benefits (Talib, Rahman, and Qureshi, 2012). The relevant areas covered by this research are outlined below.

The review of the literature suggested that there are numerous CSFs that can be identified as being crucial to the successful implementation of TQM. The CSFs in this study have been extracted in two ways.

The first way in which the CSFs for this research have been identified is through the study of the MBNQA criteria, which was chosen as a set of CSFs of TQM implementation. There are numerous reasons for this selection. The use of the Baldrige framework to articulate the content of TQM practices has been supported by a number of scholars (Curkovic et al., 2000; Dean and Bowen, 1994; Prajogo and Sohal, 2003). The wide adoption of MBNQA in many countries around the world strongly suggested that the award criteria has comprehensively captured the major dimensions of TQM practices as envisioned by its proponents, such as Deming, Juran, and Crosby (Curkovic et al., 2000). Also, the MBNQA criteria are applicable to both manufacturing and non-

manufacturing firms (Evans and Lindsay, 2008), which were the focus of this study. This award consists of six criteria of organizational practices and one criterion of organizational performance (business results). The organizational practices are: leadership, strategy and planning, customer focus, information and analysis, people management and process management. The use of the six organizational practice items in this model allows for, but does not assume, the clustering together of the two theoretically opposing TQM mindsets of control-oriented versus human resource-based implementation. These six practices are seen as CSFs for TQM implementation in this research.

The second way in which the CSFs for this research have been identified is through the review of CSF literature developed by many experts and across various industries (see Table 2.1). The focus was on identifying critical areas of TQM in a business unit (Kuo and Kuo, 2010). There are a number of popular studies repeatedly referenced in the literature. For example, Demirbag et al. (2006 cited in Kuo and Kuo, 2010) have proposed seven factors that can be used to evaluate the implementation of TQM. Other popular studies include Antony et al. (2002), who described eleven TQM practices, Sureshchandar et al. (2002), who proposed twelve major TQM practices, and Brah, Wong and Rao (2000) who studied TQM and business performance in the Singaporean service sector. Jamali, Ebrahimi and Abbaszadeh (2010) identified nine CSFs from the academic journals. These CSFs are top management commitment, training, customer focus, employee involvement, supplier management, strategic planning, product and service design, process management and quality culture. The main findings indicate that top management commitment, strategic quality planning, process management and training are the driving factors for TQM implementation and require serious attentions in Iran.

Moreover, Sila and Ebrahimpour (2002) identified seven TQM practices as the most commonly listed among the total twenty five TQM practices extracted across seventy six studies on TQM. These practices were management support and commitment, employee involvement, employee empowerment, information and communication, training and education, customer focus and continuous improvement. Furthermore, an extensive review of the quality management literature by Zu (2009) revealed the seven practices most commonly examined in empirical quality management studies. These practices including top management support, customer relationship, supplier

relationship, workforce management, quality information, product/service design and process management. They represent the wide domain of quality management and are implemented in organizations striving for continuous improvement in all functions. Based on a study of TQM practices in the literature about the Malaysian and Thai automotive industries (Zakuan et al., 2010), seven practices for constructing TQM have been suggested. These are quality leadership; customer focus and satisfaction; quality information and analysis; human resource development; strategic planning management; quality results; and quality assurance (Zakuan et al., 2010). The presentation of each CSF with the supporting studies is presented in Table 2.2. In this research, the terms *CSFs*, *TQM practices* and *TQM constructs* are used interchangeably. It can be seen that CSFs for TQM implementation have been proposed by many quality experts. It has been suggested that all these factors contribute to an increase in customer satisfaction and business performance improvement (Zu, 2009). A more comprehensive review of CSF studies and the identified CSFs are listed in Table 2.1 below. The table presents the supporting studies of CSFs extracted from numerous studies.

Table 2.1 Supporting studies of critical success factors (Adapted from Das, Paul and Swierczek, 2008; Parast, Adams and Jones, 2011; Talib, Rahman and Qureshi, 2011a; Zu, 2009)

| Authors | TQM constructs/CSFs |
|---|---|
| Joseph, Rajendran and Kamalanabhan (1999) | Top management leadership Role of the quality department Training Product design Supplier quality management Process management Quality data reporting Employee relations |
| Brah, Wong and Rao (2000) | Top management support Customer focus Employee involvement Employee training Employee empowerment Supplier quality management Process improvement Service design Quality improvement rewards Benchmarking Cleanliness and organization |
| Wilson and Collier (2000) | Leadership Information and analysis Strategic planning Human resource management Process management Process management |
| Tsang and Antony (2001) | Customer focus Continuous improvement Teamwork and employee involvement Top management commitment and recognition Training and development Quality systems and policies Supervisory leadership Communication within the company Supplier partnership and supplier management Measurement and feedback Cultured change |
| Kaynak (2003) | Management leadership Training Employee relations Quality data and reporting Supplier quality management Process management Product/service design Inventory management performance Quality performance Financial and market performance |
| Lai and Cheng (2003) | People and customer management Supplier partnerships Communication of improvement information Customer satisfaction orientation External interface management Strategic quality management Teamwork structures for improvement Operational quality planning |

| Authors | TQM constructs/CSFs |
|--|---|
| | Quality improvement measurement systems Corporate quality culture |
| Lee, Rho and Lee (2003) | Leadership Quality information and analysis Customer and market focus Strategic quality planning Human resource management Process management Quality results |
| Claver, Tari and Molina (2003) and Tari (2005) | Top management commitment Supplier quality management Continuous improvement Product innovation Benchmarking Employee involvement Reward and recognition Education and training Customer focus |
| Saravanan and Rao (2004) | Top-management commitment and leadership Benchmarking Customer focus and satisfaction Service marketing Social responsibility Human resource management Employee satisfaction Service culture Services cape Continuous improvement Technical system Information and analysis |
| Samat, Ramayah and Saad (2006) [Extracted from Sila and Ebrahimpour (2002)] | Management support and commitment Employee involvement Employee empowerment Information and communication Training and education Customer focus Continuous improvement |
| Demirbag et al. (2006) [cited in Kuo and Kuo, 2010] | Quality data and reporting Role of management Employee relations Supplier quality management Training Quality policy Process management |
| Das, Paul and Swierczek (2008) | Top management support Supplier quality management Continuous improvement Product innovation Benchmarking Employee involvement Employee empowerment Reward and recognition TQM training program Focus on customer Customer satisfaction |
| Talib and Rahman (2010) | Top-management commitment Customers focus Training and education Continuous improvement and innovation |

| Authors | TQM constructs/CSFs |
|---------|--|
| | Supplier management Employee involvement Employee encouragement Benchmarking Quality information and performance |

Table 2.2 Critical success factor studies by various authors (Zu, 2009)

| CSFs | Supporting Studies |
|------------------------|---|
| Top management support | Samson and Terziovski (1999); Curkovic et al. (2000); Wilson and Collier (2000); Sun (2000); Douglas and Judge (2001); Kaynak (2003); Prajogo and Sohal (2003); Lau, Zhao and Xiao (2004); Sila and Ebrahimpour (2005); Yeung and Armstrong (2005) |
| Customer relationship | Samson and Terziovski (1999); Curkovic et al. (2000); Das et al. (2000); Sun (2000); Douglas and Judge (2001); Prajogo and Sohal (2003); Lau, Zhao and Xiao (2004); Sila and Ebrahimpour (2005); Yeung and Armstrong (2005) |
| Supplier relationship | Saraph, Benson and Schroeder (1989); Anderson et al. (1995); Samson and Terziovski (1999); Curkovic et al. (2000); Das et al. (2000); Sun (2000); Kaynak (2003); Sila and Ebrahimpour (2005); Yeung and Armstrong (2005) |
| Workforce management | Saraph, Benson and Schroeder (1989); Anderson et al. (1995); Samson and Terziovski (1999); Curkovic et al. (2000); Sun (2000); Wilson and Collier (2000); Douglas and Judge (2001); Kaynak (2003); Prajogo and Sohal (2003); Lau, Zhao and Xiao (2004); Sila and Ebrahimpour (2005); Yeung and Armstrong (2005) |
| Quality information | Saraph, Benson and Schroeder (1989); Flynn, Schoeder and Sakakibara (1994); Powell (1995); Curkovic et al. (2000); Sun (2000); Wilson and Collier (2000); Douglas and Judge (2001); Kaynak (2003); Prajogo and Sohal (2003); Lau, Zhao and Xiao (2004); Sila and Ebrahimpour (2005); Yeung and Armstrong (2005) |
| Product/service design | Saraph, Benson and Schroeder (1989); Flynn, Schoeder and Sakakibara (1994); Ahire, Gohlar and Walker (1996); Black and Porter (1996); Adam et al. (1997); Ahire and O'Shaughnessy (1998) cited in Jung and Hong (2008); Ahire and Dreyfus (2000); Curkovic et al. (2000); Kaynak (2003) |

From the review of the studies listed in the table above, it can be seen that there are many CSFs that contribute to the success of TQM implementation within organizations. As many organizations still have problems when implementing TQM, research on the CSFs of TQM implementation is required and is expected to enhance the success rate of TQM adoption (Jamali, Ebrahimi and Abbaszadeh, 2010). The purpose of this section is to identify the CSFs of TQM implementation based on the academic literature. After a comprehensive literature review on the topic, the CSFs for TQM implementation that will be considered in this study are: availability of competent quality visionary managers in the firm, commitment of all members to TQM value, encouragement of

team work, increased employee involvement, provision of effective quality training programs, the use of a good performance measurement system, process focus orientation, product and service innovation, effective communication system, focus on the customer, company base of well performing quality suppliers and the use of continuous improvement methodologies and tools. It is evident that these factors have been considered as critical practices in TQM accepted by scholars and practitioners. They incorporate both the hard and soft aspects of TQM. They relate to Thailand Quality Award (TQA), ISO and MBNQA criteria. The following sections provide a general analysis of the identified CSFs.

2.5.3.1 Top management commitment

TQM literature recognizes the importance of significant top management support as one of the major determinants for successful TQM implementation. Once top management has provided a high degree of commitment, members of the organization tend to become involved in the TQM effort (Moghaddam and Moballeghi, 2008). Top management must assume responsibility for maintaining a positive work atmosphere by motivating each of their employees and showing good leadership (Das, Paul and Swierczek, 2008; Evans and Lindsay, 2008). Moreover, previous studies emphasize the critical role of top management in driving overall quality systems in the organization (Andersson, Eriksson and Torstensson, 1995).

In the MBNQA model, top management is the major driver of quality systems that affect organizational performance and profitability (Wilson and Collier, 2000). According to Javier, Antonio and Mignel (2003), top management at the Chief Executive Officer and senior manager levels are important in TQM. Senior managers shape the direction of the organization as well as its values. Also, top management support, as one of the elements in TQM practices, contributes to better market orientation in an organization (Litton, 2001 cited in Samat, Ramayah and Saad, 2006, p. 717). It is interesting to note that Tsang and Antony (2001) determined that top management commitment does not have a direct effect on business performance; instead its effect is mediated through process management and customer orientation.

Leadership is conceptualized as senior management's personal involvement, acceptance of responsibility, visibility, and shared vision and goals (Zu, 2009). The crucial role of top management leadership is to create the goals, values and systems to satisfy customer

expectations and to improve performance of organizations. Top management then need to be held responsible for the organization's strategic quality planning, the integration of quality management and customer satisfaction into organizational plans as a long-term vision for achieving quality, and the understanding and deployment of quality management. These are some of the ways that top management directs the creation and maintenance of the organizational culture (Waddell et al., 2009). The absence of sound strategic planning by top management has often contributed to ineffective quality improvement (Whalen and Rahim, 1994).

A TQM program will succeed only if top management is fully committed, rather than participating only in public announcements (Whalen and Rahim, 1994). Ellram (1991) emphasized top management commitment as an enabler, while lack of top management commitment is a barrier. It is evident that the lack of top management commitment to quality improvement can have a severe impact on TQM implementation and contributes to the failure of TQM adoption (Antony et al., 2002; Talib, Rahman and Qureshi, 2011b). Reasons for lack of top management commitment include lack of experience and training, resistance to change and hesitation in initiating improvement programs. According to Brigham (1993), lack of proper leadership is a common barrier for both the manufacturing and service industries when implementing TQM. Kanji (1996) identified management's failure to lead as the primary obstacle to successful TQM. Van der Wiele and Brown (2002) found management-related factors as the core factors that affect the long-term sustainability of quality management.

2.5.3.2 Supplier quality management

Supplier quality management is an important factor in TQM implementation success. Quality supplier partnerships are measured by considering supplier-selection criteria, the number of suppliers, the exchange of information and services, the involvement of suppliers in the development of new products and the duration of the relationships with suppliers (Zu, 2009). Quality raw materials are constantly needed in many manufacturing companies (Talib, Rahman and Qureshi, 2011b). In service organization such as hospitals and universities, suppliers can include pharmaceutical companies, hospital equipment providers, high schools, scientific lab providers, educational equipment providers and building companies. The quality of these incoming materials is important because poor quality materials can lead to extra costs and may affect the

quality of the organization's image. Selecting high quality suppliers can ultimately improve the quality of products and services because this reduces the quality-related problems associated with materials and spare parts (Jamali, Ebrahimi and Abbaszadeh, 2010). By maintaining a good relationship with suppliers, the costs of raw materials may reduce. Thus, the collaborative and cooperative relationships with quality suppliers are important in TQ companies. Organizations that manufacture products of the highest quality must focus on maintaining a reliable flow of quality raw materials instead of cheaper lower quality raw materials. Feedback about all raw purchased materials should be given to the supplier so a constant standard for the material quality can be maintained (Das, Paul and Swierczek, 2008).

2.5.3.3 Continuous improvement

Continuous improvement should be widely practiced in TQM organizations (Antony et al., 2002) and should be used as the basis on which successful TQM initiatives are constructed (Moghaddam and Moballeghi, 2008). It is necessary for management to develop plans to maintain continuous improvement within the organization. This reduces the chance of failure and increases the chance of success. Current work procedures and quality management practices should be evaluated to determine a better way to run the organization. This evaluation is accomplished through the gathering of quality-related information from internal operations. Quality-related information can also be used to determine production capability. Process procedures should be properly documented. As a result, clear instructions describing how to operate should lessen the chance of operator errors. Effective process management can positively impact the quality of goods and services. To achieve better quality, key processes must be identified and improved continuously (Jamali, Ebrahimi and Abbaszadeh, 2010). Methods such as statistical process control (SPC), plan-do-check-action (PDCA) cycle, quality control (QC) tools, inspection and sampling are often used to continuously improve company performance (Das, Paul and Swierczek, 2008; Evans and Lindsay, 2008).

2.5.3.4 Product/service design

Product design should be considered in TQM organizations since competition between many organizations arises based on the overall product/service (Evans and Lindsay, 2008). Quality improvement can occur in the product development process.

Organizations tend to invent new products to draw the attention of customers away from their competitor's products. These products are ensured to exceed customer expectations, which may lead to brand loyalty. Proper research about customer requirements is essential to produce a product that will satisfy a large market segmentation of customers. Effective design of services or products can contribute to quality improvement and lead to a higher level of customer satisfaction (Jamali, Ebrahimi and Abbaszadeh, 2010). The design engineers of the innovation teams must then develop different ideas and designs for products based on these requirements. These designs must be thoroughly checked before production commences to ensure fewer complications (Das, Paul and Swierczek, 2008).

2.5.3.5 Benchmarking of quality results

Benchmarking is a continuous systematic process of measuring the quality of products, services and practices against those of competitive organization leaders (Saravanan and Rao, 2006). Quality results are measured by the consideration of levels of scrap and rework, throughput time, warranty costs, customer complaints, productivity, profitability, market share, costs and competitive position (Zu, 2009). Benchmarking is a way to improve quality performance by comparing one organization's procedures and services with other organizations in the same industry. It may also involve comparison against a certain standard. Organizations analyze the products of the competitor to see whether they can gain an advantage and learn from their products. Due to the ever-changing environment and broad use of the benchmarking approach, organizations must remain flexible to be able to keep up with the market and to rapidly respond to increased competition, technological advancement and the acceleration of globalization (Das, Paul and Swierczek, 2008; Evans and Lindsay, 2008).

It is difficult for an organization to achieve global standards without benchmarking its business processes with best practice (Talib, Rahman and Qureshi, 2011a). Regular meetings to review and improve strategic plans help in achieving well defined goals and targets, and result in the removal of non-benchmarking barriers in the organization (Talib, Rahman and Qureshi, 2011a). Organizations rarely apply benchmarking within their own organization. This might be because they do not have feasible tools to compare their business practices with the practice of others (Bjorklund, 2010 cited in Talib, Rahman and Qureshi, 2011a). The absence of benchmarking from an

organization results in the lack of a continuous improvement culture and competitiveness. Performance measurement and benchmarking can be used as important tools for firms to enable continuous improvement and perform sustainability.

2.5.3.6 Employee involvement

Employee involvement should be promoted throughout TQM organizations (Antony et al., 2002). Successful employee empowerment and involvement are essential components of TQM journeys (Moghaddam and Moballeghi, 2008). TQ firms should seek an approach that maximizes the benefits of employees' skills and abilities (Jamali, Ebrahimi and Abbaszadeh, 2010). Employees should be allowed to participate in quality and procedure improvement activities. Feedback from all employees is vital because they know how the business runs on a day-to-day basis so they are well qualified to identify where improvements should be made. When employees assist the organization, they feel a sense of accomplishment which can then improve the work atmosphere, and a sense of importance which can lead to improvements in work output. If employees' opinions are not heard, this is likely to negatively affect their work ethic. Employees will become even more motivated to reach a set goal if there is a reward attached to it. Encouraging employees to suggest improvements to work procedures is a good way to get them involved in decision-making. After contributing their own opinions, employees tend to feel more committed to the success of the company (Das, Paul and Swierczek, 2008).

2.5.3.7 Employee empowerment

Employee empowerment should be encouraged by management. Empowerment is the foundation on which TQM and its related principles, concepts and techniques have to be built (Parast, Adams and Jones, 2011). The pre-condition for building an excellent organization is empowerment. More and more traditional management activities must gradually be delegated to ordinary employees together with the necessary authority and capability to plan, check and improve these activities to the benefit of themselves and the organization. Employees must be given both the freedom to plan and decide and the capability to take over this responsibility (Das, Paul and Swierczek, 2008; Evans and Lindsay, 2008). Employee empowerment and teamwork are critical factors in TQM adoption (Evans and Lindsay, 2008), with most TQM programs using both teamwork and problem-solving groups to achieve employee empowerment.

2.5.3.8 Reward and recognition

Reward and recognition can be used to motivate employees. The performance of any individual, section, team, department or division in the organization may be improved by offering a reward for achieving or reaching a set goal. Rewarding employees or giving them recognition for performing a task is an essential part of a quality improvement program. Organizations should have formal compensation systems to motivate an individual or a team to work harder for quality improvement and improved customer satisfaction. The system can be used to encourage and evaluate employees within the business. Employees of the organization should be aware that there is also a penalty system for mistakes committed. Employees should be encouraged to make suggestions to help the business, and should be recognized and rewarded for excellent suggestions. This system of rewards could include an improvement in the work conditions, monetary and non-monetary rewards and salary promotion. Some organizations offer profit-sharing programs to enhance employees' ownership of their jobs and quality improvement activities (Das, Paul, Swierczek, 2008; Evans and Lindsay, 2008).

2.5.3.9 Education and training program

A successful TQM environment requires a committed, well-trained and educated workforce that participates fully in quality improvement activities. The delivery of high quality services and products requires well-trained employees with knowledge and skills. All organizational members should accept training and education (Jamali, Ebrahimi and Abbaszadeh, 2010). Insufficient training on problem identification and problem solving techniques can lead to failure in a TQM implementation program. However, it should be noted that training programs that are effectively designed may be incorrectly implemented. A TQM training program should be provided to all employees. The success of quality programs depends on improving employees' knowledge about quality, with a number of studies concluding that education and training is one of the most important factors for successful TQM implementation (Parast, Adams and Jones, 2011). Education and training in the quality concepts, tools and techniques is essential for employees to understand quality-related issues and participate in process improvement. Through the participation of both employees and managers in training sessions, quality performance can be enhanced, thereby creating an atmosphere of teamwork and involvement in the quality system implementation (Das,

Paul and Swierczek, 2008). As a result, operational performance will also be improved and productivity will increase through the provision of quality training programs to employees (Parast, Adams and Jones, 2011). Organizations should regard employees as valuable, long-term resources that can be developed by education and training. Human resource development stems from continuous training and education, empowerment and the provision of resources and a proper environment (Zu, 2009). To facilitate the necessary education and training, organizations must make adequate resources available.

2.5.3.10 Customer orientation

Customer orientation is seen as a commitment to satisfying customers, the integration of customer satisfaction into the organization's goals and vision, knowledge of customers' needs and expectations and use of customer feedback to provide a new level of interaction with customers (Zu, 2009). Leadership in the global market place belongs to those organizations that meet or exceed customers' requirement. Customer focus is usually one of the key factors that make TQM effective and efficient, because it increases customer satisfaction and considers customer involvement (Zu, 2009). In recent years, research has shown that customer satisfaction, which is one of the goals of TQM (Wisner, Leong and Tan, 2005), has a significant positive impact on market value, accounting returns, financial results and customer loyalty (Andersson, Eriksson and Torstensson, 2006). Customer satisfaction can be seen as a decisive measure of company performance as it can determine the success or failure of an organization (Das, Paul and Swierczek, 2008). Customer satisfaction requires not only understanding of customers' requirements but also determination of the extent to which those requirements are being met based on feedback. Therefore improved customer satisfaction can be a consequence of TQM implementation.

Within TQM, it is necessary to define a culture that supports the constant attainment of customer satisfaction through an integrated system of tools, techniques and training. Dahlgaard and Dahlgaard-Park (2006) assert that TQM is a corporate culture in which all employees actively participate. It is characterized by increased customer satisfaction through continuous improvement. Customer involvement is necessary in the product design and development process. It is asserted that customer orientation is positively related to process improvement (Parast, Adams and Jones, 2011). It has been shown that

process improvement will lead to higher levels of internal and external quality results (Parast, Adams and Jones, 2011). Companies should be able to respond quickly with new ideas and technologies to meet customers' demands, produce products that satisfy or exceed customers' expectations, anticipate and respond to customers' evolving needs and be committed to staying competitive in the market (Wisner, Leong and Tan, 2005).

2.5.3.11 Effective communication system

Effective communication is important for TQM implementation. To communicate more effectively and achieve quality improvement, the development of information systems is necessary. Access to and availability of a quality information system can improve productivity performance and process improvement. Information and analysis is conceptualized as the availability of data, timeliness of data and use of data (Evans and Lindsay, 2008). Quality information should be collected and made available to management to enhance managerial decision making in quality improvement (Zu, 2009). Monitoring best industry practices along with the information obtained from competitors will help an organization to improve its operations and processes, accordingly enhancing internal and external quality results (Parast, Adams and Jones, 2011).

Ineffective communication is one of the major barriers that hinders TQM efforts (Talib, Rahman and Qureshi, 2011a). The main enabler of TQM implementation is communication between managers, supervisors and staff (Talib, Rahman and Qureshi, 2011a). Lack of communication across the organization often results in unsatisfied customers, unfulfilled customer requirements and an environment of distrust (Talib, Rahman and Qureshi, 2011a). If management doesn't want to share important information with employees, an environment of distrust and conflict among management and employees can be observed.

2.5.4 Benefits of TQM implementation

Many successful firms such as IBM, British Airways, Hewlett-Packard and Motorola have been successfully adopted TQM (Yusof and Aspinwall, 2000). It is accepted as an approach for achieving performance excellence internationally (Kuo and Kuo, 2010). The literature on successful implementation identifies a variety of benefits for organizational performance such as an improvement in financial performance, an increase in customer satisfaction and the enhancement of product quality. Proper

implementation of TQM will lead to better organization performance in many areas, as discussed previously in discussion of the importance of TQM (see section 2.2). Common findings of many studies regarding TQM implementation are that the implementation process is central to the long term success of TQM within an organization and that effective implementation for each organization will be unique and cannot be directly duplicated in other organizations (Bayazit, 2003; Talib, Rahman and Qureshi, 2011a).

Successful TQM implementation can lead to improved employee involvement because TQM ensures that everyone within the organization has a clear understanding of what is required and how their processes relate to the business as a whole. Under TQM, teamwork is employed and employees are motivated and encouraged to control, manage and improve the processes within their responsibility (Antony et al., 2002; Evans and Lindsay, 2008).

Proper TQM implementation can lead to better communication between management and staff. Communication is considered vital to ensure that quality information is distributed. In a TQM organization, more open and frequent communication will be found and they will view and treat one another as customers and suppliers (Antony et al., 2002).

The adoption of TQM can result in increased productivity. In an effective implementation program, the work process and potential improvements to it are the focus of efforts. Employees place more emphasis on the elimination of causes of problems than on problem correction. Occurrences of defects and errors are remedied proactively. Problems will be identified and tackled at lower levels, by the people closest to the work who are empowered to deal with the problems. As a result the quality of the products/services will be improved and product rework will be reduced (Antony et al., 2002; Evans and Lindsay, 2008), with a significant reduction in costs of poor quality such as scrap, rework, late deliveries, warranty and replacement (Antony et al., 2002). The work process will also become more efficient. Consequently, productivity can be increased by reducing the cycle time (Antony et al., 2002).

TQM changes the organizational culture and creates a happy working environment through effective delegation, empowerment and total staff involvement. Organizational culture is the set of values, norms, standards of behavior and common expectations,

which influence the ways in which individuals, groups and teams interact with each other and cooperate to achieve organizational goals (Baird, Hu and Reeve, 2011). Managing organizational change is one of managers' most important and difficult tasks. There are four steps in the organization change process: assessing the need for change, deciding on the change to make, implementing the change and evaluating how successful the change effort has been (Waddell et al., 2009). Once the change has been implemented, the organizational environment will change. Both practitioners and researchers highlight the importance of managing the organizational environment, which includes both the task environment and general environment (Waddell et al., 2009). The organizational environment is a set of forces and conditions that operate beyond an organization's boundaries but affect a manager's ability to acquire and utilize resources (Waddell et al., 2009). It is not possible to examine the environment of the organization without giving consideration to an organization's culture.

In addition, improved customer satisfaction can be a consequence of TQM implementation. Through open communication among employees, customers and suppliers, the true voice of the customers can be more readily understood. Since quality operations also focus more on work processes and related improvements, participating organizations will provide better quality products/services to the market. Therefore enhanced customer satisfaction is achieved (Antony et al., 2002).

2.6 Barriers to TQM adoption

There are some identified barriers that hinder TQM implementation and obstruct total quality organizations from gaining benefits from the adoption of TQM. There is significant evidence that suggests TQM implementation is often unsuccessful due to different factors in its implementation (Venkatraman, 2007). Consequently, many companies have stopped practicing TQM initiatives. It has been reported that 67 percent of organizations have failed in their attempts to implement TQM (Talib, Rahman and Qureshi, 2011b). If an organization is not properly prepared for effective implementation, the organization's performance cannot be enhanced as expected. TQM failures due to poor preparation have been well documented over the years, with some organizations investing a large amount of resources with no tangible improvements achieved. This information could be enough to deter the efforts of a large number of organizations from embracing TQM. As a result, this section aims to identify the

barriers that need to be addressed in the TQM implementation process. TQM managers can use this knowledge to prepare and advance their implementation process.

TQM is not an easy practice to implement. It demands full commitment from various parties in the organization and requires some changes and restructuring that involves a large amount of time. This length of time may be one of the reasons that some TQM implementations have not delivered positive results (Samat, Ramayah and Saad, 2006). Practitioners must always consider the level of commitment, expense and time that the TQM effort requires. For example, many companies have implemented TQM with only a short-term commitment. When quality is not the main focus of an organization, the success rate is affected by the degree of commitment (Huq and Stolen, 1998).

Amar and Zain (2002) suggested eleven factors that contribute to dampening the efforts of TQM implementation in Indonesian manufacturing firms. These barriers include human resource issues, management, attitude towards quality, culture, interdepartmental relations, material, machines and equipment, quality related information, method, training and finance. These factors are similar to the barriers found by various scholars (Amar and Zain, 2002). The main barriers identified as hindering successful TQM implementation in service sectors (Talib, Rahman and Qureshi, 2011b) include lack of top management commitment, high turnover at management level, attitude of employees toward quality, lack of proper training and education, lack of coordination between department, human resource barriers, no benchmarking, poor planning, employee's resistance to change, inadequate use of empowerment and teamwork, lack of continuous improvement culture and lack of communication. These barriers are often cited in the TQM literature and are found to be frequently used by different researchers in their studies, which suggest that these barriers hinder the successful implementation of TQM.

Other issues previously considered relevant to TQM implementation, such as inadequate understanding of customer needs, lack of customer focus, lack of measurement, lack of awareness of quality at management level, lack of vision, lack of accounting systems, lack of access to data and result and lack of suppliers/contractors participation have been found to be insignificant in the present era of digital technology and mass customization (Talib, Rahman and Qureshi, 2011b). When closely monitored by management, these barriers can be considered as controllable factors.

In addition, in this research, TQM implementation barriers related to CSF practices – such as the lack of management commitment, lack of communication, lack of continuous improvement and lack of training and education – are excluded from the following discussion. It is assumed that all CSFs must be adopted to ensure an effective TQM implementation. This section has provided a brief discussion of some of the more general barriers to TQM implementation. A number of specific key barriers of TQM implementation are discussed in the sub-sections below.

2.6.1 Lack of coordination between departments

Poor coordination between departments is one of the critical barriers that inhibit an organization. Employee relations and coordination between departments influences the performance of the organizational system and consequently determines the nature and extent of TQM implementation (Sureshchandar, Rajendran and Anantharaman, 2001). Amar and Zain (2002) found that culture and interdepartmental relations are critical to TQM initiatives. Additionally, a lack of coordination between departments was shown to be detrimental to successful TQM implementation. For example, it was observed that there are very wide differences of opinions between the quality and production departments on many organization-related matters (Amar and Zain, 2002). Ineffective internal communication within the departments can also cause lack of coordination between departments and thus create major barrier to TQM implementation.

2.6.2 Culture

It is evident that TQM is related to organizational culture. TQM culture will affect the values of shared system in the organization when implementing TQM (Jamali, Ebrahimi and Abbaszadeh, 2010). When implementing TQM, organizations need to have an appropriate company culture characterized by the core principles of TQM. Many companies have experienced failure when they have tried to implement TQM in the same way as implementing a machine. TQM stresses the mutual cooperation of everyone in an organization and associated business processes to produce services that meet the needs and expectations of customers (Chin and Pun, 2002). If an appropriate company culture has been established from top management to the shop floor level, creating a shared understanding and set of work practices, effective implementation can be achieved (Dahlgaard and Dahlgaard-Park, 2006).

Quality is generally corporate-driven. In some cases, quality is sacrificed to meet the bottom line output or immediate customer requirements. However, in other circumstances, organizations will never sacrifice quality. Such decisions are heavily dependent on management style and organizational culture (Samat, Ramayah and Saad, 2006). Employees at all levels must understand and perform in a way that demonstrates the importance of quality. This type of behavior can be difficult to embed, which can obstruct quality improvement efforts. Top management needs to take a leadership role and show high commitment to TQM adoption to encourage employees to engage with quality improvement initiatives (Talib, Rahman and Qureshi, 2011b).

Employees' resistance to change, such as TQM, has been seen in many organizations. Employees may perceive TQM as controlling rather than empowering them. They may need to work harder for fewer rewards (Talib, Rahman and Qureshi, 2011b). Management should therefore clarify the objectives of TQM, encourage employees to participate in quality planning and decision making, and use employees' ideas and suggestions to improve quality in the process.

2.6.3 Human resources

High turnover and absenteeism at management level inhibits improvement through TQM adoption. Managers and employees often find it difficult to adapt to the TQM culture with new rules and organization hierarchies. Reward schemes for staff and their families can be used to reduce this high turnover rate (Talib, Rahman and Qureshi, 2011b). Human resource barriers also include non-participation from employees, low knowledge of TQM, geographic homogeneity and a lack of employee TQM culture.

2.6.4 Intolerable demand for perfection

One of the most significant barriers to TQM implementation is TQM's intolerable demand for perfection. Striving for product/quality perfection in TQM has brought about, in part, one of its key downfalls as the "Zero Defects" attitude proves counterproductive, unhelpful and reflects what could be calculated at infinity sigma, which is statistically impossible (Dahlgaard and Dahlgaard-Park, 2006). Organizations should fully understand that perfection is not possible. However, the attitude and efforts related to this ideal are valuable and will be appreciated by customers. Shareholders will also benefit. However, TQM's imposition of quality perfection has not been addressed in the practical sense and is not seen as being as flexible as other management practices,

such as lean management or Six Sigma. In these other management practices, perfection is not expected and therefore a margin is allowed to work towards minimizing “defects” while accepting them nonetheless. The "Zero Defects" expectation has an implicit assumption that all defects are equal (Evans and Lindsay, 2008). This is not true. In fact, for most firms and products, defects must be identified and prioritized and treated from the most important to least important (Dahlgaard and Dahlgaard-Park, 2006).

2.6.5 Lack of TQM knowledge

According to Section 2.3.2, TQM practitioners can face with difficulties understanding what TQM actually is. It is claimed that organizations may suffer from poor understanding due to the various definitions of TQM and an inability to understand the relevant TQM applications in their entirety (Andersson, Eriksson and Torstensson, 2006). It is evident that TQM practitioners still lack of TQM knowledge especially in small business sector (Yusof and Aspinwall, 2000). The concept of TQM is continually changing and has become a very broad term used to define what has differentiated into many different variants/strains of TQM created to suit the different demands, methods and goals of different organizations. Different understandings of TQM lead to different opinions about what TQM should result in, for example, whether it will be measured by profit increase or refined human resources. To counterbalance such misunderstandings, a growing number of TQM professionals are seeking improved knowledge of quality and the related methodologies in order to manage the changing concepts of TQM.

2.7 Conclusion

Quality is important, and it is therefore necessary to provide a structure to manage this issue of quality. TQM can be viewed as a way to achieve quality performance excellence. The journey for performance excellence can be observed in the high approval ratings accorded to well-accepted quality awards such as the Malcolm Baldrige National Quality Award, ISO certification and the Deming prize. These quality awards are acknowledged across many industries. Quality management is now a main concern for many organizations, both public and private (Evans and Lindsay, 2008).

TQM is acknowledged as an innovative approach to management and is widely accepted in both business and industry sectors (Lam, Poon and Chin, 2006). This approach is categorized by its principles, practices and techniques. The main principles

include customer focus, continuous improvement and teamwork. TQM requires cultural change that creates a new approach to the management of the basic processes of firms that focus on offering high quality products and services.

The actual definition of TQM has been a controversial issue amongst many promoters of quality management. There is no consensus on the definition of TQM, with an ongoing discussion about the origin of the term. In this research, TQM can be defined as an evolving quality management, which includes efficient and effective process management, quality philosophy, methods and tools; the focus is on how to effectively and efficiently satisfy all customers. TQM is seen as one of the most important strategies to improve the quality of products and services and has become a requirement for success in global market (Talib, Rahman and Qureshi, 2011a). The recognition of TQM widely promotes competitive advantage, which indicates the organization's ability to be a leader (Dean and Bowen, 1994). TQM also provides the basis for further improvement and motivation to the entire organization. Furthermore, it matches the organization's unique resources with opportunities in the environment. This means quality can be seen as a key source of business success and great competitive advantage in the world market. The significance of TQM cannot be ignored because it provides strengthens organizational advantages to enhance competitiveness (Parast, Adams and Jones, 2011). Appropriate implementation of TQM contributes to better service quality and the improvement of the overall effectiveness in organizational performance (Cook and Verma, 2002; Prajogo and Sohal, 2003).

Research on the impact of TQM on organizational performance has presented mixed results. In order to enhance the likelihood of TQM implementation success, there is a need to study the critical success factors (CSFs) for TQM implementation. Many experts have proposed sets of CSFs. Most of them are similar. Differences could be explained by the interpretation of available TQM knowledge, which impacts on the methodology design process. The literature suggests that the CSFs of TQM implementation include availability of competent quality visionary managers in the firm, commitment of all members to TQM value, encouragement of team work, increased employee involvement, provision of effective quality training programs, the use of good performance measurement system, process focus orientation, product and service innovation, effective communication system, focus on customer, company base of well performing quality suppliers and the use of continuous improvement

methodologies and tools. Research has also identified some barriers that hinder the implementation of TQM, including a lack of coordination among organizational units, human resource barriers, cultural barriers and a lack of TQM knowledge among employees.

From the above, since TQM adoption has been well documented and proved to benefit overall performance in the manufacturing industry (Agus and Abdullah, 2000; Ronnback and Witell, 2008, Zakuan et al., 2010), research on TQM application in service organizations provides an opportunity to contribute to TQM literature. In addition, as cultural factors have been noted as a main barrier for TQM implementation, the cultural implications of TQM implementation are a focus of this research. The next chapter considers TQM adoption in the context of the service industry generally, as well as considering the impact of cultural factors on TQM implementation.

Since TQM was initially adopted in Japan, then in USA, Europe and developing countries (Zakuan et al., 2010), it is evident that companies around the world have not implemented TQM at the same pace. Although TQM has been well researched worldwide, there is a lack of empirical studies investigating TQM in developing countries, particularly Asian countries (Zakuan et al., 2010). Many Thai organizations have implemented ISO 9000 as the first step in their TQM adoption, and are now benchmarking their products and processes with the best practice in the market (Das, Paul and Swierczek, 2008). From the above it is evident that research into TQM in Thai service organizations will provide a new perspective on TQM. Specific characteristics of the Thai service industry and Thai culture are considered in the next chapter.

Chapter 3 The service industry in Thailand and impact of Thai cultural characteristics on TQM adoption

3.1 Introduction

The chapter discusses the service industry and key concepts of service generally. The applicability of Total Quality Management (TQM) to the service sector is analysed. In this research, the terms ‘service industry’ and ‘service sector’ have similar meaning and are used interchangeably to represent all service organizations, which operate in many sectors such as the hospital sector and university sector. Next, an explanation of how both national and organizational cultures affect TQM adoption will be presented. Three models of cultural dimensions are presented and the various ways of classifying cultures and cultural characteristics are discussed. Literature reviews of the use of TQM in hospital and university sectors are provided. Finally, the chapter provides an overview of Thailand and its notable cultural characteristics. This discussion informs the identification of the existing gap in the literature. This identified gap will be addressed by this research.

3.2 Service industry

According to North American Industry Classification System (NAICS), the service industry includes all service organizations operating in such sectors as banking, communications, wholesale and retail trade, health, education, all professional services such as engineering and medicine, all consumer services and all government services (Evan and Lindsay, 2008). The scope of the service industry is broad, covering both technical and non-technical aspects including health care, education, insurance, maintenance and transportation (Phusavat and Kanchana, 2008). Therefore, the scope of business types involved in the Thai service industry spans many sectors including Electricity, gas and water supply; Transport, storage and communication; Wholesale-retail trades and repairing; Hotels and restaurants; Financial intermediation such as banks, insurance business and financial institutions; and Other services such as radio and television broadcasting services, amusement activities, sports service, beauty salons, real estate servicing, renting, business services, education, health and public administration service (NESDB, 2013). Due to the great diversity in activities performed by service providers, it is difficult to provide single, all-encompassing definition for the service industry.

Economists divide the products of all economic activities into two broad categories: goods and services (Simmering, 2010). Pure service businesses such as hospitals, universities and law firms deliver intangible products. The World Bank defines services as intangible goods that are often produced and consumed at the same time (World Bank, 2012a). Gronroos (2001) defines the service concept as an activity or series of activities of a more or less intangible nature that normally, but not necessarily, takes place in the interaction between the customer and service employees and/or physical resources or goods and/or systems of the service provider, which are provided as solutions to customer problems. An alternative, more academic definition of service can be any primary or contemporary activity that does not directly produce a physical product (Evans and Lindsay, 2008). One example of such a service is education: students consume a lesson (an educational service) at the same time that a teacher produces it. From these definitions, the service industry can thus be broadly defined as an industry that provides services rather than goods.

The North American Industry Classification Systems describes service organizations as firms that are primarily engaged in providing a wide variety of services to individuals, business and government establishments and other organizations (Evans and Lindsay, 2008). Services can range from simple activities such as handling complaints to more complex ones such as approving home mortgages. Other definitions emphasize that services are deeds, processes, performances, non physical objects activities, experiences, and solutions that have embedded value, and that these are the key factors in defining the service sector (Edvardsson, Gustafsson and Roos, 2005). In general attempts to define services focus on what the service does for the customers. These definitions have different meanings depending on how the services are viewed: using an objective way of portraying service or as a way of constructing services in terms of process (Edvardsson, Gustafsson and Roos, 2005).

In this study, a service is viewed as a process of constructing the service in terms of value creation, since process management is the key management practice under the TQM umbrella. The following evidence reinforces this view. Gustafsson and Johnson (2003) state that service organizations should create a seamless system of linked activities to solve customer problems or provide unique experiences. Consumers do not buy goods or services, but rather purchase offerings that render services, which create value.

The service sector plays an important role in the worldwide economy and society. Service industries play an essential part in the survival and growth of nations (Talib, Rahman and Qureshi, 2012). As a result of significant growth in the service sector, many service organizations have developed an enhanced focus on the efficiency and effectiveness of their working processes since the year 1990 (Phusavat and Kanchana, 2008). The growing pressure to improve efficiency and effectiveness in service organizations is one of the most constant challenges facing service organizations, which now find themselves in a full global recession (Suarez-Barraza, Smith and Dahlgaard-Park, 2012). Extensive external pressures to reduce costs, enhance flexibility and reduce lead times have led organizations in the service sector to learn about and implement TQM practices and methods (Suarez-Barraza, Smith and Dahlgaard-Park, 2012). In this competitive environment, TQM adoption is a proactive response due to its effectiveness in sustainable competitive advantage and business performance enhancement (Talib, Rahman and Qureshi, 2012). Implementation of TQM in the service industry requires the involvement of an entire organization. It is not simply the responsibility of top management; it also requires involvement by all staff. Management should establish an environment that facilitates the processes and encourages and involves employees in the implementation of TQM (Talib, Rahman and Qureshi, 2012). TQM has been applied to gain competitive advantages in various types of service industry (Antony et al., 2002; Owlia and Aspinwall, 1997; Woon, 2000).

3.2.1 Service organization characteristics

Previous research in the area of service characteristics has identified four basic characteristics that distinguish services from goods (Gronroos, 2001). These characteristics have differentiated service organizations from manufacturing organizations in their operational processes. The characteristics are: intangibility, inseparability (of production and consumption), heterogeneity (i.e. non-standardization) and perishability (Dean and Evans, 1994; Parasuraman, Berry and Zeithaml, 1991). In addition, these characteristics are found to be the most frequently cited characteristics of service and are utilized in operations textbooks (Edvardsson, Gustafsson and Roos, 2005). Other relevant characteristics, such as the absence of ownership in service purchases, have also been proposed (Edvardsson, Gustafsson and Roos, 2005). It should be noted that the characteristics are neither based on empirical research in an inductive way nor developed from previous research and theories in a deductive way. Their

selection is based on observations, anecdotes and practical experience (Edvardsson, Gustafsson and Roos, 2005).

These four service characteristics have certain implications for the implementation of TQM in service organizations (Prajogo, 2005; Sureshchandar, Rajendran and Anantharaman, 2001; Woon, 2000). For example, as services are intangible, they cannot be subjected to precise specifications for uniform quality and performance measurement. Also, the inseparability and heterogeneity of services means that there is less managerial control over quality, since the services cannot be tested and assured before delivery or standardized during the delivery. It is also difficult to predict, and hence influence, how a customer will perceive and evaluate service quality. These characteristics lead to difficulties in the management of service sector quality, despite the extensive knowledge about and proven success of the management of quality in the manufacturing sector. The four basic characteristics of services are discussed below.

3.2.1.1 Intangibility

Intangibility denotes that services are activities and not physical objects. The intangible nature of services often means that customers have difficulty evaluating and comparing services. As a result, they may use price as a basis for assessing quality and they may place greater emphasis on personal information sources (Edvardsson, Gustafsson and Roos, 2005; Ronnback and Witell, 2008). Often services cannot be seen, felt, tasted or touched before they are purchased. Some services may be characterized in terms of standardization through IT (e.g. internet-based and telecom services) or through machine-intensive service operations such as an automated teller machine. In terms of intangibility, it is difficult to develop output measures for services and to display or communicate them (Edvardsson, Gustafsson and Roos, 2005). Visualization of service is difficult because there is no physical form of goods to judge. Customers cannot look at the physical form of products before making their decision. Therefore, it is difficult to promote services. It is necessary for service quality to present evidence in order to tangibilize the intangible. In order to tangibilize a service, visible indicators such as the number of non-complained services delivered can be used (Ghosh and Ling, 1994). Managing intangible characteristics is difficult since these depend on employee performance, employee behavior and organizational culture. However, the value of the

intangible service may actually be tangible for a long time after the service is delivered (Edvardsson, Gustafsson and Roos, 2005).

3.2.1.2 Inseparability

As services are generated and consumed simultaneously, service firms cannot stock their products. As a result, they are not able to check their service provided in advance. This has the potential to lead to quality problems (Ghosh and Ling, 1994). The inseparability of production and consumption makes the interaction between employees and the customer an essential ingredient in the service experience (Edvardsson, Gustafsson and Roos, 2005; Ronnback and Witell, 2008). The use of the term inseparability may be considered to be an oversimplification of the concept. Inseparability can be seen mainly as a problem for the service organization rather than an opportunity (Lovelock and Gummesson, 2004).

3.2.1.3 Variability

Service quality is normally more variable than the quality of physical goods. Normally, either service providers or customers are involved in the service production and delivery process. Given that people are involved in providing the actual services in most sectors and that people are unlikely to operate as reliably and constantly as machines, it is often difficult to measure and control quality. Service quality usually depends on the employees producing the service (because services are processes, deeds, acts or interactions), the customers involved in the production of the service and the place where the service is offered (Edvardsson, Gustafsson and Roos, 2005; Ronnback and Witell, 2008). Therefore, the services that are delivered will naturally be heterogeneous. It is important to note that this service characteristic of variability offers an opportunity for service firms to differentiate their services based on varying customer needs (Ghosh and Ling, 1994).

3.2.1.4 Perishability

In most cases, services are produced by service providers and simultaneously consumed by customers. Services cannot be stored as physical goods for future time periods. Consequently, service firms tend to face difficulty in coping with demand variability (Ghosh and Ling, 1994). Given the intangible nature of services, perishability refers to the fact that services cannot be inventoried, stored, warehoused or reused (Ronnback

and Witell, 2008). Thus, the availability of enough opportunities for service delivery at relevant times is important for service managers (Edvardsson, Gustafsson and Roos, 2005; Ronnback and Witell, 2008). The perishability aspect of services often causes capacity problems and introduces uncertainty because of both task characteristics and task interdependencies (Edvardsson, Gustafsson and Roos, 2005).

Even though each service organization usually offers different services, efforts have been made to categorize service organizations. There is agreement among researchers that the four service characteristics are found in varying degrees among service organizations (Woon, 2000). Hence the various categories of service organizations should be differentiated in order to improve management and control. These categories can then be used to yield relevant results and suggest appropriate management systems (Woon, 2000).

A well-designed service process matrix such as the one presented in Woon (2000) (see Figure 3.1) can be used to categorize service organizations.

| | | | |
|----------------------------|------|---|----------------------|
| Degree of labour intensity | High | mass service | professional service |
| | Low | service factory | service shop |
| | | Low | High |
| | | Degree of interaction and customisation | |

Figure 3.1 Service matrix (Woon, 2000, p.324)

The matrix suggests that service organizations can be divided into four categories: mass service, professional service, service factory and service shop (Woon, 2000). These four service types are differentiated by the degree of labor intensity and the degree of customer interaction and customization. Service shops and professional services can be grouped as ‘service’ while service factories and mass services can be grouped as ‘manufacturing-oriented services’. The second group is given this title because its

nature is similar to that of manufacturing operations. In many cases, a service organization can be classified under two of these categories. For example, hospitals and universities can be categorized as both mass service and professional service. By differentiating these service categories, TQM can be tailored and applied more effectively, gaining more meaningful results and informing appropriate policies (Woon, 2000).

3.3 Quality management in the service sector

There are many types of service organizations in any society. These include: accommodation providers; establishments providing personal, business, repair and amusement services; health, legal, engineering and other professional service providers; educational institutions; and membership organizations (Evans and Lindsay, 2008). Based on the NESDB and NAICS classifications of the service industry, the scope of the industry used in this research includes Electricity, gas and water supply; Transport, storage and communication; Wholesale-retail trades and repairing; Hotels and restaurants; Financial intermediation; and Other services (Evan and Lindsay, 2008; NESDB, 2013). Service organizations such as hotels, restaurants, transport companies, freight forwarders, communication companies, banks, insurance business and financial institutions, radio and television broadcasting services, sports services, beauty salons, real estate servicing, renting, business services, education, health and public administration services are included in service industry. Within each type of service organization, there has been an increasing application of the concept of quality management in recent years (Evans and Lindsay, 2008; Waddell et al., 2009). The service sector did not recognize the importance of quality until several years after quality concepts had been implemented across the manufacturing sector (Evans and Lindsay, 2008), which may have been due to a lower level of competition from international trade in the service sector. Following the success of TQM in manufacturing, academics have begun to study the potential to transfer and apply TQM principles and practices to service organizations. Although product quality has been well studied in operation and business management, the visibility of service quality has increased only in recent years with the development towards a service economy (Oliva and Kallenberg, 2005).

3.3.1 Components of service quality management systems

If they are to stay competitive in the global marketplace, service providers must be able to increase their customer satisfaction level as well as manage their customers' service perceptions (Sivabrovnvatana et al., 2005). In general, there are two components of well-designed service quality management systems: employees and a system linking relevant information and technology (Evans and Lindsay, 2008). The first component, employees, is important because they have direct contact with customers, and customers evaluate a service primarily by the quality of human contact. Managing such intangible characteristics is difficult since it depends on a combination of employee performance, employee behavior and organizational culture. It is claimed that when service sector employees' job satisfaction is high, customer satisfaction is high and vice versa (Evans and Lindsay, 2008; Waddell et al., 2009). Two principles determined as having a strong relationship with each other in service organizations are process orientation and employee management (Nilsson, Johnson and Gustafsson, 2001; Ronnback and Witell, 2008), indicating that the human interactions and actual processes undertaken are closely linked. Successful service providers realize that managing employees is a very important aspect of their management (Prajogo, 2005). For example, at the company FedEx, all potential decisions are evaluated in relation to their impact on employees, service and profit. Reward systems should be implemented to recognize customer satisfaction results, customer focused behaviors, completed training, visionary management, exhibiting the appropriate skills to perform the job and supervisors who act more as coaches and mentors than as administrators (Evans and Lindsay, 2008).

In addition to employee considerations, technology and related information systems have been utilized by many types of service organizations to improve their performance and customer satisfaction. Intelligent use of information technology can also lead to improved quality, productivity and competitive advantage. This is true for integration of technology into both products and services (Kandampully and Duddy, 1999). With its ability to integrate computing, communication, data processing and various data-based means of converting data to useful information, information technology is essential in modern service organizations. One major benefit afforded by technology is the provision of faster access to better information, particularly when accessing customer records. To ensure that the desired benefits are achieved, technology should be implemented in association with an appropriate quality management system (QMS),

such as TQM, to assess and satisfy customers' expectations (Cook and Verma, 2002). Implementing technology and a quality management system like TQM can therefore improve service quality as perceived by both internal and external customers. This integration of technology and QMS should be an area of management consideration (Sivabrovnvatana et al., 2005).

Quality in service delivery deserves significant management attention as it assists companies to retain their loyal customers, and ultimately leads to profit. Even with higher unit costs, companies with loyal customers can financially outperform competitors that have higher customer turnover (Waddell et al., 2009). The common nature of service implies that it must respond to the needs of customer. This implies that service must meet or exceed customer expectations. These expectations must be translated into performance standards, which direct servicing activities. In the mid-1990s, many service firms have not made the effort to fully understand the nature of total quality and its potential benefits, and the effective implementation of quality practices (Waddell et al., 2009). Examples of service organizations with notable quality efforts include AT&T universal card services, Fedex and the Ritz Carlton Hotel (Evans and Lindsay, 2008).

3.3.2 TQM application in service organizations

TQM has been identified as one of the most important strategies for manufacturing, services and small-to-medium size enterprises (SMEs) and has become a prerequisite for success in the global market (Parast, Adams and Jones, 2011; Sila, Ebrahimpour and Birkholz, 2006; Talib, Rahman and Qureshi, 2011a). The focus of quality has moved from product defects to achieving customer satisfaction (Evans and Lindsay, 2008). The fundamental objectives of TQM, which are applicable to all industries, are to satisfy customers, prevent poor quality rather than a correcting problem, develop an attitude of continuous improvement, understand the value of measuring performance to identify opportunities and maintain improvements and eliminate chronic sources of inefficiencies and costs (Rad, 2006). The literature shows that TQM has been successfully adopted in manufacturing firms and with proven positive contributions to business success by increasing operational performance and achieving customer satisfaction. The application of TQM has been expanded to the service sector in recent years as the sector has become more important to economic growth (Moghaddam and

Moballegghi, 2008). Yasin, Kunt and Zimmerer, (2004) found service organizations are still lagging behind their manufacturing counterparts in terms of their strategic commitment to TQM. The service sector lags behind manufacturing in the adoption of TQM, this presents an opportunity for the service sector to learn from the mistake of TQM pioneers. There is still a shortage of TQM studies in the service sector in general (Brah, Wong and Rao, 2000).

In the early 1980s, there were efforts to study the key elements for successful transfer of TQM from manufacturing to service organizations such as hospitals and universities (Tsang and Antony, 2001). TQM began to be applied in service organizations in the late 1990s (Woon, 2000) and is now widely used in health care, libraries and educational institutions to improve quality performance (Evans and Lindsay, 2008; Mehra and Ranganathan, 2008). One of the reasons for implementing TQM in these types of organizations is an increased level of competition and the need to increase quality to compete and obtain a leading position within the sector. This is particularly true for Thai hospitals (Hasin, Seeluangsawat and Shareef, 2001) and Thai educational institutions (Sahney, Banwet and Karunes, 2010). Orientation towards quality and competitiveness in higher education in India has also started gaining the attention of policy makers, educational planners, administrators and the various stakeholders in the educational system (Sahney, Banwet and Karunes, 2010). Since TQM concepts have been favored in recent years (Prajogo, 2005), there has been a strong push for embracing TQM in other types of service organizations such as banks, hotels and telecommunication firms (Talib, Rahman and Qureshi, 2010) with the concept finding favor in recent years. This is largely due to broad recognition that quality management issues are strongly related to the performance of service firms (Talib, Rahman and Qureshi, 2012), and that productivity in the service sector has been considerably lower than in the manufacturing sector. Given general agreement that quality of life is the guiding principle for many people, TQM in service firms has moved to integrate consideration of their employees' and customers' quality of life concerns into their practices (Suarez-Barraza, Smith and Dahlgard-Park, 2012).

Although TQM is applicable to service organizations, there is a need to consider the specific organizational and contextual requirements when implementing the framework. There are many types of service organizations. Some service organizations are similar to manufacturing in terms of operation process (Prajogo, 2005; Woon, 2000). Although

it is widely believed that TQM concepts and principles are applicable to all business sectors, TQM's control and implementation concepts should be selectively practiced in both manufacturing and service organizations in order to turn TQM into an effective continuous improvement approach (Prajogo, 2005; Woon, 2000). To benefit from the implementation of TQM, service firms should selectively implement only essential tools and techniques that are well suited to the service sector (Prajogo, 2005). While TQM basics are not constrained to specific industries (Huq and Stolen, 1998), some TQM tools may be industry specific. It is claimed that TQM practices are applied selectively in service firms, as opposed to manufacturing firms in which the full range of TQM practices are usually applied (Huq and Stolen, 1998). Service firms also use fewer quality management tools, especially in relation to statistical process control (Beaumont, Sohal and Terziovski, 1997). While Singaporean service organizations were found to have a significantly lower level of TQM implementation than manufacturing organizations generally (Woon, 2000), there was no significant difference with respect to the elements of leadership, human resources, customer focus, mission statement, management commitment, empowerment and communications. This indicates that some TQM practices are generally applicable to all firms, regardless of whether they are manufacturing or service.

While the application of TQM to the service industry is now widely recommended, scholars have also noted several factors that can hinder the achievement of TQM in service firms. Firstly, the production of services is very different to manufacturing products which were the initial focus of TQM. These service differences include: customer needs and performance standards are often difficult to identify and measure, the production of services often requires a higher degree of customization, services are produced and consumed simultaneously, service offerings are often intangible, customers are involved in the process of producing services, services are usually labor intensive and service firms tend to have a massive number of customer transactions. In addition, several of the service characteristics mentioned in the previous section can have an impact on the transfer of the TQM principles, tools and techniques to service environments (Prajogo, 2005; Silvestro, 1998; Sureshchandar, Rajendran and Anantharaman, 2001; Woon, 2000). For instance, the most notable characteristics are the intangibility and heterogeneity of the outputs of services, which is in contrast to those in the manufacturing industry that are more measurable and standardized in their

specifications (Silvestro, 1998; Sureshchandar, Rajendran and Anantharaman, 2001). Therefore, factors that may be considered appropriate and effective for TQM implementation in the manufacturing sector may not be so in the service industry (Woon, 2000). In addition, employees and managers in most areas of organizations encounter difficulties in adapting to modern work environments created by TQM, with new rules and organization hierarchies. Structural problems (such as organizational culture) and performance appraisal problems (such as lack of reward systems and training programs) were the most commonly cited explanations for failing to return to work as scheduled and for absenteeism (Jun, Cai and Peterson, 2004; Rad, 2006). High turnover rates in service industry jobs have impeded quality improvement efforts in the sector, because this makes the establishment of continuous improvements more difficult.

On the other hand, the foundation doctrines of TQM are directly applicable and transferable to the service industry (Prajogo, 2005; Silvestro, 1997). It is widely believed that its principles are equally relevant to service organizations as TQM can be seen as inputs facilitating organizations to satisfy customers' requirements (Brah, Wong and Rao, 2000). For example, customer focus, error prevention, management by fact, human-oriented systems, continuous quality improvement, employee involvement and employee empowerment are common TQM management concepts that are broadly applicable to the service industry (Huq and Stolen, 1998). When implementing TQM concepts, TQM managers are expected to view quality as the measurement metric, continuous improvement as the philosophy and employee involvement as the approach. These concepts are applicable to all industries and they can be beneficial to any business sector. The literature suggests that the following practices are the critical success factors of TQM implementations in the service industry: top management commitment, continuous improvement and innovation, customers' requirements, employee involvement, teamwork, supplier quality management, process management, employee training and benchmarking (Kaynak, 2003; Sila and Ebrahimpour, 2002; Talib and Rahman, 2010; Talib, Rahman and Qureshi, 2011b). Most of these proposed factors are constructs considered in this research. Furthermore, common management practices of service organizations with successful quality programs include quality process structure, customer involvement, continuous communication of quality messages, training managers to push down decision making and integration of TQM with performance

evaluation (Brah, Wong and Rao, 2000). Therefore, despite the practical challenges of transferring TQM to the service sector, it can be seen that TQM has the potential for success.

Considering the increasing importance of the role of the service sector, it is important to examine the impact of TQM practices in this sector. Initially, both US and Japanese TQM experts developed concepts concerning quality management based on their manufacturing experience (Prajogo, 2005). Although the majority of existing TQM knowledge has been established based on quality management practices and experiences from the manufacturing sector, TQM experts and researchers suggest that TQM can be implemented in the service industry (Huq and Stolen, 1998; Woon, 2000; Prajogo, 2005; Talib and Rahman, 2010). Many of the TQM techniques that originated in manufacturing have been found to be easily transferable to service settings. Examples include hospital check sheets, histograms and statistical methods (Al-Zubi and Judeh, 2011). TQM has also become popular in all industry sectors for regular management activities (Hansson and Eriksson, 2003; Talib, Rahman and Qureshi, 2011b).

3.4 Cultures and TQM

Culture is pattern of a way of life in which people either act or behave in the same way or differ from each other in various areas. It is claimed that society is the source of culture, so therefore culture can reflect the society (Anantaworasakoon, 2003). Culture includes knowledge, beliefs, laws, morale, art, customs and any other capabilities and habits acquired by man as a member of society (Shokshok et al., 2011). It is asserted that cultural factors can have an impact on the success or failure of TQM implementation (Jung et al., 2008). For instance, the impact of national and organizational cultures on TQM implementation was examined by Ngowi (2000), who found that some organizational and national cultures may not be suitable for TQM adoption (Ngowi, 2000) (see Section 3.4.3 for a discussion of national culture and TQM). Moreover, a study by Rad (2006) showed the implication of cultural values on effective TQM adoption in a hospital in Iran. The findings concluded that a quality oriented culture is fundamental to TQM implementation. This quality culture can be achieved through a high level of management commitment and involvement, collaboration, organization learning, open communication, continuous improvement and monitoring and evaluation of quality. The quality culture constructs that are critical for

successful TQM adoption in the education sector were found to include shared vision, customer focus, long term focus, continuous improvement, teacher involvement, collaboration, decision making based on fact, process focus and quality at the same cost (Detert, Schroeder and Cudeck, 2003). While there are some commonalities in the critical success factors identified across organizations and even across industries, each organization's unique culture contributes to the success or failure of its TQM implementation.

3.4.1 Organization Culture (OC) and TQM

The concept of Organization Culture (OC) has been defined by different scholars in different ways (Kaluarachchi, 2010). OC can be defined as a system of shared values. It includes the general pattern of mindsets, beliefs and values that members of an organization share and which shape the behaviors, practices and other common thoughts of the organization that are easily observable. From the definition, it is evident that national culture is one of the main factors influencing organizational culture in each country. Consequently, culture is an explanatory variable that distinguishes one organization from another (Kaluarachchi, 2010). Therefore, OC is a pattern of shared values and beliefs that enables an organization's members to understand its functioning. It provides them with common norms for behavior in the organization. It has been suggested that OC can incorporate national, corporate and work cultures (Kuo and Kuo, 2010). Organizational culture, which is embedded in organizational design, can be used as a way to encourage coordination of employees, to develop organizational members and to establish socialization and information transfer within an organization (Kuo and Kuo, 2010).

OC may be similar to the TQM philosophy in some circumstances, but they are different. There is an undefined boundary between TQM as a set of management practices and TQM as an organizational culture (Prajogo and McDermott, 2005). An organization's culture reflects the combination of the various organizational characteristics and practices adopted, including TQM. Given the embedded nature of culture, there is usually extreme difficulty in changing it (Hofstede, 1990). On the other hand, TQM has its own set of cultural beliefs, norms, values and assumptions (Roney, 1997). TQM culture can be defined as an organizational value system that shapes an organizational environment and is favorable to the establishment and continual

improvement of quality (Goetsch and Davis, 1997 cited in Lam, Poon and Chin, 2006, p. 197). This system includes traditions, procedures and expectations of a commitment to quality improvement. Quality culture can influence the effectiveness of TQM implementation and organizational performance. A case study in vocational education in Hong Kong showed that there is a strong positive relationship between organizational learning capability, which is normally promoted and nurtured in learning organizations, and TQM culture (Lam, Poon and Chin, 2006).

Although implementation of TQM may affect the culture of an organization, organizational culture is more deeply embedded within the organization, reflecting a pattern of shared and stable beliefs and values that are developed within the organization (Prajogo and McDermott, 2005). It is asserted that employee perception, which is related to norms, values and beliefs in the organization, has a relationship with operational performance (Shields, 2007). TQM adoption involves being proactive in pursuing many TQM values such as performing the right activity in the right way and the first time, and committing to continue to perform tasks to the required level (Rahman and Laosirihongthrong, 2008). To achieve this, there must be a change in the organizational culture. In recent years there has been a shift of focus in TQM literature, moving from hard aspects (such as principles and tools) to the behavioral and cultural aspects of TQM (Prajogo and McDermott, 2005).

The impact of culture on TQM adoption is an important consideration. It is claimed that TQM has a positive and direct impact on business performance, and that corporate culture has a positive and direct influence on both TQM adoption and business performance (Kuo and Kuo, 2010). The literature addressing TQM and cultural impact shows that culture is a significant factor in determining the success or failure of TQM implementation (Shokshok et al., 2011). Although literature covering the impact of cultures on TQM usually places organizational culture as the antecedent of TQM practices, the adoption and implementation of TQM is related to organizational culture. It is evident that some organizational cultural characteristics such as conservatism and reformism have substantially effects on the awareness and applications of quality practices. In general, it is argued that successful TQM implementation fundamentally depends on organizational culture (Boggs, 2004; Kuo and Kuo, 2010). TQM requires visionary leadership, a major change of organization culture and efforts (Boggs, 2004). Since the success of TQM implementation relies on the prevailing organizational

culture, when implementing TQM in a particular cultural setting, the combination of the respective OC and TQM culture is important. To succeed in organizational transformation to TQM, employees must behave by following TQM values (Boggs, 2004). In other words, when implementing TQM, the organizational culture must reflect TQM values at all business level.

In order to identify the ideal organizational culture for TQM, it is necessary to investigate the implementation of TQM in relation to cultural factors (Baird, Hu and Reeve, 2011). Once the ideal environment for TQM adoption is understood, companies can focus their efforts on improving key aspects of their organizational culture that significantly relate to specific quality management elements (Jung et al., 2008). A study by Chung, Hsu and Tsai (2010) suggests that organizational cultures significantly influence the execution of TQM practices. The implementation of TQM strategies (such as cost leadership and differentiation strategy) also have a significant influence on the level of TQM practices, which in turn significantly influences quality performance, financial performance and inventory management performance (Chung, Hsu and Tsai, 2010). Moreover, it has been suggested that people-oriented, flexible and receptive cultures are more conducive to the success of TQM implementation (Tata and Prasad, 1998). Creating a culture where employees are valued and empowered also leads to successful quality management implementation (Westbrook and Utley, 1995 cited in Prajogo and McDermott, 2005). Furthermore, it has been suggested that TQM could be implemented more successfully in an open and human oriented corporate culture that is based on autonomy of the organization and human resource management (Kuo and Kuo, 2010). The prevailing organizational culture can support TQM by providing an environment that is advantageous to the successful implementation of TQM.

Literature has identified two competing arguments concerning the relationships between OC and TQM (Prajogo and McDermott, 2005). These are the unitarist and pluralist approaches. The first view argues that TQM is associated with a single 'homogeneous' culture. Underlying this 'unitarist' argument is a view that promotes TQM as a set of organization-wide practices that unify mindsets and perceptions among members of an organization. In short, the underlying principle in this unitarist view is that TQM thrives only in a single, identifiable culture. The unitarist approach considers TQM as a unidimensional set (or package) of practices that needs to be supported by one specific type of culture. This can be traced back to the fact that TQM was introduced by

different gurus in the form of a set (or package) of tools and practices (Prajogo and McDermott, 2005).

The ‘pluralist’ view, alternatively, supports the ideas of heterogeneity of various cultural dimensions on which TQM should be built. A key difference in this view is the argument that TQM also includes cultural elements which can promote control and standardization (Prajogo and McDermott, 2005). TQM should be considered as multidimensional, particularly in relation to the arguments that TQM incorporates both people-oriented practices and more rational control types of practices, which are incompatible with each other (Prajogo and McDermott, 2005).

To succeed in the TQM journey, there is a need to establish such practices as a customer focus and continuous improvement in organizational culture. The most challenging task is the effective establishment of organizational culture by developing a ‘quality’ attitude in service providers and creating a service-oriented mentality (Sivabrovnvatana et al., 2005). Firms still experience some issues in implementing TQM successfully and these difficulties in applying TQM can arise from cultural factors (Anwar and Jabnoun, 2006). Although the importance of organizational culture to ensure successful TQM implementation is evident in the literature (Baird, Hu and Reeve, 2011), there is a gap in the literature examining the association between organizational culture and the adoption of TQM.

3.4.2 Cultural dimension model

When studying the relationship between cultures and TQM adoption, researchers often discuss the following three models of cultural dimensions (Baird, Hu and Reeve, 2011; Kumar and Sankaran, 2007; Prajogo and McDermott, 2005; Shokshok et al., 2011): Hofstede’s cultural dimension model; the organizational culture profile (OCP); and the competing values framework (CVF).

Hofstede’s cultural dimension model (Kumar and Sankaran, 2007; Shokshok et al., 2011) is based on the assumption that people around the globe are guided and driven by different attitudes, believes, morals, customs and ethical standards. Societies have different traditions, religions and rituals, and have different views of family issues, work matters, social occasions and personal responsibilities. The model was developed in the hospital industry. Hofstede (2001) identifies national culture as the “collective mental

programming” that distinguishes one nation from another. It is an important determinant of work-related values and attitudes. He explains differences in national work-related value patterns in terms of five basic dimensions: power distance (PDI) (high versus low) and uncertainty avoidance (UAI) (high versus low); individualism versus collectivism (IDV); masculinity versus femininity (MAS); and short-term orientation versus long-term orientation (LTO). These five dimensions represent universal categories for characterizing national cultures (Hofstede, 2001). “Hofstede’s work on national culture is often described as landmark and is widely used as a theoretical framework for guiding cross cultural comparisons” (Lundberg, 2007 cited in Yeh, 2011, p.11). There have been many attempts to explain the influence of national cultures on TQM adoption using Hofstede’s cultural dimension model, for instance, a study by Jung et al. (2008) suggested that an organization’s TQM practices are significantly influenced by its organizational culture, which in turn stems from national culture. For instance, power distance influences all of the TQM elements, but masculinity has a positive impact on the business performance of TQM practices only (Jung et al., 2008). Furthermore, the relationships between the main elements of QA, TQM and the dimensions of national culture show that a culture of high power distance, high uncertainty avoidance, masculinity, collectivism and long-term orientation are suitable for QA adoption. On the other hand, low power distance, low uncertainty avoidance and femininity cultures are suitable for TQM implementation (Jabnoun and Khafaji, 2005). As mentioned in Chapter 2, TQM implementation in this research incorporates both QA and TQM components. To achieve conformance to the standards, QA efforts include supervision, inspection, control, and prevention. As a result, QA can be implemented more effectively in masculine and high power distance cultures such as Hong Kong, Philippines and Japan (Jabnoun and Khafaji, 2005). Moreover, QA focuses on designing and planning for quality using a highly systematic process. This requires a high level of formalization. A culture of high uncertainty avoidance is suitable for QA companies. The focus of planning also reflects the culture of long term orientation. Collectivism is also a suitable dimension for QA adoption (Jabnoun and Khafaji, 2005). In addition, continuous improvement is fundamental to TQM implementation. Cultures with low uncertainty avoidance and a low level of power distance are expected to facilitate continuous improvement efforts in TQ organizations (Jabnoun and Khafaji, 2005). Empowerment can also be seen more in the cultures of low power distance, low uncertainty avoidance and femininity (Jabnoun and Khafaji, 2005). Customer

satisfaction is related to empowerment and continuous improvement, which require a culture of low uncertainty avoidance, low power distance and femininity. Organizations with these cultural dimensions are more suited to satisfying customers (Jabnoun and Khafaji, 2005).

According to a contingency model of TQM implementation that is based on national culture (Anwar and Jabnoun, 2006), countries with a high power distance cultural dimension (such as Singapore, Hong Kong and Philippines) are suitable for QC practices because the quality control components focus on supervision, inspection and control. QA emphasizes planning for quality through a systematic system, so countries with high uncertainty avoidance (which normally reflects formalized structures) are good candidates for QA adoption. However, change programs can be used in countries with low uncertainty avoidance cultures to make TQM implementation achievable. Furthermore, continuous improvement demands a culture of quality commitment and learning, therefore implementation of this concept is more feasible in cultures with low uncertainty avoidance and low power distance. Total customer satisfaction necessitates teamwork and employees' empowerment to enhance organizational responsiveness. Countries with low uncertainty avoidance and a low power distance, which reflect a collectivist society, are suitable for implementation of this concept. Based on the above, it is clear that cultures impact on TQM implementation in various ways.

The second model of cultural dimensions, the organizational culture profile (OCP) (O'Reilly et al., 1991 cited in Baird, Hu and Reeve, 2011), can be used to assess person-organization fit. This model examines the specific dimensions of culture with the potential to separately affect the extent of adoption of TQM practices. Six dimensions of business units are considered in OCP: outcome orientation, attention to detail, teamwork/respect for people, innovation, stability and aggressiveness. Outcome orientation refers to the extent to which business units emphasize action and results, have high expectations for performance and are competitive (O'Reilly et al., 1991 cited in Baird, Hu and Reeve, 2011). Attention to detail is defined with respect to precision and accuracy. Teamwork and respect for people refers to the collaboration between employees and/or work units within an organization and the extent to which they focus on fairness, respect for the rights of individuals and tolerance. Innovation refers to a business unit's receptivity and adaptability to change and can be defined as the "willingness of the members of an organization to consider the adoption" of new

management techniques or initiatives. Stability and aggressiveness are not anticipated to influence the extent of adoption of TQM (Baird, Hu and Reeve, 2011).

The final model of cultural dimensions is the competing values framework (CVF) developed by Denison and Spreitzer in 1991 (Prajogo and McDermott, 2005) and presented below.

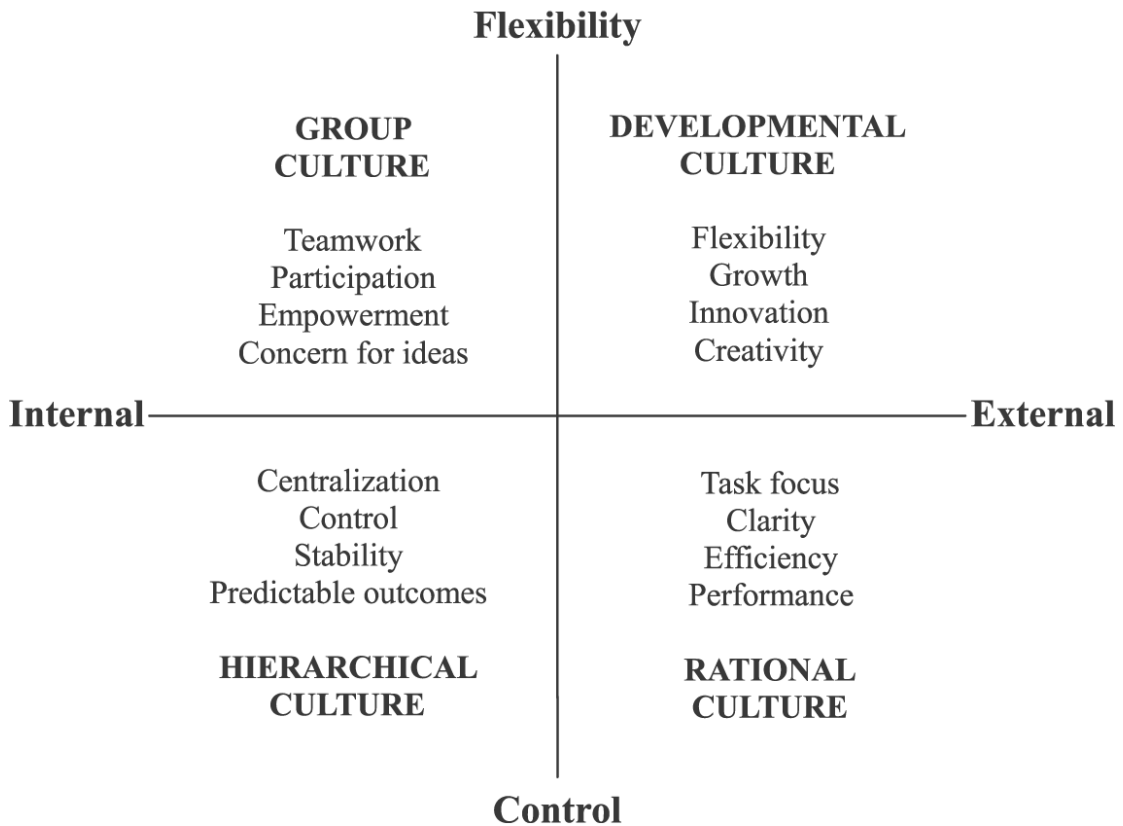


Figure 3.2 Competing Values Framework (CVF) (Prajogo and McDermott, 2005, p. 1105)

The first dimension in the CVF is the flexibility-control axis. It describes two contrasting orientations: one that reflects flexibility and spontaneity and one that reflects stability and control. The second dimension is the internal-external axis. It also describes two orientations: one oriented towards maintenance and improvement of the existing organization and the other focused on adaptation and interaction with the external environment (Prajogo and McDermott, 2005). The combination of the two dimensions results in four quadrants of cultural dimensions, namely: group, developmental, hierarchical and rational cultures. Group culture places emphasis on flexibility and internal organization. Organizations with emphasis on group culture promote the development of human resources and are concerned with openness,

participation, cohesiveness and commitment to membership. Development culture also emphasizes flexibility but with a greater focus on the external environment. The orientation is towards growth, stimulation of creativity, resource acquisition, innovation and continual adaptation to the external environment. Rational culture is also focused on the external environment but is control oriented. It emphasizes productivity, performance and goal achievement. One of its primary motivating factors is competition. The hierarchical culture is both control oriented and internal oriented. It emphasizes rules and regulations, with standardization used to achieve control and stability. The four cultures should be viewed as ideal types, with real organizations characterized as some combination of these four cultures (Prajogo and McDermott, 2005). Based on their study, Prajogo and McDermott (2005) suggested that diverse types of cultures can influence different types of TQM practices (Prajogo and McDermott, 2005). Specifically, the hierarchical culture was found to have a significant relationship with TQM practices.

3.4.3 National culture and TQM

Nation has invariably been used as a synonym for ‘culture’ where national distinctiveness has been interpreted as cultural differences. Culture can be defined as “a set of values, beliefs, common understanding, thinking and norms for behavior that are shared by all members of a society” (Mobley et al., 2005 cited in Kuo and Kuo, 2010, p. 618). Different nations may share the same common language, climate and religion, but differences in their distinctive norms and values separate them so that a certain nation can be represented by a certain national culture (Hofstede, 2001). The word ‘culture’ is rooted in the Latin word ‘cultura’ meaning ‘cultivating’. This implies that humanity can be cultivated and gain the benefits of that cultivation (Chulalongkorn, 2007).

In this study, national culture is defined as “the collective programming of mind which distinguishes one national group or category of people from another. Thus the interactive aggregate of common characteristics that influence a human group response to its environment” (Hofstede, 1980 cited in Anwar and Jabnoun, 2006, pp. 274-276). Assumptions and values that are formed by the experiences, events and history in a society are commonly seen as national cultures (Jabnoun and Khafaji, 2005). Shared values differentiate the behavioral patterns of people in one group from another. It is

asserted that cultures cannot be directly observed but they can be inferred from observed behavior and statements (Anwar and Jabnoun, 2006).

The concept of cultures has been documented in TQM literature. The proliferation of research studies on the definition and variations of national cultures can be seen in recent literature (Anwar and Jabnoun, 2006; Kumar and Sankaran, 2007; Noronha, 2002; Noronha, 2003). Every nation has its own independent historical and cultural background. The quality scenario, therefore, differs from one national setting to the other (Gauttam, 2010). National cultures influence the understanding of TQM in each country and also affect the operationalization of TQM in each country (Kumar and Sankaran, 2007). It is claimed that national cultures influence organizational culture, which then have a significant impact on organizational efficiency (Anwar and Jabnoun, 2006). The impact of national cultures on TQM is evident, with national culture recognized as a key factor in determining the success or failure of TQM adoption (Jabnoun and Khafaji, 2005). For instance, it has been confirmed that corporate culture and TQM have positive and direct influences on project performance in the Taiwanese construction industry (Kuo and Kuo, 2010). The study concluded that the effect of corporate culture on performance can be enhanced by TQM implementation (Kuo and Kuo, 2010). However, most studies have focused on the impact of organizational culture on TQM implementation, and the relationship between national culture and TQM has not been comprehensively discussed and explored (Noronha, 2002). One explanation might be that national culture does not directly affect TQM implementation and that national culture can be seen in the organizational culture of each country. In fact, national culture can affect organizational values, structures and member behaviors. This supports the explanation that national cultures impact on TQM implementation (Jabnoun and Khafaji, 2005). In addition, sociological theories state that the superordinate value system always defines the value orientation of the sub value system, which then formulates the operative codes that govern the making of policies, decision and actions. This implies that national culture operates as an influence on the organizational culture, which has a direct impact on TQM (Noronha, 2003). This thesis is concerned with the impact of national culture on TQM practices.

Organizational and national cultures are associated, and there are significant relationships between them (Shokshok et al., 2011). National cultural characteristics are deeply embedded in the members of a society and hence in the members of

organizations in that society. It is thus in people's artifacts or daily behaviors that these values are manifested. Numerous studies suggest that organizational culture is significantly influenced by the national culture in which the organization is located (Dastamalchian et al., 2000; Lindholm, 2000; Tata and Prasad, 1998). Companies cannot develop an organizational culture that differs substantially from the prevailing factors of the national culture (Shokshok et al., 2011). TQM failures have often been attributed to the direct implementation of techniques imported from other countries, which can be influenced by national culture, and this in turn has an impact on organizational culture (Noronha, 2003).

National cultures vary, and quality models such as TQM are subtle to the culture in which they are operating (Jabnoun and Khafaji, 2005). For example, Japan is legendary in quality management execution (Yeh, 2011). It is asserted that Japanese national culture, which exhibits higher levels of power distance, uncertainty avoidance, masculinity and collectivism, is ideal for TQM adoption (Yeh, 2011). It is evident that TQM is restricted by different national circumstances. TQM implementation is restricted by national markets where customers, firms and suppliers do not share the same quality culture. A literature review of national culture elements indicates that there are positive and negative influences on the implementation of TQM (Shokshok et al., 2011). Studies have identified the dimensions of national culture that influence TQM adoption. In an European study, Lagrosen (2002) suggests that power distance and uncertainty avoidance affects the TQM implementation approach in the four European countries studied (Lagrosen, 2002), and that TQM adoption is facilitated by an empowering and participative style of management. TQM ignores status distinctions and empowers employees to participate in making decision. As a result, cultures that are low on power distance and uncertainty avoidance should support TQM implementation (Chin and Pun, 2002; Tata and Prasad, 1998). Another cultural dimension that supports TQM implementation is collectivism (Kumar, 2006). Collectivists emphasize cooperation, endurance, persistence and obedience. They tend to have long-term commitment to the organization. The Japanese culture exhibits harmony among group members and respect for superiors (Khoo and Tan, 2003; Noronha, 2002). Japan has exploited this cultural trait for TQM implementation (Kumar and Sankaran, 2007). Moreover, successful TQM implementation requires the culture elements of a feminine society and long-term orientation (Shokshok et al., 2011). These cultural characteristics

support and facilitate successful TQM implementation. They must be dominant in any country and organization to achieve successful TQM implementation (Shokshok et al., 2011).

Literature suggests that there are some specific national cultural characteristics found to influence TQM embracement. Firstly, Confucianism, which emphasizes love for humanity, has been found to be useful for efficient implementation of TQM in Southeast Asian countries (Tan and Khoo, 2002). A study by Noronha (2003) found the Chinese values of abasement, adaptiveness, harmony with people, harmony with universe, interdependence and respect for authority can have important influences on the quality performance of organizations (Noronha, 2003). A study of the impact of Chinese cultures on TQM application with 90 managers from Hong Kong showed the importance of strong leadership through virtues, goodness, kindness, morality, favor or ethics. In order to have faithful followers, it was important for quality managers to act in accordance with the commonly accepted ethical values and principles governing the conduct of the group (Lo, 1999 cited in Noronha, 2002a, pp.66-67). Another important area was the ability to work in harmony through the creation of a well-balanced hierarchy in the company. This hierarchical relationship helped to identify the roles and responsibilities of every member, which in turn lead to mutual and complementary obligations and cooperation. These specific cultural characteristics were found to be related to TQM implementation from different points of view.

In each country, TQM implementations are influenced by the national environment (Anwar and Jabnoun, 2006) so TQM cannot be applied without the consideration of national culture implications. The cultural implications for TQM implementations have received scholarly attention in the literature (Anwar and Jabnoun, 2006), and the need to address the impact of national cultures on TQM implementation has been emphasized. There have been many reports of TQM failures due to the implementation of TQM techniques imported from foreign soil without the consideration of different cultural values. It is essential to formulate a TQM framework in line with the organizational and cultural modes of organizations (Shokshok et al., 2011). TQM can be implemented in any cultural setting but its success depends on how the concept is fused with the relevant national and organizational cultures (Noronha, 2002). For instance, a study by Parast et al. (2006) identified the importance of social responsibility and supplier quality in a comparison of TQM implementations in organizations in USA and Mexico. These

are the main factors that differentiate the achievement of quality results between the two countries. Social responsibility can be viewed as a reflection of national culture, thus cultural implications require management attention as part of the adoption of TQM. A positive outcome depends on successful fusion of all three cultures (national, organizational and TQM) to achieve optimal hybridization. Optimal hybridization is achieved when the particular cultural systems come into contact with the others, leading to a new system incorporating the advantages from the systems (Noronha, 2003).

3.5 TQM, CSFs and Cultural Impact

TQM is an integrative organization-wide philosophy that is concerned with continuous improvement of the quality of products/services and processes in order to meet or exceed customer expectations (Prajogo and McDermott, 2005). As discussed in Chapter 2, the literature indicates a significant positive relationship between quality management practices and organizational performance. Although some firms have achieved success from adopting quality management, there are examples of organizations in USA, Australia and UK that have not received tangible results (Baird, Hu and Reeve, 2011). Thus, effective TQM implementation remains an important problem for many firms around the world (Khanna, Sharma and Laroia, 2011). This is particularly true in the Thai service sector. The mixed results regarding TQM practices raise the need to identify and examine factors that contribute to TQM success. Effective TQM implementation involves defining and deploying CSFs (Khanna, Sharma and Laroia, 2011). Prioritization of the CSFs of TQM remains a problem for decision makers. It has therefore become common practice to select and adopt a process cautiously (Khanna, Sharma and Laroia, 2011).

There is no universal model of quality transformation and any model of implementation should be culture specific (Naronha, 2003; Roney, 1997). It is asserted that the prevailing culture of an organization can be managed to support TQM by providing an environment that is conducive to its successful implementation (Evans and Lindsay, 2008). A TQM culture can be defined as one which “uses teams, promotes pride in workmanship, drives out fear, allow participative management, promote leadership in place of supervision, and promotes long term orientation among members of the organization” (Baird, Hu and Reeve, 2011, pp. 789-790).

There is a gap in the empirical literature examining the association between organizational culture and the adoption of TQM practices (Baird, Hu and Reeve, 2011). Noronha (2002) suggests that empirical studies on the association between national culture and organizational quality climate in specific cultural settings are indeed required. In this research, despite the connection between organizational culture and national culture, organizations still develop their own individual cultures derived from the particular characteristics and experience unique to the organizations (French, 2010). Therefore, there are differences in cultures of public and private hospitals/universities in Thailand. However, both public and private organizational cultures are impacted by Thai cultural characteristics. Thai cultural characteristics are commonly observed in Thai people working in both sectors. One of the objectives of this study is to examine the cultural characteristics specific to the Thai culture and the influence of these Thai cultural characteristics on TQM practices. Organizational culture is treated as an antecedent of TQM in this study. Since the relationship between Thai cultural characteristics and TQM practices remains unclear, this study will investigate the relationships between cultural factors and CSFs.

A review of TQM practices in Thailand shows that little empirical research has been conducted in the area of TQM implementation. Although the service industry is important to the economy, accounting for almost 50% of aggregate production (World Bank, 2012b), most TQM studies have focused on the manufacturing industry. As a result, this study will focus on Thailand's service industry and will seek to generalize about TQM practices in Thailand. Due to the time and financial constraints of this study, research will be restricted to the university and hospital sectors. It is expected that these sectors will represent the service industry in general for the purposes of this research.

The King of Thailand, Majesty Bhumibol Adulyadej, asserts that "education is a major factor to create and develop a person's knowledge, ideas, behavior and merit. Any society and country should provide good, complete and well-balanced education, covering all aspects, for the youth so that the society and country will have qualified citizens. They will be able to sustain the country's prosperity and to develop the country progressively" (ONESQA, 2012). It can be seen that quality improvement in education can lead to the development of people, societies and the whole country. The university sector has acknowledged the importance of quality management for decades, with

quality assurance systems currently an important area of discussion for higher education institutions (Pitiyanuwat, 2011). There is an increasing interest in quality and standards globally, reflecting both the rapid growth of higher education and its cost to the public and the private purse (Salameh, Alzyadat and Alnsour, 2011). One of the goals of the Association of Southeast Asian Nations (ASEAN) is to facilitate establishment of practices that allow free flow of education in the region by 2015 (Pitiyanuwat, 2011). ASEAN universities are currently engaged in the urgent establishment of quality standards to facilitate mutual trust between the nations involved. Thai universities have been aware of the issue of quality improvement since 1990. This can be seen from the Eighth National Higher Education Plan 1997-2001 which lists one of the six main policy directions as quality and excellence. To control quality across the Thai higher education sector, the Office for National Education Standards and Quality Assessment (ONESQA) was established in November 2000. It serves as an independent body for compulsory accreditation and undertakes external assessments of education at all levels. Assessment of the quality of higher education incorporates a diverse set of characteristics including the quality of professors, campus facilities and positive contribution of the institution to a student's future career (Salameh, Alzyadat and Alnsour, 2011). The Thai university sector has practiced TQM in many forms. This can be seen from many public universities such as Chulalongkorn University, Mahidol University and Songkla Rajabhat University that have been awarded the Thailand Quality Award (TQA) and certified for ONESQA as well as ISO certifications.

Hospitals are now realizing the importance of service quality as a means to improve their competitive position. Service quality plays an important role when choosing a hospital (Lim and Tang, 2000). As competition within this industry intensifies, hospitals have become increasingly aware of the acute need to cap rising operating costs and meet (or even exceed) a higher level of expected patient care quality (Chua and Goh, 2000). Many hospital administrators are faced with the challenge of learning how to lower operating costs without compromising on the delivery of consistent quality care to patients. Quality management practices continue to evolve and the healthcare industry must incorporate these new practices in order to operate and remain competitive in the market. In response to incomplete consumer information, market distortions and supplier-induced demand, it is evident that leaving healthcare to a free market mechanism does not lead to an effective and efficient health system in Thailand

(Teerawattananon et al., 2003). Thai health regulations are comprehensively designed to cover both public and private organizations within the Thai healthcare system. However, quality performance issues such as inefficient human resource management and ineffective process management in hospitals still occurs across the Thai healthcare system (Teerawattananon et al., 2003). To improve quality performance in the hospital sector, many quality standards are pursued by Thai hospitals. The standards include ISO certification, hospital accreditation (HA), health promoting hospital (HPH), Thailand quality award (TQA) and Malcolm Baldrige award. The Ministry of Public Health of Thailand encourages all hospitals to pursue the HA standard. In Thailand, there are a total of 1303 hospitals. Of these, 225 hospitals hold HA accreditation and 64 hospitals hold HA-HPH accreditation (Sanguanchua et al., 2007). A study of the integration of HA showed that knowledge, core values, criteria and empowerment approaches are keys to establishing a sustainable, health-promoting hospital (Sanguanchua et al., 2007).

A review of the TQM literature suggests that the greater the extent of TQM efforts, the higher the quality performance of the organization. This research aims to examine CSFs in the university and hospital sectors of the service industry in Thailand. Using employees' perceptions, the level of CSF adoption in these sectors will be identified. While some quality management practices have already been embraced by these sectors in Thailand, management attention to the CSFs is still lacking. This research will also explore how Thai cultural characteristics impede or support the implementation of TQM. It is important to note that public and private organizations are different in nature and are faced with different environments. Therefore, public and private organizations have adopted TQM in different ways to suit with their environment and structures. However, the review of the literature in Chapter 3 suggests that TQM is applicable across the service industry, including both public and private organizations. Thus, in this research, CSFs of TQM implementation are applicable to all service organizations including both public and private sectors. In fact, the questionnaires adapted by this research are developed for industry sectors in general, including both public and private organizations (Woon, 2000).

3.6 TQM in hospitals

3.6.1 Overview of TQM in hospitals

Since 2000, the healthcare industry has faced extreme pressures, both internal and external, to change the way it operates and to improve performance (Brashier et al., 1996). These have come in the forms of increased government intervention, fierce market competition, health public policies, pressure from insurance companies, increased customer expectations and the rising cost of healthcare (Aly and Mack, 1993; Wardhani et al., 2008). Additional pressures have arisen from rising employee turnover rates, an increase in the number of lawsuits due to poor medical outcomes, and the identification of hospitals' internal efficiencies leading to external performance appraisals of the healthcare industry (Brashier et al., 1996). These constant pressures are forcing hospitals to increase their efficiency and effectiveness to remain profitable. These forces, which previously drove the manufacturing sector to embrace TQM, are now pushing hospitals toward TQM; this is also commonly known as continuous quality improvement (CQI) (Huq and Martin, 2000).

With pressure from the healthcare industry and accreditation commission, many hospitals have applied TQM/CQI to enhance their competitive position (Brashier et al., 1996). For instance, the TQM approach and methods of continuous quality improvement have been implemented in the US hospital sector as part of the accreditation requirements established by the Joint Commission on Accreditation of Healthcare Organizations (Aly and Mack, 1993). This has created challenges for hospitals as they reconsider their operations and seek more efficient ways of doing business. In such a competitive environment, hospitals must ensure that their services are optimally designed to offer the best care at the lowest cost. In Thailand, before 1994, many quality improvement tools including quality control circles and the 5S were adopted in several public and private hospitals but after trying them, many hospitals lost their interest in these tools (Sriratanaban, 2011). Since 1994, some public hospitals have implemented TQM and continuous quality improvement projects with support from government (Sriratanaban, 2011).

TQM is seen as a strategy to improve patient satisfaction, employee morale and quality patient care as well as to decrease the cost of services in hospitals (Huq and Martin, 2000). It has been asserted that TQM or continuous quality improvement is required in the healthcare industry (Aly and Mack, 1993). The current direction toward TQM represents a paradigm shift which varies significantly from the way the healthcare industry has been run. To ensure successful TQM adoption, quality change initiatives are required (Wardhani et al., 2008)

US healthcare organizations have approached TQM from various starting points. In the late 1990, TQM adoption in many US hospitals was based on the teachings of Juran, the Deming Management Method, the readings of Crosby and on the quality concepts of Peters, Albrecht and Zemke, all of whom are concerned with service-oriented TQM. Some hospitals decided to use TQM consultants to educate them on TQM concepts and practices, and many hospitals have chosen to apply the concepts slowly. These hospitals tend to focus on non-employee quality improvement practices such as housekeeping, billing and purchasing. However, to succeed in their TQM journey, this focus must shift to patients, so the hospitals can understand patients' expectations and discover what is important for them. Patient satisfaction must be continuously achieved and increased (Brashier et al., 1996). Moreover, although healthcare sector management have actively adopted TQM, other key staff members including employees, physicians and nurses have low enthusiasm for it and see it simply as a passing area of management interest (Brashier et al., 1996). Despite their lack of support for the TQM concept, it is widely accepted that physicians are committed to providing quality service to patients (Brashier et al., 1996). Physicians must be managed differently from other workers; management cannot tell them how to perform their work.

There are some considerations that differentiate TQM adoption in the healthcare industry from TQM in other industries. The healthcare workforce is divided into many distinct functions so tasks require cooperation and communication between various professional employees across different departments. Individual tasks can flow across different departments in many ways. Patients often require individual treatment, so it is therefore difficult to describe the journey of patients in the same way as it is possible to describe manufacturing production lines. Nurses cannot be managed in the same way as assembly line workers because patients' situations vary. The healthcare industry is highly regulated and this regulation can impede TQM improvement activities. In

addition, the main focus of the healthcare industry is quality so quality improvement efforts are required. Lastly, it has been suggested that “typical TQM catchphrases such as zero defects, statistical process control and error free performance” should not be used when attempting to persuade healthcare professionals to engage in TQM, because they will not accept being treated as assembly line workers (Warner, 1991 cited in Brashier et al., 1996).

Hospitals implementing TQM encounter four main challenges (Aly and Mack, 1993). The first challenge is the commitment to quality efforts by healthcare professionals. Secondly, it is difficult to define who constitutes a customer. Customer focus components of TQM aim to attract and retain customers. However, in the hospital context, both new physicians and patients may be viewed as customers. Thirdly, quality of service depends on how hospitals define quality. Measures of quality may include quality as perceived by hospitals providing medical processes. Hospitals can be evaluated based on financial/cost control and patient satisfaction indices. However, total quality is viewed as customer perceived quality. Patients’ ability to measure quality is a controversial issue. While patients are not technically qualified to judge the quality of the care they receive, they often make a judgment. It is also important to note that the level of service quality may decrease if a patient does not follow the medical advice given. The fourth challenge is concerned with how to manage and define processes with Statistical Process Control (SPC) techniques in a hospital setting (Aly and Mack, 1993). TQ firms emphasize the use of SPC tools to assist in managing processes as well as measuring and controlling quality improvement efforts in healthcare. Although it is difficult to directly and fully apply the exact TQM tools in the healthcare setting, there is evidence to show that hospitals have applied flowcharts, fishbone diagrams and Pareto charts with success (Aly and Mack, 1993).

3.6.2 TQM adoption and organizational change

The main objective of TQM is for all organizational members to apply continuous quality improvement to all their activities and functions and to hold a fundamental belief in the importance of achieving total customer satisfaction (Huq and Martin, 2000). Therefore, in the Nakornthon Hospital setting, the board of directors, hospital administrators, physicians, management team, nurses and employees are all required to embrace the TQM philosophies and to develop a culture that supports quality

improvement. It can be seen that TQM implementation involves an organizational transformation incorporating new behaviors, values, roles, expectations and relationships. Thus, TQM implementation can be considered as a paradigm shift in how organizations' tasks are accomplished.

Change management is important for successful TQM implementation in hospitals (Wardhani et al., 2008), which requires fundamental change in management strategies and cultures (Aly and Mack, 1993). Change can range from the process of dealing with patients and suppliers, to physician involvement, to nurses' and employees' responsibilities in process management. The implementation requires support for and change in organizational infrastructure (Wardhani et al., 2008). TQM requires a change in an organization's technology, philosophy and the way work gets done. In hospitals, this can be seen as the way patients are processed. Hospitals should examine how their services are applied to patients. The change in organizational culture required by TQM is necessary to reflect new organizational standards, beliefs and values in doing business. TQM also requires a change in the organization political system, specifically decision making processes and power bases. For successful TQM implementation, technological, cultural and political change must be aligned and attended by management and leadership (Wardhani et al., 2008). A supporting organization culture and quality system can facilitate the TQM implementation process.

When moving to adopt the TQM paradigm, organizational members need to accept new quality perspectives. TQ hospitals must review their emphasis, moving beyond correcting present deficiencies, eliminating errors and meeting current standards, to creating an organizational culture committed to continuous improvement and learning. Through the adoption of TQM, organizations come to be viewed as open systems where participative management is emphasized. Strategic leadership should be used to support the explicit focus on internal and external process improvement (Huq and Martin, 2000). Basic internal processes need to be changed as the TQM paradigm is implemented. This is true in the hospital sector, with TQM adoption requiring a change in hospital processes (Huq and Martin, 2000). People are a key component of organizational change, highlighting the importance of social components and the need for management to be aware of and plan for social challenges during a TQM implementation process. If the hospital culture is unable to accept the changes required by TQM, it is likely that TQM adoption will fail. To resolve such issues, the

organizational structure may be changed, leading to better identification and improvement of processes. TQ hospitals can use quality result information to analyze processes. Empowering employees and creating cross-functional teams for quality improvement can encourage continuous learning (Huq and Martin, 2000) as well as address social challenges.

From the above it is evident that a change in organizational culture is a consequence of any TQM implementation. The role of organizational culture is discussed in the following section.

3.6.3 A supportive culture for TQM implementation

It has been asserted that organizational culture (i.e. the workforce cultural situation) is one of the most significant influencing factors and main obstacles in the implementation of TQM in hospitals (Huq and Martin, 2000; Wardhani et al., 2008). In regards to TQM, organizational culture can be defined as the collective beliefs, attitudes, values, norms and behaviors of the organization's members, all of which influence the organization's TQM adoption process (Wardhani et al., 2008). Organizational culture also incorporates the pattern of basic assumptions that a group has invented, discovered or developed in learning to cope with its problems of external adaption and internal integration. These assumptions are those that have worked well enough to be considered valid, and therefore are taught to new members as the correct way to perceive, think and feel in relation to those problems (Schein, 1992 cited in Huq and Martin, 2000, p. 47). It can be seen that each organization's culture is continuously developed and the perceptions of organizational members are hence constantly evolving. Investigating the impact of cultural factors provides an opportunity to increase academic understanding of successful and failed TQM implementations (Huq and Martin, 2000).

To build an environment that supports TQM implementation there is typically a need to change the prevailing organizational culture and structure to support continuous improvement based on TQM objectives (Wardhani et al., 2008). Management has to create a working culture in which employees can embrace TQM practices more effectively (Huq and Martin, 2000). Each organizational culture is individual, dominant and unique. It consists of various powerful subcultures that influence behaviors, operations and relationships in the organization (Huq and Martin, 2000). Cultures influence the boundaries and direction of behaviors and movement in organizations so

they therefore dictate the acceptance or rejection of all organizational paradigm change (Huq and Martin, 2000). Organizational culture determines accepted behaviors in the organization, establishes ways to solve organizational problems, and describes the relationships and the processes to accomplish work. Therefore, organizational culture reflects a set of learned consequences based on behaviors (Huq and Martin, 2000). If employees hold underlying assumptions that allow them to accept TQM concepts and engage in TQM practices, this will result in successful TQM implementation in an organization.

Creating a culture that is favorable and supportive to TQM adoption is one of the frequently mentioned obstacles faced by organizations attempting to embrace TQM. To do so, organizations must be able to link the organizational components and behaviors to TQM concepts and demonstrate the contribution of quality improvement efforts to total quality improvement. It is important for management to ensure that the establishment of an appropriate TQM culture is supported. “When the new culture is established, it becomes pervasive, generally is passed on from one generation to the next and changes slowly if at all” (Huq and Martin, 2000, p. 45).

TQM is a people-based system; its success is therefore closely linked to the cultural environment in the organization (Huq and Martin, 2000). The key success factors for organizational culture that allow TQM adoption in hospitals have been identified as a focus on standards achievement; attitudes of affiliation, teamwork and innovation; the assumption of change; and risk taking behaviors (Wardhani et al., 2008). A study by Huq and Martin (2000) identified eight workforce cultural factors influencing TQM adoption in hospitals. These are:

1. *Familiarity with TQM concepts*

In order to start implementing TQM, familiarity with TQM concepts is important. Managerial staff play a role as TQM drivers in the hospital, so management should be educated about TQM concepts (Huq and Martin, 2000). Physicians, nurses and other support staff must also be familiar with these concepts. Without participation and involvement from all members, it is hard to achieve successful implementation. Considerations require knowledge about all activities in all functions to allow the implementation of a thorough

transformation process that meets customer expectations. Familiarity with the various quality tools, techniques and other elements that are required for successful implementation needs to be embedded as the predominant attitude within the hospital. In order to become familiar with the concepts, hospitals can use the services of consultants to educate top and middle management as well as other staff.

2. Measures of costs of quality

Measuring the cost of quality behaviors can build employees' knowledge of quality costs. Measuring the cost of quality knowledge in terms of prevention, appraisal, internal failure and external failure costs can modify employees' behaviors toward patients and the care processes, each of which influences the cost of a quality culture (Huq and Martin, 2000). Any measurement should include the costs associated with conformance to the requirements of the regulatory agencies including ongoing inspection and review costs.

3. Employee empowerment

Empowerment can be used to build ownership of the process and commitment to its continuous development. "Empowered employees must have: authority, responsibility and accountability; the skill, experience and understanding of task requirement; motivation commitment, confidence and willing attitude" (Huq and Martin, 2000, p. 46). The process of empowerment typically involves the establishment of an employee suggestion system and quality teams to improve the patient care process (Huq and Martin, 2000). Broad employee empowerment does not naturally result from employee membership on quality improvement teams because often a limited number of employees are involved. The lack of empowerment, involvement and participation by employees and physicians represents an obstacle to TQM implementation.

4. Performance appraisal systems

Hospitals can choose to use both activity-oriented and results-oriented measurement systems. The measuring objectives of the selected system need to

be consistent with the main TQM concepts in regard to total customer satisfaction. 85 percent of TQ firms reward individuals and teams for quality achievement. Reward systems that place employees in competition against each other for rewards that are drawn from a fixed pool may undermine the internal customer relationship. Employees lose sight of the larger picture of organizational goals when specific outcomes are rewarded. It is recommended that management should apply a group reward system based on profit or gained market share.

5. *Commitment to continuous improvement*

Sustained improvement depends on the commitment and participation of everyone involved. To stay competitive in this current environment, hospitals have to provide superior care while reducing operational costs. This can be achieved through collaboration, communication and commitment (Huq and Martin, 2000).

6. *Problem solving culture*

To practice a problem-solving approach, the four-step team approach has been proposed. It uses teamwork to identify a problem, generate solutions, evaluate alternatives and reach consensus in decision-making. It is important for all organizational members to recognize that problem solving is a responsibility shared by everyone. This attitude can create a culture of problem solving. Employees must be trained to collect quality related data and analyze it in order to generate and evaluate possible solutions (Huq and Martin, 2000).

7. *Removing barriers to achieve consensus*

Prior to seeking consensus, it is important for all team members to have the opportunity to present their opinion. This allows everyone to understand the options and facilitate the process of reaching a consensus where all participants support the decision. If there is consensus in the decision, all members should be willing to work toward its success.

8. *Education and training about TQM concepts*

To successfully implement TQM, employees require three basic types of training: instruction in TQM concepts; specific skill training (i.e. statistical process control application); and interpersonal skill training (e.g. to improve problem-solving abilities). Poor education and training is noted as a major obstacle in quality development in hospitals (Huq and Martin, 2000).

Removing barriers to the establishment of a culture that supports TQM has to be considered when developing a TQM implementation framework (Huq and Martin, 2000). To change the hospital culture, hospital management can commence by focusing on quality improvement in patient outcomes and the patient care process (Huq and Martin, 2000).

3.6.4 TQM implementation in hospitals

There is no diagram, model or framework that provides a guaranteed path for TQM implementation success (Brashier et al., 1996). There is also a lack of cases that provide knowledge on TQM implementation in service firms (Aly and Mack, 1993). Despite this lack of available guidance, more and more hospitals are willing to leap into the unknown, face the challenges and reap the rewards of high quality and cost effectiveness. It is ambiguous to assert that TQM can be well implemented in both public and private hospitals, whether large or small (Wardhani et al., 2008), using a similar approach. Similarly, failure of TQM adoption might not come from systematic differences in the concept and hospital culture, but rather from inappropriate implementation.

TQM implementation incorporates complex and continuous change processes that need to be measured in relation to the progress of continuous change processes. Stories of both success and failure of hospitals' TQM adoptions can be found, with a failure rate of 60 to 67 percent quoted in the literature (Huq and Martin, 2000). It is widely accepted that the main reason for failure is an ineffective implementation system (Huq and Martin, 2000). There is a need to study TQM implementation to reduce the gap between success and failure.

Although there is no diagrammed path for successful TQM adoption, some common elements can be seen in most TQM efforts (Brashier et al., 1996). These are: top management leadership; teaching by example; educating employees about quality

concepts; early involvement of physicians in the TQM implementation process; focusing on the customer; forming cross functional quality teams and recognizing their successes; naming the process for organizational commitment; differentiating TQM practices from TQM efforts of other industries; involving human resources; expecting pitfalls and cultural change; effective performance measurement; proper rewards and recognition; and encouraging and seeking feedback from all affected areas in the organization (Brashier et al., 1996). Two basic strategies can be used to implement quality management systems (including TQM) in the hospital sector. The first strategy involves applying TQM in selected departments (such as obstetrics, cardiopulmonary, pharmacy, nursing, maintenance, operations, and clinical areas) to improve quality performance, followed by dissemination to other departments (Brashier et al., 1996; Wardhani et al., 2008). This strategy is low risk and provides examples of improvement in a short time. The provision of success stories using internal examples tends to increase TQM acceptance by other hospital parties. The second strategy involves adoption of TQM across the whole organization. This strategy begins by creating awareness and preparing the infrastructure for the new quality approach (Wardhani et al., 2008).

There are a number of critical success factors for successful TQM implementation in hospitals. These include:

- *Visional leadership of quality*

Leadership is an enabling and supporting factor for TQM adoption and the success of quality long term improvement depends on it (Aly and Mack, 1993; Wardhani et al., 2008). In the hospital environment, leadership is not restricted to the quality improvement efforts of top management. Leadership in this context incorporates top management, middle management, the governance board, senior physicians, voluntary physicians and senior respected nurses (Wardhani et al., 2008). Support from top management and senior physicians is important to enhance bottom up quality actions. Evidence of positive leadership behaviors should be encouraged at many levels including the CEO, board of directors, medical staff leaders and departmental leaders. To begin the TQM implementation process, each area of management must define quality products or services from their perspective and determine how the standards will be

achieved (Brashier et al., 1996). Once this is established, management should decide where to start the TQM implementation. The provision of support to enable the entire workforce to participate in quality improvement efforts is a key in developing TQM culture (Huq and Martin, 2000).

- *A competent quality leader*

Quality leaders are responsible for planning, scheduling, conducting training, so their competency is essential for success (Aly and Mack, 1993). They act as quality consultants and facilitators for everyone in the organization, empowering staff during the implementation process and coaching senior management. Quality leaders require extensive training in quality concepts and tools as well as experience of operations in hospitals. There are many roles that quality leaders assume including acting as a role model to demonstrate TQM behaviors, directing the hospital through the establishment of a quality vision statement, putting quality at the top of every management agenda, deploying quality goals in the organization, and managing the processes that will evaluate the TQM implementation process and determine when TQM is fully embedded across the organization.

- *A quality council and structure*

The quality council is a formal structure for quality leadership in hospitals. The council membership should include the quality leaders, physicians and administrative representatives (Aly and Mack, 1993). Quality council members are responsible for planning, directing and supporting TQM, and for reviewing and rewarding quality teams (Aly and Mack, 1993). Basing reward and incentives on actual information and supporting employee empowerment can be taken as a first step to create a culture that supports the implementation of TQM (Huq and Martin, 2000). A broader organizational structure to support both quality and technical capabilities is also necessary. This structure may include the presence of quality improvement physicians and nurses, a quality department, a quality assurance department, full time quality staff and a budget allocation for quality improvement (Wardhani et al., 2008).

- *Develop a clear quality vision and strategy*

A clearly articulated and communicated quality vision and strategy can maximize involvement, support and ownership by all organizational members (Aly and Mack, 1993). Through evaluation of the available quality management systems (such as Deming philosophies, TQM, TQC, QA, QCC), it is possible to select the strategies that best fit the hospital's culture, people and needs. Selection of strategies must also incorporate consideration of how feasible it is to implement them. Promoting the hospital's quality vision and strategy prior to delivering education and training about quality management technical skills can help to diffuse awareness about quality across the organization (Wardhani et al., 2008).

- *Physician involvement*

Physicians play a vital role in hospitals (Brashier et al., 1996; Wardhani et al., 2008), and should be engaged in the TQM development process as early as possible (Aly and Mack, 1993). Their roles, such as quality team leaders and facilitators, should be defined early in the TQM adoption process to encourage them to be true leaders of TQM, with their participation efforts focused on improving quality in clinical service. Physicians may participate on the quality council, in TQM training and on quality improvement teams. However, it is essential that physician involvement be closely managed and clear boundaries assigned, with power conflict between management and physicians found to be a barrier to TQM adoption in the hospital sector (Wardhani et al., 2008).

- *Customer focus*

Customer focus is one of the main principles that is widely applied in TQ organizations. Both internal and external customers need to be identified and satisfied (Aly and Mack, 1993; Brashier et al., 1996). Therefore, the goals of any TQM program should be created accordingly (Brashier et al., 1996). Patient surveys can be used to monitor customer satisfaction and indicate yearly improvement. Hospitals should attempt to meet and then exceed customer expectations. However, the relationships between customers and suppliers in

hospitals are complex. Many TQ hospitals have focused their attention on patients (Aly and Mack, 1993). Although patients are not qualified to judge the quality of a professional service, patients' feedback concerning their expectations can lead to improvement in hospital care. In the past, the hospital processes were designed to satisfy professional staff. This move to a customer focus can help identify quality issues in the process and address them (Aly and Mack, 1993).

- *Measurement*

TQM adoption needs to be supported by a performance measurement system (Wardhani et al., 2008). This system needs to identify quality measurements and indicators for performance evaluation and improvement using data collection and statistical controls (Aly and Mack, 1993). It is important for TQ hospitals to use a process to understand and measure patients' expectations, establish a quality policy that satisfies patients' expectations, and implement check in and check out procedures that reduce rework and minimize activities that do not add value. Patient suggestions and concerns can help hospitals to improve their services. In all these cases, it is important to measure and review performance on an on-going basis.

- *Timely and adequate management training*

Deming suggests that 85% of quality problem can be controlled by management, so it is clear that timely and adequate training for top and middle management is important. The training should focus on basic awareness of quality principles and how to manage in a TQM organization. Familiarization with TQM should form the basis of early training. Management can then be education on the quality improvement concepts established by recognized TQM experts, as well as basic team building, problem solving, SPC tools and other TQM tools (Aly and Mack, 1993; Brashier et al., 1996). To provide proper training for the entire organization, management must first understand TQM and then determine what type of TQM knowledge is important for organizations and who should be educated.

Training require time efforts and investments however, hospitals should educate as many members as the budget can afford. Ideally, each employee should be provided with TQM related training (Brashier et al., 1996). Clear job descriptions including TQM activities for each employee should be provided (Wardhani et al., 2008). Hospitals can then provide training to enhance employees' existing understanding as well as fill their gaps in knowledge where necessary. For example, SPC is a concept that physicians are familiar with, so it is unnecessary to provide training on this to physicians. However, physicians do need to be educated about the relationship between SPC and other TQM concepts. Training should enhance both analytical and behavioral skills, focusing on how to apply the TQM concepts and skills in the work situations. Once this general understanding is established, specialized training should be provided as soon as possible.

Both internally and externally sourced training can be used. Many hospitals initially employ external consultants, who are perceived as adding credibility to the TQM process and are used to train top management about TQM concepts. Once top management are educated, they are typically expected to train the middle managers, who then train general employees. This internal education is relatively inexpensive. The training period can vary between a few hours and several weeks.

- *Education and quality awareness for all staff*

Education and training should be conducted for all hospital staff (Wardhani et al., 2008). It has been suggested that top management, middle management and staff training should be the initial emphasis of quality awareness sessions (Aly and Mack, 1993). Quality training can be used to encourage employees to embed TQM concept in their work. Top management and the quality council are responsible for educating and increasing quality awareness across all levels of staff. Meetings to communicate about and discuss the impact of TQM adoption both on the hospital staff and on the future of the hospital should be encouraged (Aly and Mack, 1993).

- *Process focus*

Effective process management is important to successful TQM implementation. Considerations include the definition, analysis and improvement of hospital processes (Aly and Mack, 1993). A process focus can encourage the establishment of a commitment to continuous improvement in hospitals. Defining and analyzing the hospital's processes can be achieved by conducting interviews and reviewing existing documents and procedures. Quality process management should be applied to a variety of processes such as admissions, housekeeping, food service, account billing and medical services. Hospitals may choose to create quality improvement teams to support this process management and to cope with quality issues occurring in the organizations (Brashier et al., 1996). For example, physicians, nurses, technicians and employees should be involved in defining, analyzing and documenting the processes in which they are involved. When selecting quality team members, it is important to recognize that people who perform the tasks understand the jobs and processes better than members of management staff can. Their suggestions are important in resolving quality problems. Frontline workers in a department are usually the most appropriate people to solve a problem in that department. However, in practice, healthcare procedures cross many departments so quality teams should include members drawn from various departments. It is believed that the greater the variety of team members, the higher the possibility that all aspects of the organization will be considered when solving problems and improving processes (Brashier et al., 1996).

- *Integration of management system and technical support*

TQM should be seen as a way of doing business, so its adoption must be integrated with core management systems such as strategic planning, information and communication systems and the organizational infrastructure (i.e. quality council or department). The term 'technical support' is used to describe the organizational capability to apply TQM concepts and tools. This can include the provision of education and training on the application of TQM, the scientific problem solving approach, information systems and systems for

quality data analysis and reporting. Quality-focused budgeting, facilities and human resource policies can heavily influence TQM implementation in the hospital sector. The recruitment of management staff should include a component that evaluates these prospective staff members according to their overall fit in the TQ environment and their ability to contribute to the TQM implementation process (Brashier et al., 1996).

From the discussion above it can be seen that, in the healthcare industry, successful TQM implementation is dependent on a number of factors including quality strategic management and planning, employee motivation and empowerment, employee training, the leadership and commitment of top management and physicians, physician and general employee involvement, conducive organizational culture change, effective measurement of quality factors, a focus on customer and patient satisfaction, a focus on continuous improvement, supplier partnerships and staff recognition of the importance of quality.

Investigation of the obstacles to successful TQM implementation is important (Huq and Martin, 2000). Through identification of these barriers, management can increase their understanding of cases of TQM implementation failure and thereby seek to eliminate these barriers. This can enhance the success rate of TQM adoption. It is acknowledged that there are many challenges when implementing TQM in hospitals, and these require management attention (Brashier et al., 1996). These challenges include:

- *Lack of management commitment*

During the TQM implementation process, support from top management and senior physicians is important to enhance bottom up quality actions. The importance of management commitment and competent, visionary quality leadership has been mentioned several times throughout this thesis. In a TQ hospital environment, leadership supports need from many levels (including top management, middle management, the governance board, senior physicians, voluntary physicians and senior respected nurses) is required (Wardhani et al., 2008). All these members of management act as quality consultants and facilitators for everyone in the organization, empowering staff during the implementation process and coaching senior management.

- *Employee interest*

Employees often become concerned about the status and security of their jobs when a TQM program is commenced. Change is always accompanied by some degree of fear. According to a study by Huq and Martin (2000), employee involvement and education is an area requiring additional attention in UK hospitals. Hospitals must communicate more openly and thoughtfully with staff to establish clear job expectations, a better understanding of the TQM system, its components and their interactions, and the importance of the role of each individual staff member in the hospital's quality improvement journey. This can be achieved by creating a learning environment through standardization of processes with a high volume of care, thereby reducing the number of transactions (Huq and Martin, 2000).

- *Physician unresponsiveness*

Some hospitals make direct financial payments to physicians to have them become involved and interested in the TQM implementation from its commencement. This is usually eventually repaid through their significant contribution to a successful TQM implementation. Many UK hospitals have experienced limitations in the involvement of physicians in TQM activities

including the planning, management and execution of quality improvement efforts. Barriers to physician involvement and leadership in TQM are the most important issues that hinder TQM implementation in hospitals (Huq and Martin, 2000). The key staff who can effectively lead and promote clinical involvement in hospital quality improvement efforts are physicians, top management and the board of directors.

- *Lack of a good future plan*

A successful TQM implementation process can extend over a period of years. During this process, organizations usually confront difficulties. It is normal to achieve small, subtle improvements at the beginning however a longer term plan is essential to maintain focus. It has been suggested that allowing management to use cost as a constraint for not embracing TQM is one of the barriers to a successful TQM journey (Brashier et al., 1996).

- *Lack of focus on process*

Lack of process focus is noted as a barrier to TQM implementation. Since process management includes design, control and the improvement of key organizational processes, the lack of process focus can obstruct organizations in optimizing their effectiveness as well as improving their performance. The definition and improvement of hospitals' processes are common areas of focus in TQM practices. Assigning a process owner who is accountable for the process performance can be applied to enhance the focus on university process. The process owner is responsible for managing the process and optimizing its effectiveness. Deming states that 85 percent of quality problems are due to the process (Brashier et al., 1996). Therefore, quality improvement efforts should be focused on the process. Designing service delivery processes, which drive the creation of service, is critical to customer satisfaction (Evans and Lindsay, 2008). Moreover, process improvement should be a proactive task of university management.

3.6.5 Impact of cultural factors on TQM adoption in hospitals

TQM is a people-based system and its success depends on the cultural environment in the organization (Huq and Martin, 2000). Workforce culture can therefore influence the success of TQM adoption. Group and development cultures that embrace the characteristics of affiliation and teamwork, the assumption of change, and risk taking can positively contribute to effective TQM adoption. Employee empowerment, scientifically-based decision making and customer focus cultures are considered to be suitable for TQM implementation (Wardhani et al., 2008). However, there is a negative correlation between a hierarchical culture and TQM implementation (Wardhani et al., 2008). A hierarchical structure, which often brings about a hierarchical culture, can hinder the success of TQM adoption. Large hospitals commonly exhibit a hierarchical culture. This is also true in Thailand. It is assumed that Thai hospitals with the specific workforce cultural characteristics identified above have more opportunity to be successful in TQM adoption than those without them.

There is a lack of literature discussing the impact of Thai cultural characteristics on hospitals in general. Pankwan suggests that Thai cultural characteristics, including high power distance, high uncertainty avoidance and high taking other people's feelings into consideration (Krengjai) undesirably influence TQM implementation in Thai organizations (Pankwan, 2006). Moreover, the survey findings presented in the previous chapter found that the Thai cultural characteristics of non-assertiveness, flexibility over principles, social connection and social recognition have the highest impact on CSFs adoption in Thai hospitals. Thai society's high uncertainty avoidance cultural dimension is characterized by the Thai cultural characteristics of non-assertiveness, high Krengjai and flexibility of rules to maintain harmony. These cultural characteristics are expected to hinder TQM adoption in Thai hospitals. Thai society is also characterized as high power distance, which is demonstrated through inequality of power between managers and subordinates. This may contribute to the high level of appreciation for social connections (i.e. getting to know the right person) in Thai society. Consequently, this cultural characteristic is expected to hinder TQM implementation in Thai hospitals.

3.7 TQM in universities

Higher education institutions are the main source of learning and knowledge creation through research activities (Sirvanci, 2004), with academic education being one of the main ways through which beliefs, values and ideals are transferred to future generations (Saleki et al., 2012, p.111). Universities are considered as the main actors in the creation and utilization of knowledge (Anninos, 2007), pursuing objective and scientifically documented knowledge along with the need for individual and social development. The aims of universities can include transferring scientifically documented knowledge through teaching, advancing science through research and engaging in economic development and social prosperity (Anninos, 2007). Ideally, universities apply new developments to benefit humanity (Suleiman, 1979 cited in Salameh, Alzyadal and Alnsor, 2011).

With continuing advancements in society, the roles of universities increase in difficulty. For instance, the traditional administrative pattern used by higher education institutions is outdated (Salameh, Alzyadal and Alnsor, 2011). Similar to an increase in hospital costs, the costs of university have been gradually rising (Sirvanci, 2004). The industry has also become more competitive, with pressures such as lower enrolments, reduced funding, closer assessment by university boards (Saleki et al., 2012), and greater competition from online education providers and private universities. Moreover, globally, universities are faced with many challenges (Anninos, 2007; Salameh, Alzyadal and Alnsor, 2011) including diverse demands for scarce material and human resources, the need for accountability, the focus on the economic perspective of higher education and funding related issues, the appearance of new types of higher education institutions, the globalization and increasing competition among universities, university networking activities, the diversification of the student body, and the external and public assessment of quality (Anninos, 2007; Salameh, Alzyadal and Alnsor, 2011). Also, technology advancements such as videotaped lectures, the use of multimedia in teaching and the emergence of distance and electronic learning has affected higher education processes and structure (Sirvanci, 2004). These factors reduce the role of traditional classroom teaching. In Thailand, the majority of universities face many of the challenges mentioned above. Both Thailand's public and private universities operate in a common environment of increasing demand for higher education, increased expectations about the quality of the workforce, and the need for diversification of

activities to satisfy customers' expectations (Yavirach, 2009). However, in Thailand, many of these challenges are not the main concern of well-known public and private universities. This is because they have strong reputations in many areas, such as the quality of their graduating students, quality of lecturers and availability of high technology equipment. Most students in Thailand expect to continue their education in these well-known universities, and highly qualified lecturers tend to work in these well-known public and private universities in Thailand.

TQM could be used to solve these issues and enable universities to become more competitive (Campatelli, Citti and Meneghin, 2012; Salameh, Alzyadal and Alnsor, 2011; Saleki et al., 2012; Sirvanci, 2004). It should be noted that, despite this shared focus on quality across both public and private universities, some public universities may not have sufficient resources or the internal capabilities to support TQM implementation (Campatelli, Citti and Meneghin, 2012).

3.7.1 Overview of TQM in universities

TQM has been applied as a management paradigm by organizations around the world (Sirvanci, 2004). After the success of quality improvement projects in the manufacturing sector, this paradigm has been adopted by service companies such as banks and insurance companies. More recently, non-profit organizations such as healthcare providers, education institutions and government agencies have recognized the potential benefit of TQM (Sirvanci, 2004). TQM has been applied with good results by private sector organizations; following their success, it has been subsequently implemented by public organizations (Campatelli, Citti and Meneghin, 2012). This may explain why the private sector demonstrates greater efficiency when compared with the service provided by the public sector. The focus of this chapter is the adoption of TQM in higher education institutions, particularly in universities.

TQM concepts were first introduced into higher education in the late 1980s, resulting from successful TQM adoption in the industrial sector and the need for a revolution in education (Anninos, 2007). The concept of quality assurance was introduced in higher education in the mid 1990s followed by the establishment European quality assurance agencies (Anninos, 2007).

Many universities around the world have recognized the importance of TQM adoption. These include Sukhothai Thammathirat Open University (Thailand), Chulalongkorn University (Thailand), Hang Seng School of Commerce (Hong Kong), Asahi University (Japan), University of Lulea (Sweden) and National University of Singapore (Singapore) (Ebrahim, 2004). Each of these universities has attempted to provide a forum for the identification of TQM theories and the development of TQM practices (Ebrahim, 2004).

TQM is receiving attention across the education sector (Saleki et al., 2012). The number of universities applying TQM has increased (Salameh, Alzyadal and Alnsor, 2011). One education institution in Hong Kong adopted TQM to reform the management of the school and to improve value added performance (Ebrahim, 2004). The University of Wisconsin-Stout in USA won the Baldrige Education Award for its TQM implementation. Some authors have also suggested the possibility of successful TQM implementation in universities in Iraq and the Arab world to cope with the challenges facing the Arab higher education sector currently (Salameh, Alzyadal and Alnsor, 2011). However, the application of TQM as a modern management approach is still limited in Arab higher education institutions. In Thailand, as part of the National Act for Educational Reform in 1999, the Thai government recognized the importance of quality assurance. The resulting quality assurance system is used as a technique to improve quality performance in institutions such as Chulalongkorn University (Ebrahim, 2004).

The satisfaction of beneficiaries is important for successful adoption of TQM in higher education, however student satisfaction and learning should be the focal point for the development of TQM practices (Salameh, Alzyadal and Alnsor, 2011). In the past, students' contributions to the learning process have been important; TQM concepts confirm that many advantages can be derived from the involvement of undergraduate students. Scientific experiment also suggests that enhanced involvement by students, faculty members and university staff can lead to added benefits for universities (Salameh, Alzyadal and Alnsor, 2011). Similar to the process followed in hospitals where patients are required to actively engage, university students receive a service that requires them to take an active role in the study process. The involvement of students is fundamental (Campatelli, Citti and Meneghin, 2012). When adopting TQM, universities are managed under a people-centered system that is focussed on continuously meeting and exceeding customer expectations at the lowest possible cost by using scientific

methods, and maximizing personal and team contributions (Anninos, 2007). The systematic application of quality strategy at a high level, necessary to attain the desired quality level, involves everyone and everything in an organization. Also, learning and adapting to change are basic success factors.

TQM practices have been applied in many areas of universities. Public universities have applied TQM concepts such as quality circles, quality action teams, customer surveys and training, quality function deployment for curriculum development and improvement and advisory councils to understand market demand for graduates. TQM concepts have also been applied to academic processes (Potocki, Brocato and Popick, 1994). TQM methods have been used by an educational team to teach TQM principles in a masters degree program at Johns Hopkins University. The course design and delivery addressed customer focus, empowerment, teamwork, continuous improvement, data-driven decision making and leadership (Potocki, Brocato and Popick, 1994). A modified TQM model has been proven to be useful for enhancing quality performance in a public university (University of Firenze) (Campatelli, Citti and Meneghin, 2012). It has been suggested that the best results from the implementation of TQM practices in universities are achieved when the management team has experience in the manufacturing sector (Campatelli, Citti and Meneghin, 2012).

3.7.2 Benefits of TQM implementation in universities

There are many potential benefits that universities may obtain from TQM implementation including a reduction in cost for higher education delivery, improvement in competitive position between other universities, and enhanced quality and reliability according to government assessment (Salameh, Alzyadal and Alnsor, 2011). Other improvements offered to educational institutions by TQM include improving the education process, making the educational environment more motivating, improving educational curriculum, more effectively providing training services and reducing cost (Peak, 1995 cited in Saleki et al., 2012).

TQM is seen as an approach for the utilization and exploitation of human, finance and technology resources in educational institutions (Saleki et al., 2012). In the university context, the general concept of TQM is to involve all educational agents at all levels in educational activities to achieve the goals of educational institutions. Educational institution management aims to utilize staff capabilities by using the physical and

intellectual capabilities of staff in different levels of a university. Teaching and learning are not solely the responsibility of a lecturer or a faculty; TQM optimizes all advantages derived from all staff contributions through tangible and practical cooperation. Therefore, TQM adoption provides basic structures to utilize the experiences, talents, intellectual ability, physical resources and other existing capabilities of higher education.

TQM adoption can create and nurture several opportunities for higher education institutions to achieve effectiveness (Saleki et al., 2012). These mechanisms include effective time utilization in universities (providing time frame for learning and teaching process), providing performance measures and indicators for managing the learning process, the application of problem identification and a problem solving approach.

The effectiveness of TQM adoption in universities is hard to prove and its success cannot be judged before observing clear results. Also, to prove the theory requires time and constant effort. It is widely accepted by many businesses that TQM is beneficial for service organizations and it could be an important factor for the educational sector. Hence its increasing prevalence in schools and universities (Saleki et al., 2012).

3.7.3 Difficulties of TQM implementation in universities

While business organizations have become leaner and more efficient through the implementation of TQM, this trend has not been widely seen in universities (Sirvanci, 2004). The implementation of TQM in higher education lags behind other organizations and industries (Salameh, Alzyadal and Alnsor, 2011; Sirvanci, 2004). This trend is seen in both UK and Italy, where the introduction of quality management is not widespread in public universities (Campatelli, Citti and Meneghin, 2012). Related to this lack of adoption, there are few studies on the implementation of TQM in universities', both in relation to processes and in the classroom (Saleki et al., 2012). To date, TQM application has been largely restricted to administrative branches and non-academic processes in universities (Sirvanci, 2004). The limited application of TQM in universities may be due to a lack of resources for quality improvement and a lack of training (Campatelli, Citti and Meneghin, 2012). The problem of limited adoption of TQM in higher education also results from certain structural and traditional characteristics of the organizations in the industry (Sirvanci, 2004). These

characteristics create additional challenges and difficulties for TQM implementation in higher education institutions (Sirvanci, 2004).

The first challenge arises from the traditional leadership characteristics of educational institutions. The authority of university presidents and chancellors is different to that of top management in business organization. University top management (i.e. university presidents and chancellors) do not have decisive authority in employing, firing and allocating resources. In some cases, university top management also lack the power to implement extreme measures and undertake changes. It is therefore hard for university top management to achieve their specified values and objectives due to the complex structure of higher education institutions.

The second challenge concerns the difficulties of cultural and organizational transformations in departments and faculties within higher education institutions (Sirvanci, 2004). Universities have inherent traditions; this make them resistant to change. For instance, universities are organized in departments based on academic disciplines. In a TQM culture, universities must focus on the market requirements as established by students rather than being primarily concerned with the products offered. However, the main loyalty of faculties and their staff is usually their academic field. Therefore, it is difficult to establish a core focus on the market and customers.

Universities are always heavily based around a departmental model (Sirvanci, 2004). Contract and promotion decisions for faculty members are initiated by the departments, and departments compete with each other to access university resources. Consequently, the application of process management, the establishment of interdepartmental teams and cooperative efforts among departments become problematic. From a logical analysis of these characteristics it is evident that leadership and cultural and organizational transformations are significant issues obstructing TQM adoption in higher education institutions.

A third challenge facing universities is difficulty identifying the customer in the university context (Sirvanci, 2004). There is no consensus among faculty, students and administrators about who are university customers. Administrators tend to view students as the customers in faculty and classroom contexts. Parents, alumni, employers, society, faculty, local community, academic disciplines and staff are often seen as customers by

university councils. Consideration of this list suggests that some of these ‘customer’ groups could also be classed as stakeholders or customers of secondary processes. A well defined ‘customer’ and subsequently a focus on that customer are prerequisite for successful TQM adoption.

The fourth challenge identified, which is the perception of customer loyalty in higher education institutions, appears unimportant (Sirvanci, 2004). In the business sector, customer loyalty is very important since it can lead to repeat purchases by loyal customers. Participation in the higher education process occurs, at most, only a few times in a person’s life. Therefore, the traditional definition of repeat purchases applied in the business sector does not act as a motivator for the higher education sector. However, viewing students as customers in a broader sense could include contributions from alumni donations as input from customers. If employers are considered to be customers, repeat purchases can refer to annually hiring students or graduates from that university. Therefore, the definition of customer impacts on the significance of this challenge.

Lastly, the complexity of students’ roles causes some difficulties for TQM adoption in the higher education sector (Sirvanci, 2004). It is important to recognize the significant differences in the customers and services of the higher education industry compared to other industries. A university is not factory and student is not a product, and neither can be treated as such; however the education of each student is a product (Saleki et al., 2012). TQM needs to be tailored to meet the unique needs of the industry.

Although some TQ universities describe their customers as only their students, the student role as customer is debatable. To begin with, higher education institutions are service organizations and their operation is similar to a manufacturing line. The production analogy can be beneficial for universities in implementing TQM because TQM has been successfully adopted in production institutions. Once students (raw material) have been admitted, they have to complete the courses required by a degree. Graduating students are issued with certification to confirm that all degree requirements have been achieved by a student. This certification can be seen as the brand name of the university. After certification, graduates compete for jobs in a similar way to branded products competing for customers’ in the market. From this perspective, graduates should be seen as the finished product, while employers are the customer of universities.

However, both positive and negative results of the education product cannot be easily judged; employers require a long period observation for consideration (Saleki et al., 2012). In addition to product role (raw material when admitted and finished products when they graduate) of students, they have other roles in the studying process. These roles include internal customers for facilities, laborers in the learning process and internal customers for the delivery of courses. To complete their degree, students have to demonstrate active cooperation (in a similar way to employees in a business organization) and individually manage the e-learning process (Saleki et al., 2012). Learning and teaching are different processes. Teaching is a management role. On the other hand, learning is similar to research and development processes. From this discussion it can be seen that students have multiple roles (including the customer role) in universities and that customer identification in higher education institutions is a complicated issue.

In brief, TQM implementation in higher education requires considerations that are different to other parts of the service industry. Universities can face obstacles and problems in implementing TQM. TQM adoption in higher education is hindered by many issues such as the unique characteristics of higher education institutions, capability with the quality movement, individual autonomy of faculties, the application of statistic tools, identification of the customer, a need for greater focus on learning, the application of performance measurement in universities and managing the processes of students' study (Anninos, 2007; Saleki, et al., 2012; Sirvanci, 2004).

3.7.4 TQM implementation in universities

There is no single, widely accepted TQM implementation model available for higher educational institutions. Although some scholars have proposed implementation guidelines, there is no consensus on the steps to implement TQM. Some guidelines for TQM adoption in universities are discussed below.

3.7.4.1 Guidelines for TQM implementation

A number of studies have presented guidelines for TQM implementation in universities. This section outlines the key findings of these studies.

A study by Saleki et al. (2012) presented the following five steps for TQM adoption in the higher education industry:

- *Training:* Training is a tool to enhance employees' skills and abilities. Training appropriate to each job is effective in increasing employees' abilities and skills and ultimately their performance.
- *Review of culture of commitment:* Organizational members should understand their responsibility in the university system and commit to achieving excellent quality performance.
- *Review of management role:* Management at all levels should identify staff members' abilities and potential, and should be allowed to participate in decision-making.
- *Authority to change:* Management should offer the opportunity for staff to collect and evaluate quality improvement data. Also, management should ensure that staff provide feedback and suggestions for further improvement.
- *Review of reward system:* Organizational members should be recognized for high quality achievements and their contributions to success.

A study by Campatelli, Citti and Meneghin (2012) suggested that TQM adoption in universities should incorporate the following five steps:

- Identification of customers, suppliers and other people involved in the processes
- Evaluation of customers' and other actors' requirements and specifications
- Design of the service delivery process
- Development of strategies to reduce the time required to carry out the process and responding immediately to errors
- Promotion of continuous improvement by means of continuous evaluation of customer satisfaction and indicators for process efficiency

A study by Salameh, Alzyadal and Alnsor (2011) recommended following six TQM practices to improve performance in universities:

- Identifying the main beneficiary of a university's output

- Developing the academic institution's mission to enable competition through quality performance of education programs, student scientific experiments, services offered to beneficiaries, the presence of distinguished academics and services provided to the surrounding environment
- Setting up internal procedures to achieve quality performance
- Identifying individuals and groups who carry out the responsibility of the selected criteria
- Providing rewards and recognition for quality achievement
- Forming teams that are responsible for the quality program

Furthermore, the authors (Salameh, Alzyadal and Alnsor, 2011) suggested the following TQM best practices in universities:

- Full understanding of the beneficiaries' expectations using their feedback for further continuous improvement
- Connecting the students' expectations with educational process design
- Cooperation and interaction between students and faculty members through an exchange of experiences, advice and an assistance system
- Measuring the satisfaction of students and faculty members with university services through the adoption of comparison criteria with other universities
- Involving employees in university tasks to bring management and faculty members closer together to solve problems. This encourages teamwork, brainstorming and a better flow of information.

In addition to TQM implementation guidelines, it has been suggested that it is possible to conduct education development using TQM through two key steps. Firstly, organizational staff should have a good understanding of TQM and the impact of continuous improvement, along with a positive attitude toward TQM. To achieve this, all individuals must receive adequate instruction and experience the practical effect of TQM adoption. The second step in TQM development includes the further development

of employees' knowledge, attitudes and skills. It is asserted that the effectiveness of TQM relies mainly on the knowledge of people, which is related to employees' attitude and skills. An increase in knowledge can lead to a change in attitude; in a TQM organization, this required for any member of staff to become successful in their career. A negative attitude and approach toward TQM can hinder the success of TQM adoption in universities.

There are performance measurement techniques that can be applied in higher education institutions (Salameh, Alzyadal and Alnsor, 2011). Firstly, self assessment is an effective tool to guide leadership on resource investment decisions, improving quality performance compared with international standards. Secondly, benchmarking is an effective tool to compare inputs, processes, outputs, systems and functions with those of competitors and also to compare with other good practices in the market. Thirdly, ISO is a widely accepted good standard for quality that many universities rely on in their TQM journey.

3.7.4.2 CSFs of TQM implementation in universities

Many scholars have discussed the practice of TQM CSFs in the university sector (Anninos, 2007; Salameh, Alzyadal and Alnsor, 2011; Saleki et al., 2012). The main principles of TQM oriented universities include a university stakeholder focus, leadership commitment, staff participation and teamwork, a process focus, measurement and management based on factual data, and continuous improvement and learning (Anninos, 2007).

A study by Potocki, Brocato and Popick (1994) explored how TQM was implemented in a university classroom. In this study, a number of TQM concepts were applied to teach TQM principles to graduate students as part of masters degree program at Johns Hopkins University (Potocki, Brocato and Popick, 1994). These concepts included:

- *Focus on the customer*

This was achieved by treating the students and local organizations as customers. For example, to establish a customer focus in the classroom, the educational team analysed input from the customers to assess their needs. Three TQM methods can be used to assess customer satisfaction. These are the application of

a quality survey, matrix data analysis and focus groups. In summary, the educational team needed to design the course to satisfy their customers' needs.

- *Empowerment*

The students were empowered by being given personal freedom in the selection of project areas, classroom texts and reporting style. To respond to the customers' needs, the educational team used an empowerment strategy in the course design. By designing a course that allowed students to participate in the selection of different application areas, the course will increase students' motivation. In summary, educational teams have to give personal freedom to students so they feel empowered.

- *Teamwork environment*

A teamwork environment was developed to involve both the students and the educational team through problem-solving exercises and meetings. This allowed the course to be continuously evaluated and adjusted as required. To work toward a TQ environment, organizations must prioritize improved cooperation and teamwork; this is the same in the university environment. Students learn from their outside experiences and studies, from their contact with other students and from their interactions with instructors. In summary, the educational team have to develop a teamwork environment incorporating both the students and instructors.

- *Engaging the students in the continuous improvement process*

The educational team have adapted to a modular instructional format to meet the expressed need for quality and relevance in the course materials and activities, and to integrate as many TQM principles and methods as possible into the curriculum. Following this model will challenge students to think about the theory, to practice using TQM tools and to apply concepts to their own work areas through homework reading and exercises. Each class session includes session objectives, a homework discussion, a lecture supported by multimedia techniques, an in-class team exercise and session feedback. To be successful,

this approach requires the educational team to give constructive feedback that assists students to improve. The implementation of this approach led to a continuous improvement process that encouraged student involvement and created a dynamic learning environment through one-minute fast feedback given by the educational team. In summary, feedback was required to engage students in the continuous improvement process.

- *Data-driven decision-making*

This is another TQM strategy used by the educational team. It helped students develop a sense of ownership because it encouraged students to use the data they generated to make decisions concerning course improvements. For example, changes were made based on the fast feedback at the end of each class, class focus group sessions that brainstormed improvement ideas, and student satisfaction feedback from the student quality survey.

- *Leadership focus*

Leadership was demonstrated in the classroom by practicing the quality philosophy and principles it was teaching.

A study by Saleki et al. (2012) described six CSFs for TQM adoption in higher education institutions. These are funding, training, rewards, commitment, teamwork and involvement.

- *Funding*

TQM must receive high priority in higher educational institutions to receive an adequate share of the university's funds. Funding for the application of TQM and related concepts should be available in each university. During any successful TQM implementation process, funding for consultants, facilitators and training is required. Ideally, a TQ coordinator should be appointed to lead all quality improvement. The availability of resources and funds is important to the success of TQM implementations, and suggestions from quality consultants have the potential to increase the effectiveness of TQM implementation efforts.

- *Training*

Training is vital to TQM implementation in universities, because it leads to an increase in staff knowledge and skills. Training should initially be given to university executive level staff. TQM training programs provide an understanding of TQM concepts and the TQM methodology (Saleki et al., 2012), providing information about how TQM can be applied in the university. Training in TQM concepts and tools can help organizations to release the full potential of their workforce (Wehnert, 2009). Using an external facilitator for training courses provides a more objective view of TQM adoption.

Inadequate training is a problem facing by many universities undertaking the TQM journey (Saleki et al., 2012). Employees and middle managers need to be adequately trained, which can then create a high level of staff commitment (Wehnert, 2009). In higher education, training can be provided in three steps, with each step covering a separate aspect of TQM implementation:

1. Plan: Management will define desired goals, the timeframe to accomplish the goals, the methods, roles and responsibilities, and details of assessment.
2. Control: Statistical quality control can be used to control quality.
3. Improve: The aim is to achieve performance excellence. Six Sigma concepts can play an important role in quality improvement.

Training can also keep employees motivated. Gaining new knowledge and skills can reduce staff boredom. By promoting training as an investment by the organization, employees will realize that they are valuable to their managers. Management should motivate employees to make recommendations and suggestions for improvement. This can create a positive attitude in the workplace. Although training may be costly, it typically reduces total costs in the long term.

- *Rewards and Recognition*

Rewards and recognition are necessary for TQM adoption in higher education processes. They are one of the most motivating factors to improve quality performance. However, monetary rewards are not always possible in the educational sector. The application of rewards and recognition requires funding by the higher educational institution. Although they increase total expenses, they are a prerequisite in the improvement process. Rewards and recognition are significantly related to staff motivation, and team rewards and recognition can encourage team building. The proper use of rewards and recognition can lead to high performing teams and can support cross-organizational cooperation.

- *Commitment*

The executive management of the university and of each department must commit to TQM. The process of TQM adoption in higher education is not simple; it can take years to accomplish and to see benefits. This period can be shortened through improved commitment. Without visible high level commitment to TQM, employees lose interest resulting in a lower level of job quality. High commitment can motivate employees to share ideas and supports a cooperative workforce.

- *Teamwork*

TQM success relies heavily on teamwork. Team members and their responsibilities should be well defined. The effective application of teamwork can lead to better achievement of established goals. To improve the quality of university processes, teams must be made up of all the people involved and with an interest in the relevant processes. The understanding of roles and responsibilities for all team members can bring about recommendations for modifying a process; such recommendations can lead to significant improvements. University staff should also be given authority to make changes. When staff are permitted to make an actual change to improve the processes in which they are involved, they have a sense of ownership of the process. They tend to do their best and expand their responsibility. Teamwork can enhance the

working atmosphere in all levels of universities. There are many problems when building teamwork. Common rules for the team should be established among team members. For example, such rules in a TQM environment may be ‘no interrupting when other members present their ideas’ and ‘respect others’ ideas’. Although members may agree or disagree with an idea, respect for all suggested ideas is crucial. Without this respect, team members might not want to share their opinions. It is important that team members respect the established team rules.

- *Involvement*

Work commitment and job involvement have a significant relationship. However, involvement is a broader term that incorporates both participation and commitment. Good employee involvement can lead to better decisions since they know more about the processes. Involvement also encourages involved employees to support and implement decisions, and allows them to take immediate corrective actions.

Employee involvement can result in an increase in employees’ motivation because they feel that they can control the work environment. The proper use of staff involvement can lead to an increase in satisfaction because employees have authority to change procedures and routine forms. Involvement can also increase commitment to the university’s goals. In TQ universities, the management style must be firm, visible and based on participation, with judgements made practically and fairly about values and strategies, not solely based on the power of management.

A study conducted in the Faculty of Planning and Management at Al-Balqa Applied University (Salameh, Alzyadal and Alnsor, 2011) showed how TQM could be applied to improve quality in an academic institution. The findings suggest the influencing factors that contributed to the success of TQM implementation in Arab universities (Salameh, Alzyadal and Alnsor, 2011) were found to be:

- Administrative leadership
- Quality management and process design with continuous improvement

- Quality strategic planning
- Human resource management and development
- Quality evaluation and measurement
- Data collection and analysis
- Teamwork and integrated coordination
- Beneficiary satisfaction and
- Creativity and innovation.

There are a number of similarities in the factors identified in the studies discussed above. Competent administrative leadership is a key influencing factor in implementing TQM and should be adopted by academic institutions (Salameh, Alzyadal and Alnsor, 2011). The implementation of a TQM program requires administrative support. TQM requires top management to act as the primary internal change agent for quality improvement. It also stresses the importance of empowering the workforce through delegation of responsibility to frontline employees (Ebrahim, 2004). Quality is not in the products and services but it can be obtained from well designed manufacturing and service processes (Campatelli, Citti and Meneghin, 2012). It is asserted that 94% of quality problems come from the management system, so employee participation to improve this system and related decision making processes is required (Saleki et al., 2012). Teamwork, continuous improvement and coordination can lead to creativity and innovation in the university environment. Learning, training and development are important to increase technical and information skills (Salameh, Alzyadal and Alnsor, 2011). To support continuous improvement in the universities' processes, they must apply measurement to gain visible and positive results for their improvement.

3.7.5 Impact of cultural factors on TQM adoption in universities

The McKinsey 7S model suggests that a firm comprises of both hard elements (strategy, structure and system) and soft elements (style/culture, staff, skills and shared values). To be a superior quality organization, management needs to pay attention to both hard and soft elements, considering the interaction between the elements to achieve a fit

between them (Anninos, 2007). It is evident that culture and shared attitudes among members need management attention in the pursuit of organizational excellence.

Deming and other quality gurus suggest that to enhance success in the quality journey, management need to identify the proper organizational culture prior to commencing the TQM implementation process and to embrace a change toward a modern management style required for TQM (Ebrahim, 2004). When implementing TQM, organizations must transform their culture into a TQ culture that includes characteristics such as teamwork, customer and market focus, employee involvement and participation, and process management (Sirvanci, 2004). It should be noted that “unless quality is internalized at the personal level, it will never become rooted in the culture of an university institution. If someone embraces quality as a personal value then it is highly likely to perform better than expected” (Anninos, 2007, p. 316).

Literature shows that national culture can have both positive and negative impacts on TQM implementation in each country. For instance, a study by Twaissi, Graham and Ralph (2009) was conducted in service organizations, most of which were Information and Communication Technology organizations in Jordan. The study aimed to explore the role of national culture in TQM implementations in developing countries. The findings showed that the national cultural characteristics had a negative impact on adopting and supporting TQM implementation (Twaissi, Graham and Ralph, 2009). The literature shows that national culture can influence organizational cultures, and these organizational cultures directly impact on organizational performance. A study by Wehnert (2009) suggested that national culture dimensions affect TQM values, and TQM values affect organizational performance. The implication of national cultures on TQM adoption is the focus of this study.

Thai culture is characterized by the concept of *Krengjai* (Yukongdi, 2001). With this cultural characteristic, when there are different opinions presented by team members, consensus tends to be reached mainly through the influence of the organization’s owners and senior management. Other members seem to accept and follow management ideas rather than confront or contradict the suggested ideas; this is done in order to maintain harmony in the organizational group. Sometimes conflicts remain unresolved. The *Krengjai* exhibited by Thai people can lead to the avoidance of confrontation in the decision-making process in an attempt to maintain harmonious relationships; this can

hinder employees' participation and hence the resulting benefits from their contributions. It can be seen that Thai cultural factors can significantly influence employee participation and outcomes.

However, TQM adoption requires that employees share their ideas and offer suggestions to improve organizational processes. It is claimed that employee participation is one of the critical elements for successful TQM implementation (Yukongdi, 2001). Without employee participation, even well designed TQM programs tend to collapse. Cultural and historical values need to be considered for the participation concept to be effectively applied in different cultures. When implementing TQM, employee participation in organizations can be introduced in the form of quality circles, quality improvement teams and cross-functional teams. The application of quality circles can have a positive effect on productivity and employee attitudes.

From the discussion above, it can be seen that TQM adoption within the Thai culture leads to a pessimistic view of the prospects of teams in Thai organizations, with TQM preferring a participative management style with the use of teamwork in order to succeed. The characteristics of Thai culture mentioned can impede successful TQM implementation in Thai organizations and industries.

Based on Chapter 3, it was found that Thailand is a high power distance and feminine country. The high power distance is characterized by high inequality between management and university staff and high centralization (Yukongdi, 2001). Power distance refers to the influence between a management level staff member and a general university staff member in the hierarchy, as perceived by the staff (Wehnert, 2009). A high power distance country is characterized by considerable dependence of subordinates on bosses. Subordinates do not like to approach and contradict their bosses directly. Thai organizations tend to centralize decision structures, expect managers to rely on formal rules and show a high degree of formalization within the organization. The amount of participation in decision-making is expected to be low. Furthermore, in the feminine society of Thailand, people tend to be nonassertive, modest, tender and concerned with the quality of work-life. Thai people socialize with modesty and solidarity and resolve conflict through compromise and negotiation. The implications of these Thai cultural characteristics are discussed below.

- *Femininity*

Top management commitment is positively affected by the culture of a feminine society such as that in Thailand (Wehnert, 2009). Under the TQM philosophy, top management have to play a role as transformational leaders. Transformational leadership incorporates the values of participative change, coaching and developing other members, employee empowerment and employee recognition. In feminine societies, top management is perceptive and eager to seek consensus. As feminine business is a cooperative venture, it is supported by modest leaders with an intuitive and consensus-based decision making style. The relationship between top management commitment and the value of femininity may lead to the successful adoption of TQM in Thailand.

Feminine cultural characteristics including participation, cooperation, understanding and negotiation are likely to support the customer focus concept of TQM. Customer focus orientation is required for successful TQM implementation. To practice customer focus orientation, organizations need to focus on customers, manage the organization's knowledge of its customers, implement an effective customer service system, be responsive to customers and have the ability to meet customers' expectations. The cultural characteristics of feminine countries like Thailand reflect strong negotiation, conflict mitigation and participation when dealing with internal and external customers. There is a relationship between the TQM value of customer focus and femininity. These values seem to support a customer focus orientation when implementing TQM.

The feminine characteristics of the Thai culture also positively support TQM implementation in terms of continuous improvement (Wehnert, 2009). Continuous improvement requires an organization's commitment to constant improvement of the organizational process, creating better quality through a search for better methods. The underlying value of this concept is the view of a university as a system of connected processes. The improvement of these linked processes leads to the development of university effectiveness. To achieve continuous improvement, the use of teamwork (such as cross-functional teams) should be encouraged. Management should emphasize the importance of involving all members in analyzing and implementing solutions to problems to

improve the organizational processes. Individual members of teams will actively teach and learn from each other. In the Thai feminine society, the leadership style promotes values such as interaction, facilitation, supportive behavior and communication facilitation. These values should support teamwork in organizations, leading to continuous improvement through team building.

The emphasis on TQM oriented training can be supported by the feminine characteristics of Thai society. The design of training programs aims to support the core principles of TQM in terms of staff empowerment and involvement, thereby enhancing the effectiveness of quality improvement activities. Managing human resources, including work attitudes, work behaviors, psychological contacts and organizational outcomes, is one of the most significant influencing factors in successful TQM adoption.

The TQM value of management by fact' can be negatively influenced by the feminine characteristics of Thai culture (Wehnert, 2009). Management by fact can be reflected by the application of quality assurance, which is based on systematic measurement and a documented system.

- *Power distance*

Top management commitment is negatively influenced by the high power distance characteristics of Thai culture (Wehnert, 2009). In a high power distance society, management have an authoritative leadership style and play the role of a good father, which the relationship between management and staff is emotional. The staff need to be told what to do. However, it has been suggested that to support TQM adoption, leadership should focus on involving human interaction and encouraging participative decision-making. The leadership responsibility in TQM organizations is not about power, authority and control. Rather, the role is more concerned with empowerment, recognition, coaching and developing others. Participative and consultative leadership in TQM adoption favor such traits as team building, stimulating creativity and delegation of authority.

The TQM value of a customer focus is negatively influenced by the Thai cultural characteristics of high power distance. Organizational ability to satisfy customer expectations mainly depends on organizational structure. The ideal organizational structure for meeting and exceeding customers' requirements is a flat structure, with decentralized and horizontal communication as well as high participation in decision making by staff. These characteristics often appear in low power distance countries, and do not appear in Thailand. High sensitivity to customer expectations is more likely to be achieved in flat hierarchical structures with decentralized authority.

The TQM value of continuous improvement is negatively influenced by the Thai cultural characteristics of high power distance (Wehnert, 2009). To achieve continuous improvement, effective process management with teamwork is important. Incremental innovation is incorporated in the concept of continuous improvement. In the high power distance society of Thailand, it is difficult for an innovation project to be approved through the organizational hierarchy. This may also take considerable time for innovators. High power distance societies are characterized by centralized decision-making, preference of authority and the application of formal rules, so information sharing can be hindered by the hierarchical system. However, an open system with accessibility of information among organizational members can result in innovation, effective process controls and ultimately continuous improvement. It can be seen that continuous improvement through innovation is negatively influenced by the cultural characteristics of high power distance.

The TQM value of TQM oriented training is negatively influenced by the Thai cultural characteristics of high power distance (Wehnert, 2009). The provision of TQM training can bring about a collaborative human resource development approach. This approach is similar to feminine cultural values including participation, cooperation and solidarity to create a high level of staff empowerment and commitment. Management view their staff as a core asset who can be supported and developed through TQM training. It is argued that the collaborative human resource development approach works better in the culture of low power distance societies.

TQM methods comprising of statistical techniques and procedure may be easily implement in high power distance society like Thailand, which has centralized decision structure (Wehnert, 2009).

It can be seen that Thai cultural characteristics can both support and hinder TQM implementation in various ways. The implications of Thai national culture on TQM adoption provide diverse results. Feminine characteristics tend to support TQM adoption, while high power distance characteristics seem to obstruct the implementation of TQM in Thai organizations. This study aims to identify the relationship between cultural characteristics and the CSFs for TQM adoption. Based on the survey findings presented in Chapter 4, it is suggested that the Thai cultural characteristics of flexibility over principles, grateful relationship, fun and humorous in nature, care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness have significant relationships with TQM practices.

3.8 TQM adoption in Thailand and the impact of notable Thai cultural characteristics on TQM practice

3.8.1 Thailand overview

The Thai economy is an emerging market that depends heavily on product exports. One of the fundamentals of the Thai economy is its free market approach which encourages and facilitates foreign trade. In 2003, Thailand achieved an impressive 6.3% growth in spite of a sluggish international economy (Reis and Pati, 2007). In recent years, export revenue has accounted for more than two thirds of gross domestic product (GDP) (CIA, 2012). After Thailand's recovery from the Asian financial crisis in 1997-98, the country's growth rate averaged more than 4% per year from 2000 to 2008. Key factors of this growth included a well developed infrastructure, free-enterprise economy, a policy portfolio that was generally pro-investment and strong export industries. Thai exports continue to drive the economy, accounting for more than half of GDP (CIA, 2012). In 2006, Thailand's GDP was \$USD196.6 billion, reflecting a growth rate of 4.4% over the previous year. Per capita GDP was \$USD9100 using purchasing power parity. In 2006, services revenue constituted 45.2% of GDP, followed closely by

industrial revenue (44.9%). Agriculture accounted for the remaining 10% (Country Profile Thailand, 2007).

Due to the change from an industrial to a service based economy, the proportion of service providers contributing to Thailand GDP has also expanded (Phusavat and Kanchana, 2008). In 2005, the service sector accounted for 48% of GDP. The effects of the global financial crisis in 2008-09 has a negative impact on the Thai economy. In general, most sectors experienced approximately double-digit falls in GDP. In 2008, agriculture accounted for 42.4% of Thai GDP, the industrial sector accounted for 19.7% and services accounted for 37.9%. The service sector contributes to almost half of Thai GDP and employs 38% of the workforce (CIA, 2012). Overall, Thailand has experienced a substantial slowing of growth in the years since the financial crisis. The slowdown is evident in both the industrial and service sectors of the economy where gains in labor productivity have been disappointing. The service sector is notable due to negative rates of change in total factor productivity (TFP). It experienced efficiency changes in the use of labor and capital over 25 years and only small gains in both labor productivity and TFP in recent years (World Bank, 2012b). The contribution of the service sector to Thai gross national product (GNP) expanded from 48% in 1980 to 52% in 2004, and employment in this sector increased from 32% of national employment in 1992 to 43% in 2004 (NESDB, 2010). In addition, in Thailand the services sector continues to dominate the economy, although its average share of value added fell from 50.2% in 1990-1999 to 47.7% in 2000-2007. The share value of the service industry increased from 39.0% to 42.6% in the corresponding periods (Aldaba and Pasadilla, 2010). Also, the services growth rate increased from an annual average of 4.1% to 4.5%. In terms of employment contribution, services accounted for the largest proportion with an increase from 28.4% to 36.1% in the same periods. Major services in Thailand include wholesale and retail trade (30.3%); transportation, storage and communications (21.0%); public administration and others (27%) and finance (15.0%) (Aldaba and Pasadilla, 2010). Due to rising labor costs, many Thai firms have outsourced production plants to countries with lower labor costs within the region. It is anticipated that Thai economic development will lead to a greater reliance on the service sector (Phusavat and Kanchana, 2008).

There is no consensus on how to divide the service sector in Thailand, with classifications of the Thai economic usually referring to agricultural and non-

agricultural sectors. Typically, the service sector includes wholesale and retail trade, hotels and restaurants, transportation and storage, communications, finance, real estate, renting and business activities, public administration and defense, education, health and social work and other services (Evans and Lindsay, 2008; NESDB, 2010). Significantly, the service sector accounts for nearly half of aggregate production. It is also the dominant source of new job creation. Between 2000 and 2005, employment expanded by 2.6 million in the service sector compared to 1.6 million in the industrial sector (World Bank, 2012a). Thailand's services sector is the country's most important contributor to the economy representing 47% GDP and 37% of the labor force, employing 12 million people (MFA, 2011). However, most of these employees never receive formal services training. Service industries are facing a critical problem in identifying qualified service staff for this huge and growing segment. For example, hotel operators see the most important foundation on which to provide quality to their customers as service attitude and staff behavior. The results of poor training have resulted in staff turnover rates reaching up to 60%, causing increased recruitment and training costs and declining service quality (BBC, 2007).

In Thailand, there are public agencies tasked with addressing unique problems in the agricultural and manufacturing sectors. However, there is no specific agency responsible for solving emerging problems in the Thai service sector as a whole. Thai service firms tend to be more professional and well managed than businesses in other sectors (Phusavat and Kanchana, 2008). Thai service companies must identify and access their own resources to build their own businesses as well as form networks. Membership in influential trade associations, such as the Federal of Thai Industries (FTI), is useful for external assistance and obtaining required knowledge (Phusavat and Kanchana, 2008).

3.8.2 TQM in Thailand

Developed countries have commonly applied TQM, and TQM is an innovative and challenging concept in developing countries (Pankwan, 2006). In Thailand, TQM organizations are uncommon and there have been few studies on TQM adoption in Thailand (Pankwan, 2006). In the last two decades, Thailand has successfully developed quality efforts in the manufacturing industry. Over the last 30 years, the Thai manufacturing industry has experienced substantial growth and established itself as the

biggest export earner for the country (Krasachol, Willey and Tannock, 1998). As previously mentioned, one of the fundamentals of the Thai economy is its free-market approach, which encourages and facilitates foreign trade. To earn a better reputation in the export market, Thai companies have increasingly sought ISO 9000 accreditation in their quest for attaining consistent product quality, standardizing and documenting work processes and creating a culture of quality (Butsontorn, 1996). In terms of TQM positioning, Thailand ranks in the middle of the developing countries of Southeast Asia. Its status in TQM is higher than Indonesia and Philippines, but lower than Malaysia and Taiwan (Krasachol, Willey and Tannock, 1998).

During the 1990s, numerous Asian countries including Thailand embraced Japanese high quality and productivity strategies to increase their market share and export business. Different TQM approaches and tools (such as Just-in-Time (JIT)) have been applied in Thailand (Tabucanon, 1993 cited in Krasachol, Willey and Tannock, 1998 p. 40). From 1985 to 1995, Thailand set the standard for economic development with its significant growth rate and was used as a model for other developing countries in the region. During the 1990s, the main emphasis of Thailand's manufacturing industry was the implementation of ISO 9000 standards, which can be seen as a step towards TQM. Despite acknowledgement of the importance of ISO 9000 across Thai industries, and the finding that quality is the most important competitive priority from the perspective of Thai service providers (Phusavat and Kanchana, 2008), the number of companies with ISO 9000 certification across Thailand is relatively low when compared to other Asian countries (Krasachol, Willey and Tannock, 1998; Tannock and Krasachol, 2000). Other important competitive priorities identified by service organizations were customer focus, service design and service provision (Phusavat and Kanchana, 2008). However, achievements in this area of accreditation were essentially led by the private sector. Although there are many barriers still to be overcome for Thai's developing economy, quality movements are becoming commonplace in Thai companies in both the manufacturing and service sectors (Reis and Pati, 2007).

While quality improvement has been largely successful in the Thai manufacturing industry over the last 20 years, TQM has made little impact in Thailand. Only a few companies have successfully developed a TQM approach. In Thailand, TQM has been adopted primarily by companies within the electronics sector, many of which are foreign owned (Krasachol and Tannock, 1999). For example, Siam Cement (a Thai

owned company) was influenced by Japanese TQM ideas. Similarly a Japanese owned company (Toshiba) has successfully implemented a classic Japanese participative TQM approach, and a United States based company (the now defunct Read-Rite Corp.) employed a different approach of TQM with a strong bias towards Six Sigma themes. Few Thai companies have implemented the TQM approach; those that have implemented TQM have often been assisted by the relevant Thai government agency to facilitate the practice of quality management and achieve a basic Thai Foundation Quality Standard (TFQS).

A review of literature discussing TQM in Thailand shows that most studies have been focused on the manufacturing sector (Pankwan, 2006; Phusavat and Kanchana, 2008; Reis and Pati, 2007; Tannock, Krasachol and Ruangpermpool, 2002). Several studies have also been published on the progress of quality management in Thailand (Reis and Pati, 2007). The success of TQM adoptions in Thai small-to-medium enterprises have been related to management and information issues (Tannock, Krasachol and Ruangpermpool, 2002). A study of the proliferation of TQM in Thailand (Reis and Pati, 2007) suggests that when implementing TQM, improvements in training, employee relations, quality data, reporting and supplier quality management are the most important areas of focus for Thai service and manufacturing companies to improve quality of products and services. Once these areas are addressed, companies should focus their efforts on top management, a quality policy, the process management role of the quality department, and product and service design (Reis and Pati, 2007). Moreover, a study of TQM practices in Malaysian and Thai automotive industries suggested eight practices around which TQM is generally constructed. These were quality leadership, customer focus and satisfaction, quality information and analysis, human resource development, strategic planning management, quality results and quality assurance (Zakuan et al., 2010). From these eight TQM constructs, only seven constructs were validated in the automotive industry, because quality results and quality assurance were recognized as being identical from the practitioners' perspectives. Thus, the two constructs were retitled as quality results and assurance.

Based on the available literature, it can be concluded that published studies of TQM implementation in Thailand are lacking. A review of the TQM practices in Thailand shows that little empirical research has been conducted in the area of TQM implementation in Thailand. Although the current situation of TQM implementation in

Thai manufacturing companies still remains unclear, the sector's quality improvement efforts can be seen in the literature. Given its importance to the economy, a study of TQM adoption in the Thai service sector is necessary. Since there are many sectors in Thailand's service industry (NESDB, 2013), two particular Thai service sectors – hospitals and universities – have been chosen as the focus of this research. These two sectors are examples of the Thai service industry and they are expected to partly represent the service industry of Thailand. There are two main reasons that hospitals and universities have been selected to partly represent the Thai service industry. Firstly, the hospital and university sectors are important to the development and competitiveness of Thailand. Moreover, the Thai government has identified these two sectors as needing to enhance their quality (HA, 2010; ONESQA, 2013). This study assumes that quality practices, management and improvement are requirements in these two sectors of Thailand. In Thailand, it is expected that the hospitals and the universities have a high level of quality awareness and so they have adopted quality management practices at a certain level. This thesis is an early attempt to conduct such research in the hospital and university sectors of Thailand. This thesis considers the range of studies conducted in relation to TQM in Thailand. Thailand has been selected partly due to its geographic location within Asia, which is considered to be the epicenter of industrial activities during the 1990s (Reis and Pati, 2007). As most studies on the progress of quality management in Thailand have focused on the manufacturing sector, this thesis is designed to explore the level of TQM practices in Thai service sector.

3.8.3 Thai cultural characteristics

In social science, culture is broadly defined as a way of life incorporating how people live in society, their beliefs, norms, attitudes and popularity, and the knowledge of people in each society (Chulalongkorn, 2007). Culture includes the knowledge, beliefs, laws, morale, art, customs and any other capabilities and habits acquired by members of specific society (Shokshok et al., 2011).

Studies have identified the shared attitudes, norms and beliefs in Thai culture. The basic Thai societal characteristics include agriculture; Buddhism; respect for the King; and seniority systems. Diversity of cultures is another important feature of Thai society, with Thais open to experiencing and accepting different cultures. Thai people also place high importance on family and on helping each other (Anantraworasakoon, 2003). In

general, the presentation of most Thai interactions is honest and sincere. Thai people are renowned for sincere and deep reciprocal relationships (Komin, 1991). With more than 90% of Thai people being Buddhist, many Thai cultural behaviors reflect these religious behaviors. In general, people accept disability or death as part of their karma and it is believed that the cycle of life including birth, old age, illness and death is inevitable for human beings (Teerawattananon et al., 2003).

Another set of Thai cultural characteristics, which define Thai behavior patterns, were derived from empirical data from two national samples and showed remarkable overall consistency over time and across groups (Komin, 1991). This set of characteristics included high ego orientation; grateful relationship orientation; smooth interpersonal relationship orientation; flexibility and adjustment over principle orientation; education and competence orientation; interdependence orientation; fun and pleasure behaviors orientation; and low achievement-task orientation.

More recently, a list of notable current Thai cultural characteristics was presented on a popular social website. These characteristics included persistence of Buddhism; very high respect for the King; a greater belief in reason, fact and doing right than in the past; the importance of education for survival in competitive environments; a preference for wealth and social dignity; high self-confidence; the ability to compete with others; a preference for consuming expensive products; working against time; a preference for freedom; equal provision of human rights to males and females; living together before marriage; and the preference for international languages (Panyathai, 2010).

Chareonwongsak (1998) suggested that the current norms of Thai people might be the primary source of Thai economic regression. These norms include: culture of prodigal spending; quickly adapting to the latest developments; hoping for unrealistic dreams; the preference of supporting established systems; non-measurement behaviors; the culture of materialism; and credulous behaviors. Additionally, individual Thais may dislike facing the truth, and may postpone solving problems and listening to warnings because of their dependence on benefits received from the existing system. Chareonwongsak (1998) concluded that although an economic strategy was important to fix economic problems, significant cultural change was required in order to implement an effective solution. Roongrensuke and Chansuthus (1998) found that the Thai people's low tolerance for conflict reflects a socio-cultural context that Hofstede

identifies as collectivist and associates with high power distance and strong uncertainty avoidance. Collectivists emphasize fitting in with other people, social harmony, interpersonal sensitivity, conformity and readiness to be influenced by other people. This also shows a high level of inequality of power and wealth in the society, and emphasizes the society's low tolerance for uncertainty. In contrast, Thailand has a low level of individualism and masculinity. Loyalty in a collectivist culture is paramount and over-rides most other societal rules and regulations. Also, the low level of masculinity might demonstrate that the Thai people are non assertive and not competitive. Thai people exhibit a high level of respect for tradition, the need to fulfill social obligations and value the custom of protecting one's face (*Rak Sa Na*) (Hofstede, 2001).

It has been suggested that TQM implementation is more suitable in national cultures with higher levels of power distance, uncertainty avoidance, masculinity and collectivism (Flynn and Saladin, 2006). Despite the Thai culture characteristic of low masculinity level, the other Thai cultural characteristics tend to support TQM implementation. It is important to note that though empowerment and participative management have been considered important for successful TQM implementation, employees expect empowerment in low power distance countries but not in high power distance countries such as Thailand (Kumar and Sankaran, 2007). A high power distance does not support an empowering and participative style of management and thus may not be suitable for TQM implementation. However, a study of Indian culture and the culture necessary for TQM (Kumar and Sankaran, 2007) contradicted the conventional knowledge in TQM literature that high power distance or hierarchical cultures can be conducive for TQM implementation (Kumar and Sankaran, 2007). From the evidence above it can be seen that although Thai society exhibits the characteristics of high uncertainty avoidance and power distance suitable for TQM adoption, the characteristics of low masculinity and high power distance could hinder TQM practices in Thailand.

By its nature, culture continuously evolves, repeating a process of development and adaptation. There are many forces that impact on Thai culture, including materialism, liberalism, globalization, advances in technology, hierarchy systems, violence in many areas and support for shared opinions, all of which affect Thai people's behavioral and thought patterns. As a result, the Thai cultural characteristics change over time. A

survey by Boonme (2000) investigated this change in Thai culture characteristics. Emerging cultural characteristics were identified. There is currently a greater focus on economic values, with a change in traditional values from a collectivist society to a material or individual society. The traditional norm of helping each other has changed to a focus on the exchange between money and benefits. Thai people have developed more individual characteristics, which is one of the features of a free society. Also, they are now more effectively responsible for themselves. Thais have the belief, which is derived from Buddhist teaching, that the more you try, the more you succeed. They also believe that those who conduct good deeds will receive goodness in return. Although the free thinking society has benefits, such as encouraging self responsibility, tolerance for others' thinking and the invention of creative thinking, this liberalism can lead to disadvantages such as selfishness and individualism. Many of the cultural characteristics seen in Thai society are changing based on the changing environment.

Based on the literature discussed above, this research will focus on the following cultural characteristics, which are widely seen in Thai society: *Krengjai* (taking other people's feeling into consideration), pride of face and dignity, grateful relationships, flexibility over principles, non assertiveness, care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness, education and competence orientation, fun and humorous in nature, social connection (getting to know the right person), social recognition and mutual help.

The literature discussing TQM and cultural impact shows that culture is a significant factor in determining the success or failure of TQM implementation (Shokshok et al., 2011). In this study, it is hypothesized that Thai culture can both support and hinder TQM practices. Thai society is defined as collectivist, which is suitable for TQM implementation (Kumar, 2006). However, Thai culture is characterized by the concept of *Krengjai*, defined as taking 'the other person's feelings into account' (Yukongdi, 2001). According to this concept, there is a tendency in Thai culture for differences in opinions between individuals to be 'met' rather than confronted as long as harmony is maintained, even though the problem may remain unresolved. This scenario leads to difficulties in TQM practices. For example, a study of employees in public and private organizations in Thailand in which the Japanese and Thai cultures were contrasted suggested that cultural differences between the two countries may 'generate great difficulties in applying quality control circles in Thai industries' (Kumbanaruk, 1987

cited in Yukongdi, 2001, p. 389). A continuous improvement effort through a quality control cycle is probably one of the requirements for successful implementation. Therefore, the ability of the Thai culture to accommodate TQM practices will be considered.

Since the relationship between Thai cultural characteristics and TQM practices remain unclear, this study will investigate the relationships between cultural factors and management factors. It is believed that a TQM culture in any Thai organization must simultaneously incorporate the underlying Thai cultural values and some of TQM's host cultural values. Most Thai people have an ego orientation value, which is the root of *Krengjai* behaviors. They do not want to lose face and dignity. Consequently, to protect these values, they tend to save the face and dignity of other people. These attitudes can lead to undesirable flexibility over principles such as the values esteemed by TQM. The following scenarios provide examples of how Thai cultural characteristics may affect TQM practices.

- A woman is working in a hotel. The female boss asks her to take some money to another department. Once the money arrives, it is determined that an amount is missing. For cultural reasons, the blame is always assigned to the woman who transferred the money. Thailand has a strong belief in the seniority system due to its hierarchical society. To save face for the boss and show trust in the female employee, it is unnecessary to count the money to ensure the correct amount is given. This has an implication for TQM management, since one of the critical factors is measurement. It is difficult to improve the level of quality in the process if people continue to adhere to this kind of behavior. Also, if there is no measurement in the system, it is difficult to practice continuous improvement efforts. However, if the woman has a very good relationship with the senior manager of the hotel and asks the CEO to help her, the situation will be altered. If the woman has ever completed a good deed for the CEO and he is aware of this, he will tend to return the good deed to her. Building connections is very important in Thai society; getting to know the right person can be considered an activator for success.
- In Thai society, if a manager demonstrates a high level of care, consideration, kindness, helpfulness, politeness and humbleness, it can be expected that the

staff will work well as a team and will be able to communicate with most other departments. Communication and group work efficiency within organizations can be increased by this kind of person.

- Face and dignity are extremely important to Thai people. In a meeting room, there may be many problems related to a company's success. However, if any of these particular problems are related to one of the senior managers, it is unusual for anyone to comment on them. Even if a manager has made major errors, this silence will be maintained.
- Although there is a decrease in society's trust and respect towards health care professionals, people generally trust and respect doctors in the Asian culture because it is a traditional belief that a doctor is "a selfless person who is dedicated to the well-being of the people" (Teerawattananon et al., 2003, p. 324). Under this attitude, patients do not want to question the treatment provided by doctors or blame doctors for any medical errors. It is difficult to evaluate the importance of customers' feedback for further quality improvement. Thai people also usually respect educated and professional people. It can be expected that if doctors and nurses (as providers of health services to customers) are involved in a quality development program, such as product and service design and customer relationship improvement activities, hospitals will achieve higher customer satisfaction.
- The Thai cultural characteristic of non-assertiveness can decrease the quality of the education process. In lectures, the lecturer plays a main role in delivering subject material as well as teaching students. Most Thai students are non-assertive. If Thai students do not understand the subject matter or have questions about the content, they will not ask a lecturer while he is lecturing and few students will ask after the lecture. Some may ask their friends and colleagues. The issues will remain unclear to many students because they do not seek clarification. If the lecturer asks whether the subject matter is understood, students always say that it is. When assignments are assigned, if the lecturer asks whether students are able to do it, they will always say that they are. This lack of assertiveness, to the point of students avoiding asking questions even when the opportunity to raise concerns is offered, makes it difficult to involve Thai

students in the education process. The Thai student cohort are unlikely to participate in classes.

The attitudes, norms, beliefs and values of the Thai people must be taken into account when considering the applicability of TQM in Thai organizations. It is important to note that many Asian firms have succeeded on the quality journey with similar cultural values to those identified in the lists of Thai cultural characteristics above, where good interpersonal relationships are valued as opposed to the priority placed on individual rights in Western companies. Maccoby (1994) claimed that both approaches can be used as the basis for excelling in TQM.

3.9 Conclusion

TQM incorporates a range of contemporary management concepts and can be practiced to achieve performance excellence. Many quality experts have suggested that quality principles are applicable in service industries and many organizations have attempted to implement quality management improvement within the sector. However, TQM is not an easy management practice to implement. It demands full commitment from various parties in any given organization and involves changes and restructuring that require a large time investment (Samat, Ramayah and Saad, 2006). Therefore, a study of TQM constructs, which might be key contributors for service success, is necessary. Evaluation of TQM practices to identify CSFs of TQM implementation in service industries suggests that the following practices are critical to TQM implementation in the service industry. These are: top management commitment, continuous improvement and innovation, customers' requirements, employee involvement, teamwork, supplier quality management, process management, employee training and benchmarking (Kaynak, 2003; Sila and Ebrahimpour, 2002).

Any TQM journey is unique to its respective cultural setting (Noronha, 2002). Literature demonstrates that many cultural characteristics can influence TQM implementation. National culture should be considered alongside the roles of corporate culture, structure, company leadership, firm size, technology availability and TQM knowledge. It has been suggested that linking organizational learning and TQM with the consideration of quality culture implications can facilitate transformation to a learning organization (Lam, Poon and Chin, 2006). Although the TQM philosophy and organizational culture are related, they are distinct (Baird, Hu and Reeve, 2011). TQM

can mirror the organizational culture, however organizational culture is more heavily rooted within the organization. It reflects a pattern of shared and stable beliefs and values that are developed in the firm (Baird, Hu and Reeve, 2011). Therefore, companies must facilitate an organizational culture that provides an environment that is conducive to the implementation of TQM practices.

In the case of TQM practices in Thailand, several research studies were conducted in Thailand during 1990s in order to examine the progress of TQM implementation, mostly in small and medium business and the manufacturing sector (Krasachol, Willey and Tannock, 1998; Tannock and Krasachol, 2000; Tannock, Krasachol and Ruangpermpool, 2002). These studies evaluated the application of TQM methods and tools in Thai firms. It should be noted that there are few international studies dealing specifically with the implementation of TQM in the Thai service sector. This can be considered as a research gap which the current work will fill.

The service sector is economically important for both developed and developing countries. It accounts for approximately 70% of GNP in developed countries (Beaumont and Sohal, 1999). Specifically, the service sector is critical in the success of the Thai economy because it has moved from an agricultural economy to a service-oriented economy over recent decades (NESDB, 2010). It is anticipated that Thai economic development will lead to a greater reliance on the service sector (Phusavat and Kanchana, 2008).

It is evident that the organizational cultures are significantly influenced by the national culture (Jung et al., 2008). It is hypothesized that Thai cultural characteristics have influenced TQM practices in various ways. This study will investigate the relationships between TQM implementation and cultural factors in Thailand. Through an understanding of the cultural implications when implementing TQM, managers can enhance the chance of success. Accordingly, since the influence of societal or national culture is most powerful and TQM must work within the context of the society as well as within the organization, research suggests that management needs to be aware of such associations and attempt to change the prevailing organizational culture to support TQM practices. As argued by many scholars, TQM can be more easily implemented in working environments that encourage collaborative and cooperative behavior. Managers should establish an organizational atmosphere that facilitates the extensive use of TQM

practices by motivating employees to actively contribute their skills and wisdom collectively in the business process, thereby enhancing the organization's ability to succeed in the quality journey (Prajogo and McDermott, 2005). The findings of this thesis are expected to support the existing literature regarding the influence of culture on TQM adoption and to provide valuable guidelines for companies in the discretionary application of quality management.

Based on the importance of CSFs to TQM adoption (as discussed in Chapter 2) and the significance of cultural implications to TQM implementation discussed in this chapter, this research is designed to investigate CSF practices in the Thai service sector and to explore the relationship between CSF practices and Thai cultural characteristics. The methodology for achieving these objectives is explained in detail in the next chapter. The research findings are also presented and discussed.

Chapter 4 Research Methodology

4.1 Introduction

This chapter describes the methodology of this research. The research methodology is used to guide the researcher through the process necessary in order to accomplish the objectives of the research. Many different criteria are used to classify research types such as applications, objectives and types of information sought. According to the criteria of types of information sought, research can be classified into two main groups: quantitative and qualitative research (Sukamolson, 1997; Hair et al., 2007). Both approaches can be used to capture narrative and/or numeric data (Hair et al., 2007). In quantitative and qualitative research, many research methods, such as interviews, focus groups, case studies, observations, self-completion surveys, and interviewer-completed surveys, can be employed to collect data (Hair et al., 2007). The selection of data collection methods can influence the accuracy and reliability of data. To achieve the objectives established in Chapter 1, a mixed method approach was used. To accomplish the objectives and answer the research questions of this research, it was important to combine both qualitative and quantitative approaches. In this research, both quantitative survey and qualitative case studies are employed. The use of both quantitative and qualitative data and approaches is considered to be appropriate and tends to offer the greatest benefit to research projects such as this one. This chapter explains the concepts of quantitative approaches, qualitative approaches and mixed methodology. It also gives a detailed outline of how the researcher employed survey and case study techniques in this research.

4.2 Quantitative research

Quantitative research can be defined as social research that employs empirical methods, empirical statements and empirical evaluations. This approach aims to explain phenomena by collecting numerical data that is analyzed using statistical methods (Sukamolson, 1997). In other words, quantitative research is based on numerical data analyzed statistically. The objective of quantitative research is to generalize the truth found in the samples to the population more broadly. Many types of research questions are well answered by quantitative research. For instance, quantitative research is

suitable for quantifying opinions, attitudes and behaviors to determine the feelings of an entire population for a certain issue (Sukamolson, 1997). In other instances, quantitative research is suitable for explaining phenomena and testing hypotheses (Sukamolson, 1997).

A quantitative data collection approach involves the collection of numerical data using structured questionnaires to collect primary data from individuals. Quantitative data can be gathered in many forms, including beliefs, opinions, attitudes, behavior and lifestyle characteristics, to understand the general background of individuals as well as company characteristics. A quantitative approach to data collection is often used when a well-defined research problem is established. Validation of this concept involves the use of data obtained from large-scale questionnaire surveys. There are several types of quantitative research, such as survey research, correlational research, experimental research and causal comparative research (Sukamolson, 1997). Many methods are used by researchers to collect quantitative data, including self-completion, interviewer-completion and observation (Hair et al., 2007). A self-completion survey technique is employed in this research.

4.2.1 Survey method

The survey approach is a popular type of quantitative data collection used in business research (Sukamolson, 1997; Hair et al., 2007). If the research project encompasses collection of data from a large sample of organizations, survey research is the best approach (Hair et al., 2007). Surveys employ scientific sampling and questionnaire design to measure characteristics of the population through statistics (Sukamolson, 1997). Survey research enables management to make comparisons between groups. It can provide estimates from a sample that is related to the degree of population with a degree of certainty. Survey research requires that respondents are randomly sampled. Each organization in the entire population has a known probability of being selected (Sukamolson, 1997).

There are many types of survey method, including in-person interview survey, telephone interview survey, omnibus survey and self-completion questionnaire survey (Sukamolson, 1997). Self-completion survey using structured questionnaires was employed in this research. Questionnaire survey can acquire large quantities of data. A

questionnaire consists of a standard set of questions with a range of possible answers to each question. Each answer has a separate response category, and a response category should be included for all possible answers. Questionnaire wording is very important to the accuracy of the information collected (Hair et al., 2007). Questionnaires are completed without the researcher's involvement. Respondents are expected to have the knowledge and motivation to complete the questions on their own. Structured questionnaires enable researchers to collect quantitative data from a large number of individuals in a relatively quick and convenient manner. "A structured questionnaire is a predetermined set of questions designed to capture data from respondents. It is a scientifically developed instrument for measurement of key characteristics of individuals, organizations, events and phenomena" (Hair et al., 2007, p. 205). Self-completion surveys were conducted to investigate the level of CSF practices in the hospital and university sectors of Thailand. In this study, questionnaires were delivered to respondents in two ways: postal mail and electronic mail. Given the mode of delivery, the surveys used may also be classified as mail surveys. Using mail surveys, many decisions must be made about the envelope, cover letter, length and incentive. Attractive envelopes, stationary, an official cover letter from UOW to introduce this research and researchers, and a prepaid envelope for return (included in the envelope) were used. However, the questionnaire length was considered to be long since there were 100 questions included. These factors can affect the response rate (Hair et al., 2007). To increase the number of respondents, as part of the follow up process, if the respondents preferred electronic self-completion questionnaires then the questionnaire was sent to respondents by electronic mail.

4.3 Qualitative research

Qualitative research uses non-numerical data. Many methods are employed in qualitative research (Sukamolson, 1997). The objective of qualitative research is to understand a phenomenon in which the researcher is interested. "Qualitative research aims to understand how individuals make meaning of their social world and the social world is created through social interactions of individuals with the world around them" (Hesse-Biber, 2010, p455). Qualitative research is suitable for investigating a problem in depth, to develop hypotheses and theories, to study a complex issue, and to interpret the meaning of particular circumstances. There are many methods in qualitative

research, such as ethnographic methods, interviews and in-depth case studies (Sukamolson, 1997). The primary method of a qualitative approach encompasses values reflection, and listening with aims to empower respondents and give a voice to their experiences. “A qualitative approach privileges the exploration of the process of human meaning making” (Hesse-Biber, 2010, p455). Qualitative data is usually gathered in narrative form and is often used to describe human behavior and business phenomena (Hair et al., 2007). There are two broad approaches to qualitative data collection: observation and interviews. Both interview and observation are conducted as qualitative data collection methods. Firstly, an interview occurs that allows the researcher to be involved with the participants directly. The interview helps the researcher to gather data when dealing with complex or sensitive issues and when open-ended questions are useful for collect data. To establish cooperation during the interview process, the interviewer must create a relaxed atmosphere at the start of the interview. A case study approach was applied in this research to record and reflect the qualitative perspective of the topic.

4.3.1 Case study method

Case study is an approach to qualitative research that assists researchers to explore a phenomenon within its context using a variety of data sources (Baxtor and Jack, 2008). A case study approach focuses on collecting information about a specific event or activity. It often emphasizes the situation in a particular firm or industry (Hair et al., 2007). Case study research is the most appropriate methodology for the exploratory nature of the study (Psychogios, Atanasovski and Tsironis, 2012). It is appropriate for this research for many reasons. For instance, depicting the process requires detailed descriptions of how people engage with one another. For another instance, peoples’ experiences of processes need to be captured in their own words; processes can not be fairly summarized on a single rating scale (Palinkas et al., 2011). The aim of this approach is to gather qualitative data. This qualitative approach is an appropriate tool for capturing complex relationships (Psychogios, Atanasovski and Tsironis, 2012) . The main reason for using case studies is that, to obtain a complete picture of an entire situation, researchers must examine a real life example. This approach allows researchers to identify interactions between all the variables in a real-life setting (Hair et al., 2007). “It is suitable for exploration of the impact of different institutional and

contextual factors on operation management tools and techniques as well as reconciles complexity, details and context” (Psychogios , Atanasovski and Tsironis, 2012, p127). One particular hospital and one university in Thailand were chosen to deeply investigate through case studies.

The qualitative case study method is widely used by social scientists to investigate contemporary real-life situations and to provide a general understanding of specific concepts and their application (Gdlis, 2012). Case studies can also be used to illustrate exploration of a phenomenon in its context supported by a variety of data sources (Baxter and Jackson, 2008). This research used the case study approach based on constructivist theory, which asserts that “truth is relative and that it is dependable on one’s perspective” (Baxter and Jackson, 2008, p.545). The importance of the subjective human creation of meaning is emphasized in this theory, with recognition of the limitations imposed by objectivity.

4.4 Mixed Method Research

To achieve the objectives described in Chapter 1, a mixed methodology approach was employed. Mixed method research combines both quantitative and qualitative components. One of these can predominate or equal priority can be given to both of them (Sukamolson, 1997). Mixed methods research acknowledges that all methods have inherent disadvantages (such as biases and weaknesses). Thus, the use of a mixed methodology can ensure that the combination of data is richer, more meaningful and more useful to answer the research questions (Johnson, Onwuegbuzie and Turner, 2007). Mixed methods research refers to studies involving both quantitative and qualitative research that use data collection methods to collect both quantitative and qualitative data (Johnson, Onwuegbuzie and Turner, 2007). Therefore, mixed methods must include quantitative and qualitative perspectives in the investigation and analysis of research questions. Mixed methodology involves the use of qualitative and quantitative viewpoints, data collection, data analysis and data connection techniques.

Mixed methods are mainly designed to collect, analyze and combine quantitative and qualitative data in one study. The use of quantitative and qualitative approaches to provide better understanding of research questions is a central premise for the adoption of a mixed methodology (Palinkas et al., 2011). Mixed methodology research

encompasses the integration of quantitative and qualitative data (Palinkas et al., 2011). This can occur in merging the data, connecting the data, and embedding the data (Palinkas et al., 2011). Quantitative methods are used to confirm validity by testing hypotheses, while qualitative methods are used to explore phenomenon. Therefore, mixed methodology research can be both exploratory and confirmatory research (Palinkas et al., 2011). In mixed methods research, one set of methods can be used to compensate the use of another set of methods (Palinkas et al., 2011).

Although mixing can occur in different stages of a research project, such as the data collection and data analysis stages, it has been suggested that mixing can occur at all of the stages of research (Johnson, Onwuegbuzie and Turner, 2007). In this study, mixed methods research is the type of research used to combine both quantitative and qualitative elements for the purposes of breadth and depth of understanding as well as corroboration (Johnson, Onwuegbuzie and Turner, 2007). The purposes of breadth and depth include provision of better understanding, bigger picture and deeper understanding as well as enhancement of description and understanding (Johnson, Onwuegbuzie and Turner, 2007). In response to the purpose of corroboration, the mixed methodology attempts to validate and explicate findings from another approach to produce comprehensive, consistent and valid findings. In addition, it also provides a more elaborate understanding and greater confidence in conclusions.

Sequential collection and analysis of quantitative and qualitative data is used as the structure of this research. The collection and analysis of quantitative data is followed by the collection and analysis of qualitative data. The research methodology commences with the collection of quantitative data to investigate the levels of CSF practices in the Thai university and hospital sectors in general. This is then followed by the collection of qualitative data to gather insights on cultural implications on TQM practices. Equivalent priority is given to the two phases. In this study, the methodology and results from the quantitative research influenced the methodology subsequently employed in the qualitative study. Data is integrated during interpretation. The researcher uses both quantitative and qualitative elements in a complementary fashion to answer a series of research questions for the purposes of evaluation or elaboration (Palinkas et al., 2011). In general, quantitative methods are used to measure TQM implementation practices in universities and hospitals in Thailand. In addition, qualitative methods are used to understand examples of two particular hospital/university processes, quality

management practices in the processes and the cultural implication on CSFs adoption in the processes in both sectors.

4.4.1 Quantitative component: Survey

The use of a survey in this study attempts to assist in bridging the existing research gap by providing guidelines of TQM implementation for the university and hospital sectors as well as similar service providers. The findings are expected to identify CSFs of TQM implementation as well as to review the TQM implementation level in those sectors. It is anticipated that the results will provide insightful understanding of the relationship between TQM constructs and Thai cultural characteristics. The three research questions of this study are:

1. What are the current statuses of TQM implementation in the Thai university sector, Thai hospital sector and Thai university and hospital sectors?
2. What are the CSFs of TQM implementations in the university and hospital sectors in Thailand?
3. Which Thai cultural characteristics influence TQM efforts in the university and hospital sectors in Thailand?

The scope of the investigation of CSFs in this study incorporates:

- Management commitment
- Role of the quality department
- Training and education
- Employee involvement
- Continuous improvement
- Supplier partnership

- Product/service design
- Quality policies
- Quality data and reporting
- Communication to improve quality and
- Customer satisfaction orientation.

The Thai culture characteristics that are considered in this study are:

- *Krengjai* (taking other people feeling into consideration)
- Pride of face and dignity
- Grateful relationships
- Flexibility over principles
- Non assertiveness
- Care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness
- Education and competence orientation
- Fun and humorous in nature
- Appreciation of social connection (i.e. getting to know the right person)
- Appreciation of social recognition, and
- Mutual help.

Structured questionnaires enable researchers to collect quantitative data from a large

number of individuals in a relatively quick and convenient manner. The questionnaire in this research was developed based on Antony et al.'s (2002) study of CSFs of TQM implementation in Hong Kong industries. The questionnaire design can be argued to be robust given that it was derived from the published work of other leading TQM academics (Antony et al., 2002; Black and Porter, 1996; Saraph, Benson and Schroeder, 1989). Reasons for the selection of this research as the basis of the questionnaire were that Antony et al.'s (2002) questionnaire was designed for application in a location that was similar to the current study (i.e. another Asian country) and it was designed to be applied across a variety of industries. A review of the eleven CSFs developed by Antony et al. (2002) determined that the questionnaire content should be sufficiently comprehensive to represent most quality efforts under TQM practices.

The purpose of the questionnaire (see Appendix 2) applied in this study was to use the perceptions and experiences of universities and hospitals in Thailand that have adopted TQM to study the level of CSFs adoption in their TQM implementation process. Prioritization of CSFs of TQM still remains a problem for decision makers in many organizations (Khanna, Sharma and Laroia, 2011). The questionnaire consisted of three parts. Part A collected general information about participant organizations, including the company size, type of industry, location, number of employees, and working period. This part of the questionnaire was used to provide a description of background issues of the respondents' organization. Part B consisted of 72 statements about the adoption of CSFs, used to represent the eleven CSFs of TQM implementation. The 72 statements, categorized into these eleven CSFs, are listed in Table 4.1 below. Part C of the questionnaire consisted of 28 statements relating to the negative and positive relationships between CSFs, TQM success and Thai cultural factors. These statements were used to measure the participants' perceptions of the impact of cultural factors on TQM adoption. The statements, which were grouped into eleven cultural factors, are listed in 4.2 below. During the data analysis process, the Director of the School of Mathematics and Applied Statistics at the University of Wollongong (UOW), Dr Marijka Batterham, was engaged by the UOW Statistical Consulting Service to assist the research. This facilitated the researcher to establish a clear research hypotheses, to effectively analyze statistical data and to better present the research outcomes. The relationship between the CSFs and the Thai cultural characteristics was studied using

hypothesis testing (see Table 4.3). Appendix 1 on page 157 shows the complete list of 55 hypotheses.

Table 4.1 Critical Success Factors and related statements

| CSF reference | CSF description | Statement numbers | Statements | |
|---------------|--------------------------------|-------------------|------------|--|
| F1 | Management commitment | 1-11 | 1 | Top management should take responsibility for quality performance. |
| | | | 2 | All department heads are responsible for quality. |
| | | | 3 | Top management support a long term quality improvement process. |
| | | | 4 | There is participation in the quality improvement process by department heads. |
| | | | 5 | Top management considers the importance of quality in relation to cost and schedule objectives. |
| | | | 6 | The company has clear, consistent communication of mission statement and objectives. |
| | | | 7 | The company specifies quality goals at all levels. |
| | | | 8 | Quality goals and policy are understood within the company. |
| | | | 9 | The top management considers quality improvement as a way to increase profit. |
| | | | 10 | The company has a comprehensive quality plan. |
| | | | 11 | The top management shows their commitment to employee training. |
| F2 | Role of the quality department | 12-17 | 12 | Quality department is generally visible. |
| | | | 13 | Quality department has access to top management. |
| | | | 14 | Quality department is self-sufficient. |
| | | | 15 | Quality staff professionals are utilized as a consulting resource. |
| | | | 16 | Quality department can improve quality effectively. |
| | | | 17 | Quality awareness measures among employees are effective. |
| F3 | Training and education | 18-28 | 18 | Specific work skills training (technical and vocational) are given to employees throughout the company. |
| | | | 19 | There are programs in the company that develop teamwork between employees. |
| | | | 20 | Quality-related training is given to managers, supervisors and employees. |
| | | | 21 | Training in the total quality concept is given. |
| | | | 22 | Training of employees to implement quality circle program is provided. |
| | | | 23 | Employees are trained in statistical improvement techniques (e.g. histograms, control charts etc.). |
| | | | 24 | Training in advanced statistical techniques (such as design of experiment and regression analysis) is conducted by the company. |
| | | | 25 | There is availability of resources for employee training in the company. |
| | | | 26 | There is training in interactive skills (such as communication skills, effective meeting skills, and empowerment and leadership skills). |
| | | | 27 | There is training in problem identification and solving skills as well as quality improvement skills. |
| | | | 28 | Quality awareness building among employees is ongoing. |

| CSF reference | CSF description | Statement numbers | Statements | |
|---------------|------------------------|-------------------|------------|--|
| F4 | Employee involvement | 29-32 | 29 | Quality circle or employee involvement type programs are implemented in the organization. |
| | | | 30 | There is participation in quality decisions by non-supervisory employees. |
| | | | 31 | Employees are recognized for superior quality performance. |
| | | | 32 | Top management pushes decision making to the lowest practical level. |
| F5 | Continuous improvement | 33-37 | 33 | Top management reviews quality issues in their meetings. |
| | | | 34 | Feedback is provided to employees on their quality performance. |
| | | | 35 | Unit heads and managers assume active roles as facilitators of continuous improvement, coaches of new methods, mentors and leaders of empowered employees. |
| | | | 36 | The company improves and assesses their processes, product and services. |
| | | | 37 | Quality data is used to evaluate supervisor and managerial performance. |
| F6 | Supplier partnership | 38-44 | 38 | Suppliers are selected based on quality instead of price or schedule. |
| | | | 39 | The company applies a supplier rating system. |
| | | | 40 | Technical assistance improves the quality and responsiveness of suppliers. |
| | | | 41 | The suppliers are involved in the product development process. |
| | | | 42 | Clarity of specifications are provided to suppliers. |
| | | | 43 | Purchasing department is responsible for the quality of incoming product/service. |
| | | | 44 | The suppliers have programs to assure quality of their product/service. |
| F7 | Product/service design | 45-50 | 45 | Thoroughness of new product/service design reviews before the product/service is produced and marketed. |
| | | | 46 | There is co-ordination among affected departments in the product/service development process. |
| | | | 47 | New product/service development process meets expected level. |
| | | | 48 | The company analyses customer requirements in product/service development process. |
| | | | 49 | Clarity of product/service specifications and procedures is provided. |
| | | | 50 | Sales and marketing people consider quality a saleable attribute. |
| F8 | Quality policies | 51-60 | 51 | Strategies focused on quality are implemented. |
| | | | 52 | The company conducts acceptance sampling to accept/reject lots of batches of work. |
| | | | 53 | The company uses statistical control charts to control processes. |
| | | | 54 | There is a policy of preventive equipment maintenance. |
| | | | 55 | It is important to inspect, review or check processes, products and services. |
| | | | 56 | The company checks and reviews amount of incoming, in-process and final inspection. |

| CSF reference | CSF description | Statement numbers | Statements | |
|---------------|-----------------------------------|-------------------|------------|---|
| | | | 57 | The company checks and reviews amount of final inspection. |
| | | | 58 | Workers practice self-inspection of work. |
| | | | 59 | Clarity of work or process instructions given to employees. |
| | | | 60 | Zero defects as the quality performance standard is pursued. |
| F9 | Quality data and reporting | 61-64 | 61 | Quality data (cost of quality, defects, errors, scrapes, etc) is used as tool to manage quality. |
| | | | 62 | Quality data is available to employees. |
| | | | 63 | Quality data is available to managers and supervisors. |
| | | | 64 | Quality data, control charts etc., are displayed at employee work station communication to improve quality. |
| F10 | Communication to improve quality | 65-68 | 65 | Quality techniques/tools are used to solve problems. |
| | | | 66 | Good communication occurs between different departments. |
| | | | 67 | Work standards are based on quality and quantity rather than quantity alone. |
| | | | 68 | The company has effective top-down and bottom-up communication. |
| F11 | Customer satisfaction orientation | 69-72 | 69 | The company commits to customers through strengthening of policies, etc. |
| | | | 70 | The company compares customer satisfaction with competitors and internal indicators. |
| | | | 71 | The company conducts benchmarking of direct competitors' products and processes. |
| | | | 72 | There are determinations of improvements in customer satisfaction throughout the company. |

Table 4.2 Thai cultural characteristics and related statements

| Thai cultural characteristic reference | Thai cultural characteristic description | Statement numbers | Statements | |
|--|---|-------------------|------------|---|
| C1 | Krengjai (taking other people feeling into consideration) | 73 | 73 | The Thai cultural characteristic of ‘Krengjai’ (taking other people feeling in to consideration) can hinder the continuous improvement efforts. |
| C2 | Pride of face and dignity | 74-77 | 74 | The Thai cultural characteristic of pride of face and dignity can hinder the success of continuous improvement in regard to employee involvement. |
| | | | 75 | The Thai cultural characteristic of pride of face and dignity can hinder the success of continuous improvement in regard to communication within the company. |
| | | | 76 | The Thai cultural characteristic of pride of face and dignity can hinder evaluation and performance feedback of employee. |
| | | | 77 | The Thai cultural characteristic of pride of face and dignity can be used in rewards and recognitions of employees’ success. |
| C3 | Grateful relationships | 78-81 | 78 | The Thai cultural characteristic of grateful relationship can improve the level of communication within the company. |
| | | | 79 | The Thai cultural characteristic of grateful relationship can promote loyalty from employees through effective reward and recognition system. |
| | | | 80 | The Thai cultural characteristic of grateful relationship can improve the level of teamwork and employee involvement. |
| | | | 81 | The Thai cultural characteristic of grateful relationship can hinder evaluation and performance feedback of employees. |
| C4 | Flexibility over principles | 82-86 | 82 | The Thai cultural characteristic of flexibility over principles can hinder the effectiveness of products and services of the company. |
| | | | 83 | The Thai cultural characteristic of flexibility over principles can hinder TQM implementation. |
| | | | 84 | The Thai cultural characteristic of flexibility over principles can hinder the effectiveness of employee involvement. |
| | | | 85 | The Thai cultural characteristic of bending the rule can hinder quality policy implementation. |
| | | | 86 | The Thai cultural characteristic of bending the rule can improve the effectiveness of customer service. |
| C5 | Non-assertiveness | 87-89 | 87 | The Thai cultural characteristic of non-assertiveness can improve the effectiveness of TQM implementation. |

| Thai cultural characteristic reference | Thai cultural characteristic description | Statement numbers | Statements | |
|--|--|-------------------|------------|---|
| | | | 88 | The level of communication within the firms can be improved by the Thai cultural characteristic of non-assertive characteristics. |
| | | | 89 | Working in group can be improved by the Thai cultural characteristic of non-assertive characteristics. |
| C6 | Care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness | 90-95 | 90 | The Thai cultural characteristic of care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness can improve the level of communication in the company. |
| | | | 91 | The Thai cultural characteristic of care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness can improve teamwork. |
| | | | 92 | The Thai cultural characteristic of care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness can improve the level of employee involvement. |
| | | | 93 | The Thai cultural characteristic of care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness can improve effectiveness of customer service. |
| | | | 94 | The Thai cultural characteristic of care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness can lead to ineffectiveness of employee involvement. |
| | | | 95 | The Thai cultural characteristic of care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness can improve continuous improvement. |
| C7 | Education and competence orientation | 96 | 96 | The Thai culture value of education and competence orientation can encourage employee participation in new training programs |
| C8 | Fun and humorous in nature | 97 | 97 | Thai social interactions are of fun and humorous in nature can improve the level of communication in teamwork and employee involvement. |
| C9 | Social connection (i.e.getting to know the right person) | 98 | 98 | The Thai cultural characteristic of 'getting to know the right person' can hinder employees pursuing performance excellence. |
| C10 | Social recognition | 99 | 99 | The Thai cultural characteristic of social recognition can encourage employees pursuing performance excellence. |
| C11 | Mutual help | 100 | 100 | The Thai cultural characteristics of mutual help can facilitate employee involvement and communication to improve quality. |

Respondents were asked to express their opinions based on a 5-point Likert scale. In the Thai university sector, the respondents' positions were expected to include the University Chancellor, Vice Chancellors of all sections, Dean and Sub-Dean of all faculties, and the quality department director and personnel. In the Thai hospital sector, the respondents were expected to include executives, directors, quality department managers and staff, and general administration managers. If any of these positions were not available, other positions that were familiar with quality management practices in the organization and were willing to participate in the survey were accepted. A value of '5' represented a very high frequency of practice and a value of '1' represented a very low frequency of practice. The Likert scale responses were used to collect an understanding of the existing level of TQM adoption in each of the surveyed organizations in the Thai university and hospital sectors. The findings were expected to describe the TQM adoption situation across the hospital and university sectors. The results could also be used to reflect the state of TQM practices and level of TQM adoption in the Thai service sector generally. Since the questionnaire was prepared to examine the level of practice associated with each of the CSFs, the review of these levels of CSF practice will be used in this study to determine whether the TQM implementations can be considered to be effective in the sectors through assessment of the level of each CSF for TQM implementation. The questionnaire was designed for self completion by management and quality department staff, and was distributed as a postal survey. In order to increase the response rate, the questionnaire was translated into Thai language for Thai participants. The translation was checked by three Thai quality experts in the education sector to ensure the content validity (see Appendix 3). These experts included: Professor Emeritus Dr. Somwang Pitiyanuwat, the former Director of the Office for National Education Standards and Quality Assessment (ONESQA) in Thailand; Assistant Professor Preamjai Aueaungkul, Dean of Faculty of Education of SKRU and the senior executive managing of ONESQA network at SKRU; and senior lecturer Punee Chaiyo, Board of Directors of Basic Education in Thailand, holding a Masters degree M.Ed. (Adult Education) from University of Florida, USA, with expertise in quality management and fluency in the English and Thai languages. These experts have worked to enhance the quality standards of the educational sector in Thailand for many years. Table 4.3 shows the hypothesis testing between the CSFs and the cultural characteristics. "Hypothesis is a tentative explanation that accounts for a set of facts and can be tested by further investigation" (Sukamolson, 1997, p11).

Table 4.3 Hypothesis testing between CSFs and Thai cultural characteristics

| CSFs/Thai cultural characteristics | F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F9 | F10 | F11 |
|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|
| C1 | | | | | H19 | | | | | | |
| C2 | | | | H10 | H20 | | | H33 | H37 | H41 | H49 |
| C3 | | | | H11 | | | | H34 | H38 | H42 | H50 |
| C4 | H1 | H3 | H5 | H12 | H21 | H27 | H29 | H35 | H39 | H43 | H51 |
| C5 | H2 | H4 | H6 | H13 | H22 | H28 | H30 | H36 | H40 | H44 | H52 |
| C6 | | | | H14 | H23 | | | | | H45 | H53 |
| C7 | | | | | H24 | | | | | | |
| C8 | | | H7 | H15 | | | | | | | |
| C9 | | | H8 | H16 | H25 | | H31 | | | H46 | H54 |
| C10 | | | H9 | H17 | H26 | | H32 | | | H47 | H55 |
| C11 | | | | H18 | | | | | | H48 | |

The main method of data collection was a postal survey. A simple random selection technique was used to select 205 hospital participants from 420 Thai hospitals and 107 university participants from 146 Thai universities. Questionnaires were mailed to the selected Thai hospitals and universities, requesting their participation. To improve the response rate, follow up contact was made using electronic mail, telephone and personal interviews to encourage respondents to participate in the survey. The questionnaires were addressed to the University Chancellor, Vice Chancellors of all sections, Deans and Sub-Deans of all faculties, and the quality department director and personnel in the university sector, while in the Thai hospital sector they were addressed to executives, directors, quality department managers and staff, and general administration managers. If these positions were not available, any positions that were familiar with quality management practices in the organization and were willing to participate in the survey were accepted. These roles were chosen because it was expected that respondents in such positions would be familiar with the TQM implementation and other quality performance controls within the organization.

4.4.2 Qualitative component: Case studies

The aims of the case studies were: to examine how the CSFs of TQM implementation are embraced in the Thai hospital and university sectors; and to explore how Thai cultural characteristics influence CSFs practices in the Thai hospital and university sectors. Case study research, which is applied across many disciplines (Gdlis, 2012), was determined to be an appropriate methodology for use in this research. This selection was based on the position that a case study approach is suitable when the study in question is concerned with answering a “how” question and when the boundaries or relationship between the phenomenon and context are unclear (Baxter and Jackson, 2008). Case study research focuses on detailed contextual analysis of a limited number of factors and their relationships, helping researchers to gain an understanding of complex issues (Gdlis, 2012). Since one of the main aims of this study is to investigate how Thai cultural characteristics influence TQM adoption in the Thai university and hospital sectors, exploring the complicated cultural behaviors of people is difficult to consider outside of the context. One advantage of the case study methodology is its ability to help the researcher to understand both simple and complex phenomena. The selected methodology enabled the researcher to focus on multiple facets of the phenomenon that were to be reviewed and understood (Baxter and Jackson, 2008). The findings of this research can be used to confirm and contribute to the findings of previous research (Gdlis, 2012).

The two case studies – Nakornthon Hospital and Songkla Rajabhat University (SKRU) – were the units of analysis for this study. Each case study organization was moving toward successful implementation of TQM. In this study, successful TQM implementation is not assessed based on market share, customer satisfaction or profitability. Rather, any organization that has a high level of CSF practices is considered as moving toward successful implementation of TQM. This research was conducted using qualitative case study analysis to investigate how Nakornthon Hospital and SKRU embrace the CSFs of TQM implementation as well as to explore how Thai cultural characteristics positively and negatively influence TQM adoption in these organizations.

Case study research involves a large amount of data from multiple sources. To prevent the researcher from losing sight of the purpose of the research due to this potentially

overwhelming data, it is important to establish research questions (Gdlis, 2012). The two main research questions for this research are:

1. How do Nakornthon Hospital and SKRU practice the CSFs of TQM implementation?
2. How do Thai cultural characteristics affect CSFs practices in Nakornthon Hospital and SKRU?

Structured interviews were conducted in this research. The researcher used an interview sequence and well-designed open-ended questions during the interview processes. For each interview, a similar interview sequence was used; the researcher attempted to avoid biases that can result from inconsistent interviewing practice. A standardized approach ensured that responses and results are comparable between interviews. Moreover, observation data was gathered by systematically recording observations of people and the interactions with organizations' processes. Individuals did not know that their behavior was being observed.

The researcher began with a review of the literature to determine the findings of prior studies. For each case study, documentation, direct observation and an in-depth interview were used to collect data from the management perspective. The examination of documentation was conducted by gathering organizational documents. In the hospital case study, documents included the quality policy document, quality-related written materials used to describe the organization and its purpose, Nakornthon Hospital website content, a copy of the Hospital's mission, and copies of news, clippings and brochures that related to the Hospital. Direct observation of the out-patient journey was also used as a tool for data collection.

In 2010, interviews were conducted with the Quality Department Manager of Nakornthon Hospital and the Vice-Rector for Administration of SKRU. These interviews were used to collect in-depth information about the current practices and current adoption of quality management in each of the case study organizations. This research applied open questions to guide the interviewer during the interview process. This ensured uniformity and consistency across the data collection process. Interview questions included:

- What are the quality issues in Nakornthon Hospital [SKRU]?
- How does Nakornthon Hospital [SKRU] describe the patients' [students'] journey and related processes?
- What are the current quality management practices in Nakornthon Hospital's [SKRU's] processes?
- How are quality practices currently applied?
- Which Thai cultural characteristics influence quality management practices in Nakornthon Hospital [SKRU]?
- What are the areas for potential improvement in the process that could improve quality in Nakornthon Hospital [SKRU]?
- How do Thai cultural characteristics influence TQM practices in Nakornthon Hospital [SKRU]?

The interviews were structured around the research questions that were previously identified in this study. Both written notes and a voice recording were taken during the interview process. During the interview process, the scope of the case study was explained to provide context for the interviewee. In brief, the first case study was concerned with Nakornthon Hospital's TQM practices and adoption of CSFs. The out-patients' journey was considered with particular focus on current quality issues, areas for quality development and the impact of Thai cultural characteristics. The second case study was concerned with SKRU's TQM practices and the adoption of CSFs. The students' journey was considered with particular focus on current quality issues, areas for quality development and the impact of Thai cultural characteristics.

Interviews were conducted in the Thai language (the native language of the interviewees) and answers were recorded in Thai. The information was subsequently translated into English. The Dean of the Faculty of Education at SKRU was engaged to verify the translations. Two interviews were conducted. In 2010, the hospital quality department manager of Nakornthon Hospital and the Vice-Rector for Administration of SKRU were interviewed. The Vice President of the university selected the Vice-Rector for Administration as the most appropriate interviewee, while the hospital CEO selected

their quality department manager as the most appropriate interviewee. In 2011, the interview questions were sent by email to another member of management personnel in each of the organizations. This second set of responses was collected as the study progressed to determine further facts, opinions, unexpected insights and changes over time. It has been suggested that information gathered from managers at a variety of managerial levels as well as other employees involved can provide more value, quality, depth and efficiency (Psychogios, Atanasovski and Tsironis, 2012). This can ensure that the issue is not explored through a single lens, but rather allows multiple aspects of the phenomenon to be investigated and understood (Baxter and Jack, 2008).

The initial interviews and the subsequent interviews in 2011 were conducted in two different periods, however both were used to collect information about the hospital's and university's processes, including through the collection of flowcharts and other similar documents, and to discuss related quality issues. While initially it was expected that only one round of interviews would be required, it was identified during the process of research completion that there was a need for additional information. Consequently, in 2011 the Dean of the Faculty of Education of SKRU and CEO of Nakornthon Hospital were approached to answer the same open questions that were used in the first interview by email. Attempts were made to follow up the information by telephone. In the second interview, email and telephone were used to collect the data (instead of face to face interviews) because it was not possible for the researcher/interviewer to travel to Thailand. The researcher chose to conduct the second round of interviews with different people to the first round because, as explained above, data gathered from management at different managerial levels can provide a greater depth of information. The written data collected (i.e. from emails) was well structured and clearly explained but not fully detailed, while the data collected from verbal (i.e. telephone) interviews was rich and fully detailed, containing both unexpected and insightful information. In this research, the two sets of data were compared, combined and analysed together to produce more accurate and meaningful information and results.

The case analysis technique was used to identify unique patterns in the data within each case study. Cross case analysis followed, with the researcher examining the collected data from both Nakornthon Hospital and SKRU, and categorizing the similarities and differences in the case study findings. This data analysis technique drew heavily on the qualitative interview information and academic journals within the topics of TQM in

hospitals and TQM in universities. These case studies can be considered as exploratory case studies. ‘Exploratory study’ refers to a study that is used to explore the situations in which the intervention being evaluated, where there is no consensus (Baxter and Jackson, 2008). Literature discussed in previous chapters has shown that there has been a lack of studies considering the implementation of TQM in Thailand and that the relationships between cultural factors and TQM implementation are complex and unclear. As well as addressing these gaps in the literature, this research also explores and seeks to understand the similarities and differences between Nakornthon Hospital and SKRU.

4.5 Sampling Method

There are four broad categories of sampling procedures in the social and behavioral sciences: probability sampling, purposive sampling, convenience sampling and mixed methods sampling (Teddle and Yu, 2007). The probability sampling technique is mainly used in quantitative studies (Teddle and Yu, 2007). It includes selection of a relatively large number of units from a population in a random manner. The probability of inclusion of every member of the population should be determined. Probability sampling attempts to represent an entire population. As is common for survey research, a simple random sampling was conducted in this research by drawing names of hospitals and universities out of a box. Random sampling occurs when each sampling unit in a clearly defined population has an equal chance of being included in the sample (Teddle and Yu, 2007), and the probability of a unit being selected is not affected by the selection of other units from the accessible population.

Samples for this study were drawn from the hospital and university sectors. The data collection process began with a search of information about hospitals and universities in Thailand, as hospitals and universities participating in this research needed to have implemented quality management practices prior to the commencement of this research. There were no consolidated listings of Thai hospitals and universities that practiced TQM. However, the adoption of quality management practices, ISO certification, ONESQA, HA and HPH in hospitals and universities can be identified. Adherence to quality awards such as ISO, HA, HPH can be identified across the hospital sector nationally. In the higher education sector, the baseline for Thailand’s quality assurance framework lies in the establishment of standards, criteria and requirements for all levels

of degree programs offered. These quality awards and standards were used as a proxy for the adoption of TQM practices.

From all hospitals and universities in Thailand, a simple random selection of a sample was used, with emphasis placed on selecting organizations that had adopted quality management practices. Sample participants were selected as follows:

- Hospital sector: Thai hospitals registered with the Ministry of Public Health (MOPH) including both government hospitals and private hospitals in Thailand (MOPH, 2012). MOPH is the main public agency aiming to develop a quality health system in terms of efficiency of providers and equity of access to the service. Its main task is to ensure that Thai people have healthy lives. MOPH plays an important role in determining national health policies in response to the changing environment and developing an effective health care system for Thai people (MOPH, 2012; Teerawattananon et al., 2003).
- University sector: Higher education institutions in Thailand comprise public and private universities, institutions, colleges, and community colleges (UNESCO, 2013). Among the institutions, universities play an important role in Thai higher education. In Thailand, public and private universities are established under jurisdiction of the Commission on Higher Education (CHE), Ministry of Education of Thailand. They aim to provide education at tertiary level and grant degrees, diplomas and other credentials. In university sector of Thailand, quality assurance mechanisms include Office for National Education Standards and Quality Assessment (ONESQA) and Bureau of Standards and Evaluation, Commission on Higher Education (Thai) (UNESCO, 2013).

Since Thai hospitals and universities are expected to improve quality (MUA, 2013; HA, 2013), they have adopted quality management practices such as the establishment of quality departments and the application of continuous improvement concepts, management commitment to quality and the encouragement of staff involvement and participation. All Thai hospitals and universities are two population groups in this research.

The total number of hospitals in Thailand is not officially known since this data has not been collected and updated in recent times. In this research, the population of the

hospital sector was drawn from two different groups of data. Firstly, the number of public hospitals was gathered from the Thai government website (SSO, 2013). According to the list of hospitals providing a public service to the Thai people in 2010, the total number of public hospitals was 215. The number of private hospitals derived from the Private Hospital Association website (PHA, 2013) was 205. Therefore, the population of the hospital sector was determined to be 420. In terms of the Thai university sector, there were 146 public and private universities in Thailand (MUA, 2013). The number of public universities was 78 and the number of private universities was 68. There are many constraints, such as budget and time, that make investigation of the entire population infeasible. Yamane (1967) provides a simplified formula to identify appropriate sample sizes. The formula is shown below:

$$n = \frac{N}{1 + N(e)^2}$$

Where n is the sample size, N is the population size, and e is the level of precision. This research desires a 95% confidence level and 5% precision, so the e value is 0.05. When this formula is applied to define sample sizes of the hospital and university sectors for this research, the sample size for Thai hospitals and universities are 205 and 107 respectively. Due to concerns about a possible low response rate, an additional 28 participants are included (15 respondents for the hospital sector and 13 respondents for the university sector). In the hospital sector, a simple random sampling technique was used to select the 220 participants from 420 hospitals. After 220 hospitals were randomly selected from the entire population of the hospital sector in Thailand, 220 questionnaires were sent to the selected respondents. In the university sector, the 120 universities were randomly selected from the university sector (MUA, 2013). 120 questionnaires were sent out to the selected universities. It was determined that, if the response rate was still too low, the researcher would select another random sample of respondents from the entire population and send them questionnaires.

In terms of case studies, purposive sampling techniques are primarily used in qualitative studies (Teddlie and Yu, 2007). This technique can be defined as selecting units (i.e. organizations) based on specific purposes associated with answering a research question. Particular organizations are deliberately selected for the important information

they can provide that cannot be gathered from studies of other organizations (Teddlie and Yu, 2007). For case study research, a purposive sampling technique can be used to select participants. This sampling aims to achieve representativeness or comparability. There are six types of purposive sampling procedures that are based on achieving representativeness or comparability: typical case sampling, extreme or deviant case sampling, intensity sampling, maximum variation sampling, homogeneous sampling, and reputational sampling. Typical case sampling and reputational sampling were used in this research to select SKRU and Nakornthon Hospital respectively. The results from the quantitative research (survey) influenced the selection method for the qualitative research (case studies).

From the above, it is evident that this research encompasses both quantitative and qualitative sampling techniques. Thus, the sampling technique for this research is mixed methods sampling. A mixed methods sampling strategy encompasses the selection of units or cases for research by using both a probability sampling technique and a purposive sampling technique. In this research, when addressing the quantitative strand of this research, the researcher focused on generating representative samples, while when addressing the qualitative strand, the researcher typically used sampling techniques that yield information rich cases. Such a combination of qualitative and quantitative research enables researchers to generate complementary databases that include information with both depth and breadth regarding the phenomenon of studies (Teddlie and Yu, 2007).

4.6 Conclusion

A mixed methodology was employed in this research to accomplish the research objectives established in Chapter 1. It comprises both quantitative aspects (survey) and qualitative aspects (case studies). A survey technique was used to investigate the current status of TQM implementation, identify CSFs of TQM implementations and define Thai cultural characteristics influencing TQM efforts in Thailand's university and hospital sectors. Case studies were used to understand how a Thai hospital and university practice CSFs of TQM implementation as well as how Thai cultural characteristics affect CSFs practices in these organizations. This research combines public and private organizations together because in Thailand's hospital and university sectors, public and private hospitals/universities have similar quality control mechanisms and quality

control criteria. However, since private and public organizations are different in their natures, stratified simple sampling should be used to identify the percentage of public and private sectors in order to get more accurate results. It is important to note that different sizes of organization can have an impact on CSF adoption in the hospital and university sectors. For instance, large hospitals tend to have high availability of funds so it is common to see the establishment of quality department in large hospitals. However, many CSFs, such as management commitment, customer focus and employee involvement, can be practiced in service organizations regardless of whether they are large or small.

Chapter 5 Survey of Thai university and hospital sectors

5.1 Introduction

This chapter presents the results of the questionnaire on Critical Success Factors (CSFs) for Total Quality Management (TQM) implementation in organizations in the Thai university and hospital sectors. A probability sampling technique was used to select the participant organizations from the relevant population (the Thai hospital and university sectors). Thai hospitals and universities are expected to practice quality at a certain level (The Private Hospital Association, 2013; HA, 2013; MUA, 2013; ONESQA, 2013). It can be seen that hospitals and universities in Thailand adopt quality management practices under different approaches such as 5S, continuous quality improvement, ISO, TQA, HA, HPH and ONESQA. They therefore broadly practice quality management at a certain level, but under various schemes. Consequently, all Thai hospitals and universities are considered as part of the populations of this research. The chapter provides a discussion of the relationship between TQM, CSFs and the role of culture before outlining the questionnaire methodology, design, sample selection, data analysis and results. A discussion of the findings concludes the chapter.

5.2 Survey Results

5.2.1 Profile of respondents

From the previous chapter, the total numbers of hospitals and universities in Thailand was determined to be 420 and 146 respectively. Yamane (1967) provides a simplified formula to identify appropriate sample sizes. The formula is shown below:

$$n = \frac{N}{1 + N(e)^2}$$

Where n is the sample size, N is the population size, and e is the level of precision. This research desires a 95% confidence level and 5% precision so the e value is 0.05. When this formula is applied to define sample sizes of the hospital and university sectors for this research, the sample sizes of Thai hospitals and universities are 205 and 107 respectively. An additional 28 participants (15 hospitals and 13 universities) are included at this stage because of the issue of low response rates. In this research, 220

hospitals and 120 universities were randomly selected as representatives of the hospital and university sectors by drawing names out of a box. 340 questionnaires were sent out and 127 responses were received, for a response rate of 37.35 percent (40.71 percent of expected sample size). In the hospital sector, 84 questionnaires were returned, for a response rate of 40.98 percent. In the university sector, 43 questionnaires were returned, for a response rate of 40.19 percent. The data was analyzed using the statistical software system SPSS version 19.0. Chi-square tests were conducted to investigate whether there were any significant relationships between each CSF and the Thai cultural characteristics.

The general characteristics of respondents are presented in Table 5.1 to Table 5.7. They provide an indication of the eligibility of the respondents to complete the questionnaire.

Table 5.1 shows the educational level of respondents. In the university sector, most respondents are at master and PhD level, accounting for 95% of all respondents. In the hospital sector, the educational levels of most respondents are at bachelor level and above, which accounts for 97%. The percentage of respondents with a bachelor level of education in the university sector is 5%, whereas the percentage in the hospital sector is 69%. In addition, the percentage of respondents holding master level of education in the university is 65% while the percentage in the hospital sector is 23%. The ‘non-university qualification’ respondents are those without a university-level qualification.

Table 5.1 Education level of respondents

| Education level | University | | Hospital | | Total | |
|-------------------------------------|------------|------------|----------|------------|--------|------------|
| | Number | Percentage | Number | Percentage | Number | Percentage |
| Non-university qualification | 0 | 0 | 2 | 2% | 2 | 2 % |
| Bachelor | 2 | 5% | 58 | 69% | 60 | 47% |
| Master | 28 | 65% | 19 | 23% | 47 | 37% |
| PhD | 13 | 30% | 4 | 5% | 17 | 13 % |
| Unknown | 0 | 0 | 1 | 1 % | 1 | 1% |
| Total | 43 | 100% | 84 | 100% | 127 | 100% |

Table 5.2 shows the role of the respondents in their organization. In the university sector, most respondents were at management level (67%), with half of the total respondents classifying themselves as top management. 33% of respondents were staff (i.e. not management). These non-management positions include university consultants,

permanent lecturers and human resource personnel. In the hospital sector, over half (59%) of the respondents were non-managers. Overall across the total responses in both sectors, half of the respondents were managers and half were employees. Although it was expected that the questionnaires would be completed by those in management positions to ensure familiarity with quality management concepts, the responses from the hospital sector were from non-managers. This may be because managers were not available to participate in the survey.

Table 5.2 Work role of respondents

| Position of respondent | University | | Hospital | | Total | |
|------------------------|------------|------------|----------|------------|--------|------------|
| | Number | Percentage | Number | Percentage | Number | Percentage |
| Top management | 22 | 51% | 4 | 5% | 26 | 21% |
| Middle manager | 7 | 16% | 30 | 36% | 37 | 29% |
| Non manager | 14 | 33% | 50 | 59% | 64 | 50% |
| Total | 43 | 100% | 84 | 100% | 127 | 100% |

Table 5.3 shows the years of work experience in the current position of the respondents. In the university sector, 42% of respondents had worked in that position in their university for more than five years. 91% of respondents had been employed in the same position for more than a year. In the hospital sector, 63% of respondents had worked in the same position for more than five years. 95% of respondents had been employed in the same position for more than a year.

Table 5.3 Working period in current position of respondents

| Working period | University | | Hospital | | Total | |
|----------------------|------------|------------|----------|------------|--------|------------|
| | Number | Percentage | Number | Percentage | Number | Percentage |
| Less than one year | 4 | 9% | 3 | 4% | 7 | 5% |
| One to three years | 16 | 37% | 13 | 16% | 29 | 23% |
| Three to five years | 5 | 12% | 15 | 18% | 20 | 16% |
| More than five years | 18 | 42% | 53 | 63% | 71 | 56% |
| Total | 43 | 100% | 84 | 100% | 127 | 100% |

Table 5.4 shows the location of the respondents' organizations. In the university sector, 28% of participants were in the Northeast region of Thailand. 21% of respondents were located in the South region and 21% in the Middle region. 5% of respondents were in

the East region. In the hospital sector, most respondents were located in the Middle and South regions of Thailand, accounting for 41% and 39% respectively. 6% of respondents were in the East region and 9% of participants were in the North region. The results show that the respondents come from all regions of Thailand. The findings are expected to represent TQM practices in hospitals and public universities in Thailand in general.

Table 5.4 Location of organizations

| Location | University | | Hospital | | Total | |
|-----------|------------|------------|----------|------------|--------|------------|
| | Number | Percentage | Number | Percentage | Number | Percentage |
| South | 9 | 21% | 32 | 39% | 41 | 32% |
| North | 8 | 18% | 3 | 4% | 11 | 9% |
| East | 2 | 5% | 6 | 7% | 8 | 6% |
| Northeast | 12 | 28% | 8 | 10% | 20 | 16% |
| Middle | 9 | 21% | 34 | 41% | 43 | 34% |
| Unknow | 3 | 7% | 1 | 1% | 4 | 3% |
| Total | 43 | 100% | 84 | 100% | 127 | 100% |

Table 5.5 shows the type of ownership of each organization. In the university sector, 88% of respondent organizations are public sector. The sample in the university sector shows that respondents were mainly in the Rajabhat University system: 28 Rajabhat universities accounted for 65% of the universities included in this research. Only five universities were classified as private sector. In the hospital sector, 54% of participant organizations were public sector and 46% were private sector. In total, there are 65% public and 35% private organization responses. Although there are differences in the nature and objectives of public and private organizations, they share basic objectives in terms of quality management (HA, 2013; MUA, 2013). Both sectors are required to improve quality to certain levels and to practice quality management concepts. Thus, the difference in the number of respondents between the sectors is not likely to affect the results of this research.

Table 5.5 Type of ownership of organizations

| Ownership | University | | Hospital | | Total | |
|----------------|------------|------------|----------|------------|--------|------------|
| | Number | Percentage | Number | Percentage | Number | Percentage |
| Public | 38 | 88% | 45 | 54% | 83 | 65% |
| Private | 5 | 12% | 39 | 46% | 44 | 35% |
| Total | 43 | 100% | 84 | 100% | 127 | 100% |

Table 5.6 shows the number of employees in each of the respondents' organizations. In the university sector, 16% of respondents' organizations were considered to be small universities since the total number of employees is less than 100. 42% of universities employed more than 400 staff. In the hospital sector, 50% the respondent organizations had more than 400 employees. Across both the university and hospital sector responses, only 10% of organizations had less than 100 employees. Interestingly, sub group analysis was conducted using ANOVA tests to investigate the differences of CSF practice levels in the large, medium and small organizations employing participants. The results show that there is no difference in CSF practice levels among large, medium and small organizations that participated in this research. However, this research focused on investigating the overall level of CSF practices in universities and hospitals in general. Investigation of the impact between CSFs of TQM and sizes of organizations requires different methodologies and sample sizes.

Table 5.6 Number of employees in organizations

| Number of employees | University | | Hospital | | Total | |
|----------------------|------------|------------|----------|------------|--------|------------|
| | Number | Percentage | Number | Percentage | Number | Percentage |
| Less than 100 | 7 | 16% | 6 | 7% | 13 | 10% |
| 100-400 | 13 | 30% | 30 | 36% | 43 | 32% |
| More than 400 | 18 | 42% | 42 | 50% | 60 | 47% |
| Not known | 5 | 12% | 6 | 7% | 11 | 11% |
| Total | 43 | 100% | 84 | 100 | 127 | 100% |

Table 5.7 shows the quality certifications held by the respondents' organizations. In the university sector, 51% of responses came from quality certified universities. In the hospital sector, 75% of the hospitals were quality certified. Only 17% of the hospitals

were confirmed as not holding any quality certification, however most of these indicated that they were expecting to receive quality certification in the near future.

Table 5.7 Quality certifications held by organizations

| Quality Certified | University | | Hospital | | Total | |
|-------------------|------------|------------|----------|------------|--------|------------|
| | Number | Percentage | Number | Percentage | Number | Percentage |
| Yes | 22 | 51% | 63 | 75% | 85 | 67% |
| No | 13 | 30% | 14 | 17% | 27 | 21% |
| Not known | 8 | 19% | 7 | 8 % | 15 | 12% |
| Total | 43 | 100% | 84 | 100% | 127 | 100% |

The tables above have provided general background about the respondents and their organizations, presenting information for the university sector participants, hospital sector participants and the combined responses for both university and hospital sector responses across various locations in Thailand. In summary, 97% of respondents held at least a bachelor level qualification. Overall, 67% of participating organizations were quality certified. These certifications included ISO, HPH, HA, TQA and ONESQA. Respondents held a range of positions including top management, middle management and general employee. In both sectors, half of the responses (50%) came from the management level, while another half of the responses (50%) came from non-managers. In the university sector, the majority of responses came from the management level (67%) in the university sector and non-management level (59%) in the hospital sector. In both sectors, over half of respondents had been in their current position for more than five years (56%). It is evident that most respondents firms were medium to large organizations since they had more than 100 employees. Given the education level and extended duration of employment in the role for most respondents, it can be concluded that the respondents were generally qualified to provide information about their organization.

5.2.2 University sector results

The questionnaire required respondents to provide scores in the range of 1 to 5. Scores are divided into level of practice as presented in Table 5.8. This classification should be used to analyze the data in the following tables in this chapter.

Table 5.8 Level of practice categories

| Scores | Level of practice |
|---------------|--------------------------|
| 1.00-1.50 | Extremely low practice |
| 1.51-2.50 | Low practice |
| 2.51-3.50 | Moderate practice |
| 3.51-4.50 | High practice |
| 4.51-5.00 | Extremely high practice |

Table 5.9 to Table 5.19 shows the mean rating and standard deviation of each of the 72 statements for the questionnaire responses received from the universities. The results can be used to:

- Identify the CSFs in Thai universities; and
- Determine the level of CSF practice in the Thai university sector. CSFs with a high level of practice reflect those that are considered as important to the respondents' organizations.

This information can be used to determine the CSFs requiring management attention for TQM implementation in universities. It is important to note that the main respondents in the university sector of this research are Rajabhat universities. Thus, the results are strongly applicable to Rajabhat universities and the interpretation of results may be based on Rajabhat universities. In general, for an organization to maximize its chance of success with TQM implementation, it is expected that each of the CSFs will be practiced to a high degree.

Table 5.9 CSF Management commitment in the Thai university sector

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 1 | 4.72 | 0.45 |
| 2 | 4.74 | 0.44 |
| 3 | 4.60 | 0.54 |
| 4 | 4.34 | 0.71 |
| 5 | 4.18 | 0.62 |
| 6 | 4.11 | 0.76 |
| 7 | 4.00 | 0.78 |
| 8 | 3.86 | 0.63 |

| | | |
|-----------------------|------|------|
| 9 | 3.93 | 0.85 |
| 10 | 3.83 | 0.57 |
| 11 | 3.86 | 0.70 |
| Management commitment | 4.20 | 0.63 |

Table 5.10 CSF Role of quality department in the Thai university sector

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 12 | 3.95 | 0.65 |
| 13 | 3.72 | 0.88 |
| 14 | 3.37 | 0.78 |
| 15 | 3.74 | 0.58 |
| 16 | 3.83 | 0.65 |
| 17 | 3.48 | 0.73 |
| Role of quality department | 3.69 | 0.56 |

Table 5.11 CSF Training and education in the Thai university sector

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 18 | 3.67 | 0.74 |
| 19 | 3.41 | 0.85 |
| 20 | 4.02 | 1.03 |
| 21 | 3.90 | 0.64 |
| 22 | 3.86 | 0.86 |
| 23 | 3.39 | 0.84 |
| 24 | 3.16 | 1.34 |
| 25 | 3.51 | 0.88 |
| 26 | 3.46 | 0.98 |
| 27 | 3.37 | 0.84 |
| 28 | 3.65 | 0.61 |
| Training and education | 3.59 | 0.66 |

Table 5.12 CSF Employee involvement in the Thai university sector

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 29 | 3.72 | 0.70 |
| 30 | 3.65 | 0.65 |
| 31 | 3.79 | 0.88 |
| 32 | 3.53 | 0.73 |
| Employee involvement | 3.67 | 0.49 |

Table 5.13 CSF Continuous improvement in the Thai university sector

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 33 | 3.93 | 1.12 |
| 34 | 3.81 | 0.62 |
| 35 | 3.72 | 0.70 |
| 36 | 4.02 | 0.59 |
| 37 | 3.97 | 0.59 |
| Continuous improvement | 3.83 | 0.46 |

Table 5.14 CSF Supplier partnership in the Thai university sector

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 38 | 4.30 | 0.67 |
| 39 | 3.62 | 0.81 |
| 40 | 3.90 | 0.64 |
| 41 | 3.79 | 0.77 |
| 42 | 4.02 | 0.67 |
| 43 | 3.74 | 0.87 |
| 44 | 3.62 | 0.72 |
| Supplier partnership | 3.86 | 0.52 |

Table 5.15 CSF Product/service design in the Thai university sector

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 45 | 4 | 0.81 |
| 46 | 3.93 | 0.59 |
| 47 | 3.83 | 0.65 |
| 48 | 3.86 | 0.77 |
| 49 | 3.67 | 0.86 |
| 50 | 3.81 | 1.05 |
| Product/service design | 3.85 | 0.46 |

Table 5.16 CSF Quality policies in the Thai university sector

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 51 | 3.97 | 0.70 |
| 52 | 3.32 | 0.74 |
| 53 | 3.65 | 0.68 |
| 54 | 3.86 | 0.60 |
| 55 | 3.83 | 0.68 |
| 56 | 3.72 | 0.70 |
| 57 | 3.74 | 0.69 |
| 58 | 3.88 | 0.69 |
| 59 | 3.86 | 0.70 |
| 60 | 3.83 | 0.65 |
| Quality policies | 3.77 | 0.48 |

Table 5.17 CSF Quality data and reporting in the Thai university sector

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 61 | 3.83 | 0.72 |
| 62 | 3.76 | 0.71 |
| 63 | 4.04 | 0.57 |
| 64 | 3.72 | 0.70 |
| Quality data and reporting | 3.84 | 0.45 |

Table 5.18 CSF Communication to improve quality in the Thai university sector

| CSF statement number | Mean rating | Standard deviation |
|----------------------------------|--------------------|---------------------------|
| 65 | 3.97 | 1.07 |
| 66 | 3.58 | 0.79 |
| 67 | 4.11 | 0.79 |
| 68 | 3.53 | 0.73 |
| Communication to improve quality | 3.80 | 0.32 |

Table 5.19 CSF Customer satisfaction orientation in the Thai university sector

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------------|--------------------|---------------------------|
| 69 | 3.74 | 0.62 |
| 70 | 3.76 | 0.64 |
| 71 | 3.67 | 0.64 |
| 72 | 3.86 | 0.63 |
| Customer satisfaction orientation | 3.76 | 0.32 |

One of the main objectives of this study is to investigate the CSFs that are incorporated in the TQM implementation process in the Thai university sector. The results maintain that all eleven CSFs have been highly practiced in this sector. The findings identify high levels of practice of management commitment, continuous improvement, quality supplier partnership, product and service design, quality data and reporting, communication to improve quality, quality policies, customer satisfaction orientation, role of quality department, employee involvement and training and education. These practices can be used to conceptualize TQM practices in the university sector in Thailand. In other words, the research findings show that all eleven factors shown in Table 5.20 are identified as CSFs of TQM implementation in Thai universities. It is expected that these factors can be used to construct a framework to approach TQM in the university sector in Thailand.

The research findings support a study by Antony et al. (2002) of the empirical studies identifying CSFs in the literature (see Chapter 2). The eleven CSFs considered in this research are also important to TQM adoption in the Thai university sector. In fact, these factors are found to be similar to those identified by various researchers such as Zu (2009), Talib, Rahman and Qureshi (2011c), Parast, Adams and Jones (2010) and Das, Paul and Swierczek (2008). The findings also suggest that TQM concepts are universal concepts because CSFs found to be important in other industries and in other countries are also important in the context of the education sector in Thailand.

Table 5.20 illustrates the mean rating and standard deviation for the adoption of each of the CSFs in the Thai university sector. The CSFs are listed in decreasing order of level of practice.

Table 5.20 CSF rankings based on level of practice in the Thai university sector

| CSFs | Mean rating | Standard deviation |
|---|--------------------|---------------------------|
| Management commitment (F1) | 4.20 | 0.63 |
| Continuous improvement (F5) | 3.89 | 0.46 |
| Supplier partnership (F6) | 3.86 | 0.52 |
| Product/service design (F7) | 3.85 | 0.46 |
| Quality data and reporting (F9) | 3.84 | 0.45 |
| Communication to improve quality (F10) | 3.80 | 0.32 |
| Quality policies (F8) | 3.77 | 0.48 |
| Customer satisfaction orientation (F11) | 3.76 | 0.32 |
| Role of the quality department (F2) | 3.69 | 0.56 |
| Employee involvement (F4) | 3.67 | 0.49 |
| Training and education (F3) | 3.59 | 0.66 |

As prioritization of CSFs of TQM remains a problem for the decision makers (Khanna, Sharma and Laroiya, 2011), the findings reveal how Thai university prioritizes the importance of CSFs in their TQM implementation process. Since TQM adoption may incur high investment, it is a common practice to select and utilize CSF practices to maximize the organizational benefits. The analysis of the findings shows that management commitment, continuous improvement and supplier partnership are the most important among these CSFs. The lowest mean was for training and education (3.59, SD=0.66), while the highest mean was for management (4.20, SD=0.67). In general, the results indicate that the Thai university sector is currently attaining an above average level of TQM implementation. This is because the mean scores of all CSFs for TQM implementation, as shown in Table 5.20, were above 3.51. This shows that TQM have been extensively practiced in Thai university sector. However, it is recommended that to improve quality performance in the sector, improvements in training and education, employee involvement and role of quality department efforts are necessary. These practices could be seen as quality initiatives in Thai universities to enhance the quality performance of this sector. This finding may affect the development of TQM strategies and practices in Thai universities.

This research has taken into consideration the effect of cultures on TQM implementation through each CSF. To analyze the impact of Thai cultural characteristics on TQM practices, 28 statements about these cultural characteristics were presented in part C of the questionnaire. The previous chapter of this thesis

suggested that cultural factors can both support and hinder TQM implementation. Mean ratings were computed to determine whether Thai cultural factors have a positive or negative impact on organizations attempting to embrace TQM practices. Table 5.21 shows the mean rating and standard deviation of each of the statements used to evaluate the impact of Thai culture on TQM adoption in the university sector.

Table 5.21 Impact of Thai cultural characteristics on TQM practices in the Thai university sector

| Thai cultural characteristic statement number | Mean rating | Standard deviation |
|--|--------------------|---------------------------|
| 73 | 3.86 | 0.86 |
| 74 | 3.79 | 0.88 |
| 75 | 3.86 | 0.77 |
| 76 | 3.93 | 0.88 |
| 77 | 3.58 | 0.98 |
| 78 | 4.23 | 0.64 |
| 79 | 4.23 | 0.68 |
| 80 | 4.20 | 0.59 |
| 81 | 3.02 | 1.22 |
| 82 | 4.04 | 0.81 |
| 83 | 4.09 | 0.71 |
| 84 | 3.83 | 0.81 |
| 85 | 4.18 | 0.69 |
| 86 | 3.35 | 1.11 |
| 87 | 3.67 | 1.01 |
| 88 | 3.72 | 1.03 |
| 89 | 3.95 | 0.92 |
| 90 | 4.30 | 1.03 |
| 91 | 4.33 | 0.68 |
| 92 | 4.33 | 0.68 |
| 93 | 4.26 | 0.69 |
| 94 | 3.44 | 1.24 |
| 95 | 4.07 | 0.73 |
| 96 | 4.33 | 0.64 |
| 97 | 4.05 | 0.78 |
| 98 | 3.65 | 1.17 |
| 99 | 4.14 | 0.67 |
| 100 | 4.40 | 0.62 |

National cultures are different and TQM must be subtly adjusted to the culture in which they are operating. TQM companies operating in Thailand have to consider these Thai cultural implications in their TQM adoption. Thus, in their TQM adoption, Thai

universities have to consider the cultural implications of grateful relationship, care and consideration, kindness and helpfulness, self control, tolerance, politeness, humbleness, calmness and cautiousness, education and competence orientation, and mutual help characteristics. National culture can affect organizational values, structures, and member behaviors. This explanation supports how national cultures impact TQM implementation (Jabnoun and Khafaji, 2005). The considerations of cultural impact on TQM implementation are necessary to enhance the likelihood of success in TQM implementation.

Chi-square tests were conducted to investigate whether there were any significant relationships between each CSF and each Thai cultural characteristic. Using crosstab analysis, each cultural factor was matched with each CSF to find the relationship between them at $p=0.001$. The results are presented in Table 5.22 and Table 5.23. Table 5.22 uses the symbol 'S' to identify significant relationships between cultural factors and CSFs. All Chi-square values are listed in Appendix 4. Chi-square values, that showed significance relationships with p value less than or equivalent to 0.001, are presented in Table 5.23.

Table 5.22 Significant relationships between CSFs and Thai cultural characteristics in the Thai university sector

| CSFs/Thai cultural characteristics | F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F9 | F10 | F11 |
|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|
| C1 | | | | | | | | | | | |
| C2 | | | | | | | | S | | | |
| C3 | | | | | | | | S | S | | |
| C4 | | | | | | | | S | | | S |
| C5 | | | | | | | | | | | |
| C6 | | | | S | S | | | | | | |
| C7 | | | | | S | | | | | | |
| C8 | | | S | S | | | | | | | |
| C9 | | | | | | | | | | | |
| C10 | | | | | | | | | | | |
| C11 | | | | | | | | | | | |

Table 5.23 Chi-square results for the Thai university sector

| Statements | Hypothesis | Pearson Chi-square value | Asymp. Sig. |
|-------------------|-------------------|---------------------------------|--------------------|
| S20 × S97 | H7 | 45.538 | 0.000 |
| S30 × S95 | H14 | 29.387 | 0.001 |
| S31 × S95 | H14 | 47.546 | 0.000 |
| S31 × S97 | H15 | 51.458 | 0.000 |
| S33 × S95 | H23 | 54.531 | 0.000 |
| S34 × S95 | H23 | 50.068 | 0.000 |
| S34 × S96 | H24 | 24.871 | 0.000 |
| S52 × S74 | H33 | 26.893 | 0.001 |
| S55 × S80 | H34 | 30.130 | 0.000 |
| S58 × S83 | H35 | 45.749 | 0.000 |
| S62 × S80 | H38 | 21.838 | 0.001 |
| S69 × S83 | H51 | 27.094 | 0.001 |
| S69 × S85 | H51 | 28.328 | 0.001 |
| S71 × S83 | H51 | 43.702 | 0.000 |

The results showed that a number of Thai cultural characteristics exhibited significant relationships with CSFs. Specifically:

- Training and education practice had a significant relationship with the Thai cultural characteristic of fun and humorous in nature.
- Employee involvement was influenced by the Thai cultural characteristics of care and consideration, kindness and helpfulness, self-control, tolerance, restraint politeness, humbleness, calmness and cautiousness, and fun and humorous in nature.
- Continuous improvement was related to the Thai cultural characteristics of education and competence, and care and consideration, kindness and helpfulness, self-control, tolerance, restraint politeness, humbleness, calmness and cautiousness.
- The practice of quality policies had a significant relationship with the Thai cultural characteristics of pride of face and dignity, grateful relationship, and flexibility over principles.

- The quality data and reporting factor was affected by the Thai cultural characteristic of grateful relationship.
- The adoption of customer satisfaction was related to the Thai cultural characteristic of flexibility over principles.

It is essential to consider how these characteristics affect TQM adoption. The Thai cultural characteristics of non-assertiveness and being humorous and fun can support TQM adoption through the general nature of Thai workers. Thai people tend to be friendly. Among friends and with colleagues they know, Thai people enjoy having fun and hence tend to get along well with colleagues and teammates. When there are problems in the workplace, Thai people will usually listen and respect others because culturally they tend to be friendly and non-assertive. These characteristics may assist in increasing the success rate of TQM adoption since Thais work well in teams. These characteristics also make Thais effective at practicing quality training and education. However, TQM implementations can also be negatively affected by the Thai cultural characteristics of pride of face and dignity, grateful relationship and flexibility over principles. Supervisors tend not to escalate reports of employee errors or performance issues to top management, in order to maintain on-going good relationships and to reciprocate previous assistance. Consequently, this characteristic may impede continuous improvement. Furthermore, the Thai cultural characteristic of grateful relationship can affect the effectiveness of quality policies. When there are few errors in the work process, employees tend to resolve these themselves rather than report incidents to management. However, some errors cannot be correctly resolved by employees and should therefore be reported immediately to management. The results from the questionnaire have confirmed that Thai cultural characteristics have the potential to have both positive and negative impacts on TQM implementation.

5.2.3 Hospital sector results

The questionnaire required respondents to provide scores in the range 1 to 5. Scores are divided into level of practice as presented in Table 5.8 above. This classification should be used to analyze the data in the following tables in this chapter.

Table 5.24 to Table 5.34 shows the mean rating and standard deviation of each of the 72 statements for the questionnaire responses received from the hospitals. The results can be used to:

- Identify the CSFs in Thai hospitals; and
- Determine the level of CSF practice in the Thai hospital sector. CSFs with a high level of practice reflect those that are considered as important to the respondents' organizations.

This information can be used to determine the CSFs requiring management attention for TQM implementation in hospitals.

Table 5.24 CSF Management commitment in the Thai hospital sector

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 1 | 4.61 | 0.61 |
| 2 | 4.55 | 0.56 |
| 3 | 4.59 | 0.54 |
| 4 | 4.42 | 0.64 |
| 5 | 4.32 | 0.66 |
| 6 | 4.08 | 0.68 |
| 7 | 4.01 | 0.70 |
| 8 | 3.89 | 0.77 |
| 9 | 4.00 | 0.93 |
| 10 | 3.78 | 0.85 |
| 11 | 4.08 | 0.76 |
| Management commitment | 4.22 | 0.60 |

Table 5.25 Role of quality department in the Thai hospital sector

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 12 | 3.83 | 0.74 |
| 13 | 4.02 | 0.72 |
| 14 | 3.70 | 1.01 |
| 15 | 3.94 | 0.70 |
| 16 | 3.94 | 0.66 |
| 17 | 3.58 | 0.66 |
| Role of quality department | 3.84 | 0.52 |

Table 5.26 CSF Training and education in the Thai hospital sector

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 18 | 3.88 | 0.73 |
| 19 | 3.89 | 0.62 |
| 20 | 3.96 | 0.75 |
| 21 | 4.07 | 0.51 |
| 22 | 3.96 | 0.79 |
| 23 | 3.39 | 0.90 |
| 24 | 3.01 | 0.89 |
| 25 | 3.52 | 0.78 |
| 26 | 3.85 | 0.80 |
| 27 | 3.79 | 0.74 |
| 28 | 3.71 | 0.80 |
| Training and education | 3.73 | 0.59 |

Table 5.27 CSF Employee involvement in the Thai hospital sector

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 29 | 3.82 | 0.64 |
| 30 | 3.66 | 0.79 |
| 31 | 3.92 | 0.74 |
| 32 | 3.28 | 0.88 |
| Employee involvement | 3.67 | 0.49 |

Table 5.28 CSF Continuous improvement in the Thai hospital sector

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 33 | 3.98 | 0.59 |
| 34 | 3.96 | 0.56 |
| 35 | 3.88 | 0.73 |
| 36 | 4.07 | 0.80 |
| 37 | 3.96 | 0.54 |
| Continuous improvement | 3.97 | 0.40 |

Table 5.29 CSF Supplier partnership in the Thai hospital sector

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 38 | 4.07 | 0.78 |
| 39 | 3.86 | 0.87 |
| 40 | 4.04 | 0.75 |
| 41 | 3.92 | 0.61 |
| 42 | 4.15 | 0.61 |
| 43 | 4.03 | 0.92 |
| 44 | 3.90 | 0.80 |
| Supplier partnership | 4.00 | 0.53 |

Table 5.30 CSF Product/service design in the Thai hospital sector

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 45 | 4.26 | 0.67 |
| 46 | 3.94 | 0.60 |
| 47 | 3.92 | 0.59 |
| 48 | 3.96 | 0.64 |
| 49 | 3.90 | 0.72 |
| 50 | 4.07 | 0.72 |
| Product/service design | 4.01 | 0.39 |

Table 5.31 CSF Quality policies in the Thai hospital sector

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 51 | 4.01 | 0.68 |
| 52 | 3.52 | 0.96 |
| 53 | 3.77 | 0.73 |
| 54 | 4.01 | 0.92 |
| 55 | 3.97 | 0.63 |
| 56 | 3.85 | 0.62 |
| 57 | 3.89 | 0.64 |
| 58 | 3.86 | 0.72 |
| 59 | 4.15 | 0.68 |
| 60 | 4.01 | 0.70 |
| Quality policies | 3.91 | 0.53 |

Table 5.32 CSF Quality data and reporting in the Thai hospital sector

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 61 | 4.07 | 0.61 |
| 62 | 3.71 | 0.72 |
| 63 | 4.11 | 0.60 |
| 64 | 3.82 | 0.69 |
| Quality data and reporting | 3.93 | 0.45 |

Table 5.33 CSF Communication to improve quality in the Thai hospital sector

| CSF statement number | Mean rating | Standard deviation |
|----------------------------------|--------------------|---------------------------|
| 65 | 3.91 | 0.60 |
| 66 | 3.72 | 0.75 |
| 67 | 4.23 | 0.61 |
| 68 | 3.72 | 0.75 |
| Communication to improve quality | 3.90 | 0.46 |

Table 5.34 CSF Customer satisfaction orientation in the Thai hospital sector

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------------|--------------------|---------------------------|
| 69 | 3.96 | 0.71 |
| 70 | 3.88 | 0.70 |
| 71 | 3.83 | 0.74 |
| 72 | 4.15 | 0.79 |
| Customer satisfaction orientation | 3.96 | 0.40 |

The study of CSF is important to enhance the chance of succeeding in TQM implementation. The success of TQM implementation depends on the efficient and effective practices of CSFs. To date, there is a lack of study of the CSFs of TQM in the Thai hospital sector. The findings identify CSFs that are incorporated into the TQM implementation process in the Thai hospital sector. The results suggest that management commitment, continuous improvement, quality supplier partnership, product and service design quality data and reporting, communication to improve quality, quality policies, customer satisfaction orientation, role of quality department, employee involvement and training and education are CSFs of TQM implementation in the sector, and can be used to conceptualize TQM practices in the sector. It is expected

that these factors can be used to construct a quality framework to approach TQM in hospitals in Thailand. The eleven CSFs that are considered to be crucial to TQM implementation are also important to TQM adoption in Thai hospitals. The findings also suggest that TQM concepts are universal concepts because CSFs found to be important in other industries and in other countries are also important in the context of the Thai hospital sector.

Table 5.35 illustrates the mean rating and standard deviation for the adoption of each of the CSFs in the Thai hospital sector. The CSFs are listed in decreasing order of level of practice.

Table 5.35 CSF rankings based on level of practice in the Thai hospital sector

| CSFs | Mean rating | Standard deviation |
|---|--------------------|---------------------------|
| Management commitment (F1) | 4.22 | 0.60 |
| Product/service design (F7) | 4.01 | 0.39 |
| Supplier partnership (F6) | 4.00 | 0.53 |
| Continuous improvement (F5) | 3.97 | 0.40 |
| Customer satisfaction orientation (F11) | 3.96 | 0.40 |
| Quality data and reporting (F9) | 3.93 | 0.45 |
| Quality policies (F8) | 3.91 | 0.53 |
| Communication to improve quality (F10) | 3.90 | 0.46 |
| Role of the quality department (F2) | 3.84 | 0.52 |
| Training and education (F3) | 3.73 | 0.59 |
| Employee involvement (F4) | 3.67 | 0.49 |

From the results, it can be seen that management commitment had the highest level of practice of all the CSFs, which was the same result as in the university sector. The CSF with the lowest level of practice in Thai hospitals was employee involvement. However, it can be seen from the mean ratings that all CSFs have been embraced in the hospital sector.

As discussed above, 28 statements were used to analyze the impact of Thai cultural characteristics on TQM practices. Table 5.36 shows the mean rating and standard deviation of each of the statements used to evaluate the impact of Thai culture on TQM adoption in the hospital sector.

Table 5.36 Impact of Thai cultural characteristics on TQM practices in the Thai hospital sector

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 73 | 3.83 | 0.99 |
| 74 | 3.63 | 1.12 |
| 75 | 3.67 | 1.14 |
| 76 | 3.66 | 1.13 |
| 77 | 3.67 | 1.00 |
| 78 | 4.22 | 1.01 |
| 79 | 4.26 | 0.83 |
| 80 | 4.21 | 0.87 |
| 81 | 3.19 | 1.24 |
| 82 | 4.10 | 0.90 |
| 83 | 4.16 | 0.90 |
| 84 | 3.83 | 1.02 |
| 85 | 4.36 | 0.96 |
| 86 | 3.38 | 1.44 |
| 87 | 3.58 | 1.30 |
| 88 | 3.67 | 1.22 |
| 89 | 3.79 | 1.20 |
| 90 | 4.19 | 0.88 |
| 91 | 4.39 | 0.53 |
| 92 | 4.35 | 0.57 |
| 93 | 4.37 | 0.62 |
| 94 | 3.35 | 1.31 |
| 95 | 4.35 | 0.81 |
| 96 | 4.44 | 0.49 |
| 97 | 4.14 | 0.73 |
| 98 | 3.83 | 0.99 |
| 99 | 4.07 | 0.72 |
| 100 | 4.36 | 0.59 |

As discussed, if the implications of organizational culture (Kaluarachchi, 2010) stemming from national culture (Jung et al., 2008) have not been taken into consideration by management, TQM implementation is unlikely to provide long-term success to an organization (Kaluarachchi, 2010). Ignoring the cultural factors of TQM adoption, managers can find that it is difficult to practice TQM activities and to initiate TQM efforts. Thus, the understanding of the effect of Thai cultural characteristics is fundamental to successfully implementing TQM in Thai companies. The analysis revealed that the Thai cultural characteristics of grateful relationship (statements 78, 79

and 80), flexibility over the principles (statement 85), care and consideration, kindness and helpfulness, self control, tolerance, restraint, politeness, humbleness, calmness and cautiousness (statements 91, 92, 93 and 95), education and competence orientation (statement 96) and mutual help (statement 100) can influence TQM adoption. It is important to consider the implications of these factors on pursuing the TQM journey within a hospital.

Chi-square tests were conducted to investigate whether there were any significant relationships between each CSF and each Thai cultural characteristic. Using crosstab analysis, each cultural factor was matched with each CSF to find the relationship between them at $p=0.001$. The results are presented in Table 5.37 and Table 5.38. Table 5.37 uses the symbol 'S' to identify significant relationships between cultural factors and CSFs. All Chi-square values are listed in Appendix 4. Chi-square values that showed significance are presented in Table 5.38.

Table 5.37 Significant relationships between CSFs and Thai cultural characteristics in the Thai hospital sector

| CSFs/Thai cultural characteristics | F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F9 | F10 | F11 |
|------------------------------------|----|----|----|----|----|----|----|----|----|-----|-----|
| C1 | | | | | | | | | | | |
| C2 | | | | | | | | S | | S | S |
| C3 | | | | | | | | S | S | | S |
| C4 | S | | | | | S | | S | | | S |
| C5 | S | | | S | | S | | | S | | S |
| C6 | | | | | S | | | | | | S |
| C7 | | | | | | | | | | | |
| C8 | | | | | | | | | | | |
| C9 | | | S | S | | | S | | | | S |
| C10 | | | S | | S | | S | | | S | |
| C11 | | | | | | | | | | | |

Table 5.38 Chi-square results for the Thai hospital sector

| Statements | Hypothesis | Pearson Chi-square value | Asymp. Sig. |
|-------------------|-------------------|---------------------------------|--------------------|
| S4 × S85 | H1 | 22.983 | 0.001 |
| S2 × S87 | H2 | 33.314 | 0.000 |
| S2 × S89 | H2 | 33.051 | 0.000 |
| S4 × S89 | H2 | 29.784 | 0.001 |
| S7 × S89 | H2 | 40.419 | 0.000 |
| S23 × S98 | H8 | 53.566 | 0.000 |
| S25 × S98 | H8 | 53.229 | 0.000 |
| S24 × S99 | H9 | 44.397 | 0.000 |
| S32 × S87 | H13 | 44.701 | 0.001 |
| S32 × S89 | H13 | 52.483 | 0.000 |
| S30 × S98 | H16 | 54.425 | 0.000 |
| S32 × S98 | H16 | 40.593 | 0.001 |
| S34 × S91 | H23 | 25.015 | 0.000 |
| S33 × S99 | H26 | 49.304 | 0.000 |
| S36 × S99 | H26 | 35.523 | 0.000 |
| S38 × S82 | H27 | 51.746 | 0.000 |
| S38 × S83 | H27 | 49.372 | 0.000 |
| S38 × S84 | H27 | 46.726 | 0.000 |
| S38 × S86 | H27 | 47.925 | 0.000 |
| S42 × S85 | H27 | 26.904 | 0.001 |
| S38 × S87 | H28 | 49.633 | 0.000 |
| S38 × S88 | H28 | 61.609 | 0.000 |
| S38 × S89 | H28 | 52.082 | 0.000 |
| S48 × S98 | H31 | 48.649 | 0.000 |
| S49 × S98 | H31 | 35.248 | 0.000 |
| S48 × S99 | H32 | 27.361 | 0.001 |
| S49 × S99 | H32 | 29.995 | 0.000 |
| S52 × S74 | H33 | 44.353 | 0.001 |
| S52 × S76 | H33 | 45.317 | 0.001 |
| S53 × S77 | H33 | 37.097 | 0.001 |
| S54 × S77 | H33 | 45.505 | 0.001 |
| S55 × S77 | H33 | 46.659 | 0.000 |
| S57 × S77 | H33 | 42.281 | 0.000 |
| S59 × S78 | H34 | 54.946 | 0.000 |
| S59 × S79 | H34 | 64.580 | 0.000 |
| S59 × S80 | H34 | 62.521 | 0.000 |
| S59 × S87 | H35 | 39.965 | 0.000 |
| S64 × S84 | H38 | 32.831 | 0.001 |
| S61 × S88 | H40 | 30.153 | 0.001 |

| Statements | Hypothesis | Pearson Chi-square value | Asymp. Sig. |
|------------|------------|--------------------------|-------------|
| S65 × S77 | H41 | 65.240 | 0.000 |
| S66 × S77 | H41 | 39.977 | 0.000 |
| S65 × S99 | H47 | 49.309 | 0.000 |
| S70 × S77 | H49 | 47.677 | 0.000 |
| S71 × S74 | H49 | 49.732 | 0.000 |
| S71 × S75 | H49 | 46.619 | 0.001 |
| S72 × S74 | H49 | 110.506 | 0.000 |
| S72 × S75 | H49 | 108.553 | 0.000 |
| S72 × S76 | H49 | 93.769 | 0.000 |
| S72 × S77 | H49 | 99.691 | 0.000 |
| S72 × S78 | H50 | 47.712 | 0.000 |
| S72 × S79 | H50 | 90.959 | 0.000 |
| S72 × S80 | H50 | 90.401 | 0.000 |
| S72 × S81 | H50 | 98.928 | 0.000 |
| S71 × S82 | H51 | 56.894 | 0.000 |
| S72 × S82 | H51 | 104.394 | 0.000 |
| S72 × S83 | H51 | 95.072 | 0.000 |
| S72 × S84 | H51 | 96.275 | 0.000 |
| S72 × S85 | H51 | 46.915 | 0.000 |
| S72 × S86 | H51 | 96.541 | 0.000 |
| S72 × S87 | H52 | 99.367 | 0.000 |
| S72 × S88 | H52 | 98.127 | 0.001 |
| S72 × S89 | H52 | 97.476 | 0.000 |
| S72 × S90 | H53 | 95.591 | 0.000 |
| S71 × S98 | H54 | 50.362 | 0.000 |

The results show that the Thai cultural characteristics of non-assertiveness, flexibility over principles, social connection and social recognition have the highest impact on CSFs adoption in Thai hospitals. There were many relationships identified between CSFs and Thai cultural characteristics. Specifically:

- Management commitment practice had a significant relationship with the Thai cultural characteristics of flexibility over principles and non-assertiveness.
- Training and education was related to the Thai cultural characteristics of social connection and social recognition.
- Employee involvement practice was influenced by the Thai cultural characteristics of non-assertiveness and social connection.

- The practice of continuous improvement had a relationship with social recognition, care and consideration, kindness and helpfulness, self-control, tolerance, restraint politeness, humbleness, calmness and cautiousness.
- Supplier partnership was related to the Thai cultural characteristics of flexibility over principles and non-assertiveness.
- Product and service design had a significant relationship with flexibility over principles, social connection and social recognition.
- Implementation of quality policies was related to the Thai cultural characteristics of pride of face and dignity, grateful relationship and flexibility over principles.
- Quality data and reporting were influenced by the Thai cultural characteristics of grateful relationship and non-assertiveness.
- Communication to improve quality effort had a relationship with pride of face and dignity and social recognition.
- The practice of customer satisfaction orientation was related to many Thai cultural characteristics. These are pride of face and dignity, grateful relationship, flexibility over principles, non-assertiveness, care and consideration, kindness and helpfulness, self-control, tolerance, restraint, politeness, humbleness, calmness and cautiousness as well as social connection.

By considering the number of significant relationships between cultural factors and CSFs, it is shown that Thai cultural characteristics can affect TQM practices in various ways. For example, the Thai cultural characteristic of non-assertiveness can influence the TQM practices of management commitment, employee involvement, quality supplier partnership, quality data and reporting and customer satisfaction orientation. The analysis shows that in the hospital sector, non-assertiveness, flexibility over the principles, social connection and social recognition have at least four significant relationships with the CSFs. The Thai cultural characteristic of non-assertiveness has the greatest impact on CSFs with five relationships: management commitment, employee involvement, quality supplier partnership, quality data and reporting and

customer satisfaction orientation. Flexibility over principles as well as appreciation of social connection and social recognition also have high impact on TQM adoption, with four relationships each. It can be concluded that these cultural characteristics have the most impact on TQM practices in Thai hospital sector.

It is essential to consider how these characteristics affect TQM adoption since the effectiveness of TQM implementation can be influenced by these cultural characteristics. For example, the results indicate that the Thai cultural characteristic of non-assertiveness has a significant relationship with employee involvement practice. One possible explanation is that Thai workers tend to act according to their manager's orders because they do not like conflicts with others, especially their supervisor. Workers usually do not want to present new ideas in meetings. It is hard to achieve active employee involvement. It is important to note that acting according to orders is a positive characteristic because experienced managers usually know what is good for their department. In Thai society, working in groups and teamwork could be improved by the Thai cultural characteristic of non-assertiveness since workers tend to follow orders from management. Also, the Thai cultural characteristics of care and consideration, kindness and helpfulness, self control, tolerance, restraint, politeness, humbleness, calmness and cautiousness tend to improve teamwork. The findings also indicate that the Thai cultural characteristics of flexibility over principles and non-assertiveness may influence the level of quality data and the reporting system. Pride of face and dignity and appreciation of social connection can affect communication. Moreover, Thai cultural characteristics of care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness, cautiousness and social recognition have relationships with the practices of continuous improvement. Flexibility over principles and non-assertiveness can impact supplier partnerships. Furthermore, pride of face and dignity, grateful relationship, and non-assertiveness have an effect on quality policies. From the above, it is evident that many Thai cultural characteristics can have a notable impact on TQM practices and the consideration of their implications are required for successful implementation of TQM in the Thai hospital sector.

5.2.4 Overall sector results

Table 5.39 to Table 5.49 show the mean ratings and standard deviations of 72 statements on the overall sector. This combined review presents an over-arching picture of the level of TQM practices, assisting with identifying areas that are currently not receiving adequate attention. The results presented below can also be used to identify the CSFs for successful TQM implementation in the Thai hospitals and university sectors.

Table 5.39 CSF Management commitment in the Thai university and hospital sectors

| CSF statement number | Mean rating | Standard deviation |
|-----------------------|-------------|--------------------|
| 1 | 4.65 | 0.56 |
| 2 | 4.62 | 0.53 |
| 3 | 4.59 | 0.53 |
| 4 | 4.40 | 0.66 |
| 5 | 4.27 | 0.65 |
| 6 | 4.09 | 0.70 |
| 7 | 4.00 | 0.72 |
| 8 | 3.88 | 0.73 |
| 9 | 3.97 | 0.90 |
| 10 | 3.80 | 0.76 |
| 11 | 4.01 | 0.75 |
| Management commitment | 4.21 | 0.61 |

Table 5.40 CSF Role of quality department in the Thai university and hospital sectors

| CSF statement number | Mean rating | Standard deviation |
|----------------------------|-------------|--------------------|
| 12 | 3.87 | 0.71 |
| 13 | 3.92 | 0.79 |
| 14 | 3.59 | 0.95 |
| 15 | 3.87 | 0.66 |
| 16 | 3.90 | 0.65 |
| 17 | 3.55 | 0.68 |
| Role of quality department | 3.79 | 0.54 |

Table 5.41 CSF Training and education in the Thai university and hospital sectors

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 18 | 3.81 | 0.74 |
| 19 | 3.73 | 0.73 |
| 20 | 3.98 | 0.85 |
| 21 | 4.01 | 0.56 |
| 22 | 3.92 | 0.81 |
| 23 | 3.39 | 0.88 |
| 24 | 3.06 | 1.06 |
| 25 | 3.51 | 0.81 |
| 26 | 3.72 | 0.88 |
| 27 | 3.65 | 0.80 |
| 28 | 3.69 | 0.74 |
| Training and education | 3.68 | 0.62 |

Table 5.42 CSF Employee involvement in the Thai university and hospital sectors

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 29 | 3.78 | 0.66 |
| 30 | 3.66 | 0.74 |
| 31 | 3.88 | 0.79 |
| 32 | 3.37 | 0.84 |
| Employee involvement | 3.67 | 0.49 |

Table 5.43 CSF Continuous improvement in the Thai university and hospital sectors

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 33 | 3.96 | 0.80 |
| 34 | 3.91 | 0.59 |
| 35 | 3.82 | 0.72 |
| 36 | 4.05 | 0.73 |
| 37 | 3.96 | 0.56 |
| Continuous improvement | 3.95 | 0.42 |

Table 5.44 CSF Supplier partnership in the Thai university and hospital sectors

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 38 | 4.14 | 0.75 |
| 39 | 3.78 | 0.86 |
| 40 | 4.00 | 0.72 |
| 41 | 3.88 | 0.67 |
| 42 | 4.11 | 0.63 |
| 43 | 3.93 | 0.91 |
| 44 | 3.81 | 0.78 |
| Supplier partnership | 3.95 | 0.53 |

Table 5.45 CSF Product/service design in the Thai university and hospital sectors

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 45 | 4.17 | 0.73 |
| 46 | 3.93 | 0.60 |
| 47 | 3.89 | 0.61 |
| 48 | 3.92 | 0.69 |
| 49 | 3.82 | 0.77 |
| 50 | 3.98 | 0.85 |
| Product/service design | 3.96 | 0.41 |

Table 5.46 CSF Quality policies in the Thai university and hospital sectors

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 51 | 4.00 | 0.69 |
| 52 | 3.45 | 0.89 |
| 53 | 3.73 | 0.71 |
| 54 | 3.96 | 0.83 |
| 55 | 3.92 | 0.65 |
| 56 | 3.81 | 0.65 |
| 57 | 3.84 | 0.65 |
| 58 | 3.87 | 0.71 |
| 59 | 4.05 | 0.70 |
| 60 | 3.95 | 0.68 |
| Quality policies | 3.86 | 0.51 |

Table 5.47 CSF Quality data and reporting in the Thai university and hospital sectors

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 61 | 3.99 | 0.66 |
| 62 | 3.73 | 0.71 |
| 63 | 4.09 | 0.59 |
| 64 | 3.78 | 0.69 |
| Quality data and reporting | 3.90 | 0.59 |

Table 5.48 CSF Communication to improve quality in the Thai university and hospital sectors

| CSF statement number | Mean rating | Standard deviation |
|----------------------------------|--------------------|---------------------------|
| 65 | 3.93 | 0.79 |
| 66 | 3.67 | 0.76 |
| 67 | 4.19 | 0.67 |
| 68 | 3.66 | 0.74 |
| Communication to improve quality | 3.87 | 0.47 |

Table 5.49 CSF Customer satisfaction orientation in the Thai university and hospital sectors

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------------|--------------------|---------------------------|
| 69 | 3.88 | 0.69 |
| 70 | 3.84 | 0.68 |
| 71 | 3.77 | 0.71 |
| 72 | 4.05 | 0.75 |
| Customer satisfaction orientation | 3.89 | 0.38 |

Based on the findings above, it is recommended that the practices of training and education, employee involvement and quality policies are encouraged in the Thai service sector to improve quality performance.

Table 5.50 illustrates the mean rating and standard deviation for the adoption of each of the CSFs overall across the Thai university and hospital sectors. The CSFs are listed in decreasing order of level of practice.

Table 5.50 CSF rankings based on level of practice in the Thai university and hospital sectors

| CSFs | Mean rating | Standard deviation |
|---|--------------------|---------------------------|
| Management commitment (F1) | 4.21 | 0.61 |
| Product/service design (F7) | 3.96 | 0.41 |
| Supplier partnership (F6) | 3.95 | 0.53 |
| Continuous improvement (F5) | 3.94 | 0.42 |
| Quality data and reporting (F9) | 3.90 | 0.59 |
| Customer satisfaction orientation (F11) | 3.89 | 0.38 |
| Communication to improve quality (F10) | 3.87 | 0.47 |
| Quality policies (F8) | 3.86 | 0.51 |
| Role of the quality department (F2) | 3.79 | 0.54 |
| Training and education (F3) | 3.68 | 0.62 |
| Employee involvement (F4) | 3.67 | 0.49 |

Management commitment had the highest level of practice across both sectors, indicating it is an essential factor in any successful TQM implementation. The three CSFs with the lowest levels of practice – training and education, employee involvement and role of the quality department – were the same in both sectors, indicating that these are the least important factors for successful TQM implementations.

As explained above, the questionnaire contained 28 statements about the impact of Thai cultural characteristics on TQM practices. Table 5.51 shows the mean rating and standard deviation of each of the statements used to evaluate the impact of Thai culture on TQM adoption in both sectors.

Table 5.51 Impact of Thai cultural characteristics on TQM practices in the Thai university and hospital sectors

| CSF statement number | Mean rating | Standard deviation |
|-----------------------------|--------------------|---------------------------|
| 73 | 3.84 | 0.94 |
| 74 | 3.68 | 1.05 |
| 75 | 3.74 | 1.03 |
| 76 | 3.75 | 1.05 |
| 77 | 3.64 | 0.99 |
| 78 | 4.22 | 0.90 |
| 79 | 4.25 | 0.78 |
| 80 | 4.21 | 0.79 |
| 81 | 3.13 | 1.23 |
| 82 | 4.08 | 0.87 |
| 83 | 4.14 | 0.84 |
| 84 | 3.83 | 0.95 |
| 85 | 4.30 | 0.88 |
| 86 | 3.37 | 1.33 |
| 87 | 3.61 | 1.21 |
| 88 | 3.69 | 1.15 |
| 89 | 3.85 | 1.11 |
| 90 | 4.22 | 0.93 |
| 91 | 4.37 | 0.58 |
| 92 | 4.34 | 0.60 |
| 93 | 4.33 | 0.64 |
| 94 | 3.38 | 1.28 |
| 95 | 4.25 | 0.79 |
| 96 | 4.40 | 0.55 |
| 97 | 4.11 | 0.74 |
| 98 | 3.77 | 1.05 |
| 99 | 4.09 | 0.70 |
| 100 | 4.37 | 0.60 |

The analysis shows that Thai cultural characteristics have more positive implications for TQM implementation than negative implications. Thai national cultural characteristics have influenced TQM practices in the Thai service industry, specifically in the hospital and university sectors. This finding that national culture has an influence on TQM practices is supported by the literature.

Chi-square tests were conducted to investigate whether there were any significant relationships between each CSF and each Thai cultural characteristic. Using crosstab analysis, each cultural factor was matched with each CSF to find the relationship between them at $p=0.001$. The results are presented in Table 5.52 and Table 5.53. Table 5.52 uses the symbol ‘S’ to identify significant relationships between cultural factors and CSFs. All Chi-square values are listed in Appendix 4. Chi-square values that showed significance are presented in Table 5.52.

Table 5.52 Significant relationships between CSFs and Thai cultural characteristics in the Thai university and hospital sectors

| CSFs/Thai cultural characteristics | F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F9 | F10 | F11 |
|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|
| C1 | | | | | | | | | | | |
| C2 | | | | | S | | | S | | S | S |
| C3 | | | | | | | | S | S | | S |
| C4 | | | | | | S | | S | S | S | S |
| C5 | S | | | S | S | S | | S | | | S |
| C6 | | | | S | S | | | | | S | S |
| C7 | | | | | S | | | | | | |
| C8 | | | | | | | | | | | |
| C9 | | | S | | | | | | | | |
| C10 | | | | | S | | | | | S | |
| C11 | | | | | | | | | | | |

Table 5.53 Chi-squared results for the Thai university and hospital sectors

| Statements | Hypothesis | Pearson Chi-square value | Asymp. Sig. |
|-------------------|-------------------|---------------------------------|--------------------|
| S2 × S87 | H2 | 30.524 | 0.001 |
| S2 × S89 | H2 | 35.584 | 0.000 |
| S27 × S98 | H8 | 38.233 | 0.000 |
| S32 × S89 | H13 | 50.459 | 0.000 |
| S31 × S95 | H14 | 41.633 | 0.000 |
| S34 × S74 | H20 | 39.973 | 0.000 |
| S34 × S75 | H20 | 41.619 | 0.000 |
| S34 × S88 | H22 | 40.131 | 0.000 |
| S33 × S91 | H23 | 31.039 | 0.001 |
| S33 × S92 | H23 | 29.603 | 0.001 |
| S33 × S95 | H23 | 78.984 | 0.000 |
| S34 × S91 | H23 | 35.035 | 0.000 |
| S34 × S92 | H23 | 25.609 | 0.000 |

| Statements | Hypothesis | Pearson Chi-square value | Asymp. Sig. |
|------------|------------|--------------------------|-------------|
| S34 × S95 | H23 | 53.339 | 0.000 |
| S37 × S91 | H23 | 26.363 | 0.000 |
| S33 × S96 | H24 | 52.747 | 0.000 |
| S34 × S96 | H24 | 38.766 | 0.000 |
| S35 × S96 | H24 | 27.058 | 0.000 |
| S37 × S96 | H24 | 26.226 | 0.000 |
| S33 × S99 | H26 | 56.943 | 0.000 |
| S37 × S99 | H26 | 29.908 | 0.000 |
| S38 × S82 | H27 | 82.276 | 0.000 |
| S38 × S83 | H27 | 78.093 | 0.000 |
| S38 × S84 | H27 | 70.843 | 0.000 |
| S38 × S85 | H27 | 44.331 | 0.000 |
| S38 × S86 | H27 | 70.361 | 0.000 |
| S38 × S87 | H28 | 77.827 | 0.000 |
| S38 × S88 | H28 | 80.882 | 0.000 |
| S38 × S89 | H28 | 73.480 | 0.000 |
| S52 × S74 | H33 | 65.051 | 0.000 |
| S52 × S75 | H33 | 52.045 | 0.000 |
| S52 × S76 | H33 | 50.391 | 0.000 |
| S59 × S78 | H34 | 42.240 | 0.000 |
| S59 × S79 | H34 | 47.698 | 0.000 |
| S59 × S80 | H34 | 52.839 | 0.000 |
| S60 × S84 | H35 | 31.775 | 0.001 |
| S59 × S87 | H36 | 46.772 | 0.000 |
| S63 × S79 | H38 | 30.471 | 0.000 |
| S63 × S80 | H38 | 27.007 | 0.001 |
| S64 × S79 | H38 | 41.311 | 0.000 |
| S64 × S84 | H39 | 34.229 | 0.001 |
| S65 × S77 | H41 | 45.714 | 0.001 |
| S67 × S82 | H43 | 55.986 | 0.000 |
| S65 × S91 | H45 | 31.949 | 0.000 |
| S65 × S92 | H45 | 28.692 | 0.000 |
| S65 × S95 | H45 | 40.807 | 0.001 |
| S66 × S91 | H45 | 28.692 | 0.000 |
| S66 × S92 | H45 | 30.330 | 0.000 |
| S65 × S99 | H47 | 42.456 | 0.000 |
| S70 × S77 | H49 | 50.101 | 0.000 |
| S71 × S75 | H49 | 47.934 | 0.000 |
| S72 × S74 | H49 | 156.290 | 0.000 |
| S72 × S75 | H49 | 162.686 | 0.000 |
| S72 × S76 | H49 | 142.921 | 0.000 |
| S72 × S77 | H49 | 146.663 | 0.000 |

| Statements | Hypothesis | Pearson Chi-square value | Asymp. Sig. |
|------------|------------|--------------------------|-------------|
| S69 × S80 | H50 | 38.230 | 0.000 |
| S72 × S78 | H50 | 70.841 | 0.000 |
| S72 × S79 | H50 | 145.797 | 0.000 |
| S72 × S80 | H50 | 139.047 | 0.000 |
| S72 × S81 | H50 | 149.004 | 0.000 |
| S69 × S83 | H51 | 32.238 | 0.001 |
| S71 × S82 | H51 | 54.450 | 0.000 |
| S71 × S83 | H51 | 63.361 | 0.000 |
| S72 × S82 | H51 | 210.302 | 0.000 |
| S72 × S83 | H51 | 138.575 | 0.000 |
| S72 × S84 | H51 | 141.070 | 0.000 |
| S72 × S85 | H51 | 79.384 | 0.000 |
| S72 × S86 | H51 | 139.137 | 0.000 |
| S72 × S87 | H52 | 143.588 | 0.000 |
| S72 × S88 | H52 | 142.809 | 0.000 |
| S72 × S89 | H52 | 142.377 | 0.000 |
| S70 × S91 | H53 | 25.945 | 0.001 |
| S71 × S91 | H53 | 26.778 | 0.001 |
| S71 × S92 | H53 | 34.170 | 0.000 |
| S72 × S90 | H53 | 82.094 | 0.000 |

The results show that the Thai cultural characteristics of social connection, non-assertiveness, flexibility over the principles, care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness had the greatest impact on CSFs embracement across both sectors. The results showed that a number of Thai cultural characteristics exhibited significant relationships with CSFs overall. Specifically:

- Management commitment exhibited a relationship with the Thai cultural characteristic of non-assertiveness.
- Training and education practice was related to social connection.
- Employee involvement efforts had a relationship with the Thai cultural characteristics of non-assertiveness, care and consideration, kindness and helpfulness, self-control, tolerance, restraint politeness, humbleness, calmness and cautiousness.

- Continuous improvement practice had significant relationships with pride of face and dignity, non-assertiveness, education and competence orientation, social recognition, care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness.
- Supplier partnership practice was related to the characteristics of flexibility over principles and non-assertiveness.
- Quality policies were related to Thai culture of pride of face and dignity, grateful relationship, flexibility over the principles and non-assertiveness.
- Quality data and reporting practice was influenced by the Thai cultural characteristics of grateful relationships and flexibility over the principles.
- Communication to improve quality effort had relationships with pride of face and dignity, flexibility over principles, social recognition, care and consideration, kindness and helpfulness, self-control, tolerance, restraint politeness, humbleness, calmness and cautiousness.
- Customer satisfaction orientation practices were related to Thai cultural characteristics of pride of face and dignity, grateful relationships, flexibility over the principles, non-assertiveness, care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness.

Table 5.52 shows that the Thai cultural characteristics of non-assertiveness, care and consideration, kindness and helpfulness, self control, tolerance, restraint, politeness, humbleness, calmness and cautiousness, flexibility over the principle and appreciation of social connection (i.e. getting to know the right person) have the highest number of significant relationships with CSFs. For example, the table shows that appreciation of social connection can influence TQM practices of training and education, employee involvement, product and service design, and communication to improve quality.

It is crucial to consider how these characteristics affect TQM adoption. The results suggest that the Thai cultural characteristic of non-assertiveness can influence the effectiveness of TQM implementation through issues such as employee involvement

and continuous improvement efforts. Most Thai people are usually non-assertive. In the context of a group work environment, they tend to avoid trouble with their teammates. As a result, they are likely to get along well with other people. This environment can lead to an increased communication level within the firm. Thai group members appear to get along together well in a team, seem to listen to others' opinions and act according to their supervisors' orders.

Flexibility over principles can affect TQM practices such as quality and data reporting and customer focus orientation efforts. In Thai societies, flexibility is a good thing. If a rule is not flexible, there will be many conflicts. However, too much flexibility on principles leads to uncontrolled situations. A flexible process can increase the level of customer orientation since it can provide instant solutions for customers. However, if there is too much flexibility, corrective actions to improve the process are usually postponed. Workers will not show respect for the rules. If there is too little flexibility in the process, it is hard to create mutual working environment in Thai society.

The cultural characteristic of getting to know the right person can hinder TQM adoption in regard to employees' training and education. Personal relationships between employees and managers can obstruct the performance reporting and feedback system. When employees have personal relationships with their supervisors and they are lacking self-motivation, they may not work hard to achieve the organization's goal. Despite this, such employees can pass a performance audit based on their personal relationship with the auditing supervisor.

From the analysis above, it is evident that Thai cultural characteristics have the potential to have both positive and negative impacts on TQM implementation.

5.3 Discussion

The results of this study were compared with other previous studies to inform identification and analysis of the key findings. Published studies identified top management commitment as the most important success factor in the US and Indian industries, whereas training and education was the most critical factor in Hong Kong industries (Antony et al., 2002). This study identified that top management commitment was the most highly practiced CSF in Thai hospitals and universities. Other highly practiced factors in the organizations that implemented TQM in the Thai service

industry were continuous improvement, product/service design and supplier partnership. This high level of practice implies that the above factors have been seen as the most importance CSFs in the sector.

Reis and Pati's (2007) study of TQM proliferation in Thailand suggested that, when implementing TQM, improvement in training, employee relations, quality data and reporting, and the management of supplier quality were the most important tasks for the Thai service and manufacturing companies to improve the quality of their products and services. Other important issues included top management, quality policy, the process management role of quality department, and product/service design (Reis and Pati, 2007). As a result, to improve the quality of service provided, Thai hospitals and universities have reprioritized their practices to focus more on training, employee relations, quality data and reporting, and supplier quality management.

According to a study of TQM practices prioritization (Talib, Rahman and Qureshi, 2012), it has been suggested that top management commitment, continuous improvement and innovation, quality culture, quality systems, training and education are the most important TQM practices. Strategically, the factors that are important for achieving business goals and organization effectiveness are top management commitment, continuous improvement and innovation and quality cultures. With respect to tactical factors, training and education, teamwork and communication are crucial for TQM implementation. Operationally, product and service design, as well as process management, can affect business results in the short term (Talib, Rahman and Qureshi, 2012). The findings of this study showed that Thai universities and hospitals have implemented most TQM practices. However, in order to improve their strategic, tactical and operational performance, there are a number of factors that should be considered more closely by management. These factors are the level of involvement in quality data reporting, training and education, communication to improve quality and the quality culture. Table 5.54 summarizes the most highly practiced CSFs in the Thai university and hospital sectors alongside the CSFs identified in previous research from the USA, UK, India and Hong Kong.

| USA in 20 business companies (Saraph, Benson and Schroeder, 1989) | UK in 25 service companies (Tsang and Antony, 2001) | India in 101 business companies across the country (Joseph, Rajendran and Kamalanabhan, 1999) | Hong Kong in electronics, telecommunication, textiles, building and construction, real estate and other service sectors (Antony et al., 2002) | Thailand university sector | Thailand hospital sector |
|--|---|--|---|--|--|
| <ol style="list-style-type: none"> 1. Top management commitment 2. Role of the quality department 3. Training 4. Product design 5. Supplier quality management 6. Process management 7. Quality data and reporting 8. Employee relations | <ol style="list-style-type: none"> 1. Customer focus 2. Continuous improvement 3. Top management commitment and recognition 4. Teamwork and employee involvement 5. Communication in company 6. Quality system and policies 7. Training and development 8. Cultural change 9. Supervisory leadership 10. Measurement and feedback 11. Supplier partnership/supplier management | <ol style="list-style-type: none"> 1. Organizational commitment 2. Human resources 3. Management commitment 4. Customer satisfaction 5. Role of the quality department 6. Process management 7. Quality data reporting 8. Employee relations | <ol style="list-style-type: none"> 1. Training and education 2. Quality data and reporting 3. Management commitment 4. Customer satisfaction orientation 5. Role of quality department 6. Communication to improve quality 7. Continuous improvement | <ol style="list-style-type: none"> 1. Management commitment 2. Continuous improvement 3. Supplier partnership 4. Product/service design 5. Quality data and reporting 6. Communication to improve quality 7. Quality policies 8. Customer satisfaction orientation | <ol style="list-style-type: none"> 1. Management commitment 2. Product/service design 3. Supplier partnership 4. Continuous improvement 5. Customer satisfaction orientation 6. Quality data and reporting 7. Quality policies 8. Communication to improve quality |

Table 5.54 Summary of heavily practiced TQM CSFs in different countries

An analysis of the impact of Thai cultural characteristics on CSFs is summarized in Table 5.55. The Thai culture characteristics are arranged by order of most to least impact on CSFs based on the number of significant relationships between each Thai cultural characteristic and CSF. It can be concluded (based on the data presented in Table 5.52) that non-assertiveness has six significant relationships with CSFs and flexibility over the rule has five significant relationships with CSFs in the overall sector. In addition, care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness as well as pride of face and dignity have four significant relationships with CSFs. Moreover, according to Table

5.37, non-assertiveness has five significant relationships with CSFs in the hospital sector in Thailand, while flexibility over principles, appreciation of social connection and appreciation of social recognition have four significant relationships with CSFs. Furthermore, according to Table 5.22, the Thai culture characteristics of grateful relationship, fun and humorous in nature and flexibility over principles have two significant relationships with CSFs in the university sector. Care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness also have two significant relationship with CSFs.

Table 5.55 Thai cultural characteristics that have a relationship to TQM adoption

| | University | Hospitals | Overall |
|---------------------------------|--|---|---|
| Cultural characteristics | <ol style="list-style-type: none"> 1. Flexibility over principles 2. Grateful relationship 3. Fun and humorous in nature 4. Care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness | <ol style="list-style-type: none"> 1. Non assertiveness 2. Flexibility over principles 3. Appreciation of social connection 4. Appreciation of social recognition | <ol style="list-style-type: none"> 1. Non assertiveness 2. Flexibility over principles 3. Care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness 4. Pride of face and dignity |

Table 5.55 shows that the Thai cultural characteristic of flexibility over principles had a strong relationship with TQM adoption in both the hospital and university sectors in the questionnaire results. Grateful relationship, fun and humorous in nature, and care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness exhibited relationships with TQM in the university sector. The Thai cultural characteristics that had a demonstrable relationship with TQM practices in Thai hospitals were flexibility over principles, appreciation of social connection and appreciation of social recognition. It can be seen that the sets of Thai cultural characteristics that impacted on TQM practices in the Thai hospital and university sectors were different. These findings support the pluralist view of TQM and cultures, which indicate that there are many sets of cultures on which TQM can be built.

The findings of this study suggest that Thai cultural characteristics can both positively and negatively influence quality practices in an organization. As reported by Lo (1999), cultural characteristics such as the importance of strong leadership demonstrated through virtue, goodness, kindness, morality, favor or ethics can positively impact on TQM adoption. In order to have faithful followers, it is important for quality managers to act in accordance with the commonly accepted ethical values and principles governing the conduct of the group (Lo, 1999 cited in Noronha, 2002a, pp.66-67). Another important area is the ability to work in harmony through the creation of a well-balanced company hierarchy. This hierarchical relationship helps to identify the roles and responsibilities of every member, which in turn leads to mutual and complementary obligations and cooperation. These characteristics share some commonalities with Thai cultural characteristics. It is believed that a TQM culture in a Thai organization must incorporate the underlying Thai cultural characteristics and some of TQM's host cultural values concurrently. Noronha's (2002) study reported that Chinese cultural characteristics had positively and significantly influenced organizations' quality climate. The Chinese cultural characteristics of the value of abasement, adaptiveness, harmony with people, interdependence (grateful relationship) and respect for authority were found to be positively related with TQM. On the other hand, the value of harmony with the universe and sincerity (face) do not correlate with TQM adoption. Negative impacts may be a consequence of cultural differences.

A study conducted in 364 Australia firms across various industries suggested that the cultural dimension of teamwork/respect for people was the most important factor in enhancing the use of TQM practice (Baird, Hu and Reeve, 2011). The cultural characteristics of teamwork and respect for people incorporate many characteristics such as fairness, respect for the rights of the individual, tolerance, being socially responsible, being people oriented, being team oriented and working in collaboration with others. These cultural characteristics are similar to Thai cultural characteristics, which have been found to relate to TQM practices in this study.

It has been suggested that a flexible, people-oriented style is suitable for TQM implementation. For example, Tata and Prasad (1998) concluded that people-oriented and flexible cultures were more conducive to successful TQM implementations. They identified that practices such as leadership, employee involvement and empowerment, teamwork, customer focus and continuous improvement were the reflection of people-

centered and flexible cultures, or would be best implemented where such cultures prevailed. The findings of this research suggest that some Thai culture characteristics such as non-assertiveness, care and consideration, kindness and helpfulness, self-control, tolerance, restraint politeness, and flexibility over the principles, all of which can be considered to be people oriented and flexible characteristics, have a significant relationship with TQM adoption in Thai hospitals and universities.

5.4 Conclusion

This chapter has presented the findings of the questionnaire completed by representatives of Thai universities and hospitals. The results of the questionnaire have revealed that, to implement TQM more effectively, management in the Thai service sector should create a pervasive environment that facilitates an awareness of the cultural impact of the Thai cultural characteristics of non-assertiveness, flexibility over principles, care and consideration, kindness and helpfulness, self-control, tolerance, restraint politeness, humbleness, calmness, cautiousness and pride of face and dignity. It is also apparent that managers should concentrate on enhancing the level of teamwork within their organization. This study suggests that some Thai cultural characteristics, such as grateful relationship and fun in nature, may lead to the enhancement of teamwork efforts.

It is concluded that Thai universities and hospitals have embraced TQM because all the CSFs of TQM implementation have been highly practiced in these two sectors. Accordingly, these factors are seen as CSFs in the service sector in general. The research findings suggest that management commitment, continuous improvement and supplier partnership have been highly practiced in the university sector in Thailand while, in the context of Thai hospitals, management commitment, product and service design, supplier partnership and continuous improvement are the most practiced CSFs among the eleven CSFs considered in this study. It is recommended that improvement efforts in the areas of employee involvement, training and education and role of quality department should be considered by management to improve total quality performance in these sectors. Policy makers can use these findings to construct a TQM framework for the sectors and the findings should also be considered by the management of Thai universities and hospitals to more effectively approach TQM, ultimately bringing about performance excellence.

This research identifies CSFs of TQM adoption in Thai universities and hospitals and explores the level of the CSFs practices in the sectors in general. In order to provide a detailed explanation of how Thai universities and hospitals have approached the TQM journey, the following chapter will present a case study of a Thai hospital. Through the case study, Chapter 6 will consider how Thai cultural characteristics influence TQM practices in a hospital.

Chapter 6 CSF Adoption in Nakornthon Hospital: A Case Study

6.1 Introduction

The previous chapter presented an examination of the level of practice of identified Critical Success Factors (CSFs) of Total Quality Management (TQM) implementations. This examination was conducted in the context of the Thai university and hospital sectors. The impact of Thai cultural characteristics on CSFs was also investigated. These results and the associated analysis were based on the results of a survey. Categorization of service firms into specific sectors, such as the university and hospital sectors, was used as this has been found to assist in identifying more meaningful results (Woon, 2000).

This chapter presents the case study of a Thai service organization: a hospital. The objectives of this chapter are to understand how CSFs have been practiced and how Thai cultural characteristics affect CSFs practices in one hospital. Purposive sampling procedure was used to select a respondent for the hospital sector. In this research, a reputational sampling procedure was applied. Nakornthon Hospital was selected because it has a good reputation regarding quality management practices. This can be seen from the hospital's adoption and practicing of quality management and is certified to many quality standards including ISO, HA and HPH (Nakornthon, 2013). These standards have been certified by both public and private hospitals. Moreover, the hospital has established a formal quality department together with support from top management. Therefore, the investigation of Nakornthon Hospital can provide rich and meaningful information. Furthermore, the most common hospitals in Thailand are small to medium hospitals, which have approximately 100-250 beds (MOPH, 2011). Nakornthon Hospital has 150 beds so it should be a good representative of the hospital sector in Thailand. Thus, Nakornthon Hospital was selected based on a specific purpose associated with answering the research questions. The use of case study allows for the collection of more detailed information than was available through the general survey information described in Chapter 5. The chapter is divided into three main sections: Section 6.2 illustrates quality issues in hospitals; Section 6.3 presents the background of Thailand's hospital sector and its quality control mechanisms; and Section 6.4 presents

the case study of Nakornthon Hospital. The case study presents issues of quality in the hospital and detailed information about the organization including an organizational profile, TQM practices and the adoption of CSFs. Nakornthon Hospital's work processes, described in terms of the patient journey, are then presented along with the identified quality issues related to the journey and recommendations for quality improvement. A discussion of the impact of Thai cultural characteristics on TQM practices is also included.

6.2 Issues of hospital quality

There are many quality issues faced by healthcare providers around the world. In USA, the top quality issues that healthcare providers currently deal with include imaging scan radiation exposure and overutilization, dialysis mortality, central line infections, patient involvement in care, electronic health record and health information technology adoption, transparency for stakeholders, medical errors and the privacy of patient information (Cheryl, 2011). According to a study of quality management system implementation in public hospitals in Thailand (Pongpirul et al., 2006), healthcare professionals face a number of obstacles associated with the multidisciplinary process of the accreditation standard. This is a consequence of healthcare reform based on the underlying quality principles. Analysis against the Hospital Accreditation (HA) standard shows that quality problems linked to this standard in Thai hospitals include integration and utilization of information, the adoption of quality improvement activities, development of clinical practice guidelines, multidisciplinary care, participation in quality improvement programs, the discharge and referral process, medical recording process, adequacy of staff and human resource development policies (Pongpirul et al., 2006).

It is important to deliver quality service to customers. Models such as the Technical and Functional Quality Model and the Gap Model are often used by researchers to evaluate how customers perceive quality of service. Firstly, Technical and Functional Quality Model developed by Gronroos (1984 cited in Leelataypin, Maluesri, and Punnakitikashem, 2011) suggests that quality service can be categorized into technical quality and functional quality. Technical quality relates to accuracy in the working process; i.e. the accuracy of doctors' diagnoses, the standardization of working processes and the ability of staff (such as the ability of doctors to provide treatment,

nurses to satisfy customers and pharmacists to deliver the correct drugs). On the other hand, functional quality concerns service design and the way hospitals provide service to patients. It is claimed that patients usually assess the quality of service from a functional quality perspective (considering the availability of equipment, cleanliness and quality of hospital food) more than technical quality. Patients do not have enough knowledge to evaluate the quality of doctors' diagnoses and it is hard for them to differentiate their expectations from the service quality specification provided by hospitals. Although technical quality is important to patients, they are likely to judge the service quality based on functional quality (Leelataypin, Maluesri and Punnakitikashem, 2011). The second model, the Gap Model developed by Parasuraman, Zeithaml and Berry (1985 cited in Leelataypin, Maluesri and Punnakitikashem, 2011), suggests that customers evaluate service quality based on the differences between customers' expectations and customers' perceptions in five different dimensions: tangible (availability of modern equipment, uniform, professional staff and electronic systems); reliability (services delivered as promised by the hospital at all times); responsiveness (service attitude of employees, instant response to patients' requirements and waiting time); assurance (availability of specialists, delivery of service with a professional manner); and empathy (availability of staff to take care of patients and to satisfy their unique expectations). If a customer's perception of the services received is higher than or equivalent to his expectation, the customer is satisfied with the service offering. Customer expectation refers to what a customer demands from a service provider, while customer perception refers to what a customer feels about the service provided (Leelataypin, Maluesri and Punnakitikashem, 2011). According to the survey findings in the previous chapter, Thai hospitals have highly practiced the CSFs of TQM implementation. However, a study of service quality in a public hospital in Bangkok, Thailand that used the Gap Model revealed that the service quality delivered by the hospital did not meet patients' expectations. The hospital did not deliver service quality in all five dimensions (Leelataypin, Maluesri and Punnakitikashem, 2011). It can be seen that these results seem to contradict the survey results in previous chapter. It is important to note that the study by Leelataypin, Maluesri and Punnakitikashem (2011) measures customer satisfaction by using patients' perception. However, this research examines the level of CSFs practices based on the perception of hospitals' management staff. High quality service can be perceived differently when viewed from different perspectives. A high level of CSFs practices seems to enhance quality performance in

many areas but it is difficult to guarantee that the hospitals can provide satisfactory service. The adoption of CSFs practices can ensure that the practitioners will continuously improve their quality performance and eventually provide high quality service to their customers. Delivery of service quality performance can be varied depending on effective implementation and integration of comprehensive quality management concepts. Although many CSFs have been practiced by the Thai hospital sector, some hospitals can still face problems in the delivery of service quality to customers. Understanding customer requirements and expectations depends on how hospitals define their customers and is unique to each hospital. In fact, focusing and understanding customers' expectation is one of CSFs of TQM adoption.

Examples of patient dissatisfaction with Thai hospitals generally relate to poor hygiene in hospitals, a lack of doctors and specialists, the distance between wards, an insufficient number of beds and medical errors (MOPH, 2012). Patients also experience long waiting times to be treated in well-respected hospitals. Over-crowding is a problem in some hospitals and during certain periods (Aimtrakoon, 2012; Pankrud, 2012). One notable difference between Western healthcare and the operations of Thai hospitals is that, in Western countries, patients usually have mandatory medical insurance. Therefore, hospitals are guaranteed to get paid. However, in the case of Thai hospital admission, patients are required to pay for the treatment immediately as this type of medical insurance does not exist (Allianzworlwidecare, 2012). Numerous quality-related problems (e.g. medical staff providing poor instructions to patients) are basic and can be resolved through the implementation of simple solutions such as establishing clear job expectations and better understanding of the work process components and their interaction (Huq and Martin, 2000). Other more complex quality problems include varying standards of customer interactions, lack of physicians and the absence of advanced medical equipment (MOPH, 2012). It has been suggested that poor healthcare creates higher costs, with misdiagnoses, substandard surgery, improper drug therapies and hospital-acquired infections leading to longer hospital stays and the need for more clinical services to be provided to patients (Brashier et al., 1996).

6.3 Background of Thailand's hospital sector and its quality control mechanisms

In Thailand, the health care system is dominated by public hospitals (Sriratanaban, 2011). There are both public and private healthcare providers in Thailand including medical schools, tertiary care facilities, general hospitals, community hospitals, and community health centers from the public sector, as well as private pharmacies, clinics and private hospitals (Sriratanaban, 2011). The healthcare infrastructures are varied so Thai people can access healthcare from different sources. Among these healthcare providers, hospitals play a significant role in Thailand's healthcare sector. Hospitals are mal-distributed across the country, with most hospitals located in Bangkok and the central region (Sriratanaban, 2011). Approximately 75 percent of the hospitals and hospital beds are publicly owned by MOPH (Sriratanaban, 2011). Public hospitals receive support from governments annually so they have an advantage over private hospitals (i.e. the overall operating costs of public hospitals are lower). In the private sector, most hospitals are medium to large. The improvement in healthcare infrastructure comes from the impact of economic growth in the 1990s and the government's investment promotion policies (Sriratanaban, 2011). Private hospitals must differentiate their services and enhance the quality of doctors and other standards to improve patients' confidence in terms of quality. It can be seen that public and private hospitals are different in many areas, such as nature, challenges, strengths and weaknesses.

However, in term of quality management practices, both public and private hospitals in Thailand are similar. There are many reasons for this claim. Firstly, in Thailand, both public and private hospitals face similar quality control mechanisms. The Thai Medical Council set up criteria to determine basic quality of standards for Thailand's public and private hospitals (Sriratanaban, 2011). Also, public and private hospitals are under MOPH, which determines the level of quality standards for hospitals. These structured criteria include the number of beds, number and specialties of physicians and medical equipment (Sriratanaban, 2011). In terms of private hospitals, the MOPH establishes rules and regulations for quality assessment. MOPH also provides guidelines for quality improvement to private hospitals (Sriratanaban, 2011). Moreover, sets of hospital standards were developed by the Social Security Office to assess the quality

performance of private and public hospitals. In addition, the Nursing Division of the Office of Permanent Secretary provides guidelines for quality assurance in different areas of nursing (Sriratanaban, 2011). Lastly, the HA agency was established by MOPH in 1995 (Sriratanaban, 2011). The Thai HA program is an accreditation program which aims to provide a mechanism to encourage total hospital quality improvement systematically and effectively. There are many quality management concepts emphasized in HA accreditation including self-assessment, quality assurance, customer focus, continuous quality improvement and TQM. In addition to being an external quality audit for the hospitals, the agency attempts to encourage hospitals to improve and assess their quality performance. Being accredited shows that hospitals are committed to patient-centered quality improvement and the hospital has a good quality system to minimize risk and assure quality (Sriratanaban, 2011).

Secondly, many quality management standards including ISO9000, ISO15189, HA, HPH, and The Joint Commission International (JCI) are available for public and private hospitals (Inside Thailand, 2013). In fact, MOPH encourages public and private hospitals to implement the ISO9000 and/or HA accreditation to create their own quality assurance system (Sriratanaban, 2011). These programs are used as a regulatory tool for quality assurance systems in the hospitals. To enhance overall quality levels, all hospitals are encouraged to adopt these quality standards. Many hospitals have been certified against the standards set for HA of Thailand and international standards, such as ISO and JCI (Inside Thailand, 2013).

Finally, both public and private hospitals are motivated by the Thai government to enhance their service quality performance to achieve international standards. The current emphasis of the Thai government is wellness and high-quality services at international standards in both the public and private hospitals (Inside Thailand, 2013). A recent establishment of policy is expected to increase Thai hospitals' service quality so the country becomes a medical hub. The policy aims to encourage Thailand's public and private hospitals to enhance the quality standards of their services. It also aims to increase the country's competitiveness in terms of quality services of Thai healthcare providers (Inside Thailand, 2013). However, international healthcare quality improvement programs should not affect the availability of good, affordable healthcare for Thai patients. To ensure consumer protection, the hospitals are also regulated against dictated high ethical standards and high quality of care. From the above, this

research assumes that the standard of quality practices among public and private hospitals are similar. Thus, both public and private hospitals are investigated together in this research.

6.4 Nakornthon Hospital case study

6.4.1 Organization profile

Nakornthon Hospital is a medical and healthcare service provider located in Thonburi, Bangkok. It was officially opened on 10 November 1996. Currently, the hospital provides medical care through multidisciplinary teams of trained specialists with a 500-bed capacity and more than 15 specialty centers including Internal Medicine, Surgery, Obstetrics and Gynecology, Pediatrics, and Eye, Ear, Nose and Throat. The hospital also provides specialized medical services through the Orthopedic Center, Aesthetics Center (Plastic Surgery, Laser & Skin), Health Check-Up Center, Dental Center, Mother and Child Center, Diabetes Center, Heart Center and Medical Spa.

Nakornthon Hospital is a private hospital and regularly provides free services as a social contribution. These free services are delivered by a mobile medical and first aid team who travel to communities that have no access to medical services. Hospital members are encouraged to participate in important traditional activities and celebrations in the local community, contributing to the preservation of the Thai culture.

The Nakornthon Hospital building was designed with a focus on patient-care, with patients' safety considered to be a high priority by management. Reflecting this concern, specialist units (such as the operating rooms, delivery rooms and ICU rooms) are located on the same floor to provide prompt and safe service to patients. Ventilation systems and emergency exits were also thoughtfully considered in the design of the building. The achievement of Nakornthon Hospital's objective of patient safety and the ability to meet or exceed patients' expectations in relation to their overall experience leads to increased customer satisfaction.

Nakornthon Hospital's motto is "High standard, Prompt, and Reliable services". The Hospital's objectives are:

1. To manage with good governance and social responsibility.

2. To provide holistic medical and healthcare services with attention and care.
3. To promote teamwork, knowledge and skill development, good organizational attitude, and continuous learning among hospital personnel.
4. To continually strive to develop hospital work processes to enhance efficiency and satisfy the clients' needs and expectations.

Top management is responsible for determining the hospital's vision, mission, values and strategies, which together drive the organization towards their expected goals. The hospital aims to be a learning organization (LO). Knowledge management is used as a business tool to enhance the human resource potential and create learning communities within the hospital. The hospital expects performance excellence to be achieved through the adoption of quality management. Continuous improvement efforts can be seen through development in patients' rooms, the establishment of an insurance center for in-patients, an increased number of ICU beds (from 12 beds to 28 beds) and the extension of the 24-hour emergency department (Nakornthon Hospital, 2012).

In an effort meet or exceed customer expectations, Thai hospitals have embraced quality standards such as International Organization for Standardization (ISO), Hospital Accreditation (HA) and Health Promoting Hospital (HPH). These standards are used in this study as an approach for effective TQM adoption in the sector. It is expected that the application of such standards will help Nakornthon Hospital to deliver services that provide patient satisfaction.

Nakornthon Hospital has been certified against many quality standards. In addition to ISO certification, it is an HA and HPH accredited medical and healthcare service provider. The hospital was also awarded the Laboratory Standard System Certificate from the Department of Medical Sciences, Public Health Ministry and Mahidol University, one of the most famous teaching hospitals and medical schools in Thailand, in 2005 (Nakornthon Hospital, 2012). It is evident that Nakornthon Hospital has focused heavily on quality improvement to offer quality service to its patients.

6.4.2 Analysis of current quality practices

The Nakornthon Hospital management team performs incident reports and quality reviews every morning. Statistical data from these incident reports and quality reviews

is reviewed monthly to raise quality awareness among the staff. A management meeting with a quality-focused agenda is held every month. This process indicates that top management assumes responsibility for quality performance using statistical controls.

Nakornthon Hospital top management has committed to a long-term quality improvement process. The hospital continues to practice quality programs such as HA, which focus on process improvement. Part of this commitment is driven by top management's view that quality improvement is valuable for increasing profit. Therefore, top management demonstrate strong support for quality development projects and it is recognized by personnel across the organization that it is easy to have quality improvement projects approved.

The quality department has high visibility, with two quality lead teams in the hospital. The quality department plays an important role in formulating the quality goals, policies and quality controls for the organization (Khanna, Sharma and Laroia, 2011). It establishes the quality goals for the following year and communicates these organization-wide. For example, Nakornthon Hospital was due to apply for HA certification in 2008 and HPH certification in 2010. After determining these goals, the quality department developed clear strategies to achieve them. The quality department manager has access to top management, with the quality department acting as a facilitator for quality improvement programs across the hospital. The department is staffed to a level that allows them to facilitate hospital members in the implementation of quality improvement efforts at all levels. They coordinate and deliver assistance to hospital personnel as required. This is often achieved through the establishment of quality improvement teams, which improve the quality of the work delivered and tend to provide greater connections between hospital staff. Nakornthon Hospital's quality department uses their quality staff professionals as a consulting resource.

Quality related training is given to managers, supervisors and employees of Nakornthon Hospital. Two types of quality training are delivered. Firstly, all employees receive a 3-hour orientation session and a quality manual. They are then trained by their manager or supervisor. Secondly, employees at management level are provided with further training. The hospital puts greater emphasis on training staff at management level as it is evident that first line managers are the main driver for quality improvement.

Coaching training documentation is also provided. All employees are empowered and encouraged by top management to be a driver for quality management.

Nakornthon Hospital employees are recognized for superior quality performance. Staff tends to become more involved with quality management if they are recognized for superior quality performance. Rewards for quality improvement efforts are also provided occasionally. Top management is involved in the assessment of these rewards, which are publicly recognized.

Continuous improvement practices are widely encouraged in the hospital. Continuous improvement projects are created by quality department managers by following the key quality performance indexes. These indexes are viewed as goals to improve quality performance. Once created, the hospital encourages projects to be practiced in each department. The hospital has also implemented Kaizen, which is a gradual and orderly continuous improvement process. It encompasses four fundamental steps: identification of a visible, repeatable and measurable organizational process and the application of continuous improvement to this process; optimization of the process by emphasizing intangible effects and reducing errors; examination of the way products and services are consumed for further continuous improvement; and consideration outside the immediate product (Gauttam, 2010). It can be seen that Nakornthon Hospital utilizes a Kaizen approach. The hospital supports continuous improvement in a competitive and open environment using twice yearly contests. Final assessment of the continuous improvement work undertaken is conducted by top management. Awards for the contest are assessed at three levels: organization, committee and department. One such example of an innovative continuous improvement project was infection control that reduced the infection rate in patients.

From this internal contest, Nakornthon Hospital selected three quality continuous improvement projects to be presented at the HA National Forum. These were clinical round, dialogue thinking and love diary. The clinical round project has been practiced by the hospital for two years. A clinical round refers to the private bed-side meeting of professionals and medical staff to review a patient's case. Various members of medical staff (including pharmacists, doctors, nurses, nutritionists and physical therapists) from different departments would participate in the meeting which would usually last approximately an hour. It is very difficult for many hospitals to implement a system like

this due to time constraint of doctors and nurses. The result of this project is improved guidelines and hence better treatment for the patient involved. The second project, dialogue thinking in the work place, is based on deep listening before discussion to improve continuous effort. This project aims to promote teamwork to identify problems, generate solutions, evaluate alternatives and reach consensus in decision-making. Deep listening of other opinions can help to remove barriers for consensus, which support teamwork efforts for quality improvement (Huq and Martin, 2000). Consensus is reached when all team members present their opinion by having their 'day in court' to gain agreement to support the decision. If there is consensus in the decision, all members should be willing to work toward its success (Huq and Martin, 2000). The last project is love diary. In this project, the hospital encourages staff to publish their story of caring for patients. These stories are expected to focus on achieving customer satisfaction by understanding the ways patients are processed and the application of hospital services to patients, as described in the staff diaries.

Continuous improvement depends on on-going learning. It is necessary for management to train staff so they engage in and help to create a learning culture. Reporting is a necessary component of this process. A learning organization is one which is continually expanding its capacity to create its future (Evans and Lindsay, 2008). The learning cycle found in learning organizations is a never ending process. It has four stages: planning, execution of plans, assessment of progress and revision of plans based on assessment findings. Nakornthon Hospital believes that continuous improvement and learning should be a regular part of daily work practiced at a personal level, within each work unit and at an organizational level. It is driven by opportunities to affect significant change and focused on sharing throughout the organization. Knowledge sharing among hospital managers is encouraged. As a structured approach to knowledge sharing, knowledge management is important for learning organizations. In 2010, the hospital commenced the implementation of knowledge management across its network. Knowledge sharing projects are also supported. The hospital arranges meeting three times each month where departmental managers share information, data and knowledge, thereby creating an atmosphere of 'Good thing is good, we should do it'. Hospital forms include a section on how to further develop knowledge and the hospital has participated in public knowledge sharing at the HA National Forum.

The role of facilitators and mentors in continuous improvement efforts is actively assumed by Nakornthon Hospital top management. The hospital supports the use of continuous improvement projects in all departments, and during each quarter each person or department is required to participate in one project related to their job area. There are many continuous improvement projects conducted simultaneously across the hospital. One example is reducing the use of paper. The management both implement and reinforce quality improvement continuously to ensure that staff across the organization understand the relationship between feedback, practice and results, all of which are necessary for successful change. This leads to new goals and approaches.

TQM adoption needs to be supported by establishing a performance measurement system (Wardhani et al., 2008). When implementing TQM, it is important for hospitals to identify quality measurement and indicators for performance improvement evaluation (Aly and Mack, 1993). If performance is not measured, it is not possible to know how to continuously improve. To aid continuous improvement, Nakornthon Hospital has an effective measurement system. Top management has adopted Balanced Score Card (BSC) to direct the hospital's strategies. BSC has been proven as an effective tool for performance measurement. It comprises many measures required for organizations to achieve performance excellent. BSC is a comprehensive performance measurement tool that aims to measure the performance of a firm from different dimensions (Zafar et al., 2010). BSC contains both financial and non-financial measures. There are four perspectives that must be measures when applying BSC: financial perspective (measures profitability and shareholders' wealth); customer perspective (measures improvement in time, quality, performance, services and cost of companies, all of which affect customer satisfaction); internal business process perspective (measures efficient use of organizational resources); and learning and growth perspective (deals with the improvement of organizational capability to satisfy customers' expectation; innovation and learning should be considered as a continuous process) (Zafar et al., 2010). Key performance indicators of these four perspectives are developed to measure the hospital's performance. The application of BSC shows that hospital performance is measured by focusing on the satisfaction of patients and other stakeholders. BSC is used to continuously improve quality performance and to support a learning environment in the hospital. The perspectives affect three main stakeholders: shareholders, customers and employees (Evans and Lindsay, 2008). The quality manager considers the

monitoring process of BSC to be an important consideration in decision-making. The hospital's performance is measured by Key Performance Indicators (KPI) including emergency department waiting time, elective surgery waiting time, size of nursing workforce, percentage of accredited beds and hospital-acquired infection rates.

Effective quality policies enable the hospital to establish a systematic process to achieve quality goals efficiently. The hospital has quality goals and a policy that are communicated to and widely understood by staff. The quality department's effectiveness is confirmed by high levels of quality awareness among employees. Hospital staff practice self-inspection of work and zero defects is pursued as the quality performance standard. The main focus of Nakornthon Hospital's working process is to identify errors and, when identified, eliminate them and minimize risk in both the service and clinical aspects.

Communication to improve quality within an organization is an important factor in the adoption of TQM philosophy (Evans and Lindsay, 2008). Under TQM principles, the practice of communication to improve quality within the hospital leads to the expectation that there will be good communication in all areas: between different departments as well as effective top-down and bottom up communication (Antony et al., 2002). The computerized system and hospital's intranet are well established. Top management have invested significant effort in transferring manual records to electronic documents. Reception staff, screening nurses and doctors are encouraged to use the electronic system and communicate patient information electronically. For example, to solve quality issues in the patient registration process, the hospital developed its own intranet to communicate and transfer patient information between departments to eliminate errors created by paperwork and hand writing. Other tasks such as queuing and registration are also completed electronically. The electronic system can lead to improvement in the communication of patient information. Nakornthon Hospital has also established web conferences with the Ministry of Public Health and has implemented an online system with other hospitals to facilitate performance comparison.

The customer focus nature of TQM requires the evaluation of customer complaints, satisfaction achieved, closeness of the relationship with customers and development of customer responsiveness (Talib, Rahman and Qureshi, 2011c). To demonstrate a

customer satisfaction orientation, it is necessary to strengthen relevant policies and commit to an improvement in customer satisfaction (Antony et al., 2002). Customer satisfaction orientation has been practiced by the hospital. A customer focus can be implemented through both proactive and passive methods. Nakornthon Hospital implements both proactive and passive techniques. Using a proactive approach the hospital interviews patients to determine their demands. Using a passive approach, the hospital analyses patients' demand recorded through feedback and complaints. These techniques are practical ways to analyze customer requirements in a product/service development process.

Regarding supplier partnership practice, the hospital is involved in the nurse development process. Hospital management actively lobbies the Thai government on important nurse development issues such as increasing subsidiary funding for nursing education and the establishment of other policies to make the occupation of nursing more attractive.

From the above, it can be seen that Nakornthon Hospital has embraced many of the identified CSFs of TQM implementations including top management commitment, role of the quality department, quality training and education, employee involvement and motivation, continuous improvement, the use of effective quality policies, communication to improve quality, customer focus and supplier partnership. It should be noted that continuous promotion, education and training, strong leadership, management and physician commitment, and employee empowerment can be used to create an organizational culture and quality system that supports TQM (Wardhani et al., 2008).

6.4.3 The patient journey

This section describes an out-patient's journey in the hospital. A flowchart has been constructed to depict the sequence of activities in the patient journey process. The flowchart diagrams presented are the first step in evaluating a service process (Wisner, Leong and Tan, 2005). Once the hospital's service processes are constructed, potential problem areas can be identified and evaluated for further improvement in many areas such as waiting times and resource utilization. The flowchart can be used by management to understand problems in the process as well as to establish quality control procedures. The flowchart can also be used to help the staff involved in the

process to understand the process better and more objectively. A thorough understanding of the process enables the quality improvement team to pinpoint obvious problems, error-proof the process, streamline it by eliminating non value-added steps and reduce variation. Flowchart development can also be used as the first step in business process reengineering (BPR) (Wisner, Leong and Tan, 2005). The information presented in the flowchart below was derived from interviews with Nakornthon Hospital management and from observation of the out-patient process. The flowchart of the patient journey is presented in Figure 6.1-Figure 6.3. The journey is presented across multiple figures for enhanced readability.

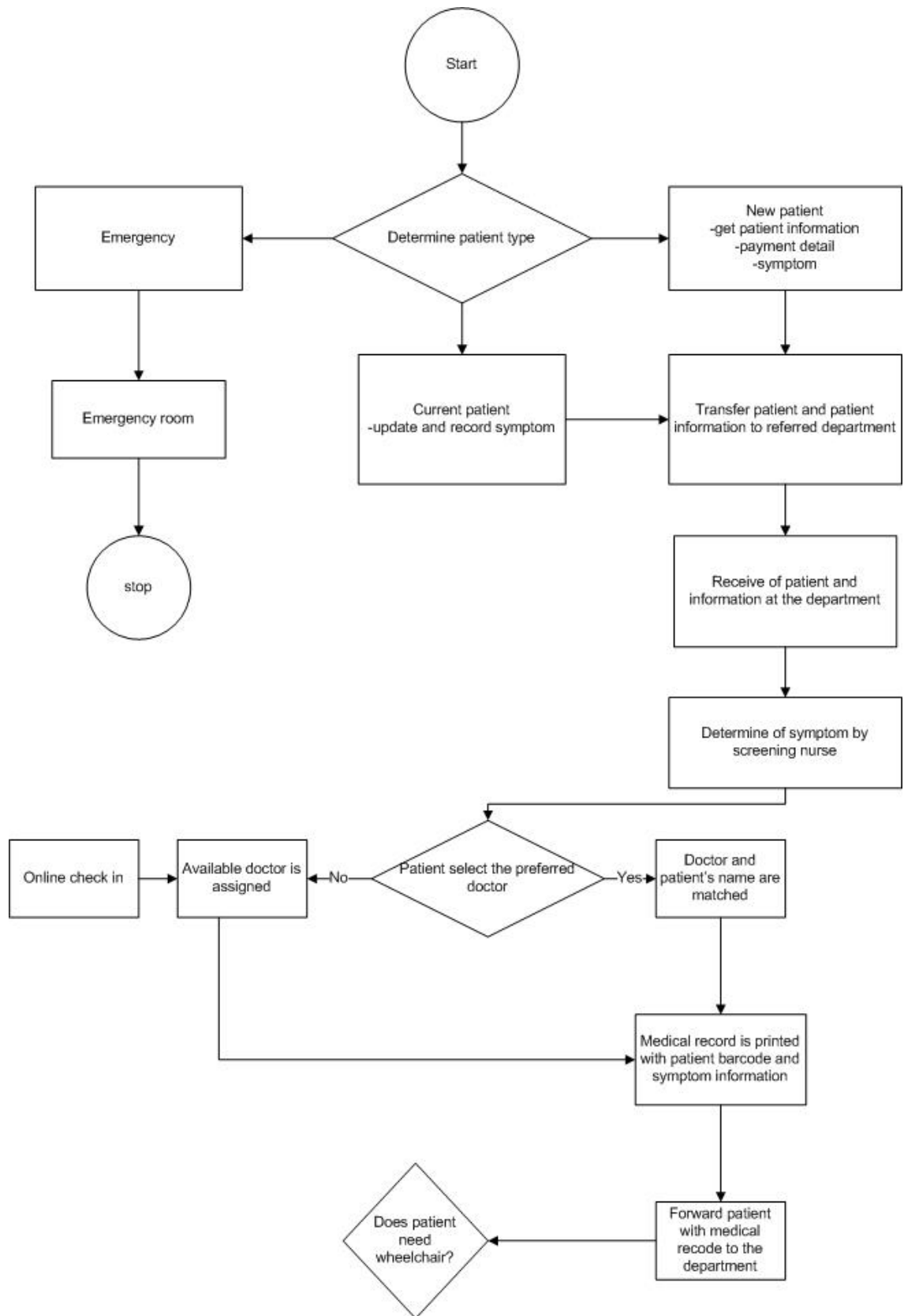


Figure 6.1 Patient journey – Part a

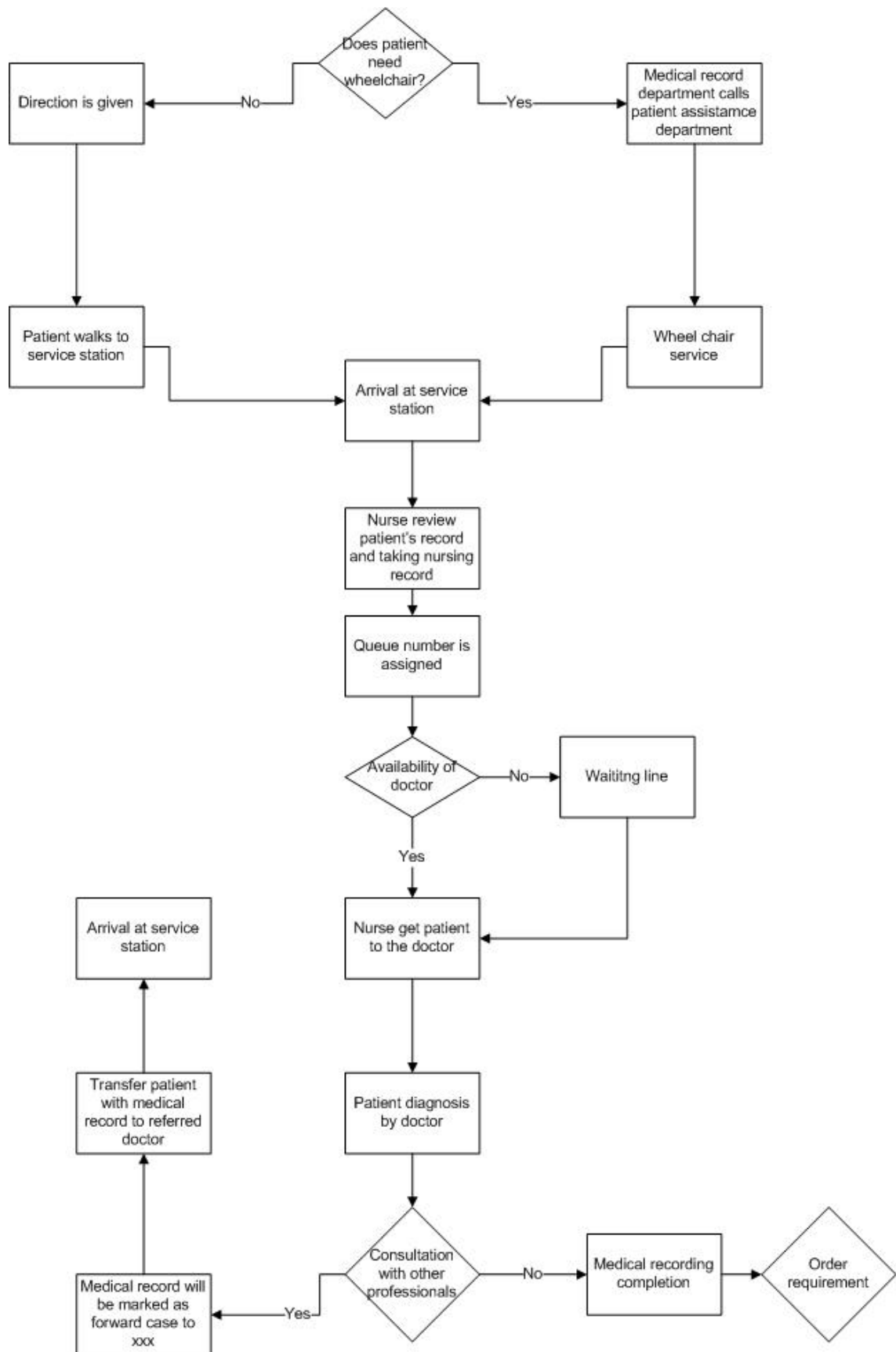


Figure 6.2 Patient journey – Part b

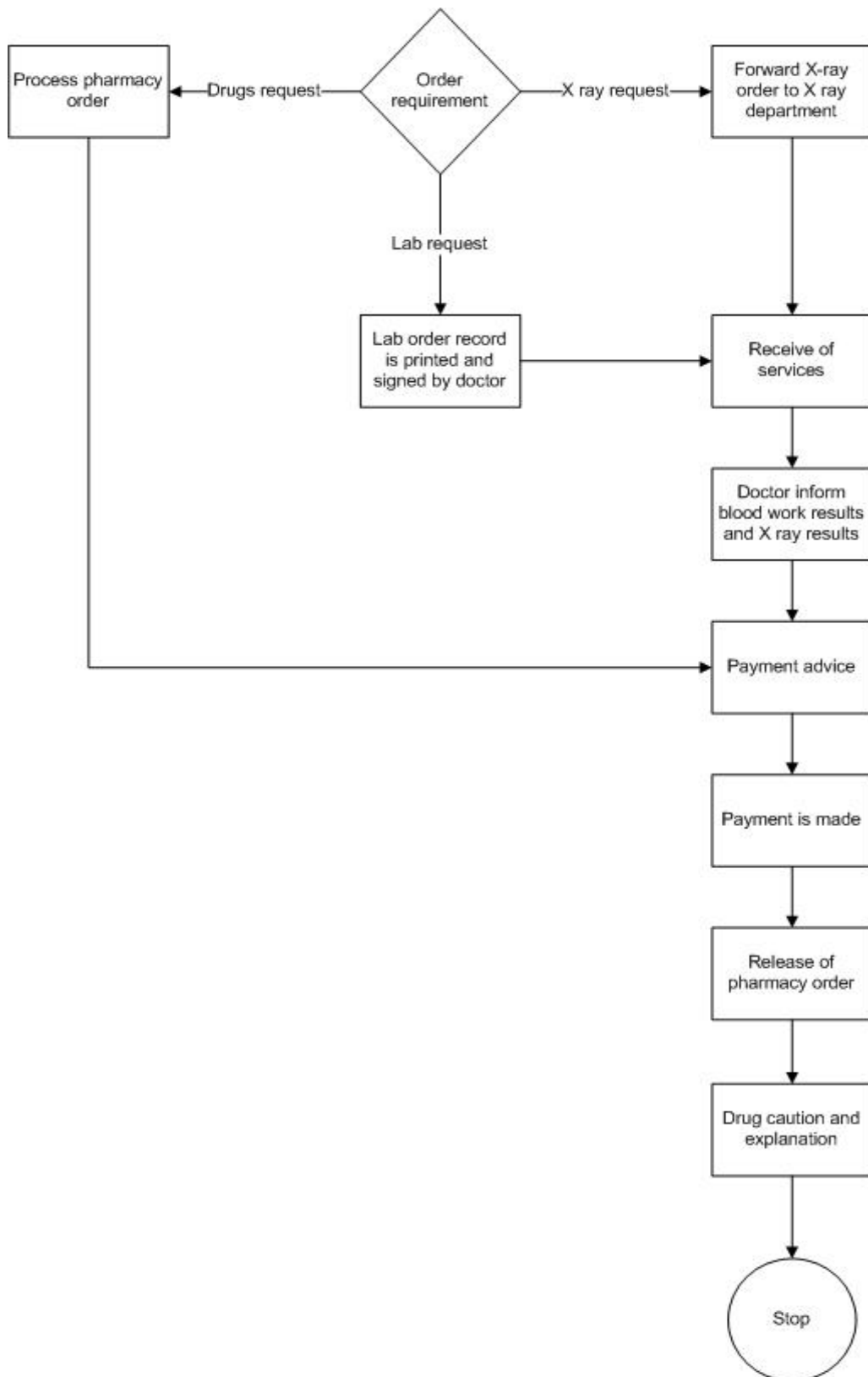


Figure 6.3 Patient journey – Part c

When a patient arrives at the hospital, the patient journey commences with patient registration. At this stage, the determination is made whether this person is a new

patient or an existing patient, and whether it is an emergency case. If the person is a new patient, the registration staff will collect patient information, payment information and symptoms. If it is an emergency case, the patient will be taken to the emergency room immediately. If the person is an existing patient, the registration department will update his record and record symptoms.

The patient and his information is then forwarded to the department to which the patient registration staff assigns the patient. When the patient arrives at the relevant department, the screening nurse inquires about the symptoms of the illness from the patient and records warning signs. The nurse asks the patient if he has a preferred doctor. If the answer is yes, the doctor's name is matched with patient's name and the A4 document 'Medical Record' is printed at the service area. This Medical Record has the patient's barcode, doctor's ID and symptom information. If the patient does not have a preferred doctor, an available doctor will be assigned. In some cases, the patient checks-in with department online. In this case, the screening nurse will assign a doctor based on availability and print out the Medical Record document for the patient. The nurse then forwards the patient with his Medical Record to the service station.

If the patient is able to walk, the patient is given directions to the service station. If the patient is unable to take himself to the service station, the nurse in the department informs the Medical Record department. Then, the patient assistance department is called for a wheelchair and an orderly is organized to take the patient to the service station.

The next step involves the patient checking in at the service station. At this point, all vital signs will be taken. The nurse reviews the patient's record, asks for symptoms, takes the patient's blood pressure and temperature, weighs the patient (if required) and takes the nursing record. The nurse at the service station assigns a queue number to see the doctor. When the doctor becomes available, the nurse gets the patient and ushers him to the examination area.

An examination is given by the doctor. If consultation with another specialist or a second opinion is needed, the patient is transferred to another service station and the process of arrival at the service station will be repeated. Meanwhile, the Medical Record that was printed will be marked with "forwarded case to the consultants" and this is also

recorded in the hospital information system. If it is found that the doctor can provide treatment or medicine, the Medical Record is processed and completed for the examination. The doctor then processes the Medical Record in the system. If medicine is required, a drug order record is forwarded to the pharmacy department electronically and the pharmacy order is processed immediately. If required, an x-ray order record is forwarded to the x-ray department electronically. If samples were taken, a lab order record is printed, signed by the physician and sent with the samples. In the situation where a case is sent to the department incorrectly, the procedure of consultation requirement above is repeated, and an incident report is also written.

The next stage of the process involves the patient receiving medical service according to the doctor's orders. The patient goes through each of the treatment services, such as having blood drawn, receiving an injection and/or having an x-ray taken. Once all the doctor's orders are completed, the doctor informs the patient of the results. The patient is then directed to make payment at the nearest payment station. After payment is made, the pharmacy order is released as paid and the patient queues to pick up the drugs. The pharmacist calls the patient to the dispensary, counsels the patient about the medication and gives the medicine to the patient.

6.4.4 Quality issues in the patient journey

Quality issues that could occur in the patient journey were primarily identified through the interview with the quality department manager. The identified quality issues are discussed below.

Waiting times throughout the patient journey can lead to customer dissatisfaction. Specifically, long waiting times are common before treatment and at the drug dispensary.

In the patient registration process, the activity of patient data collection can result in quality issues. This was particularly common in the past when hand-written versions of paperwork were used, leading to errors through the recording and updating of patient information.

Incorrect patient referrals can waste patient time. Both being sent to the wrong department and poor quality transfer services can cause dissatisfaction. Poor quality transfer service includes delays for those patients who require wheelchairs.

The competence of the screening nurse who conducts the review process at the service station can be a quality issue. The recording and updating important symptoms and patient information is important.

Quality issues can occur during the conduct of the doctor diagnosis process. Misdiagnosis can result from inexperienced judgment or staff inexperience in using new equipment.

During patient treatment, an error in the patient verification process can lead to the delivery of the wrong information to a patient. In some cases, this may lead to misdiagnosis by professionals. For example, if a lab order is not processed properly with the correct patient barcode, this could potentially cause misdiagnosis.

Errors in the dispensary drug counseling process, for example poor or incomplete explanations about the warnings associated with a drug, can also be problematic.

6.4.5 Impact of Thai cultural characteristics on TQM practices

This section provides an explanation of how Thai cultural characteristics might affect CSF practices in the hospital. More than 90% of Thai people adhere to the Buddhist religion; this shapes the characteristics of Thai culture. It is claimed that Buddhism has a strong influence on quality practices in Nakornthon Hospital. The top management team practice Buddhism and support their employees in their practice of Buddhism through the provision of seven days leave annually for Wipassana sessions and seven days of sponsored Wipassana sessions at Nakornthon Hospital twice each year. The hospital has prayer rooms on site (one Buddhist prayer room and one Muslim prayer room) and encourages people to spend 30 minutes per day praying and sitting in the quietness of the room. The management team participates in visits to the prayer room at the scheduled prayer time each day. Access to prayer time allows people to become more calm and reflect before they say something that might be hurtful or harmful. The hospital encourages employees to live and work with harmony and consciousness.

In this case study, the Thai cultural characteristic of ***Pride of face and dignity*** (TCC1) can hinder the evaluation and delivery of performance feedback to employees. For example, in trying to solve a reported incident, there is typically a certain level of ***Raksa Na*** (TCC2) which refers to the situation where straightforward language is avoided to eliminate the risk of loss of face for the person in charge of that particular operation.

This situation can impede effective communication and resolution. Although the straightforward language and explanation are true, the use of such an approach is likely to lead to a lack of cooperation or support in the future between those involved.

The evaluation and delivery of performance feedback to employees can also be hindered by the Thai cultural characteristic of *grateful relationship* (TCC3). Problems are mostly experienced in assessment, reward and recognition activities. Nakornthon Hospital top management has applied Buddhist ideas to employee compensation, rewards and recognition. One relevant Buddhist ideas is good governance, which incorporates loving-kindness, compassion, sympathetic joy and equanimity. Each of these are given intangibly; compensation is not expected. Despite general acceptance of this approach, there are some groups of employees who believe that they should receive a tangible reward in return for working hard. It is therefore necessary for the top management to encourage front-line managers to govern and lead effectively, eliminating the need for bonuses to establish motivation or commitment among employee. Other hospitals use other methods to motivate staff; for example employees of Prayathai Hospital receive financial rewards if the hospital's total revenue is above 1,500 million bahts.

The Thai cultural characteristic of *Krengjai* (TCC4) (taking other people's feelings into consideration) can also hinder quality improvement efforts. Being considerate of others' feelings, along with the characteristics of *politeness and humbleness* (TCC5), can delay the decision making process and created an excessive amount of flexibility in the process. These delays and unnecessary flexibility usually lead to quality problems. In the current competitive environment, Nakornthon Hospital must be distinctive and different from its competitors. This is one area where managing Thai cultural characteristics and decreasing the negative outcomes can provide a point of differentiation.

The Thai cultural characteristic of *flexibility over principles* (TCC6) can hinder TQM implementation and hamper quality policy implementation. The HA standard recognizes the importance of flexibility, with flexible and sustainable development chosen as the theme of quality development in 2010. While managers should allow flexibility in the workplace, this flexibility should concurrently bring about sustainable development. The general application of Thai cultural characteristics leads to a situation

where Thai people have too much flexibility and lack an environment of sustainable development. Nakornthon Hospital is trying to establish a mindset of flexibility improvement. The culture of flexible development can be achieved in a sustainable and clear way by changing employees' attitudes.

The effectiveness of customer service and communication among departments (i.e. internally) can be improved through the Thai culture characteristic of *care and consideration, kindness and helpfulness, self control, tolerance, politeness, humbleness, calmness and cautiousness* (TCC5). The experiences of the quality manager at Nakornthon Hospital suggest that these characteristics can increase the level of organizational communication. Furthermore, the brain storming process, when applied among departments, is also influenced by these cultural characteristics. It is claimed that the process can facilitate sustainable development in the hospital. Traditionally, staff worked within their comfort zone to optimize their unit; the focus should change to improve interaction among departments, encouraging staff to identify benefits for the hospital generally rather than limiting consideration to a specific unit or department. Also, the provision of training skills to managers would be constructive in reducing the incidence of offensive communication between hospital and employees.

In Nakornthon Hospital, the Thai cultural characteristic of *fun and humorous in nature* (TCC7) can affect the TQM practices. The encouragement of fun and happy behaviors could improve employee involvement through enhanced teamwork and communication. While the hospital provides technology that supports well-organized communication, the system is not used extensively. The hospital's intranet system is used for manager-employee and employee-employee communication, such as notifications about policy, the sharing of common knowledge and information about the hospital's work processes. Although the computerized system is available in the work place, staff tends not to use it. This may be due to personal preferences or related to employee age. Some experienced managers do not know how to use the system and have not attempted to learn. The hospital's quality manager believes that an environment that encourages fun and smiling employees will tend to support the proactive adoption of the new communication system, which is essential for the establishment of a quality environment throughout the hospital.

It is important to note that *appreciation of social connection* (TCC8) (a private knowing, referring to relationships with close friends and relatives) is unlikely to greatly affect the hospital. When at work, staff are professional and follow established processes so they do not prioritize people they know. The service offerings are arranged by following the system-ordered queue and recorded symptoms. Patients are prioritized based on severity of medical need and order of arrival. No favoritism or privilege is involved in this assessment; the impact of Thai cultural characteristics is eliminated. While the level of medical care is unaffected, the customer service may be impacted; there have been some incidents suggesting that social connection can affect room availability and allocation.

Thai cultural characteristics of *educational and competence orientation* (TCC9) are unlikely to affect TQM adoption in the hospital. Thai people view educational achievement and self-competency as an important factor of success. Although the selection of well-educated and experienced staff might lead to quality improvement, the quality manager identified that the delivery of well designed quality training in specific skills to employees generally provides greater benefits to Nakornthon Hospital. Many useful skills are derived from specific training provided by the hospitals rather than by continued academic study outside the hospital environment. The interviewee claimed that graduates cannot efficiently execute many tasks; specific training often leads to an improvement in the execution skills of staff. As one example, the quality manager claimed that she rarely used the knowledge gained from her Bachelors degree. Most of her knowledge and skills were developed through quality training programs.

6.4.6 Future quality improvements

There are a number of opportunities to improve the quality of the patient journey at Nakornthon Hospital.

The hospital cannot forecast the number of patients expected or identify busy periods ahead of time. However, in cases where patients have made appointments, the hospital should implement a system (for example, administration staff calling patients prior to the appointment time or a text message reminder requiring confirmation) to confirm planned attendance. At the time an appointment is made, staff should request specified information from the patient to help to improve quality in the process (for example,

arrival time and special requirements). This information can be used to provide the best possible service for patients.

To eliminate errors or mistakes in the patient registration process, the practice of information management can be used to improve quality throughout the patients' journey. Efforts should be made to enhance the effectiveness of the existing communication system. The hospital has established an advanced information system incorporating an electronic system, barcode scanning of items and online purchasing. However, the application of this system does not appear to maximize efficiency. To facilitate greater efficiency using the information system, the current features should be reviewed, new and improved features should be integrated, available features should be implemented in all appropriate areas of the hospital, and the information in the system should be manipulated to streamline as many processes as possible. Although the hospital has already implemented the barcode system in the lab and testing, there is still evidence of errors being made by professionals. The use of the barcode system is ineffective; this is an area for future system improvement. Improvements such as this will decrease errors, streamline information transfer and allow for better analysis of patient information, thereby improving the level of customer satisfaction.

The survey results presented in Chapter 4 indicated the quality practice requiring the greatest attention from management in Thai hospitals is training and education. The hospital's quality issues identified through the patient journey support the survey results because there are many identified quality issues that can be solved through training and education. It is asserted that advances in technological and clinical areas have not solved existing quality problems; this is largely due to the fact that the main problem lies in the organization of the system and the management of people engaged in the delivery of healthcare at all levels (Canel and Kadipasaoglu, 2002). To improve the level of customer satisfaction, the hospital should deliver a variety of quality training and education programs to staff. The quality department should develop a variety of quality practice manuals for doctors, nurses and administration staff to ensure that patients receive consistent service at the expected level. The recommended training programs are outlined below.

To solve the problem of patients being sent to the wrong department, there should be a training course for receptionists to master the hospital's layout and the provision of

directions. A training course to teach wheelchair staff to provide high quality wheelchair service should also be developed. To resolve the quality issues associated with the transfer of patients within the hospital, nurses' skills should also be expanded to include wheelchair control. When patients are referred incorrectly, they should be redirected to the correct department as quickly as possible to minimize potential dissatisfaction. This can be done by giving appropriate advice and instructions to the patients.

To increase the quality of the nurse review process, experienced nurses should lead training courses to teach the nurse screening process. Nursing staff with greater experience collect more relevant information and perform better preparation services for patients and physicians than less experienced (i.e. training) nurses, and sound patient information review can enable doctors to work more effectively. It is therefore essential that the nurse review process is completed thoroughly as this increases the efficiency and accuracy of later stages of the patient journey.

To increase the quality of the diagnostic process conducted by doctors, training courses should be delivered for specialists. There should be training courses delivered for staff before they commence using new medical equipment, such as 4D ultrasound, Robotic surgery and Fetoscope surgery, if available. To enhance the quality of the diagnosis process (and to reduce cases of misdiagnosis), continuous improvement should become an integral part of all staff's tasks. For instance, continuous improvement efforts are important for increasing the quality of the doctor diagnostic process. Management should continuously develop medical procedures based on best practices for surgeons and nurses. This can help them to more effectively deliver services. Doctors should be encouraged to continuously improve their specialist skills, for example through delivery of on-site training workshops led by international experts where doctors can benchmark against best practice. These would inform new ways of conducting the diagnosis process, leading to improved quality. To reduce errors that may lead to misdiagnosis, for example administrative errors in the patient verification process, training courses teaching the steps of the process and how best to communicate with patients are required for medical staff, lab staff and pharmacists.

The quality department plays an important role in establishing quality policies, supporting quality management practices and improving the level of quality across the

hospital. It has responsibility for establishing an effective quality policy that guides all employees in the achievement of the hospital's quality goals. The hospital should strengthen its policy through greater focus on the achievement of high customer satisfaction. Both medical and administrative staff should be encouraged to apply the quality policy to their working process to ensure internal customer satisfaction.

To improve quality in the drug dispensary, a training course regarding effective communication is also required for those involved in the drug explanation process, which involves a high degree of employee and customer interaction. Although the hospital prints all relevant information onto a computer label and affixes it to the medication (rather than using handwriting), good verbal explanation is necessary for patients so they can easily follow the instructions. If patients do not follow the appropriate medical advice, the level of service quality may decrease (Aly and Mack, 1993). This change to include thorough supporting verbal explanation should significantly reduce errors and miscommunication.

The value of top management support is recognized as one of the major determinants for the success of TQM implementations (Kaynak, 2003; Saravanan and Rao, 2004). Based on analysis of the Nakornthon Hospital patient journey, although it is evident that top management have heavily committed to quality improvement, the level of quality awareness among employees remains low. As any TQM implementation requires commitment to the TQM philosophy by all members, the commitment of top management is usually followed and seen as an example by employees. Top management commitment should encourage all members to increase their commitment and involvement in the TQ philosophy and quality improvement programs. It is important to introduce TQM philosophies, methodologies and tools to top management, middle managers and professional staff through a series of training and education workshops.

To address customers' expectations and needs more proactively, a general customer service training program that encourages employees to actively satisfy customers' expectations is vital. Hospital management should concentrate on establishing a proactive working environment. For example, when patients are moved between different wards in the hospital, the quality of the service experience will depend largely on the staff with whom the patient comes into contact. These staff should be trained to

provide a welcoming service and concentrate on satisfying the detailed and individual needs of each customer. If the management can establish a TQM culture, incorporating customer focus orientation and employee participation, it is assumed that employees will work more proactively and creatively in response to customer expectations. The main objective of TQ firms is to satisfy customers. Therefore, to achieve high customer satisfaction, it is important for organizational members to have proactive customer service. The hospital can include this attitude when undertaking the recruitment of new staff as well as educating existing employees to increase the level of proactive customer service provided. If the hospital expectation and employees' expectations and attitudes are similar, hospital performance can be increased (Shields, 2007).

Measurement is an essential component of achieving continuous improvement (Evans and Lindsay, 2008). Management should focus on the application of quality key performance indicators (such as the number of patient complaints, number of returning customers and number of misdiagnoses), which are directly related to an increase in customer satisfaction to inform assessment of the hospital's quality performance. Management must also closely supervise employees to ensure they are providing a quality service to customers, as it is the performance of staff that determines the hospital's overall quality (Evans and Lindsay, 2008). Such quality assessment should begin at a personal level, with employees actively engaging in the TQM journey, applying the TQM components to their work and reinforcing the hospital's goals through the use of a personal checklist.

The use of a quality benchmarking process could help the hospital to compare the organizations' core processes with similar processes in other organizations and/or industries to identify best practices and determine improvement areas (Shields, 2007). This technique emphasizes comparison in many areas including costs, staffing, productivity, quality, service, value adding, technology and the organizational structure. It also helps organizations to focus on the areas where efficiency and effectiveness can be improved (Shields, 2007). It promotes the importance of change for improvement and describes how the work can be achieved using best practices. In the benchmarking process, organizations must specify their key performance measurements in each department within the hospital. Effective benchmarking has to provide consistent reference points, use real-time current data, create new management tools and focus on organizational resources.

The practice of quality supplier partnerships can also be improved by establishing a long-term relationship with educational institutions. It is widely known that there is a lack of doctors in Thailand. The Ministry of Public Health (MOPH) estimated that Thailand required a total of 40,620 doctors in 2011 to cope with demand. 22,855 of these doctors were needed in the public sector. In 2012, there are 13,083 doctors working in the sector. Based on MOPH data, Thailand requires an additional 9,772 doctors to ensure that all public hospitals have sufficient resources. Based on the calculated estimated total need, MOPH determined that one doctor is able to treat approximately 7,000 people (MOPH, 2011). According to the Thai Medical Council and MOPH, resourcing in the area of neurologists and neurosurgeons (approximately 400 specialists) is particularly low in Thailand. 30 provinces of Thailand have no such specialists. In Thailand, a neurologist is expected to treat approximately 280,000 people (Suchon, 2011), and it expected that this ratio will increase for both physicians and surgeons in this area in the future (Suchon, 2011). To cope with these issues, medical school partnership programs can be established to identify prospective medical staff in key areas of need. Through this program, the hospital could offer scholarships and future careers to medical students. On the basis of the Thai cultural characteristic of ‘grateful relationship’, the hospital’s provision of the scholarship and career would encourage loyalty in sponsored students.

Areas of the Nakornthon Hospital patient journey that raise quality issues are summarized in Table 6.1. Recommendations to address these quality issues are also presented.

Table 6.1 Nakornthon Hospital patient journey quality issues and recommendations for improvement

| Quality issue identified | Recommendation for improvement |
|---|---|
| Long waiting times | Establishing appointment system to enhance customer satisfaction |
| Errors in patient registration process | Establishing advanced information and technology system to communicate quality data and eliminate waste and errors |
| Incorrect patient referrals | Facilitating training courses for receptionists to master the hospital's layout and the provision of directions |
| Incompetence of screening nurses | Providing training program for screening nurses led by experienced nurses |
| Physician misdiagnoses | <p>Training on skills determined to be lacking competence for physicians and professional staff</p> <p>Encouraging continuous improvement in medical procedures development</p> <p>Encouraging continuous improvement through the application of medical best practices by physicians</p> |
| Incorrect patient verifications | <p>Providing training courses to medical staff</p> <p>Establishing clear quality policies focusing on steps and procedures to be followed by physicians and professional staff to accomplish tasks</p> |
| Problems related to the drug dispensary | Providing training course to develop pharmacists' communication skills |

6.5 Summary

Based on the analysis, it is evident that Nakornthon Hospital practices a number of CSFs of TQM implementation. Top management are strongly committed to improving quality in the hospital. Quality leadership with a clear vision has been enabled by competent quality leadership, as evidenced through the delivery of ongoing and continuously updated training programs (Aly and Mack, 1993; Huq and Martin, 2000; Wardhani et al., 2008). The hospital is proactive in implementing many aspects of top

management commitment. Moreover, the role of the quality department is treated as an integral part of TQM success in Nakornthon Hospital. The hospital has established an appropriate structure for quality including a quality department, quality leaders, physicians and administrative representatives in order to fulfil technical abilities for on-going learning and quality improvement for all staff (Aly and Mack, 1993; Wardhani et al., 2008). Top management and the quality department have shared responsibility for developing a clear quality vision and strategy (Aly and Mack, 1993). Training is an important aspect of successful TQM adoption in the hospital. Meetings to communicate about the impact of the TQM adoption on hospital members and the future of the hospital are encouraged (Aly and Mack, 1993). The hospital provides varied levels of training to meet the needs of employees in different positions. Where superior quality performance is essential, relevant staff are given more involved training. All staff must be aware of TQM and the processes required in TQM in order for the hospital to be successful in the TQM journey (Aly and Mack, 1993; Brashier et al., 1996). The hospital utilizes Kaizen, creating a motivating environment to support continuous improvement (Gauttam, 2010). This process of continuous improvement has been established with information technology support (Aly and Mack, 1993). To continuously improve quality, the hospital utilizes BSC to maintain a focus on meeting and exceeding patient expectations (Aly and Mack, 1993). A customer focus orientation is a major concern of the hospital. The hospital aims to satisfy both external and internal customer expectations (Aly and Mack, 1993; Brashier et al., 1996). Patient surveys are used and family atmosphere is encouraged in the hospital (Brashier et al., 1996). Lastly, enhanced communication to improve quality has been facilitated through the well-designed IT communication system. This system enhances organizational capability to apply TQM concepts and tools (Wardhani et al., 2008). It also aims to integrate core management functions and TQM applications (Aly and Mack, 1993). However, there are some areas for improvement suggested in the literature including: physician involvement (early definition of the physicians' role and involvement in TQM implementation process; emphasize improvement in quality of clinical service (Aly and Mack, 1993; Wardhani et al., 2008)); effective process management (defining, analyzing and improving hospital's process) (Aly and Mack, 1993); and encouraging leadership at many levels (i.e. CEO, board of directors, middle management, senior

physicians, voluntary physicians, senior respected nurse, medical staff leaders and departmental leaders) (Aly and Mack, 1993; Wardhani et al., 2008).

In regard to the impact of Thai cultural characteristics on TQM practices, the analysis corresponds with the survey findings in the previous chapter. Many Thai cultural characteristics were found to have an impact on the quality management practices in Nakornthon Hospital. The TQM journey of Nakornthon Hospital is both positively and negatively impacted by Thai cultural characteristics. While the cultural characteristics of *Care and consideration, kindness and helpfulness, self control, tolerance, politeness, humbleness, calmness and cautiousness* (TCC5) and *Fun and humorous in nature* (TCC7) can positively influence adoption, the Thai cultural characteristics of *pride of face and dignity* (TCC1), *grateful relationship* (TCC3) and *Krengjai* (TCC4) can negatively influence TQM practices. Moreover, the Thai cultural characteristic of *educational and competence orientation* (TCC9) does not have considerable influence on TQM practices and quality performance in hospitals. Interestingly, the Thai cultural characteristic of *flexibility over principles* (TCC6) can both support and hinder TQM practices in the hospital. However, the finding suggests that the Thai cultural characteristic of *appreciation of social connection* (TCC8) does not greatly influence TQM adoption in the hospital, which is a private hospital. Also, it has been suggested a Thai cultural characteristics of *Raksa Na* (TCC2) has influenced TQM practices in the hospital.

The in-depth review of Nakornthon Hospital has identified many positive and negative relationships between TQM implementation and Thai cultural characteristics in the context of Thai hospitals. These findings will be compared to the findings from the Songkla Rajabhat University in Chapter 6.

6.6 Conclusion

The case study presented in this chapter has explored how Nakornthon Hospital adopted the CSFs of TQM implementation. The findings indicate that Nakornthon Hospital has adopted many of these CSFs. Based on the survey findings on the previous chapter incorporated with the finding of the case study, hospital management can reprioritize current practices by both focusing on the factors contributed to business performance improvement based on the literature and by emphasizing the factors that have a low level of practice in the current hospital environment.

The findings confirm the literature that cultural factors can contribute to the success or failure of TQM adoptions. It can be seen that Thai cultural characteristics influence TQM adoption in various ways. Although the main objective of TQM is to satisfy both internal and external customers, cultural implications can positively influence patients and negatively affect the staff. It is recommended that management work to optimize the level of total customer satisfaction to maximize the hospitals' benefits. This can be achieved by evaluating updated related information derived from the process. The following chapter presents the case study of the second Thai service organization (SKRU) and its implementation of TQM.

Chapter 7 CSF Adoption in Songkla Rajabhat University: A Case Study

7.1 Introduction

Quality is essential in the pursuit of excellence by any higher education institution, and Total Quality Management (TQM) is the art of modern management to pursue excellence (Anninos, 2007). To create an environment that is considered ‘excellent’, “quality should be a way of life for people and a way of behaving in the society. Consequently, individual and collective contributions are maximized along with personal and organizational advancement in the society through continuous improvement and learning” (Anninos, 2007, p. 317).

This chapter presents the second of two case studies of Thai service firms in relation to their use of TQM. The objectives of this chapter are to understand how TQM Critical Success Factors (CSFs) have been practiced and how Thai cultural characteristics affect CSFs practices in one public university. The case study organization is Songkla Rajabhat University (SKRU). The chapter is divided into three main sections: Section 7.2 briefly illustrates quality issues in universities; Section 7.3 presents the background of Thailand’s university sector and its quality control mechanisms; and Section 7.4 presents the case study of SKRU. The case study presents issues of quality in the university and detailed information about the organization including an organizational profile, TQM practices and the adoption of CSFs. SKRU’s work processes, described in terms of the student journey, are then presented along with the identified quality issues related to the journey and recommendations for quality improvement.

Analysis of people-based issues of quality are absent in the TQM literature (Ebrahim, 2004). Specifically, there is a lack of TQM literature covering ‘soft’ areas such as workforce management and the contribution of employees’ behaviors to successful TQM implementation. However, “Understanding human behavior is fundamental to understanding how organizations including profit making organizations, non-profit firms and government agencies, function” (Ebrahim, 2004). This study attempted to understand human behaviors in quality-oriented organizations with a focus on the

specific implications of the Thai cultural characteristics of the employees in the organizations studied. Therefore, a discussion of the impact of Thai cultural characteristics on TQM practices is also included.

7.2 Issues of university quality

Both the education and health care industries generally aim to improve quality of life for people (Saleki et al., 2012). Quality improvement in these sectors could benefit mankind in general. Students, their families, educational administrators and government administrators all expect high quality education for students. Although quality and its management concepts were firstly introduced many years ago, there is no model to define and standardize quality in education (Saleki et al., 2012). It has been suggested that the standard of educational quality depends on the act of education (teaching, learning and evaluation processes), the education environment (policies, laws, relations, models and expectations) and the educational content (skills, values and knowledge) (Wahbe, 2003 cited in Salameh, Alzyadal and Alnsor, 2011).

Total quality in higher education incorporates eight components (Salameh, Alzyadal and Alnsor, 2011). These are:

- *Students*

Refers to the selectivity, motivation and preparation for students, student-faculty member ratio and graduate level.

- *Faculty members*

Refers to the teaching skills of faculty members, contribution of faculty members to community and level of training and academic qualification of faculty members.

- *Curricula to develop students' ability*

Refers to the teaching method, assessment and learning environment.

- *Administrative leadership*

Refers to level of management commitment to quality, enhancing the climate of human relations between students, faculty members, department and faculty leadership, and the selectivity of management leaders and training.

- *Physical potential*

Refers to the capability of building facilities, benefits from the use of the library and the value of financial funds.

- *University-local community relationship*

Refers to linking research with problems faced by the community and linking university programs to community requirements.

- *Independence and release from pressure to proceed with innovation and creativity*

Refers to freedom of actions and decisions, freedom of research and publication and freedom of thought and expression.

- *Diversity and disparity among universities*

Refers to the programs needed by university graduates to be in line with community requirement.

Very high quality universities illustrate superior performance in management, teaching, research and external engagement processes (Anninos, 2007). There are many issues related to teaching quality including teaching abilities, knowledge of the instructor, teaching approach, course structure and student learning. Accurate measurement of teaching quality requires a comprehensive process and the evaluation should be based on students', colleagues' and administrators' rating of the above components. It is hard to reach consensus about the quality of teaching since colleagues and administrators are not involved in the teaching class. Teaching quality can be assessed through curriculum

design, content and organization, teaching learning and assessment, student progression and achievement, student support and guidance, learning resources, quality assurance and development, and instructor characteristics.

The identification of quality in research is complex (Anninos, 2007). For example, the Australian Research Quality Framework applies three measures to define quality in research: ranked output (i.e. journal, conferences), citation data and grant income data (Research Quality Framework, 2006 cited in Anninos, 2007). Quality performance in research can be evaluated from the number of publication, number of citations, quality (i.e. awards and honours) and utility (external income). Also, bibliometric indicators can be used to measure quality in research. Quality research is closely related to quality in scientific work. Quality scientific research can be measured on citations, awards, peer review, the research effort made by the researcher, the researcher's knowledge and skills, the research environment, the scientific effect, the research policy and financing. Excellent research can bring about advancement in scientific thinking , an increased reputation of excellence and the generation of income.

Quality in university social engagement in terms of contribution to society and economic development can be measured through the level of research findings that are adopted by business and individuals, the promotion of results in scientific and technological fields, and innovative activity to support the research findings.

In summary, in the university context, quality in teaching and learning, quality in research, quality in social involvement, quality of management and quality of university infrastructure should be examined and taken into consideration to strive for excellence (Anninos, 2007). When adopting TQM, quality must be embedded in all policies, procedures and process in the university.

Excellence comes as the result of achieving higher and higher quality levels and there is no final frontier of excellence (Anninos, 2007, p. 315). It is evident that quality is a fundamental requirement for excellence. It is claimed that the attainment of a specific quality level for a higher education institution and the culture of continuous improvement through monitoring all processes and procedures are the first steps in pursuing excellence. In fact, it is suggested that excellence can be defined as quality (quality attitudes at personal, team and organizational levels), within quality

(achievement of desired quality level), for quality (exceeding the quality level that is already achieved). Excellence in higher education can refer to achieving the institution's mission/vision, accomplishing benchmarks and specified university measurements, best practices, society involvement, effectiveness of cost control, customer/stakeholder satisfaction, dissemination of good practice nationally and internationally, student learning results, optimal use of university resources, positive atmosphere in staff and student environments, optimal combination of teaching and research, and achieving quality teaching and learning targets (Anninos, 2007).

Based on the Baldrige education criteria for performance excellence, the European Foundation Quality Management and the Balance Scorecard, high quality universities perform extraordinarily well in such areas as leadership, strategic planning, student, stakeholder and market focus, measurement analysis, knowledge management, workforce focus, process management and results (Anninos, 2007). Excellence in quality has been shown to be related to six criteria: management leadership, human resources management, business process management, customer and market focus, information and quality tools utilization and business results.

7.3 Background of Thailand's university sector and its quality control mechanisms

In Thailand, public and private universities have different challenges, strengths and weaknesses. There are many reasons for these differences. Firstly, the majority of public universities' income comes from an allocated government budget, and public university expenses associated with operating equipment and buildings are obtained mostly from the government budget (Kirtikara, 2002). While public universities receive resources from government (such as financial support, infrastructure and educational materials), private universities are supported by their own income (Yavirach, 2009). This leads to different objectives between the sectors. Public universities tend to offer quality education at an affordable price for most people while private universities provide alternative areas of study at competitive prices that are higher than those offered by public universities in order to survive in the market (Country Report Thailand, 2004).

Although public universities have been supported by government, the Thai government expects them to develop their own activities and become more self reliant (Yavirach,

2009). Some public universities in Thailand have agreed to privatize in the period since 2002. As a result of a reduction in government funding, public universities have suffered immediate cuts in budget (approximately 20 to 30 percent) (Altbach and Levy, 2005). Government policy has been applied to all public universities in order to increase the autonomy of administration in educational management. Consequently, public universities must develop and accomplish organizational goals for higher quality standards and effectiveness, in a similar way to private universities (Yavirach, 2009). In terms of employment regulations in public universities, there was a mass termination of the employment of public servants in 1999 (Tsang, Kazeroony and Ellis, 2013). Since this time, new lecturers employed at Thai public universities have been referred to as 'government staff'. The key difference between the public servant and government staff systems is employee benefits and the guarantee of lifetime employment. Government staff are subject to undergoing continual performance evaluations prior to earning a lifetime appointment, which requires achieving an academic title of associate professorship (Tsang, Kazeroony and Ellis, 2013). The comprehensive evaluation process tends to occur in private universities, which need to survive in a competitive environment. This change has been seen as a way to improve the overall quality of higher education.

Thai higher education institutes have been traditionally dominated by the public sector (Kirtikara, 2002). In 1965, private universities were permitted to enter the education market to assist the Thai government to enhance their capacity to offer alternative areas of study (Tsang, Kazeroony and Ellis, 2013) as well as to meet the needs and the demand of the country (The Prospect Group, 2013). Private universities are used as a means to support the public sector in response to an increased demand for higher education and a greater workforce to support economic development (Kirtikara, 2002; The Prospect Group, 2013). It is important to mention that traditionally, students are encouraged to attend public universities by their parents because of a lower cost of education and more areas of study (The Prospect Group, 2013). To stay competitive in the education market, quality has become an important concern for Thailand's private universities (ISRA, 2012; The Prospect Group, 2013). To survive in the market, the private universities need to offer a better quality of education than the public sector and provide innovative education (The Prospect Group, 2013).

However, in terms of quality management practices, both public and private universities are under the same quality control mechanism. In the case of quality management of the university sector in Thailand, the Commission of Higher Education, under the Ministry of Education, controls and administers public and private universities (Kirtikara, 2002). The Commission of Higher Education sets educational standards and approve curricula for universities (Country Report Thailand, 2004). In 2003, the Ministry of Education established a quality assurance system including criteria and methods for internal quality assurance of higher education institutions, which includes all public and private universities in Thailand (Country Report Thailand, 2004). Internal quality assurance is the responsibility of the University Councils, which must assess universities on many criteria such as aspects of management, teaching quality, research, academic services to the community, finance and budgeting among others (Yilmaz, 2010). Moreover, external quality assessment of public and private universities will be conducted at least once every five years (Country Report Thailand, 2004; Bovornsiri, 2006). The Office for National Education Standards and Quality Assessment (ONESQA) was established to conduct external quality assessment. Its responsibility includes developing criteria and methods of external evaluation, and evaluating educational achievements to assess the quality of institutions (Country Report Thailand, 2004). Educational achievements can be measured through assessing the quality of graduates, teaching and learning, academic support and services, research, and efficiency in administration and leadership (Yilmaz, 2010). ONESQA completed the first evaluations of all universities in 2005 (Somwung, 2007). It can be seen that both Thai public and private universities are required to enhance their quality and the similar quality improvement criteria are applied to both public and private universities. All Thai universities are required to conduct internal and external quality evaluations (Yilmaz, 2010) and expected to achieve common quality standards (Kirtikara, 2002). The Council of University Presidents of Thailand (CUPT) asserts that Thailand's public and private universities should try to compete on quality in the market (ISRA, 2012). TQM practices in public and private universities appear to be similar. Therefore, both types of universities are investigated together in this research.

7.4 Songkla Rajabhat University Case Study

The case study research was based on a number of literature studies; some studies considered TQM in general and others considered TQM in higher education in particular. The students' journey was considered with particular focus on current quality issues, areas for quality development and the impact of Thai cultural characteristics. A detailed description of the methodology and data collection processes used in this research are provided in Chapter 4. The research methodology included a literature review on TQM in higher education, review of the SKRU website, interviews, examination of SKRU's current procedures and questionnaires. See Chapter 4 for more detailed information about the research methodology and data collection.

7.4.1 Organization profile

Songkla Rajabhat University (SKRU), formally known as Teacher Training College and Rajabhat University, is a government university situated in Songkla province, South Thailand. SKRU has a long history. Established in 1919, the university was first a Teacher Training School, becoming a Teacher College in 1961. At first SKRU only offered a Certificate in Higher Education. A range of undergraduate degree courses have been offered since 1975. In 1992, His Majesty the King has endowed the name 'Rajabhat' to all 43 Teacher Training Colleges located throughout the country. A program for a masters degree was offered in 2004, and several more masters degree programs have since been added.

In 2010, SKRU had 330 teaching staff. This included 36 PhD staff, 272 masters degree lectures and 22 bachelor degree lecturers. There was one professor, 13 associate professors, 47 assistant professors and 269 lecturers. In the five year period to 2010, SKRU had 7,100 weekday students and 3,900 weekend students.

SKRU is managed by a university board that includes the university chancellor and qualified committee members selected from both inside and outside the university. The Rector acts as a Director and the Secretary.

SKRU's vision is to be an institution for local development and to produce good teachers and scholars. The missions of SKRU are:

1. Provide a variety of courses to produce highly qualified personnel working in the local area.
2. Focus on both study and research for the benefit of the local area.
3. Provide academic services and technology transfer for research.
4. Promote local arts and cultures.
5. Progress projects that are initiated by the King.

There are two types of quality control systems used by SKRU: internal quality control and external quality control. Internal quality control is conducted by the Office of the Higher Education Commission (OHEC) and by the university. External quality control is assessed by the Office for National Education Standards and Quality Assessment (ONESQA). The university has also adopted the Thailand Qualification Framework (TQF) and other quality standards. SKRU was certified by ONESQA and the Office of the Public Sector Development Commission (OPDC) standards in 2012 and 2010 respectively. These certifications raised awareness among most staff awareness and encouraged them to attempt to achieve benefits from improved quality. SKRU encourages the practice of the PDCA cycle in problem solving. A high level of teamwork is also expected. Faculty and program management tend to use assessment feedback to develop work processes. As the university has been certified against ONESQA and OPDC standards, its student enrolment numbers are often higher than at other Rajabhat universities. The SKRU interviewees claimed that this positive outcome is related to the good compensation system for SKRU top management.

7.4.2 Analysis of current quality practices

Analysis suggests that many of the identified TQM CSFs have been practiced by SKRU. In this research, 'TQM CSFs' refers to CSFs of TQM implementation or CSF practices for TQM adoption. This section aims to address how CSFs are embraced within the university. Top management's obligation to improve organizational effectiveness is vital in improving quality in higher education (Salameh, Alzyadat and Alnsour, 2011). At SKRU, top management commitment plays an important role in TQM implementation. Firstly, top management takes responsibility for the university's quality performance. The SKRU management team play a role in determining the

quality direction and policies of the university to support long-term quality improvement. A university board meeting, including quality items on the agenda, is held bi-monthly. Once management has established the quality goals and key performance indexes for the university, these are practically implemented at the faculty level and personal level. Consequently, the participation of department heads in the quality improvement process can be seen. Moreover, to support quality management practices, management prepare a strategy map covering quality issues. The university considers quality certifications as a way to improve the number of students, leading to enhanced university profit.

To improve the quality of students, top management appointed a quality committee for internal quality control for all faculties. The committee has established many quality control processes to assure that the university will produce quality students for both the society and their family. The SKRU quality department is visible to staff across SKRU. The university has established standard and quality departments to control and develop quality efforts. The quality department has access to top management. SKRU has implemented many quality control policies to assure that the university will produce quality students. Some examples of such processes are discussed below.

In the administration process, basic requirements for new students are identified by the university, faculty, program and major to control the quality of incoming students. For example, all prospective students must complete high school before applying. In some programs, students need to have a background in mathematics and sciences. Also, the minimum GPA requirement for prospective students is 2.00. There is also quality control of exam questions. The questions are designed by committees drawn from five Rajabhat universities. These exam questions are used in the admission test among Rajabhat universities in the south.

In the educating process, the university has implemented many policies to ensure quality. Before faculties assign programs to students, they analyse their resources – such as lecturers' qualifications, labs and equipment – to identify available subjects for students and suitable lecturers for the subjects. The university also assists in developing equivalent levels of skills and teaching responsibilities for all instructors. Providing qualified teachers according to course regulations is an important consideration. Each lecturer's performance is assessed by students at the end of the course and through

individual assessment. Quality control is used when creating the course syllabus. In doing so, SKRU follows the Thai Qualification Framework (TQF), which is controlled by a government office.

The university's graduation process includes minimum requirements for all graduating students. Students must meet a minimum GPA requirement to be eligible to graduate.

The examination process controls exam questions according to TQF requirements. Historically, the university assigned lecturers to design the test and assess the academic results individually. This had the potential to create inconsistency in the quality of academic results. Under TQF, the lecturers are expected to design the exam questions collaboratively. The same test is undertaken by all students. The mid and final examinations are systematically organized in advance to motivate students and teachers to achieve the course objectives. The university committee ensures that the final grades are appropriate.

Continuous improvement efforts have been practiced by the university. To measure quality performance at the management level, the university appointed responsibility for measuring human resource efficiency to the council. The council reviews the performance of the faculties' management and director, support president, dean and office directors. The council gives the feedback to the staff member at an arranged meeting. To measure the quality of lecturers, students must assess teacher performance, supporting equipment and facilities for each subjects before viewing their examination results, which are released online. Such quality measurement practices can continuously improve the efficiency and effectiveness of firms, leading to an ability to better satisfy customer expectations. In addition to performance measurement, SKRU has set up many control processes to ensure that the university will achieve high quality performance. For example, SKRU has clear policies for starting and closing the session. The university also has a quality process for lecturers' recruitment. Furthermore, in the educating process, the university has continuously improved the quality of courses. Currently, SKRU encourages lecturers to teach students based on the TQF, which focuses on the course knowledge, virtues, intellectual skills, projects and the use of research based teaching. Previously, lecturers educated students according to the course syllabus, which focused on knowledge acquisition.

Information collected during the interview suggests that the university is striving to be a learning organization. A learning organization can be defined as “an organization that is skilled at creating, acquiring, and transferring knowledge, and at modifying its behavior to reflect new knowledge and insights” (Garvin, Edmondson and Gino, 2008). University management encourage staff to contribute their efforts to knowledge management. Since improvement depends on learning (Evans and Lindsay, 2008), the use of knowledge management is expected to bring about continuous development.

Communication is encouraged in the university with the goal of improving quality within the practices of all departments. Management has established SKRU’s own information system to help in the decision process. The system is used to communicate information among departments. A user name and password is given to all staff to access this information. Management has also linked the information system with the Committee of Higher Education Office. The system is expected to encourage good communication between different departments as well as to provide effective top-down and bottom-up communication.

Quality supplier management practice is a concern for SKRU. The university has a supplier system to ensure the quality of incoming materials and delivery performance. The system enables the university to share quality data and mutually perform quality efforts. Currently, at the university level, the purchasing department is responsible for the quality of incoming products including the inventory, equipment, teaching aids and buildings. At the faculty level, purchasing and hiring decisions depend on program management. The program management in each faculty evaluates the demand for inventories and equipment. The purchasing department has trained inventories officers who make final decisions based on quality and who also help each of the faculties to complete purchases. The purchasing process is monitored by the faculty and university in terms of price and quality of products.

Education and training is one of the most important practices in SKRU. A range of quality technical and vocational training programs are delivered for the staff and students. The university facilitates training in many areas such as virtues, morality and the observation of activities for staff to improve employees’ satisfaction. To ensure the quality of the educational process, camping-based training activities are used. Camps are used to educate students about adaptation to academia, discipline development, the

seniority system and rule salutations. The camps are located in military areas and military officers are often invited to act as instructors. Moreover, additional skills that are required, such as computer skills and basic English, are provided to students to prepare them for their courses. Students in their second year to fifth year are trained in a school or business firm for a period of approximately three months per year. This depends on the program selection. In the on the job-training period, supervisors are appointed by each faculty to assess student performance and assist the students during training period. These training efforts ensure that quality students who contribute to businesses and society are produced. The university has a student union to arrange activities for students. This union promotes the development of students into people who are good people for society, addressing topics such as ethical issues, environment protection, good discipline, mild volunteers and social responsibility. Students are employed as co-researchers to increase their experience. Students also receive academic training activities, such as university academic festivals, social development camps and cultural color sport festivals, during their educational process.

Customer focus is practiced in the university. To understand customer expectations, the university must know who its customers are (Evans and Lindsay, 2008). In SKRU, the customers include students, lecturers, staff, families and society. The university has a clear policy to focus on both external (society and business) and internal customers (staff, lecturers and students). The university's good customer focus practices include understanding customer needs, gathering customer information and customer relationship management.

Staff satisfaction is a concern of the university. SKRU supports an assessment of staff satisfaction (internal customer) at all levels. For example, when initiating new programs, the university measures the demand for staff in terms of the expected number of students and the opening course suggestion. SKRU also supports employees to be healthy with the support of a welfare system. All staff are encouraged to check their health condition annually. Also, to support efficiency in the workplace, management provides a number of types of support to staff. To perform quality tasks, the university provides equipment and facilities that support the working process. For example, there are funds allocated to academic staff education development, allowing staff to study at doctoral level in Thailand and foreign countries. Management also supports the observation of education activities. SKRU organizes trips for employees to observe

work aboard. For customer focus improvement projects, a budget is allocated based on possible benefits such as its ability to meet community or society needs.

Customers' expectations and satisfaction are also a core focus of the university. SKRU provides student services such as guidance for new students on the general background of major subjects and possible future careers. Such services are designed to help students to understand university requirements and expectations. The university's alumni is used to advise prospective students about how to prepare for their study and life. Moreover, in the new student orientation process, teachers meet with the students and their parents to discuss the expectations of the university. Parents and students can also inform the university staff about their requirements and needs. New courses are designed based on society's requirements. The university often investigates high school students' demands for future study as well as evaluating market demand from employers' perspectives. The university also uses feedback about employers' satisfaction to capture vital information that informs the development of new curriculum, which strengthens subject development. The evaluation of customer feedback is important to the practices of customer focus (Evans and Lindsay, 2008).

To improve quality in product design, new courses and program designs are thoroughly reviewed before offering the new programs to the students. The university sometimes surveys their graduates and the graduates' employers to collect data for new program development. This feedback helps the university to redesign curriculum and improve course content as well as facilitating services such as academic advising. The university conducts student surveys for evaluation and the improvement of academic processes. For example, by observing students, analyzing test results and using student feedback, instructors assess their own effectiveness and develop strategies for improving it.

Employee involvement efforts can be seen at SKRU. To encourage employee involvement in quality improvement activities, management has responsibility for formulating and implementing the systems and procedures required to ensure that participation becomes part of the culture. At SKRU, top management encourages all staff to participate in the university quality meetings and quality training programs. Employees are recognized for superior quality performance. The staff have realized that they need to perform quality work, with an annual quality meeting held among staff to measure quality performance. Staff are encouraged to participate in assessing their

personal performance, with top management providing suggestions or guidelines to develop their work processes. Quality decisions at SKRU are heavily moderated by students' advisors. It is evident that these advisors play a crucial role in develop quality in SKRU's educating process. Study progress, adding/withdrawing subjects and issues of morality are the main concerns of the advisors. In each semester, between eight and 16 homeroom meetings are held to help students. As a result, the students' advisers' develop a good understanding of students' expectations. The advisors are encouraged to participate in the quality improvement decision program.

Another important element of total quality is teamwork. Teamwork breaks down barriers between individuals, departments and staff functions (Evans and Lindsay, 2008). The university has encouraged teamwork throughout the workplace. At the university management level, group and teamwork can be seen clearly. In addition, group work can be seen at the course management level because everyone involved must perform well to ensure strong departmental performance. However, at the faculty level, there is a lack of teamwork and employee involvement. This is due to the variety of tasks lecturers must perform, including teaching, researching, participation in academic festivals and management.

7.4.3 The student journey

Every organization is composed of many individual functions which are depicted as separate units on an organizational chart. It is important for top management to view the organization as a whole and concentrate on the important links among sub functions (Evans and Lindsay, 2008). It has been suggested that an educational institution can be viewed as production system (Evans and Lindsay, 2008). A production system is composed of many interacting subsystems. These subsystems are linked together as internal customers and suppliers. According to the Deming view of an educational institution as a production process, the suppliers include families, high schools, two-year colleges and businesses. The inputs to the system are students, faculty, support staff and lecturers. The outputs include people with new knowledge and abilities, and research findings that are useful to organizations. The customers include the business community, graduate schools, society, students and students' families. Processes include teaching, student counseling and research. The university flowchart (presented below) was developed based on this view.

To understand the university system, the student completion journey is examined. There are two types of student in SKRU: full time students and part time students. This study will focus only on the journey of fulltime students. From the interview and responses to the additional questions, a flowchart has been created to understand SKRU's work system. The system incorporates all the functions and activities within the university that work together to achieve the aims of the organization. Both current and new students of SKRU are required to follow the following steps to finish their studies. The flowchart of the student completion journey is presented in Figure 7.1 - Figure 7.2 below. It is presented across multiple figures for enhanced readability.

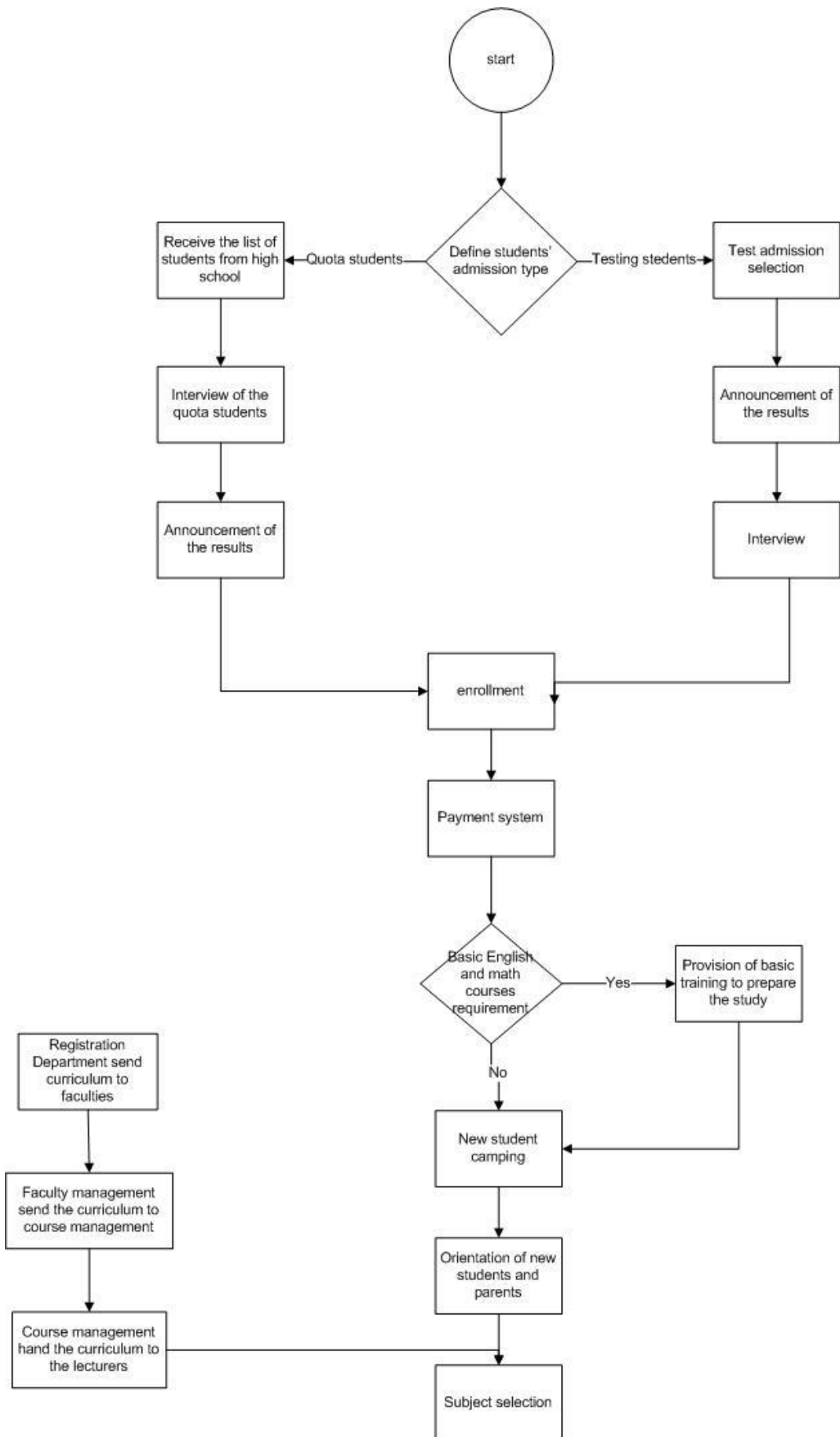


Figure 7.1 SKRU Student Completion Journey Flowchart a

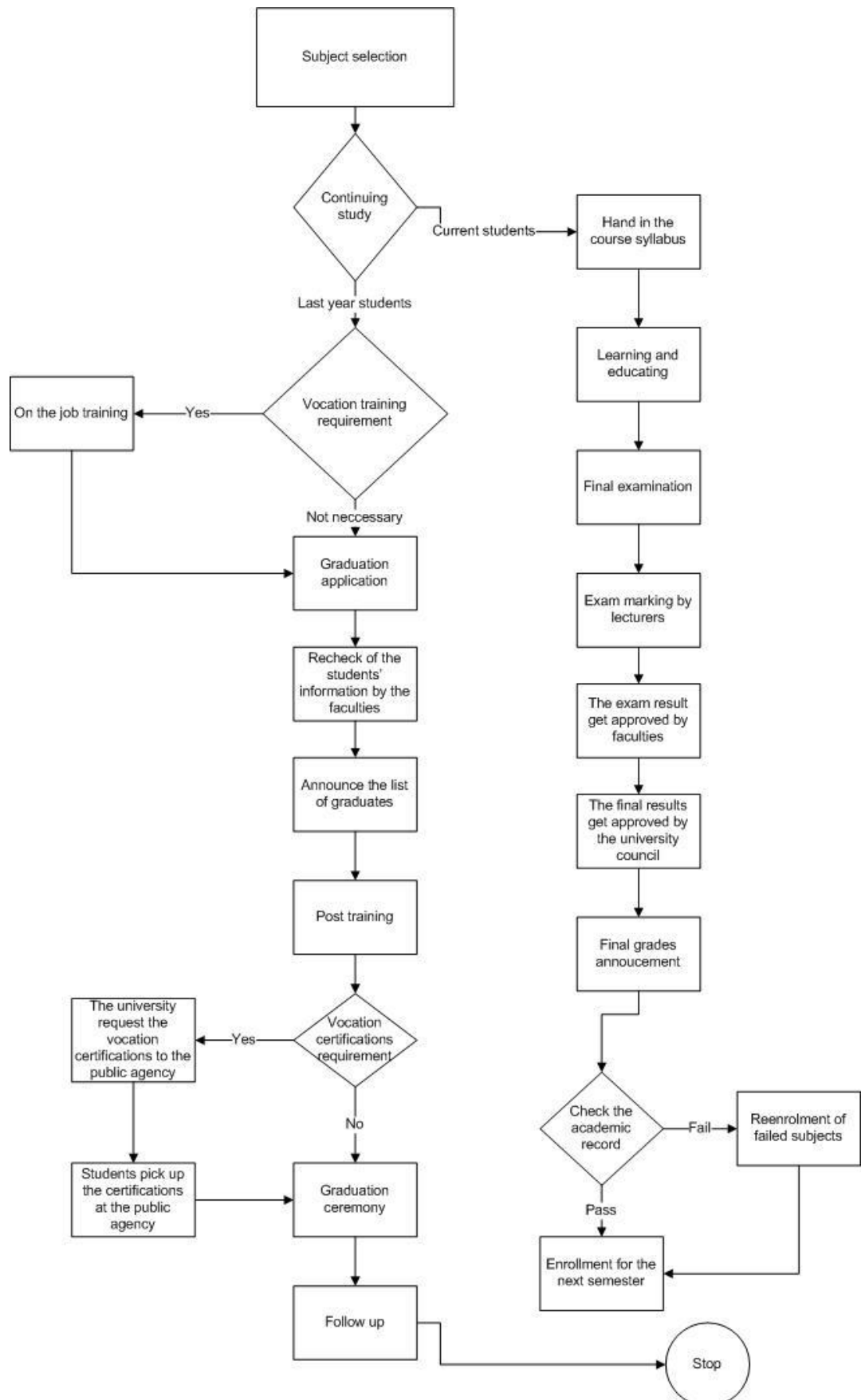


Figure 7.2 SKRU Student Completion Journey Flowchart b

Prospective students must complete high school study or equivalent. There are two types of full time student admission processes. These are quota admission and test admission. Quota admission accounts for 60 percent of total new students and test admission accounts for the remaining 40 percent of students. For quota admission, the university asks high schools to submit a list of students who intend to continue their study at SKRU. SKRU interviews these quota students and announces the results. In addition to quota admission, SKRU accepts students through the test admission process. Students who are not on the quota list must apply for test selection. These students are tested using the exam questions developed for Rajabhat Universities in the south region. SKRU tends to prefer the quota method over test admission. Finally, SKRU announces the test admission results and interviews these students. Although 80% of faculties rely only on an interview process for student admission, some programs apply an additional test for English and Math to determine student ability. Students then enroll in their chosen program and make their payment.

Once the tuition fees have been paid, the university provides the new student camp and orientations. Three to five days before semester commencement, SKRU facilitates a camp for new students. This camp aims to mix the behaviors from students together. Students are expected to share background knowledge. The camp guides students on how to live and study in the university. The university also provides morality and virtue training to students. When the camping activities are completed, the orientation for new students is given. The objective is to inform students about the general background of the university. In the orientation process, the students, advisor and parents will meet and discuss important issues in the learning process.

Concurrently, the registration department sends the curriculum of programs to the faculty. The faculty passes the curriculum to program management, who then hand the curriculum to lecturers to make the course syllabus.

The students select their subjects according to program requirements and their advisor's suggestions. It is compulsory for students to have more than 80 percent class attendance. Lecturers are required to create the course syllabus and have it approved by the university's committee. The course syllabus includes a course description, the content, period, tasks, method of measurement, assessment, expected outcomes,

technique of teaching and textbook. The educating process begins with the provision of the course syllabus by the lecturer in the first class of the session.

The educating process includes teaching, student counseling, a mid examination, a final examination and academic record announcement. Lecturers will educate and assess students using their own judgment. After the students have completed the final examination, they must wait to check their final results.

The lecturers are required to assess the examination results and send the final results to faculty committees. Each faculty then sends the examination results to the university council to approve the final results. The university council will consider whether the final results are over or under the overall expectations and announce the final grades to the students. The above activities are done electronically using the university intranet. After checking their academic record, students must be re enrolled in all failed subjects in the next available semester. If a student passes all enrolled subjects, he will enroll for other subjects in the next semester. In some faculties, such as teaching and accounting, there are vocation-training requirements for final year students. These students are expected to complete on the job training at schools or businesses.

Once a student has completed all subjects in the program and has finished any required vocation training he will apply for graduation. The university will recheck the student's status with the faculty before publicizing the final results. Once the list of graduations has been approved, the university provides post training for graduating students. Each faculty has their own post training course. This training provides guidelines for future employment. For example, the Faculty of Agriculture facilitates an ISO introduction program. The post training also aims to provide guidance for students on how to find a job and how to acquire additional knowledge and skills.

After post training, students participate in the graduation ceremony. The university has established an internal organization to help students with graduation preparation and transcripts. In some faculties, such as teaching and accounting, the university provides vocation certificates that are approved by the government. The university sends the list of graduates to the relevant council and students collect their certification from the council's office.

Once the students have graduated, the university will follow up each student's status including their employer and further study. SKRU attempts to gather data from scholars concerning the development of future programs of study. In general, all students must complete the following process: student administration, orientation, educating process, vocation training, post training, graduation and follow up.

7.4.4 Quality issues in the student journey

SKRU's student journey quality issues have been identified using information collected during the interview and follow up email questions, and by examination of the flowchart.

The standard of high school students across the province is not consistent. The university requires students to have a minimum academic result of a GPA of 2.00. The performance of eligible students (i.e. minimum GPA of 2.00) who come from some popular high schools (such as Hatyai Wittayalai and Saeng Thong Wittaya) is considered to be acceptable by SKRU. However students who are deemed eligible based on their school-assigned GPA in some other high schools do not perform to the required standard at SKRU. It can be seen that the quality of new students as incoming materials for the production line is a concern for the university. There is therefore a quality issue related to the selection of students.

The admission process at SKRU is more delayed than admission processes in higher profile universities. The delayed admission process can lead to quality issues with new students; this can also be viewed as issues with the quality of raw materials in the manufacturing process. Other universities with more efficient processes quickly accept many of the quality students. As a result, the number of new students, and particularly high quality new students, is considered to be low in some faculties.

The low number of enrolments needs to be addressed, because without sufficient students in any particular subject, it will have to be withdrawn from the faculty offerings. This issue has been remedied by the establishment of an admission center for Rajabhat universities. SKRU is one of the admission centers for all Rajabhat universities. Consequently, SKRU has the opportunity to select prospective students before assigning them to other Rajabhat universities. However, some faculties at SKRU

(such as the Faculty of Education) experience high demand for their courses. Due to the university's limited quota, they cannot accept all applicants.

The overall quality of students accepted at SKRU is also a quality issue. Because SKRU is a local public university aiming to serve the local society, which demands educated people, SKRU is willing to accept students with low to medium academic records who want to continue their study. Consequently, it is difficult to increase the minimum academic requirements for new students, and the overall quality of the students is not as high as in some other universities. Also, students with good academic records tend to be selected early to high profile universities in other main cities such as Bangkok and Chaingmai and to accept these other offers. While some quota places are allocated to high school students with good academic records, most quota students who show up on the interview days have medium to low study records. Moreover, in some programs, although there is a required standard for applicants, the number of competent students is inadequate.

In the educating process, there are insufficient lecturers, which can impact the quality of SKRU's educating process. Masters degree qualified lecturers often continue their study at the doctorate level. Part time lecturers are employed to fill the vacancies created by this. It is believed that SKRU still needs more lecturers, however it is hard to find the doctorate qualified lecturers in this urban area. As well as having too few lecturers who are not sufficiently highly qualified, some new lecturers are not sufficiently skilled to control the courses.

In some faculties, the teaching aids and laboratory equipment are outdated. For example, the Faculty of Science is lacking adequate laboratory rooms and sufficient new laboratory equipment. This leads to ineffectiveness in the educating process since the students do not have a laboratory to perform the appropriate experiments for their learning.

In some cases, grades are submitted late. This late submission can lead to students' dissatisfaction. These delays can even result in students leaving SKRU or being unable to enroll in subsequent courses at other universities. The final grade announcement process is quite complicated. The process is summarized as follows. The students complete the final exam. Within two weeks of the examination period, the lecturer is

expected to send the academic records to the faculty for assessment. The faculty submits the final grades to the university committee to check. The academic records are announced to students. The final grades are passed to the subject committee in each faculty to consider overall student performance. The involvement of many stages and staff creates the experienced delays.

In the follow up process, there is a problem with low response rates. Consequently, it is hard to collect and evaluate the customer feedback.

The information collected in this study suggests that SKRU's performance measurement system still faces some quality issues. For example, students should assess their lecturers' performance based on actual performance. However, lecturers are sometimes positively assessed by students based on the assignment of final grades. Both lecturers and students require accurate feedback to develop themselves.

7.4.5 Impact of Thai cultural characteristics on TQM practices

Although SKRU has adopted a quality management system, the application of quality practices is not fully embedded. A significant reason for this may be the lack of consideration of cultural implications and commitments. The survey results suggest that in the Thai university sector, the Thai cultural characteristic of flexibility over principles has the greatest impact on TQM practices. Also, grateful relationship and fun and humorous in nature can affect quality management practices. This study attempts to understand how Thai cultural characteristics both positively and negatively affect CSF practices in the university.

The interview result showed some important considerations about the possible impact of Thai cultural factors on TQM practices. At SKRU, the analysis shows that many Thai cultural characteristics influence TQM practices. In general, it was found that the Thai cultural characteristics of ***Krengjai*** (TCC4) (taking other people's feeling into consideration), ***flexibility over principles*** (TCC6), ***appreciation of social connection*** (TCC8) (giving priority to friends), ***grateful relationship*** (TCC3), ***Raksa Na*** (TCC2) (face saving), and ***fear to make mistakes*** (TCC11) can lead to ineffectiveness in quality management.

The interview shows that the Thai cultural characteristic of ***flexibility over principles*** (TCC6) can hinder TQM implementation in the university. Flexibility over principles

can reduce the intention to practice quality efforts. Furthermore, SKRU officers often ***appreciate social connection*** (TCC8) so they give high priority to friends. This social connection can bring about private relationships and virtually lead to ***Krengjai*** (TCC4). ***Krengjai*** (TCC4) can have an impact on quality performance measurement, which will hinder quality continuous improvement in the university. In the quality assessment process, ***Krengjai*** (TCC4) can cloud people's judgment. Some errors might not need to be reported and some officers do not regularly practice quality management as expected by the quality framework. For example, some officers ignore quality practices because they privately know the quality assessment process auditors. In some cases, auditors do not report errors because they think that the staff member will correct the error afterward and it will be eligible to be passed. It is evident that it is difficult to establish accurate performance evaluation and measurement. This could hinder continuous improvement efforts in the university since the performance measurement is not effective. As a result, it is hard to achieve high quality performance in this scenario.

In the university, ***fear to make mistakes*** (TCC11) is suggested as a cultural factor influencing the quality management journey. It can be observed that the university's staff are often afraid to be assessed and they fear punishment for any mistakes. Although management tends to encourage staff participation and involvement, staff are afraid to share their opinion with colleagues and management. Sometimes, staff ignore errors because they think they are not important and it is not necessary to report small errors. For example, in performance measurement, fear of mistakes could lead to an adjustment in final reports so that requirements are met. Inefficiency in the performance measurement system could hamper continuous improvement efforts.

On the other hand, ***politeness, tolerance, and kindness and consideration*** (TCC5) of management can encourage the staff to become more actively involved in quality activities. Under these Thai cultural values, staff do not like to confront supervisors. As a result, these cultural characteristics might make followers act according to instructions even when the instructions do not lead to the best outcome. Moreover, ***educational and competence orientation*** (TCC9) can have an impact on the level of employee involvement in quality improvement programs. Thai people tend to cooperate more with competent people. For example, management staff with a high education background and good work experience are likely to be accepted by the university's staff. It is easier for them to ask for cooperation. With cooperation, requested work tends to be

completed more easily. Also, the Thai cultural characteristic of *fun and humorous in nature* (TCC7) can create a positive working environment. This characteristic can promote teamwork and group work. It also can reduce stress and conflict in the workplace.

The Thai cultural characteristic of *grateful relationship* (TCC3) can improve the level of teamwork and employee involvement. It can also promote loyalty from employees through an effective reward and recognition system. Employee involvement and teamwork efforts can be supported by this cultural characteristic. Also, it is noted that quality management is a cooperative effort. If the staff perceive no compensation for assuming extra burdens, these burdens will be ignored. It is hard to improve quality in such an environment.

It is evident that the interview results support the survey findings presented in Chapter 4, where it was concluded that Thai cultural values do have both positive and negative influences on TQM practices in many ways. It is important to note that the solutions and recommendations are not simple. All activities will involve costs and benefits, which may be a main constraint for most universities. To propose solutions for these problems, there is a need to study the root causes of problems before identifying problems and planning for the solutions.

7.5 Summary

Quality is a crucial factor in the move toward globalization (Saleki et al., 2012). TQM can be seen as an approach for organizations to obtain high quality and achieve excellence (Anninos, 2007). TQM is based on a number of management principles from the literature, including top management commitment, teamwork, customer focus, employee involvement, training and continuous improvement (see Chapter 2 for full details).

At SKRU, top management commitment has played an important role in developing quality management (Ebrahim, 2004; Salameh, Alzyadal and Alnsor, 2011). Top management have demonstrated a high level of commitment (Saleki et al., 2012) and leadership in quality management (Anninos, 2007) through the determination of quality policies and directions as well as the establishment of control processes in order to achieve quality performance (Salameh, Alzyadal and Alnsor, 2011). The SKRU board

also provide funding to practically support quality improvement initiatives (Saleki et al., 2012)

A quality committee has been appointed to assume responsibility for accomplishing SKRU's quality goals. Continuous improvement is considered as influencing factor to achieve high quality performance in SKRU (Anninos, 2007; Salameh, Alzyadal and Alnsor, 2011; Saleki et al., 2012). The continuous improvement efforts at SKRU include the application of measurement and management by fact, such as performance evaluation of lecturers by management and students as well as the use of feedback for future improvement (Anninos, 2007; Salameh, Alzyadal and Alnsor, 2011; Saleki et al., 2012).

At SKRU, training and education are seen as an important factor to achieve high quality performance (Saleki et al., 2012; Wehnert 2009). In fact, organizational training and education is one of the most effective approaches for continuous improvement and development in organizations (Saleki et al., 2012). Providing training and education for the organization's human resources can lead to university development and this can lead to organization learning. SKRU is striving to be a learning organization (Anninos, 2007; Saleki et al., 2012). Under this concept, all members of the university exert continuous effort to increase the knowledge, insights and skills of both individuals and the group by enhancing their own knowledge and experience and learning from each other (Saleki et al., 2012). Actual learning can result in a change in staff behaviour based on the knowledge acquired and the ability to bring about knowledge and innovation creation with support from the university.

Staff involvement to develop quality has been practiced at SKRU (Anninos, 2007; Saleki et al., 2012), for example through the use of student advisors to understand students' and their parents' expectations. SKRU has identified individuals and groups who are responsible for driving the activities associated with the university's quality efforts. Teamwork efforts are encouraged in all faculties and departments (Anninos, 2007; Saleki et al., 2012). Furthermore, a stakeholder focus has been practiced at SKRU (Anninos, 2007). The university has identified their customers, which generally include employers, students and the society (Sirvanci, 2004). Course and service design has focused on an improved service delivery process using feedback (Campatelli, Citti and Meneghin, 2012).

On the other hand, the quality performance of the university could be improved by increasing the process focus and employee participation (Anninos, 2007; Saleki et al., 2012). Evaluation of customers' and other actors' requirements and specifications can facilitate this process focus (Campatelli, Citti and Meneghin, 2012). SKRU should also encourage staff to engage in quality performance development in their own processes. To enhance quality performance, effective rewards and recognition for quality performance achievement need to be applied (Saleki et al., 2012). Organizational members should be recognized for high quality achievement and their contributions to success (Saleki et al., 2012).

It is important for administrative management in higher education to understand the results of the analysis presented, and thereby promote future performance in their quality management journey. This study should be expanded further to gauge the requirements for TQM implementation at SKRU specifically as well as in all Thai universities. It has been suggested that there are three key basic challenges for quality practices in the future. These are: creating a proper organizational culture and behaviors; engaging with stakeholders in service design and policy development with a focus on customer expectations; and establishing supporting organizational processes and structures for these practices (Ebrahim, 2004). Based on the literature review, this study suggests that TQM can be implemented in organizations to effectively manage these three challenging practices and to succeed the future.

7.6 Conclusion

The case study presented in this chapter has explored how SKRU has adopted the CSFs of TQM implementation in its quality management journey. It has been shown that SKRU has adopted many CSFs of TQM implementation. Based on the survey findings from the previous chapter and the findings of this case study, the university management can reprioritize current practices. Thai universities need to focus on the factors that contribute to business performance improvement (as identified in the literature) and emphasize the factors that current show a low level of practice. It is important to note that analysis of data shows that even in public universities, there are some differences between Rajabhat universities and other well-known public universities, especially in terms of the quality of students, lecturers and material or equipment as inputs of the education systems. To receive more accurate results, future

research should focus on specific types of universities in Thailand such as private, public or well-known universities. In addition, the analysis shows that Thai cultural characteristics have positively and negatively influenced TQM practices in SKRU in many different ways. The findings confirm the literature that cultural factors can contribute to the success or failure of TQM adoptions.

8 Conclusion

8.1 Introduction

This chapter is organized as follows. Firstly, the overall findings of this research, as presented in Chapters 1 to 6, are summarized to explain the significance of the thesis. The contribution of this thesis is then discussed. This chapter also outlines the limitations of the study and presents suggestions for further research.

8.2 Summary of research findings

TQM implementation emphasizes quality concerns in the broadest sense, incorporating the quality of products, services, people, processes and environments (Fotopoulos, Psomas and Vouzas, 2010). TQM is widely accepted as an important concept for increasing organizational effectiveness, efficiency, customer satisfaction, market share and competitive advantage (Antony et al., 2002; Al-Zubi and Judeh, 2011; Saravanan and Rao, 2006). Based on a study by Antony et al. (2002), CSFs of TQM implementation include management commitment, continuous improvement, quality supplier partnership, product and service design, quality data and reporting, communication to improve quality, quality policies, customer satisfaction orientation, the role of the quality department, employee involvement and training and education. This research has selected the mentioned CSFs as the main focus. This research was conducted to address the objectives established in Chapter 1. The researcher investigated the level of CSF adoption in Thai hospitals, universities and in both sectors as well as the impact of Thai cultural characteristics on CSF practices in these sectors. Both qualitative and quantitative methods were selected for this study. The quantitative research component emphasized the testing and verification of the phenomenon while the qualitative research provided a rich, real, full and holistic understanding.

The first objective of this research was to examine the current status of TQM implementation in a Thai university, a Thai hospital and across both sectors. Implementing TQM requires utilizing and employing relevant CSFs in relation to the inputs, processes and outputs of organizations. To enhance the possibility of success in TQM implementation, academic efforts have been made to identify and detect CSFs of TQM implementation (Kaynak, 2003; Khanna, Sharma and Laroia, 2011; Sila and

Ebrahimpour, 2002). In this thesis, the investigation of the level of CSF adoption was used to understand the current status of TQM implementation in Thai hospitals and universities. The status of TQM adoption in those sectors was investigated through identification of the level of CSF practices that were incorporated in the TQM implementation processes in the Thai service sectors. In this research, the success of TQM implementations was evaluated based on the efficient and effective practice of CSFs. The findings identified high levels of practice of management commitment, continuous improvement, quality supplier partnership, product and service design, quality data and reporting, communication to improve quality, quality policies, customer satisfaction orientation, the role of the quality department, employee involvement and training and education in Thai hospitals and universities, as well as in both sectors overall. Analysis of the practitioners' viewpoints identified these eleven factors as CSFs of TQM implementation in Thailand's university and hospital sectors, which are considered as important sectors of Thailand's service industry on the basis that they are the common TQM practices in these sectors. However, it should be noted that the implementation of TQM in the educational and health sectors requires considerations unique to these sectors – for example, TQM implementation in the university sector should include consideration of the complexity of students' roles, engaging students in the continuous improvement process, customer identification (student, family or organizations), the creation of team work and creativity, and lack of resources and funding. In the hospital sector, the inclusion of concerns include physician involvement, education and quality awareness of staff and integration of management systems and technical support. When comparing the two case studies, there are many similarities in the approaches taken to embrace CSFs. These similarities include the establishment of an electronic system for quality communication, a customer focus orientation, the effective control of quality policies and a focus on continuous improvement. However, the analysis shows that the two organizations have applied CSF practices in different ways, from different points of view and at different levels of practice. Despite these differences, both have achieved the desired level of quality performance. The findings of this thesis support existing literature and provide new knowledge specific to TQM implementation in Thailand and TQM adoption in the hospital and university sectors.

The research findings support Antony et al.'s (2002) review of the empirical studies identifying CSFs in the literature (see Chapter 2). These CSFs are proposed as CSFs of TQM implementation for both service and manufacturing organizations and are proved to be valid in a variety of Hong Kong industries including electronics, telecommunication, textiles, building and construction, real estate and other service industries. The results show that the eleven CSFs considered in this research are also important to TQM adoption in the Thai hospitals and universities. It is found that TQM implementations in particular industry sectors, such as the university and hospital sectors, can involve the consideration of these eleven CSFs along with other important factors, such as physician involvement in the hospital sector and engaging students in continuous improvement efforts in the university sector. Therefore, this research suggests that when implementing TQM in other industry sectors, such as telecommunications, hotels and restaurants, and banking, TQM practitioners require at least the consideration of these eleven CSFs plus some critical factors depending on the nature and characteristics of the industry. Further research on CSF identification and validation in other specific industries can significantly contribute to TQM knowledge. In fact, these eleven factors are found to be similar to those identified by various researchers such as Zu (2009), Talib, Rahman and Qureshi (2011a), Parast, Adams and Jones (2011) and Das, Paul and Swierczek (2008). The findings also suggest that TQM concepts are universal concepts because CSFs found to be important in other industries and in other countries are also important in the context of the university, hospital and both sectors in Thailand.

The second objective of this research was to study the CSFs of TQM implementation in the Thailand's university, hospital and to both sectors specifically. Evaluation of the level of TQM implementation using a quantitative method involved investigating CSFs in Thai hospitals and universities through the level of CSF adoption. Based on the research findings, it can be concluded that Thai universities and hospitals have actively embraced TQM practices since all the CSFs of TQM implementation have been highly practiced in these two sectors. Accordingly, these factors are seen as CSFs in the service sector in general. The research findings suggest that management commitment, continuous improvement and supplier partnership have been highly practiced in the university sector in Thailand while, in the context of Thai hospitals, management commitment, product and service design, supplier partnership and continuous

improvement are the most practiced CSFs among the eleven CSFs considered in this study. In order to provide a detailed explanation of how Thai universities and hospitals have approached the TQM journey, two case studies were used to understand how CSFs of TQM implementation have been practiced in a hospital and a university in Thailand. The case studies suggest there are many similarities in the approaches taken to embrace CSFs. These similarities include the establishment of an electronic system for quality communication, a customer focus orientation, the effective control of quality policies and a focus on continuous improvement. However, analysis shows that the two organizations have applied CSF practices in different ways, from different points of view and at different levels of practice. Despite these differences, both have achieved the desired level of quality performance. Based on these findings, hospital and university management can reprioritize current practices. Both organizations should be encouraged to focus on the factors that contribute to business performance improvement (as identified in the literature) and emphasize the factors that currently show a low level of practice. It is recommended that improvement efforts in the areas of employee involvement, training and education and role of the quality department should be considered by management to improve total quality performance in these sectors.

The third objective of the research was to examine how Thai cultural characteristics can influence TQM implementation in the university, hospital and both sectors. The implication of national culture on TQM adoption was the focus of this research, with the impact of cultural factors previously noted as a vital barrier to TQM adoption (Jung et al., 2008). It is asserted that cultural factors can have an impact on the failure or success of TQM implementation (Jung et al., 2008), with the success of TQM implementation being significantly influenced by national culture. Based on Chapters 3 and 5, it can be concluded that Thai cultural characteristics can both support and hinder TQM implementation in various ways. Feminine characteristics tend to support TQM adoption, while high power distance characteristics seem to obstruct the implementation of TQM in Thai organizations (Wehnert, 2009). Since dissimilar impacts of cultural values are evident, this study contributes to prior TQM literature by comprehensively investigating the relationship between a Thai cultural characteristic and a CSF of TQM implementation. This thesis has identified a number of relationships between cultural characteristics and the CSFs for TQM adoption. There are significant relationships among CSF practices and Thai cultural characteristics in the TQM adoption processes

of Thai hospitals and universities. The research findings suggest that Thai culture has an influence on TQM practices; this is supported by the literature. In brief, it has been found that the Thai cultural characteristics of non-assertiveness, care and consideration, kindness and helpfulness, self control, tolerance, restraint, politeness, humbleness, calmness and cautiousness, flexibility over principles and appreciation of social connection (i.e. getting to know the right person) have significant relationships with CSFs of TQM implementation in Thai universities and hospitals. Also, the cultural characteristics of non-assertiveness, flexibility over principles and appreciation of social connection have highest number of significant relationships with CSFs in the sectors.

Moreover, the two case studies of a Thai hospital and university were conducted to show how Thai cultural characteristics influence TQM practices in the organizations. The results demonstrate that Thai culture characteristics have influenced quality practices in both participant organizations. While some Thai cultural characteristics such as *Krengjai* (i.e. taking other people's feeling into the consideration), flexibility over principles and appreciation of social connection were found to possibly obstruct TQM implementation in Thai service organizations, many of the characteristics such as care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness, and fun and humorous in nature can have positive impacts on the TQM implementation. These positive impacts include improved communication and employee involvement levels. The research findings demonstrate the implications of Thai culture on TQM adoption. They confirm the existing literature's claims that cultural factors can contribute to the success or failure of TQM adoptions in the Thai university and hospital sectors. Findings from this research suggest that the implications of Thai cultural characteristics on TQM adoption produce diverse results, with analysis of the case studies showing that Thai cultural characteristics have positively and negatively influenced TQM practices in Nakhonratchasrima Hospitals and SKRU in different ways. The research findings further suggest that some cultural characteristics found in a feminine society, such as flexibility over principles, can obstruct TQM practices in Thai organizations.

National culture can influence organizational cultures, and these organizational cultures directly impact on organizational performance (Jung et al., 2008). In addition, a study by Wehnert (2009) suggested that national culture dimensions affect TQM values, and TQM values affect organizational performance. According to analysis of existing

literature and research findings, this thesis posits that when organizations adopt TQM concepts, organizational cultures will be influenced by TQM values such as customer focus, continuous improvement and participation and teamwork. Simultaneously, Thai cultural characteristics, which can be observed in most Thai people, can influence the organizational culture of organizations operating in Thailand. It is evident that both national cultural characteristics and TQM values can influence prevailing organizational cultures, which in turn reflects shared norms, beliefs and behaviors of organizational members. These shared organizational values can both positively and negatively affect the applications of TQM practices, with the improvement of overall organizational performance depending on the success of CSF practices in organizations (See Figure 8.1).

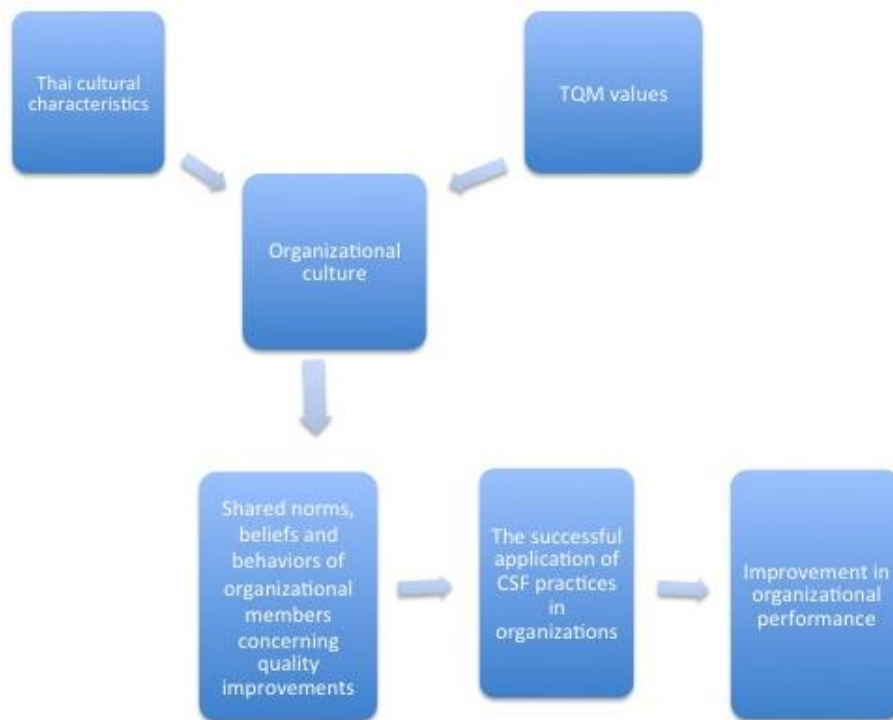


Figure 8.1 The relationships of national cultural characteristics, CSF practices and business performance

8.3 Original contribution

The contributions of this research include the identification of CSFs of TQM implementation and an understanding of the implications of Thai cultural characteristics on TQM implementations for particular types of service organizations, specifically in Thai hospitals and universities. This investigation of CSFs of TQM implementation

along with the Thai cultural implications in Thailand's service industries was required to enhance the chance of success of TQM adoption in Thai service organizations, which will lead to improved quality performance across the whole sector. The original contribution of this thesis is discussed below.

To begin with, this thesis is one of the first attempts to investigate CSFs of TQM implementation in Thai hospitals and universities. This research is the first attempt to determine CSFs of TQM adoption, explore the level of the CSF practices, and provide guidelines to reprioritize the current CSF practices based on academic literature in Thai hospitals and universities and in both sectors in general. No evidence of similar studies by other researchers has been located in the literature.

Furthermore, an investigation of Thai cultural impacts on CSF practices is original; no similar studies have been found in the literature. This thesis has identified a number of significant relationships between Thai cultural characteristics and CSFs of TQM implementation. Thai cultural characteristics that impacted on TQM practices in the Thai hospital and university sectors were different.

Moreover, the use of case studies to explain how a Thai university and hospital have practiced TQM and to understand the implications of Thai cultural characteristics on TQM practices is original and has not been completed by other researchers. In brief, the research findings demonstrate that when the university and hospital case studies are compared, there are many similarities in the approaches taken to embrace CSFs.

Due to the expected benefits that are derived from TQM adoption, practitioners and academic researchers are interested in how to best implement TQM to strengthen competitiveness (Zakuan et al., 2010). The practitioners from universities and hospitals can benefit from this research in many ways. Firstly, based on the survey findings from the previous chapter and the findings of the two case studies, TQM practitioners in the hospital and university sectors can use this research and findings as a guideline for TQM implementation. The hospital and university management can reprioritize current practices. Both management in these organizations need to focus on the factors that contribute to business performance improvement (as identified in the literature). For instance, strategically, the factors that are important for achieving business goals and organizational effectiveness are top management commitment, continuous improvement

and innovation and quality cultures. With respect to tactical factors, training and education, teamwork and communication are crucial for TQM implementation. Operationally, product and service design, as well as process management, can affect business results in the short term (Talib, Rahman and Qureshi, 2012). In addition, the quality management practitioners in Thailand's hospitals and universities can emphasize the factors that current show a low level of practice. Improvement efforts in the areas of employee involvement, training and education and role of the quality department should be considered by management to improve total quality performance in these sectors. Moreover, the analysis also showed that Thai cultural characteristics have both positively and negatively influenced TQM practices in Nakornthon Hospital and SKRU in different ways. The results have revealed that, to implement TQM more effectively, management in the Thailand's university and hospital sector should create a pervasive environment that facilitates an awareness of the cultural impact of the cultural characteristics.

8.4 Limitations of the study

The scope of this study was limited to Thailand's particular service sectors. It was conducted only in hospitals and educational institutions. This research may be considered to be relatively limited as it is restricted to the Thailand context and professional service organizations including hospitals and universities. However, it can be considered as one of the earliest attempts to examine the relationship between Thai cultural characteristics and TQM practices in the Thai hospital and university sectors. This research applies a contingency perspective. Under this view, organizations are viewed as living systems that are open to the environment and need to have suitable relations with the environment to survive. In other words, organizations have to interact with their environment (Morgan, 2006). For instance, service organizations operate in different kinds of environments to their manufacturing counterparts. In the service industry, organizations in the same industry sectors tend to deal with similar kinds of environments. Thus, two particular sectors, the hospital and university sectors, were selected as a focus of this research. In these sectors, quality and standards are prerequisite for the organizations to be viable, increase organizational competitiveness, create each organization's image and enhance their organizational reputation. Previously, the level of TQM practices in Thailand's hospital and university was unknown. Thus, this research is one of first attempts to understand this, and focused on

investigation of the level of CSFs of TQM implementation overall in the hospital and university sectors. As both public and private hospitals and universities in Thailand have similar quality control criteria and frameworks, this research was not concerned the differences between public and private organizations within both sectors. To represent the entire university and hospitals sectors, this research combined both public and private organizations and investigated them together.

This research assumes that private and public hospitals and universities are similar in terms of quality management. This assumption has a limitation. This research does not further divide the type of organizations (i.e. public or private). Although public and private hospitals/universities have similar quality control mechanisms, organizational structures and environment, they are different in nature, objectives, challenges, strengths and weaknesses. Moreover, the findings suggest that in the public sector, there are differences between common universities such as SKRU and well-known universities such as Chulalongkorn, Mahidol and Thammasat University. This research combined all types of universities and represented them as a university sector so the findings may not be accurate as a representation of the entire university sector of Thailand. It is important to recognize the differences between the public and private sectors. Therefore, further research may focus on the differences of CSFs adoption in private and public sectors and entirely focus on public hospitals and universities or private hospitals and universities. Future research can also mainly focus on TQM adoption in well-known universities/hospitals or common universities/hospitals in Thailand.

The results are also restricted by sample size. Therefore, they may not entirely represent the university sector of Thailand. For example, for the university respondents, the sample was mostly restricted to public universities with only five private university respondents. Although a sampling method was established to control the number of participants, the response rate was still low. To remedy this issue, researchers can provide incentives, increase the sample size and number postal questionnaires, and increase follow-up efforts. These actions require some support from the Thai government or related quality agencies. However, the findings are strongly applicable across the Rajabhat university system because most of respondents involved in this research were from Rajabhat universities. There are 40 universities in the Rajabhat university system in Thailand and there were 28 Rajabhat universities that participated

in this research, which accounts for 70% of all the Rajabhat university sector. It is strongly recommended that data be gathered from various types of universities in Thailand, including public and private universities, to confirm the generalizability of the findings. As the data in this study was collected from management people or quality department staff of organizations and used their subjective evaluations, objective performance indicators should also be employed in future analysis.

The findings of this study have been exploratory in nature because there is no previous research that investigates the relationship between TQM practices and cultural impact in specific industries such as hospitals and universities. While two case studies cannot be generalized to represent all relationships among cultural factors and TQM practices, the generalization in case studies can be seen differently. The case studies, which identify specific issues and systems, and other important characteristics, may be reasonably used to generalize to similar cases. This ability is particularly important given that, from a broader perspective, there is a lack of theory and empirical studies regarding TQM in specific industries and the cultural implications of TQM adoption in the service sector in Asian countries, especially in Thailand.

8.5 Directions for future research

This research has investigated the current engagement of universities and hospitals with TQM. The process of development of effective quality frameworks for these sectors must not overlook the level of TQM implementation in technical aspects. Consequently, future research could consider how the implementation of the technical aspects of TQM can be applied to specific service sectors.

Future research should study TQM in other Thai industries, such as banking and communication. This research has determined the level and extent to which the prerequisites for TQM have been implemented in hospitals and universities in Thailand, as well as identifying areas lacking implementation. However, the findings suggest there are many differences in the nature and the practices of CSFs between private and public hospitals/universities as well as between well known and common universities/hospitals. Thus, future research can entirely focus on public hospitals and universities or private hospitals and universities. Future research can also mainly focus on TQM adoption in well-known universities/hospitals or common universities/hospitals in Thailand. It is suggested that studies on other types of service

sectors are conducted simultaneously to increase the chance of obtaining a thorough and accurate assessment of the level of TQM implementation in Thailand's service industry. It is also important to understand the effectiveness of TQM implementation processes. Future research should focus on how various quality initiatives have influenced the companies' operational and business performance.

The findings of the case studies suggest that quality management and knowledge management are considered as main concerns in both participant organizations. A study of TQM and knowledge management by Ooi (2009) suggested that there is a relationship between TQM practices and knowledge management. TQM practices can lead to knowledge acquisition, dissemination and application (Ooi, 2009). Future research could consider the link between knowledge management and TQM. By developing a deeper understanding of the relationship between TQM practices and knowledge management, senior management can thus focus their efforts on the practices that ensure their organization's ability to establish a competitive knowledge management capability (Ooi, 2009).

The establishment of formal frameworks for TQM adoption in certain sectors should be examined further. This research has successfully revealed the level of implementation of TQM principles. To develop a framework based on this, further study is necessary to determine the level of success in TQM implementation. The thesis has also pinpointed areas lacking implementation in the TQM program. Future research should design an effective and integrated framework that is easy to adopt in the service sector. It is suggested that further research be carried out immediately on those organizations that are willing to participate in the development of a suitable framework for the hospitals and university in Thailand.

8.6 Conclusions

This thesis has investigated the literature related to TQM background, the potential benefits of TQM, TQM in Thailand, and TQM in both the manufacturing and service sectors. Since cultural factors are often considered as a major barrier to TQM adoption, the researcher also included a literature review on the impact of culture on TQM implementation. After researching the TQM contexts particular to Thailand, the thesis undertook a survey and two case studies. The survey findings enabled the researchers to investigate the level of TQM implementation practices in Thai universities and hospitals

through the adoption of Critical Success Factors (CSFs). The importance of quality to achieve competitive position in the market has been widely recognized by Thai businesses. Thai quality management practitioners encourage an organizational wide quality mandate that is based on training all organizational members in quality procedures and policies (Reis and Pati, 2007). In considering the important contribution of the Thai service sector to Thailand's economy, this research investigated the current level of TQM implementation in hospitals and universities in Thailand. This research has successfully revealed the level of implementation of TQM principles in universities and hospitals in Thailand. It has also pinpointed areas lacking in implementation in the TQM program. The findings will help service managers to evaluate their TQM implementation and identify critical areas requiring improvement efforts. Since this study included hospitals and universities from all regions in Thailand, organizations can be confident that the findings are applicable to all hospitals, universities and similar types of organizations that have a comparable operation process.

This study provided a profile of the level of quality practices in Thai universities and hospitals and has given recommendations based on the findings and current literature. Specifications and measurement of the CSFs of TQM implementation allows managers to obtain a better understanding of TQM practices by evaluating perceptions of quality management in their organizations. By understanding the importance of CSFs, service industries can evaluate their current practices and re-allocate reasonable resources and efforts to these factors and practices to improve their business performance (Talib, Rahman and Qureshi, 2012). It is important to prioritize resource allocation to individual practices during TQM implementation in service industries.

Furthermore, it must be remembered that each TQM journey is unique to its respective cultural setting (Noronha, 2002). Although TQM philosophy and organizational culture are related, they are distinct (Baird, Hu and Reeve, 2011). While TQM can mirror the organizational culture, culture is more entrenched within an organization. It reflects a pattern of shared and stable beliefs and values that are developed within the firm (Baird, Hu and Reeve, 2011). It is evident that organizational cultures, which are significantly influenced by the national culture, have an impact TQM adoption. The two case studies were comparatively analyzed to understand how hospitals and universities implement quality practices on their TQM journey as well as how Thai cultural characteristics can affect TQM practices. This thesis has concluded that Thai cultural characteristics have

influenced TQM practices in different ways. The knowledge of the impact of Thai cultural characteristics on CSF practices in this study is based on the quality practitioners' perspectives. By considering the cultural implications when implementing TQM, managers are able to enhance their organization's chance of success on the TQM journey.

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Appendix 1 Hypotheses

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|---------------|---|
| Hypothesis 1 | H0: there is a significant relationship between management commitment and flexibility over the rules |
| | H1: there is no significant relationship between management commitment and the Thai culture of flexibility over the rules |
| Hypothesis 2 | H0: there is a significant relationship between management commitment and non assertiveness |
| | H1: there is no significant relationship between management commitment and non assertiveness |
| Hypothesis 3 | H0: there is a significant relationship between Role of the quality department and flexibility over principles |
| | H1: there is no significant relationship between Role of the quality department and flexibility over principles |
| Hypothesis 4 | H0: there is a significant relationship between Role of the quality department and Non assertiveness |
| | H1: there is no significant relationship between Role of the quality department and Non assertiveness |
| Hypothesis 5 | H0: there is a significant relationship between Training and education and Flexibility over principles |
| | H1: there is no significant relationship between Training and education and Flexibility over principles |
| Hypothesis 6 | H0: there is a significant relationship between Training and education and Non assertiveness |
| | H1: there is no significant relationship between Training and education and Non assertiveness |
| Hypothesis 7 | H0: there is a significant relationship between Training and education and Fun and humorous in nature |
| | H1: there is no significant relationship between Training and education and Fun and humorous in nature |
| Hypothesis 8 | H0: there is a significant relationship between Training and education and Social connection |
| | H1: there is no significant relationship between Training and education and Social connection |
| Hypothesis 9 | H0: there is a significant relationship between Training and education and Social recognition |
| | H1: there is no significant relationship between Training and education and Social recognition |
| Hypothesis 10 | H0: there is a significant relationship between Employee involvement and Pride of face and dignity |
| | H1: there is no significant relationship between Employee involvement and Pride of face and dignity |
| Hypothesis 11 | H0: there is a significant relationship between Employee involvement and Grateful relationships |
| | H1: there is no significant relationship between Employee involvement and Grateful relationships |

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| Hypothesis 12 | H0: there is a significant relationship between Employee involvement and flexibility over principles |
| | H1: there is no significant relationship between Employee involvement and flexibility over principles |
| Hypothesis 13 | H0: there is a significant relationship between Employee involvement and Non assertiveness |
| | H1: there is no significant relationship between Employee involvement and Non assertiveness |
| Hypothesis 14 | H0: there is a significant relationship between Employee involvement and Care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness |
| | H1: there is no significant relationship between Employee involvement and Care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness |
| Hypothesis 15 | H0: there is a significant relationship between Employee involvement and Fun and humorous in nature |
| | H1: there is no significant relationship between Employee involvement and Fun and humorous in nature |
| Hypothesis 16 | H0: there is a significant relationship between Employee involvement and Social connection |
| | H1: there is no significant relationship between Employee involvement and Social connection |
| Hypothesis 17 | H0: there is a significant relationship between Employee involvement and Social recognition |
| | H1: there is no significant relationship between Employee involvement and Social recognition |
| Hypothesis 18 | H0: there is a significant relationship between Employee involvement and Mutual help |
| | H1: there is no significant relationship between Employee involvement and Mutual help |
| Hypothesis 19 | H0: there is a significant relationship between Continuous improvement and taking other people feeling into consideration |
| | H1: there is no significant relationship between Continuous improvement and taking other people feeling into consideration |
| Hypothesis 20 | H0: there is a significant relationship between Continuous improvement and Pride of face and dignity |
| | H1: there is no significant relationship between Continuous improvement and Pride of face and dignity |
| Hypothesis 21 | H0: there is a significant relationship between Continuous improvement and flexibility over principles |
| | H1: there is no significant relationship between Continuous improvement and flexibility over principles |
| Hypothesis 22 | H0: there is a significant relationship between Continuous improvement and Non assertiveness |
| | H1: there is no significant relationship between Continuous improvement and Non assertiveness |

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| Hypothesis 23 | H0: there is a significant relationship between Continuous improvement and Care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness |
| | H1: there is no significant relationship between Continuous improvement and Care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness |
| Hypothesis 24 | H0: there is a significant relationship between Continuous improvement and Education and competence orientation |
| | H1: there is no significant relationship between Continuous improvement and Education and competence orientation |
| Hypothesis 25 | H0: there is a significant relationship between Continuous improvement and Social connection |
| | H1: there is no significant relationship between Continuous improvement and Social connection |
| Hypothesis 26 | H0: there is a significant relationship between Continuous improvement and Social recognition |
| | H1: there is no significant relationship between Continuous improvement and Social recognition |
| Hypothesis 27 | H0: there is a significant relationship between Supplier partnership and Flexibility over the rules |
| | H1: there is no significant relationship between Supplier partnership and Flexibility over the rules |
| Hypothesis 28 | H0: there is a significant relationship between Supplier partnership and Non assertiveness |
| | H1: there is no significant relationship between Supplier partnership and Non assertiveness |
| Hypothesis 29 | H0: there is a significant relationship between Product/service design and Flexibility over the rules |
| | H1: there is no significant relationship between Product/service design and Flexibility over the rules |
| Hypothesis 30 | H0: there is a significant relationship between Product/service design and Non assertiveness |
| | H1: there is no significant relationship between Product/service design and Non assertiveness |
| Hypothesis 31 | H0: there is a significant relationship between Product/service design and Social connection |
| | H1: there is no significant relationship between Product/service design and Social connection |
| Hypothesis 32 | H0: there is a significant relationship between Product/service design and Social recognition |
| | H1: there is no significant relationship between Product/service design and Social recognition |
| Hypothesis 33 | H0: there is a significant relationship between Quality policies and Pride of face and dignity |
| | H1: there is no significant relationship between Quality policies and Pride of face and dignity |

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| Hypothesis 34 | H0: there is a significant relationship between Quality policies and Grateful relationships |
| | H1: there is no significant relationship between Quality policies and Grateful relationships |
| Hypothesis 35 | H0: there is a significant relationship between Quality policies and Flexibility over principles |
| | H1: there is no significant relationship between Quality policies and Flexibility over principles |
| Hypothesis 36 | H0: there is a significant relationship between Quality policies and Non assertiveness |
| | H1: there is no significant relationship between Quality policies and Non assertiveness |
| Hypothesis 37 | H0: there is a significant relationship between Quality data and reporting and Pride of face and dignity |
| | H1: there is no significant relationship between Quality data and reporting and Pride of face and dignity |
| Hypothesis 38 | H0: there is a significant relationship between Quality data and reporting and Grateful relationships |
| | H1: there is no significant relationship between Quality data and reporting and Grateful relationships |
| Hypothesis 39 | H0: there is a significant relationship between Quality data and reporting and flexibility over principles |
| | H1: there is no significant relationship between Quality data and reporting and flexibility over principles |
| Hypothesis 40 | H0: there is a significant relationship between Quality data and reporting and non assertiveness |
| | H1: there is no significant relationship between Quality data and reporting and non assertiveness |
| Hypothesis 41 | H0: there is a significant relationship between Communication to improve quality and Pride of face and dignity |
| | H1: there is no significant relationship between Communication to improve quality and Pride of face and dignity |
| Hypothesis 42 | H0: there is a significant relationship between Communication to improve quality and Grateful relationships |
| | H1: there is no significant relationship between Communication to improve quality and Grateful relationships |
| Hypothesis 43 | H0: there is a significant relationship between Communication to improve quality and Flexibility over principles |
| | H1: there is no significant relationship between Communication to improve quality and Flexibility over principles |
| Hypothesis 44 | H0: there is a significant relationship between Communication to improve quality and Non assertiveness |
| | H1: there is no significant relationship between Communication to improve quality and Non assertiveness |
| Hypothesis 45 | H0: there is a significant relationship between Communication to improve quality and Care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness |

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| | H1: there is no significant relationship between Communication to improve quality and Care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness |
| Hypothesis 46 | H0: there is a significant relationship between Communication to improve quality and Social connection |
| | H1: there is no significant relationship between Communication to improve quality and Social connection |
| Hypothesis 47 | H0: there is a significant relationship between Communication to improve quality and Social recognition |
| | H1: there is no significant relationship between Communication to improve quality and Social recognition |
| Hypothesis 48 | H0: there is a significant relationship between Communication to improve quality and Mutual help |
| | H1: there is no significant relationship between Communication to improve quality and Mutual help |
| Hypothesis 49 | H0: there is a significant relationship between Customer satisfaction orientation and Pride of face and dignity |
| | H1: there is no significant relationship between Customer satisfaction orientation and Pride of face and dignity |
| Hypothesis 50 | H0: there is a significant relationship between Customer satisfaction orientation and Grateful relationships |
| | H1: there is no significant relationship between Customer satisfaction orientation and Grateful relationships |
| Hypothesis 51 | H0: there is a significant relationship between Customer satisfaction orientation and Flexibility over principles |
| | H1: there is no significant relationship between Customer satisfaction orientation and Flexibility over principles |
| Hypothesis 52 | H0: there is a significant relationship between Customer satisfaction orientation and Non assertiveness |
| | H1: there is no significant relationship between Customer satisfaction orientation and Non assertiveness |
| Hypothesis 53 | H0: there is a significant relationship between Customer satisfaction orientation and Care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness |
| | H1: there is no significant relationship between Customer satisfaction orientation and Care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness |
| Hypothesis 54 | H0: there is a significant relationship between Customer satisfaction orientation and Social connection |
| | H1: there is no significant relationship between Customer satisfaction orientation and Social connection |
| Hypothesis 55 | H0: there is a significant relationship between Customer satisfaction orientation and Social recognition |
| | H1: there is no significant relationship between Customer satisfaction orientation and Social recognition |

Appendix 2 Questionnaire

**An investigation of Total Quality Management (TQM) implementation framework
of service industry in Thailand**

Instructions

My name is Apinan Aueaungkul, Ph. D. candidate at the School of Information System and Technology in the University of Wollongong, New South Wales, Australia. I am conducting the research by investigating Total Quality Management (TQM) implementation framework in Thailand. The results will be presented in academic journal articles as well as used to develop quality in Thai service industries.

There are two sections in this questionnaire. Please complete both sections by indicating a ✓ on the most appropriate answer relevant to you and your company.

Section 1

Please provide the following information about your company and yourself.

- | | |
|---|--|
| 1. Which industry sector best described your company? | <input type="checkbox"/> Transport/Logistics <input type="checkbox"/> Banking/Finance <input type="checkbox"/> Public university <input type="checkbox"/> Private university <input type="checkbox"/> Public hospital <input type="checkbox"/> Private hospital <input type="checkbox"/> Other (please specify) _____ |
| 2. Which of the following best described ownership of your company? (You can select more than one) | <input type="checkbox"/> A government-owned organization <input type="checkbox"/> A subsidiary of international company <input type="checkbox"/> A Thai-owned company <input type="checkbox"/> A subsidiary of Thai-owned company <input type="checkbox"/> Other (please specify) _____ |
| 3. Please indicate the total number of permanent employees in your company. | |
| 4. Have you certified any quality awards | <input type="radio"/> Yes <input type="checkbox"/> PMQA, <input type="checkbox"/> ISO, <input type="checkbox"/> ONESQA, <input type="checkbox"/> TQA, <input type="checkbox"/> HA, <input type="checkbox"/> HPH, <input type="checkbox"/> Other quality certification(_____) |

When.....

How many times

☐ No

Do you expect to receive the award within five years

☐ Yes

☐ No

☐ Not sure

5. Please tell us your current position (or job title) in the company. _____

6. Please tell us number of years in the current position.
- ☐ Less than 1 year
 - ☐ 1-3 years
 - ☐ 3-5 years
 - ☐ More than 5 years

7. Please tell us your highest level of education.
- ☐ Secondary school
 - ☐ Diploma
 - ☐ Bachelor degree
 - ☐ Master degree and above

Section 2

For each question, please choose the most appropriate answer (indicating with a ✓) based on your viewpoint and opinion.

| | | Strongly disagree | Disagree | Neural | Agree | Strongly agree |
|-----|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. | I think top management should take responsibilities for quality performance. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. | I think all department head are responsible for quality. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. | I think top management support long term quality improvement process. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. | I think there is the participation by department heads in the quality improvement process. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. | I think top management considers the importance of quality in relation to cost and schedule objectives. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. | I think the company has clear, consistent communication of mission statement and objectives. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. | I think the company specifies quality goals in all levels. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. | I think quality goals and policy are understood within the company. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. | I think the top management considers quality improvement as a way to increase profit. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. | I think the company has comprehensive quality plan. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. | I think the top management shows their commitments to employee training. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 12. | I think quality department is generally visible. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 13. | I think quality department has accesses to top management. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 14. | I think quality department is self-sufficient. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15. | I think there is the utilization of quality staff professionals as a consulting resource. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| | | | | | | |
|-----|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 16. | I think quality department can improve quality effectively. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 17. | I think quality awareness measures among employees are effective. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18. | I think specific work skills training (technical and vocational) are given to employees throughout the company. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 19. | I think there are the programs in the company which develop teamwork between employees. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 20. | I think quality-related trainings are given to managers, supervisors and employees. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 21. | I think training in the total quality concept is given. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 22. | I think training of employees to implement quality circle program is provided. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 23. | I think employees are trained in statistical improvement techniques (e.g. histograms, control charts etc.). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 24. | I think training in advanced statistical techniques (such as design of experiment and regression analysis) is conducted by the company. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 25. | I think there is availability of resources for employee training in the company. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 26. | I think there is training in interactive skills (such as communication skills, effective meeting skills, and empowerment and leadership skills). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 27. | I think there are trainings in problem identification and solving skills as well as quality improvement skills. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 28. | I think quality awareness building among employees is ongoing. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 29. | I think quality circle or employee involvement type programs are implemented in the organization. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 30. | I think there is the participation in quality decisions by non-supervisory employees. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 31. | I think employees are recognized for superior quality performance. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 32. | I think top management pushes decision making to the lowest practical level. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 33. | I think top management reviews quality issues in their meetings. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| | | | | | | |
|-----|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 34. | I think feedbacks are provided to employees on their quality performance. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 35. | I think unit heads and managers assume active roles as facilitators of continuous improvement, coaches of new methods, mentors and leader of empowered employees. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 36. | I think the company improves and assesses their processes, product and services. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 37. | I think quality data are used to evaluate supervisor and managerial performance. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 38. | I think suppliers are selected based on quality instead of price or schedule. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 39. | I think company applies supplier rating system. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40. | I think technical assistance improves the quality and responsiveness of suppliers. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 41. | I think the suppliers are involved in the product development process. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 42. | I think clarity of specifications are provided to suppliers. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 43. | I think purchasing department is responsible for the quality of incoming product/service. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 44. | I think the suppliers have programs to assure quality of their product/service. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 45. | I think thoroughness of new product/service design reviews before the product/service is produced and marketed. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 46. | I think there is co-ordination among affected departments in the product/service development process. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 47. | I think new product/service development process meet expected level. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 48. | I think the company analyses customer requirements in product/service development process. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 49. | I think clarity of product/service specifications and procedures is provided. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 50. | I think sales and marketing people consider quality a saleable attribute. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 51. | I think strategies focused on quality are implemented. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| | | | | | | |
|-----|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 52. | I think the company conducts acceptance sampling to accept/reject lots of batches of work. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 53. | I think the company uses statistical control charts to control processes. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 54. | I think there is policy of preventive equipment maintenance. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 55. | I think it is important to inspect, review or check processes, products and services. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 56. | I think the company checks and reviews amount of incoming, in-process and final inspection. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 57. | I think the company checks and reviews amount of final inspection. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 58. | I think workers practice self-inspection of work. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 59. | I think clarity of work or process instructions are given to employees. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 60. | I think zero defects as the quality performance standard is pursued. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 61. | I think quality data (cost of quality, defects, errors, scrapes, etc) are used as tools to manage quality. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 62. | I think quality data are available to employees. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 63. | I think quality data are available to managers and supervisors. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 64. | I think quality data, control charts etc., are displayed at employee work station communication to improve quality. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 65. | I think quality techniques/tools to solve problems are used. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 66. | I think good communications between different departments are occurred. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 67. | I think work standards are based on quality and quantity rather than quantity alone. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 68. | I think the company has effective top-down and bottom-up communication. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 69. | I think the company commits to customers through strengthening of policies, etc. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| | | | | | | |
|-----|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 70. | I think the company compares customer satisfaction with competitors and internal indicators. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 71. | I think the company conducts benchmarking of direct competitors' products and processes. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 72. | I think there are determinations of improvements in customer satisfaction throughout the company. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 73. | I think the Thai cultural characteristic of 'Kreng Jai' (taking other people feeling in to consideration) can hinder the continuous improvement efforts. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 74. | I think the Thai cultural characteristic of pride of face and dignity can hinder the success of continuous improvement in regard to employee involvement. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 75. | I think the Thai cultural characteristic of pride of face and dignity can hinder the success of continuous improvement in regard to communication within the company. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 76. | I think the Thai cultural characteristic of pride of face and dignity can hinder evaluation and performance feedback of employee. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 77. | I think the Thai cultural characteristic of pride of face and dignity can be used in rewards and recognitions of employees' success. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 78. | I think the Thai cultural characteristic of grateful relationship can improve the level of communication within the company. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 79. | I think the Thai cultural characteristic of grateful relationship can promote loyalty from employees through effective reward and recognition system. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 80. | I think the Thai cultural characteristic of grateful relationship can improve the level of teamwork and employee involvement. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 81. | I think the Thai cultural characteristic of grateful relationship can hinder evaluation and performance feedback of employees. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 82. | I think the Thai cultural characteristic of flexibility over principles can hinder the effectiveness of products and services of the company. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 83. | I think the Thai cultural characteristic of flexibility over principles can hinder TQM implementation. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 84. | I think the Thai cultural characteristic of flexibility over principles can hinder the effectiveness of employee involvement. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 85. | I think the Thai cultural characteristic of bending the rule can hinder quality policy implementation. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| | | | | | | |
|-----|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 86. | I think the Thai cultural characteristic of bending the rule can improve the effectiveness of customer service. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 87. | I think the Thai cultural characteristic of non-assertiveness can improve the effectiveness of TQM implementation. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 88. | I think the level of communication within the firms can be improved by the Thai cultural characteristic of non-assertive characteristics. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 89. | I think working in group can be improved by the Thai cultural characteristic of non-assertive characteristics. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 90. | I think the Thai cultural characteristic of care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness can improve the level of communication in the company. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 91. | I think the Thai cultural characteristic of care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness can improve teamwork. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 92. | I think the Thai cultural characteristic of care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness can improve the level of employee involvement. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 93. | I think the Thai cultural characteristic of care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness can improve effectiveness of customer service. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 94. | I think the Thai cultural characteristic of care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness can lead to ineffectiveness of employee involvement. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 95. | I think the Thai cultural characteristic of care and consideration, kindness and helpfulness, self control, tolerance, restraint politeness, humbleness, calmness and cautiousness can improve continuous improvement. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 96. | I think the Thai culture value of education and competence orientation can encourage employee participation in new training programs | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 97. | I think Thai social interactions are of fun and humorous in nature can improve the level of communication in teamwork and employee involvement. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 98. | I think the Thai cultural characteristic of 'getting to know the right person' can hinder employees pursuing performance excellence. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- | | | | | | | |
|------|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 99. | I think the Thai cultural characteristic of social recognition can encourage employees pursuing performance excellence. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 100. | I think the Thai cultural characteristics of mutual help can facilitate employee involvement and communication to improve quality. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Thank you for completing the questionnaire.

You can mail, fax or email the completed survey to:

Dr Sim Kim Lau/Mr Apinan Aueaungkul
School of Information Systems and Technology

University of Wollongong

Wollongong

NSW 2522

Australia

Fax: +612-42214045

Email: simlau@uow.edu.au or aa990@uow.edu.au

Appendix 3 Questionnaire – Thai language translation

การวิจัยเรื่อง กระบวนการใช้ TQM ในอุตสาหกรรมบริการในประเทศไทย

คำชี้แจง ข้าพเจ้านายอภิรักษ์ เอื้ออังกูร กำลังศึกษาระดับปริญญาเอกในภาควิชา Information Systems and Technology ของมหาวิทยาลัย Wollongong ประเทศออสเตรเลีย กำลังศึกษาเกี่ยวกับกระบวนการใช้ TQM ในอุตสาหกรรมเพื่อนำผลวิจัยที่ได้รับเสนอในวารสารวิชาการและเพื่อการพัฒนากระบวนการสำหรับอุตสาหกรรมบริการในประเทศไทยต่อไป

ในแบบสอบถามฉบับนี้ประกอบด้วยคำถาม 2 ส่วน คือ ส่วนที่เป็นสถานภาพ และส่วนที่เป็นพฤติกรรมการใช้ TQM โปรดเขียนเครื่องหมาย ✓ หรือเติมข้อความลงในช่องว่างให้ตรงกับความคิดเห็นของท่าน ข้อมูลของท่านจะไม่ถูกเปิดเผยชื่อหรือองค์กร ข้าพเจ้าจะเสนอผลในภาพรวมเท่านั้น และขอขอบคุณล่วงหน้าที่ทำให้ความร่วมมือ

ด้วยความเคารพนับถือ
นายอภิรักษ์ เอื้ออังกูร

แบบสอบถาม

ส่วนที่ 1 1. อุตสาหกรรมแบบใดที่สามารถอธิบายองค์กรของคุณได้ดีที่สุด

- | | |
|--|--------------------------------------|
| <input type="radio"/> ขนส่ง | <input type="radio"/> ธนาคาร |
| <input type="radio"/> สถานศึกษารัฐบาล | <input type="radio"/> สถานศึกษาเอกชน |
| <input type="radio"/> โรงพยาบาลรัฐบาล | <input type="radio"/> โรงพยาบาลเอกชน |
| <input type="radio"/> อื่น ๆ (โปรดระบุ)..... | |

2. องค์กรคุณสามารถอธิบายความเป็นเจ้าของได้ในลักษณะใด (ตอบได้มากกว่าหนึ่งข้อ)

- | | |
|---|---|
| <input type="radio"/> รัฐบาลเป็นเจ้าของ | <input type="radio"/> เอกชนเป็นเจ้าของ |
| <input type="radio"/> เป็นสาขาของบริษัทต่างชาติ | <input type="radio"/> เป็นนิติบุคคล |
| <input type="radio"/> องค์กรมหาชน | <input type="radio"/> อื่น ๆ (โปรดระบุ) |

3. จำนวนพนักงานประจำในองค์กรของท่าน.....คน

4. องค์กรของท่านได้รับรองมาตรฐานรางวัลคุณภาพหรือไม่ ☐ PMQA, ☐ ISO, ☐ มาตรฐาน ONESQA, ☐ TQA (Thailand Quality Award), ☐ HA (Hospital Accreditation), ☐ อื่นๆ
☐ ได้ ☐ PMQA, ☐ ISO, ☐ มาตรฐาน ONESQA, ☐ TQA (Thailand Quality Award), ☐ อื่นๆ โปรดระบุ.....เมื่อ พ.ศ. เป็นครั้งที่.....

- ☐ ไม่ได้ คาดว่าจะได้รับภายใน 5 ปี หรือไม่
- | |
|---------------------------------|
| <input type="radio"/> ได้รับ |
| <input type="radio"/> ไม่ได้รับ |
| <input type="radio"/> ไม่แน่ใจ |

5. โปรดระบุตำแหน่งของคุณในองค์กร

6. โปรดระบุระยะเวลาในการทำงานในตำแหน่งนี้

- ☐ น้อยกว่า 1 ปี ☐ 1 – 3 ปี
☐ 3.1 – 5 ปี ☐ มากกว่า 5 ปี

7. ระดับการศึกษาสูงสุดของท่าน

- ☐ ต่ำกว่าปริญญาตรี ☐ อนุปริญญา ☐ ปริญญาตรี
☐ ปริญญาโท ☐ สูงกว่าปริญญาโท ☐ อื่น ๆ ระบุ

ส่วนที่ 2 ในแต่ละคำถามโปรดเลือกคำตอบที่คุณคิดว่าเป็นตอบที่ตรงกับทักษะ/ ความคิดเห็นของท่านจากประสบการณ์ โดยเขียนเครื่องหมาย ✓ ลงในช่องว่าง

| รายละเอียด | | | | | |
|---|----------------------|-------------|----------|----------|-------------------|
| | ไม่เห็นด้วยอย่างยิ่ง | ไม่เห็นด้วย | ไม่แน่ใจ | เห็นด้วย | เห็นด้วยอย่างยิ่ง |
| 1. ฉันคิดว่าผู้บริหารสูงสุดควรจะมีขีดความสามารถพัฒนาคุณภาพ | | | | | |
| 2. ฉันคิดว่าหัวหน้าแผนกทุกคนต้องรับผิดชอบต่อคุณภาพ | | | | | |
| 3. ฉันคิดว่าผู้บริหารสูงสุดสนับสนุนกระบวนการพัฒนาคุณภาพในระยะยาว | | | | | |
| 4. ฉันคิดว่าหัวหน้าแผนกทุกคนได้มีส่วนร่วมในกระบวนการพัฒนาคุณภาพ | | | | | |
| 5. ฉันคิดว่า ผู้บริหารสูงสุดพิจารณาความสำคัญของคุณภาพเทียบกับต้นทุนและเป้าหมายที่กำหนดไว้ | | | | | |
| 6. ฉันคิดว่ามีการสื่อสารเกี่ยวกับพันธกิจและเป้าหมายขององค์กรด้านคุณภาพอย่างถูกต้องชัดเจน | | | | | |
| 7. ฉันคิดว่าองค์กรมีเป้าหมายคุณภาพที่ชัดเจนในทุกระดับปฏิบัติ | | | | | |
| 8. ฉันคิดว่านโยบายและเป้าหมายคุณภาพขององค์กรเป็นที่รับรู้และเข้าใจกันดี | | | | | |
| 9. ฉันคิดว่าผู้บริหารสูงสุดเชื่อว่าคุณภาพเป็นหนทางไปสู่การเพิ่มกำไร | | | | | |
| 10. ฉันคิดว่าองค์กรมีแผนพัฒนาคุณภาพที่ครอบคลุมทุกด้าน | | | | | |
| 11. ฉันคิดว่าผู้บริหารสูงสุดให้ความสำคัญในการอบรมพนักงาน | | | | | |
| 12. ฉันคิดว่าโดยทั่วไปหน่วยงานประกันคุณภาพมีผลงานชัดเจน | | | | | |
| 13. ฉันคิดว่าหน่วยงานประกันคุณภาพสามารถเข้าถึงผู้บริหารสูงสุดได้ง่าย | | | | | |
| 14. ฉันคิดว่าหน่วยงานประกันคุณภาพพึ่งตนเองได้ | | | | | |

ส่วนที่ 2 (ต่อ)

| รายละเอียด | | | | | |
|---|----------------------|-------------|----------|----------|-------------------|
| | ไม่เห็นด้วยอย่างยิ่ง | ไม่เห็นด้วย | ไม่แน่ใจ | เห็นด้วย | เห็นด้วยอย่างยิ่ง |
| 15. ฉันคิดว่าในองค์กรมีบริการให้คำปรึกษาด้านคุณภาพจากผู้เชี่ยวชาญในองค์กร | | | | | |
| 16. ฉันคิดว่าหน่วยงานประกันคุณภาพขององค์กรสามารถพัฒนาคุณภาพได้อย่างมีประสิทธิภาพ | | | | | |
| 17. ฉันคิดว่าเครื่องวัดความตระหนักในเรื่องคุณภาพในหมู่พนักงานมีประสิทธิภาพ | | | | | |
| 18. ฉันคิดว่าการฝึกทักษะการทำงานในหน้าที่รับผิดชอบเฉพาะด้าน(ทางเทคนิคและทางอาชีพ)ให้กับพนักงานทั่วทั้งองค์กร | | | | | |
| 19. ฉันคิดว่าองค์กรได้มีโปรแกรมพัฒนาพนักงานด้านการทำงานเป็นทีม | | | | | |
| 20. ฉันคิดว่าการอบรมผู้บริหารทุกระดับและพนักงานในเรื่องที่เกี่ยวข้องกับการพัฒนาคุณภาพ | | | | | |
| 21. ฉันคิดว่าการฝึกอบรมเกี่ยวกับแนวคิดของคุณภาพโดยรวม | | | | | |
| 22. ฉันคิดว่าการฝึกอบรมพนักงานเพื่อให้มีการวงจรคุณภาพ(PDCA)ไปปฏิบัติ | | | | | |
| 23. ฉันคิดว่าพนักงานได้รับอบรมเทคนิค สถิติในการประกันคุณภาพ(เช่นแผนภูมิตาราง แท่ง เป็นต้น) | | | | | |
| 24. ฉันคิดว่าการอบรมด้านสถิติขั้นสูง ให้แก่พนักงานเช่น การออกแบบการทดลอง การวิเคราะห์ถดถอย | | | | | |
| 25. ฉันคิดว่ามีทรัพยากรที่เพียงพอที่ใช้ฝึกอบรมพนักงานในองค์กร | | | | | |
| 26. ฉันคิดว่าการอบรมในเรื่องทักษะการมีปฏิสัมพันธ์ระหว่างบุคคลในองค์กร เช่นทักษะการสื่อสาร ทักษะการประชุมที่มีประสิทธิภาพ ทักษะการเสริมพลัง และทักษะการเป็นผู้นำ | | | | | |
| 27. ฉันคิดว่าการอบรมในทักษะการระบุปัญหา ทักษะแก้ปัญหา และทักษะการพัฒนาคุณภาพ | | | | | |
| 28. ฉันคิดว่าการดำเนินการสร้างความตระหนักในเรื่องคุณภาพในหมู่พนักงานอย่างต่อเนื่อง | | | | | |
| 29. ฉันคิดว่าองค์กรมีการใช้วงจรคุณภาพและการมีส่วนร่วมของพนักงาน | | | | | |
| 30. ฉันคิดว่าองค์กรมีการให้พนักงาน/เจ้าหน้าที่มีส่วนร่วมในการตัดสินใจด้านคุณภาพ | | | | | |
| 31. ฉันคิดว่าการยกย่องพนักงานที่มีผลงานคุณภาพสูง | | | | | |
| 32. ฉันคิดว่าผู้บริหารระดับสูงได้กระจายอำนาจการตัดสินใจสู่พนักงานระดับล่างสุด | | | | | |
| 33. ฉันคิดว่าการประชุมผู้บริหารระดับสูงมีการทบทวนเรื่องคุณภาพ | | | | | |

ส่วนที่ 2 (ต่อ)

| รายละเอียด | | | | | |
|---|----------------------|-------------|----------|----------|-------------------|
| | ไม่เห็นด้วยอย่างยิ่ง | ไม่เห็นด้วย | ไม่แน่ใจ | เห็นด้วย | เห็นด้วยอย่างยิ่ง |
| 34. ฉันคิดว่ามีการให้คำติชมเกี่ยวกับคุณภาพของผลการปฏิบัติงานของพนักงาน | | | | | |
| 35. ฉันคิดว่าหัวหน้าทุกระดับและผู้บริหารทำหน้าที่ให้คำแนะนำช่วยเหลืออำนวยความสะดวกเพื่อให้เกิดการพัฒนาคุณภาพอย่างต่อเนื่องโดยการสอนงานที่เป็นวิธีใหม่แนะนำด้านการให้คำปรึกษาและเป็นผู้นำใน การเสริมพลังให้พนักงาน | | | | | |
| 36. ฉันคิดว่าองค์กรมีการพัฒนาและประเมินผลการดำเนินงาน ผลผลิตและบริการต่างๆ | | | | | |
| 37. ฉันคิดว่าข้อมูลด้านคุณภาพสามารถใช้ประเมินผลการปฏิบัติงานดำเนินงานรายงานของผู้บริหารระดับกลาง | | | | | |
| 38. ฉันคิดว่า การคัดเลือกวัตถุดิบต้องพิจารณาคุณภาพมากกว่าราคา | | | | | |
| 39. ฉันคิดว่าองค์กรมีการใช้ระบบประเมินในการคัดเลือกวัตถุดิบ | | | | | |
| 40. ฉันคิดว่าเทคนิคทางวิชาการสามารถพัฒนาคุณภาพและความรับผิดชอบของผู้จัดทำวัตถุดิบ | | | | | |
| 41. ฉันคิดว่าผู้จัดทำวัตถุดิบมีส่วนร่วมกระบวนการพัฒนาผลิตภัณฑ์/ผลผลิต | | | | | |
| 42. ฉันคิดว่าต้องมีรายละเอียดที่ชัดเจนของวัตถุดิบให้ผู้จัดทำวัตถุดิบ | | | | | |
| 43. ฉันคิดว่าแผนจัดซื้อ มีความรับผิดชอบต่อคุณภาพของสินค้า/หรือที่ได้มาหลังบริการ | | | | | |
| 44. ฉันคิดว่าผู้จัดทำวัตถุดิบ มีระบบที่ทำให้มั่นใจได้ว่าสินค้ามีคุณภาพดี | | | | | |
| 45. ฉันคิดว่าจะต้องมีการตรวจตราแบบของผลผลิตหรือบริการอย่างละเอียดก่อนจะผลิตหรือวางจำหน่ายในท้องตลาด | | | | | |
| 46. ฉันคิดว่ามีความร่วมมือกันระหว่างหน่วยงานที่เกี่ยวข้องในกระบวนการพัฒนาผลผลิต/ผลิตภัณฑ์หรือบริการ | | | | | |
| 47. ฉันคิดว่ากระบวนการพัฒนาผลิตภัณฑ์และบริการใหม่ ๆ เป็นไปตามมาตรฐานที่กำหนด | | | | | |
| 48. ฉันคิดว่าองค์กรมีการวิเคราะห์ความต้องการของลูกค้าเสมอในกระบวนการพัฒนาผลิตภัณฑ์/ หรือบริการ | | | | | |
| 49. ฉันคิดว่ามีการแสดงกระบวนการและรายละเอียดของข้อกำหนดของผลิตภัณฑ์หรือบริการอย่างชัดเจน | | | | | |
| 50. ฉันคิดว่าพนักงานฝ่ายการตลาดและการขายสามารถใช้คุณภาพเป็นจุดขายได้ | | | | | |

ส่วนที่ 2 (ต่อ)

| รายละเอียด | | | | | |
|---|----------------------|-------------|----------|----------|-------------------|
| | ไม่เห็นด้วยอย่างยิ่ง | ไม่เห็นด้วย | ไม่แน่ใจ | เห็นด้วย | เห็นด้วยอย่างยิ่ง |
| 51. ฉันคิดว่าองค์กรได้นำกลยุทธ์ที่เน้นด้านคุณภาพมาใช้ | | | | | |
| 52. ฉันคิดว่าองค์กรใช้การสุ่มตัวอย่างมากพอเพื่อยอมรับหรือปฏิเสธงานที่ทำออกมาแต่ละครั้ง | | | | | |
| 53. ฉันคิดว่าองค์กรใช้สถิติในการควบคุมระบบการทำงาน | | | | | |
| 54. ฉันคิดว่าองค์กรมีนโยบายในด้านการบำรุงรักษาและป้องกันด้านวัสดุ อุปกรณ์ ครุภัณฑ์ | | | | | |
| 55. ฉันคิดว่าองค์กรให้ความสำคัญในการตรวจสอบทบทวนกระบวนการทำงาน สินค้าและบริการ | | | | | |
| 56. ฉันคิดว่าองค์กรมีการตรวจสอบและทบทวนจำนวนสิ่งที่จะตรวจสอบ กำลังตรวจสอบ และการตรวจสอบสุดท้าย | | | | | |
| 57. ฉันคิดว่าองค์กรมีการตรวจสอบ และทบทวนขั้นตอนสิ่งที่มีการตรวจสอบสุดท้าย | | | | | |
| 58. ฉันคิดว่าสมาชิกในองค์กรมีการตรวจสอบการทำงานของตนเอง | | | | | |
| 59. ฉันคิดว่ามีการจัดคู่มือการปฏิบัติงานให้ผู้ปฏิบัติ | | | | | |
| 60. ฉันคิดว่าสมาชิกในองค์กรพยายามปฏิบัติงานเพื่อไม่ให้เกิดข้อผิดพลาดเลย | | | | | |
| 61. ฉันคิดว่าข้อมูลเกี่ยวกับคุณภาพ(ต้นทุนของการประกันคุณภาพ, ข้อบกพร่อง, ความคลาดเคลื่อน)ถูกนำมาใช้เป็นเครื่องมือเพื่อการบริหารคุณภาพ | | | | | |
| 62. ฉันคิดว่าพนักงานสามารถเข้าถึงข้อมูลเกี่ยวกับคุณภาพ | | | | | |
| 63. ฉันคิดว่าผู้บริหารระดับสูงและระดับกลางสามารถเข้าถึงข้อมูลเกี่ยวกับคุณภาพ | | | | | |
| 64. ฉันคิดว่ามีการแสดงข้อมูลด้านคุณภาพ ณ ที่ทำงานของพนักงานเพื่อพัฒนาคุณภาพ | | | | | |
| 65. ฉันคิดว่าเทคนิคเครื่องมือด้านคุณภาพนำมาใช้เพื่อการแก้ปัญหา | | | | | |
| 66. ฉันคิดว่ามีการสื่อสารที่ถูกต้องมีประสิทธิภาพ ระหว่างแผนกต่าง ๆ | | | | | |
| 67. ฉันคิดว่ามาตรฐานการทำงานขึ้นกับคุณภาพและปริมาณมากกว่าจะพิจารณาจากปริมาณอย่างเดียว | | | | | |
| 68. ฉันคิดว่าองค์กรมีการสื่อสารที่มีประสิทธิภาพทั้งจากผู้บริหารสู่พนักงาน และพนักงานสู่ผู้บริหาร | | | | | |
| 69. ฉันคิดว่าองค์กรเน้นความสำคัญของลูกค้าโดยปฏิบัติตามนโยบายที่เน้นลูกค้าอย่างจริงจัง | | | | | |
| 70. ฉันคิดว่าองค์กรเปรียบเทียบความพึงพอใจของลูกค้ากับคู่แข่ง และตัวชี้วัดภายในอื่นๆ | | | | | |
| 71. ฉันคิดว่าองค์กรมีการเทียบเคียงสินค้า บริการ และระบบการทำงานกับคู่แข่ง | | | | | |

ส่วนที่ 2 (ต่อ)

| รายละเอียด | ไม่เห็นด้วยอย่างยิ่ง | ไม่เห็นด้วย | ไม่แน่ใจ | เห็นด้วย | เห็นด้วยอย่างยิ่ง |
|---|----------------------|-------------|----------|----------|-------------------|
| 72. ฉันคิดว่าสมาชิกทุกคนในองค์กรมีความมุ่งมั่นที่จะพัฒนาความพึงพอใจของลูกค้า | | | | | |
| 73. ฉันคิดว่าความเกรงใจทำให้การพัฒนาขาดความต่อเนื่อง | | | | | |
| 74. ฉันคิดว่าการรักษาหน้าและชื่อเสียงทำให้การมีส่วนร่วมของพนักงานลดลง และเกิดอุปสรรคต่อการพัฒนาอย่างต่อเนื่อง | | | | | |
| 75. ฉันคิดว่าการรักษาหน้าและชื่อเสียงทำให้การสื่อสารขาดความเที่ยงตรง และเกิดอุปสรรคต่อการพัฒนาอย่างต่อเนื่อง | | | | | |
| 76. ฉันคิดว่าการรักษาหน้าและชื่อเสียงทำให้การวัดและการให้ข้อมูลย้อนกลับขาดประสิทธิภาพ | | | | | |
| 77. ฉันคิดว่าฉันคิดว่าการรักษาหน้าและชื่อเสียงสามารถใช้ในการประกาศเกียรติคุณ และยกย่องพนักงานที่ประสบความสำเร็จ | | | | | |
| 78. ฉันคิดว่าการแสดงความขอบคุณ, กตัญญู สามารถเพิ่มประสิทธิภาพการสื่อสารในองค์กร | | | | | |
| 79. ฉันคิดว่าการแสดงความขอบคุณ, กตัญญู สามารถเพิ่มความภักดีต่อองค์กรของเจ้าหน้าที่ โดยการใช้ระบบการให้รางวัลและยกย่องที่มีประสิทธิภาพ | | | | | |
| 80. ฉันคิดว่าการแสดงความขอบคุณ, กตัญญู สามารถเพิ่มระดับการทำงานเป็นทีม และการมีส่วนร่วมของพนักงาน | | | | | |
| 81. ฉันคิดว่าการแสดงความขอบคุณ, กตัญญู เป็นอุปสรรคต่อการวัด และการให้ข้อติชมที่ดี | | | | | |
| 82. ฉันคิดว่าการยืดหยุ่นตลอดเวลาที่ปราศจากเหตุผลเป็นอุปสรรคต่อประสิทธิภาพของสินค้าและบริการขององค์กร | | | | | |
| 83. ฉันคิดว่าการยืดหยุ่นตลอดเวลาที่ปราศจากเหตุผลเป็นอุปสรรคต่อการดำเนินงานตามระบบการบริหารคุณภาพ | | | | | |
| 84. ฉันคิดว่าการยืดหยุ่นตลอดเวลาที่ปราศจากเหตุผลทำให้การมีส่วนร่วมของพนักงานลดลง | | | | | |
| 85. ฉันคิดว่าการไม่ปฏิบัติตามกฎเกณฑ์เป็นอุปสรรคต่อการนำนโยบายคุณภาพสู่ปฏิบัติ | | | | | |
| 86. ฉันคิดว่าการไม่ปฏิบัติตามกฎเกณฑ์สามารถพัฒนาประสิทธิภาพของการบริการให้ลูกค้า | | | | | |
| 87. ฉันคิดว่าการไม่กล้าแสดงออกสามารถพัฒนาประสิทธิภาพในการนำการบริหารคุณภาพไปปฏิบัติ | | | | | |
| 88. ฉันคิดว่าการไม่กล้าแสดงออกสามารถช่วยระดับการสื่อสารในองค์กรได้ | | | | | |
| 89. ฉันคิดว่าการไม่กล้าแสดงออกสามารถพัฒนาการทำงานเป็นทีมภายในองค์กรได้ | | | | | |
| 90. ฉันคิดว่าความสุภาพอ่อนโยนโอบอ้อมอารีมีเมตตากรุณาอดทนอดกลั้น ช่วยส่งเสริมการสื่อสารในองค์กร | | | | | |

ส่วนที่ 2

(ต่อ)

| รายละเอียด | | | | | |
|--|----------------------|-------------|----------|----------|-------------------|
| | ไม่เห็นด้วยอย่างยิ่ง | ไม่เห็นด้วย | ไม่แน่ใจ | เห็นด้วย | เห็นด้วยอย่างยิ่ง |
| 91. ฉันคิดว่าความสุภาพอ่อนโยนโอปอ้อมอารี, มีเมตตา กรุณา, ความอดทนอดกลั้น สามารถช่วยพัฒนาการทำงานเป็นทีม | | | | | |
| 92. ฉันคิดว่าความสุภาพอ่อนโยนโอปอ้อมอารี, มีเมตตา กรุณา, ความอดทนอดกลั้น สามารถส่งเสริมการมีส่วนร่วมของพนักงาน | | | | | |
| 93. ฉันคิดว่าความสุภาพอ่อนโยนโอปอ้อมอารี, มีเมตตา กรุณา, ความอดทนอดกลั้น สามารถพัฒนาประสิทธิภาพของการพัฒนาลูกค้า | | | | | |
| 94. ฉันคิดว่าความสุภาพอ่อนโยนโอปอ้อมอารี, มีเมตตา กรุณา, ความอดทนอดกลั้น ขัดขวางการมีส่วนร่วมของพนักงาน | | | | | |
| 95. ฉันคิดว่าความสุภาพอ่อนโยนโอปอ้อมอารี, มีเมตตา กรุณา, ความอดทนอดกลั้น สามารถทำให้เกิดการพัฒนาอย่างต่อเนื่อง | | | | | |
| 96. ฉันคิดว่าการให้ความสำคัญต่อการศึกษาและความสามารถของบุคคลช่วยกระตุ้นให้พนักงานเข้ารับการอบรมในโปรแกรมใหม่ๆ | | | | | |
| 97. ฉันคิดว่าความรักสนุกและการมีอารมณ์ขันสามารถพัฒนาระดับการสื่อสารในการทำงานเป็นทีมและการมีส่วนร่วมของพนักงาน | | | | | |
| 98. ฉันคิดว่าการให้ความสำคัญกับพวกพ้องคนใกล้ชิด ขัดขวางการปฏิบัติที่เป็นเลิศ | | | | | |
| 99. ฉันคิดว่าการมีชื่อเสียงและการเป็นที่ยอมรับของสังคมสามารถทำให้พนักงานมุ่งสู่การปฏิบัติที่เป็นเลิศ | | | | | |
| 100. ฉันคิดว่าการพึ่งพาอาศัยกันจะช่วยให้เกิดการมีส่วนร่วมและการสื่อสารภายในองค์กรซึ่งจะนำไปสู่การพัฒนาคุณภาพ | | | | | |

ขอขอบคุณที่ตอบแบบสอบถาม
 คุณสามารถอีเมลล์ แฟกซ์ หรือจดหมายแบบสอบถามฉบับนี้ให้กับ
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Appendix 4 Chi-square results

Chi-square results in university sector

| Statements | Pearson Chi-square value | Asymp. Sig. |
|------------|--------------------------|-------------|
| v1 * v82 | 9.864 | .020 |
| v1 * v83 | 9.035 | .029 |
| v1 * v84 | 7.213 | .065 |
| v1 * v85 | 1.1314 | .010 |
| v1 * v86 | 5.528 | .237 |
| v2 * v82 | 2.594 | .459 |
| v2 * v83 | 2.728 | .435 |
| v2 * v84 | 5.763 | .124 |
| v2 * v85 | 6.824 | .078 |
| v2 * v86 | .998 | .910 |
| v3 * v82 | 4.704 | .582 |
| v3 * v83 | 4.114 | .661 |
| v3 * v84 | 7.970 | .240 |
| v3 * v85 | 2.969 | .813 |
| v3 * v86 | 7.232 | .512 |
| v4 * v82 | 6.674 | .352 |
| v4 * v83 | 5.114 | .529 |
| v4 * v84 | 4.850 | .563 |
| v4 * v85 | 7.686 | .262 |
| v4 * v86 | 4.412 | .818 |
| v5 * v82 | 1.708 | .944 |
| v5 * v83 | 1.610 | .952 |
| v5 * v84 | 2.082 | .912 |
| v5 * v85 | 4.347 | .630 |
| v5 * v86 | 8.596 | .378 |
| v6 * v82 | 8.443 | .207 |
| v6 * v83 | 5.295 | .507 |
| v6 * v84 | 4.666 | .587 |
| v6 * v85 | 6.976 | .323 |
| v6 * v86 | 6.692 | .570 |
| v7 * v82 | 3.335 | .766 |
| v7 * v83 | 3.600 | .731 |
| v7 * v84 | 2.292 | .891 |
| v7 * v85 | 5.339 | .501 |
| v7 * v86 | 4.964 | .761 |
| v8 * v82 | 17.807 | .007 |
| v8 * v83 | 11.986 | .062 |
| v8 * v84 | 4.744 | .577 |
| v8 * v85 | 4.226 | .646 |

| | | |
|-----------|--------|------|
| v8 * v86 | 9.146 | .330 |
| v9 * v82 | 13.355 | .344 |
| v9 * v83 | 7.568 | .818 |
| v9 * v84 | 15.668 | .207 |
| v9 * v85 | 7.946 | .789 |
| v9 * v86 | 11.934 | .748 |
| v10 * v82 | 9.144 | .166 |
| v10 * v83 | 9.383 | .153 |
| v10 * v84 | 3.141 | .791 |
| v10 * v85 | 10.603 | .101 |
| v10 * v86 | 15.030 | .059 |
| v11 * v82 | 3.539 | .939 |
| v11 * v83 | 5.136 | .822 |
| v11 * v84 | 8.090 | .525 |
| v11 * v85 | 10.468 | .314 |
| v11 * v86 | 12.500 | .406 |
| v1 * v87 | 8.089 | .088 |
| v1 * v88 | 4.736 | .316 |
| v1 * v89 | 9.547 | .023 |
| v2 * v87 | 1.384 | .847 |
| v2 * v88 | 1.811 | .770 |
| v2 * v89 | 2.394 | .495 |
| v3 * v87 | 5.415 | .712 |
| v3 * v88 | 6.795 | .559 |
| v3 * v89 | 3.476 | .747 |
| v4 * v87 | 10.062 | .261 |
| v4 * v88 | 14.674 | .066 |
| v4 * v89 | 7.322 | .292 |
| v5 * v87 | 8.406 | .395 |
| v5 * v88 | 7.164 | .519 |
| v5 * v89 | 10.146 | .119 |
| v6 * v87 | 5.426 | .711 |
| v6 * v88 | 4.076 | .850 |
| v6 * v89 | 3.070 | .800 |
| v7 * v87 | 6.530 | .588 |
| v7 * v88 | 7.066 | .529 |
| v7 * v89 | 2.035 | .916 |
| v8 * v87 | 18.879 | .016 |
| v8 * v88 | 4.989 | .759 |
| v8 * v89 | 1.347 | .969 |
| v9 * v87 | 15.510 | .488 |
| v9 * v88 | 15.563 | .484 |
| v9 * v89 | 10.221 | .597 |

| | | |
|-----------|--------|------|
| v10 * v87 | 11.466 | .177 |
| v10 * v88 | 7.468 | .487 |
| v10 * v89 | 6.108 | .411 |
| v11 * v87 | 9.556 | .655 |
| v11 * v88 | 10.295 | .590 |
| v11 * v89 | 14.805 | .096 |
| v12 * v82 | 3.243 | .778 |
| v12 * v83 | 3.736 | .712 |
| v12 * v84 | 3.287 | .772 |
| v12 * v85 | 1.908 | .928 |
| v12 * v86 | 6.218 | .623 |
| v13 * v82 | 6.890 | .865 |
| v13 * v83 | 8.532 | .742 |
| v13 * v84 | 6.794 | .871 |
| v13 * v85 | 14.952 | .244 |
| v13 * v86 | 11.617 | .770 |
| v14 * v82 | 16.798 | .157 |
| v14 * v83 | 11.203 | .512 |
| v14 * v84 | 16.416 | .173 |
| v14 * v85 | 15.941 | .194 |
| v14 * v86 | 14.912 | .531 |
| v15 * v82 | 6.760 | .662 |
| v15 * v83 | 8.526 | .482 |
| v15 * v84 | 7.850 | .549 |
| v15 * v85 | 3.619 | .935 |
| v15 * v86 | 10.540 | .569 |
| v16 * v82 | 9.934 | .356 |
| v16 * v83 | 11.792 | .225 |
| v16 * v84 | 8.477 | .487 |
| v16 * v85 | 7.028 | .634 |
| v16 * v86 | 15.166 | .232 |
| v17 * v82 | 12.389 | .192 |
| v17 * v83 | 8.388 | .496 |
| v17 * v84 | 11.235 | .260 |
| v17 * v85 | 7.049 | .632 |
| v17 * v86 | 24.424 | .018 |
| v12 * v87 | 5.049 | .752 |
| v12 * v88 | 3.880 | .868 |
| v12 * v89 | 3.849 | .697 |
| v13 * v87 | 14.513 | .561 |
| v13 * v88 | 14.825 | .537 |
| v13 * v89 | 21.878 | .039 |
| v14 * v87 | 8.998 | .913 |

| | | |
|-----------|--------|------|
| v14 * v88 | 11.246 | .794 |
| v14 * v89 | 9.623 | .649 |
| v15 * v87 | 15.246 | .228 |
| v15 * v88 | 15.480 | .216 |
| v15 * v89 | 10.047 | .347 |
| v16 * v87 | 11.305 | .503 |
| v16 * v88 | 10.828 | .544 |
| v16 * v89 | 5.768 | .763 |
| v17 * v87 | 16.371 | .175 |
| v17 * v88 | 10.434 | .578 |
| v17 * v89 | 6.291 | .710 |
| v18 * v82 | 5.713 | .768 |
| v18 * v83 | 8.510 | .484 |
| v18 * v84 | 7.824 | .552 |
| v18 * v85 | 4.117 | .904 |
| v18 * v86 | 20.197 | .063 |
| v19 * v82 | 15.364 | .081 |
| v19 * v83 | 12.441 | .190 |
| v19 * v84 | 14.936 | .093 |
| v19 * v85 | 14.423 | .108 |
| v19 * v86 | 20.148 | .064 |
| v20 * v82 | 11.623 | .476 |
| v20 * v83 | 13.344 | .345 |
| v20 * v84 | 14.696 | .258 |
| v20 * v85 | 9.200 | .686 |
| v20 * v86 | 13.748 | .617 |
| v21 * v82 | 5.726 | .455 |
| v21 * v83 | 6.873 | .333 |
| v21 * v84 | 3.591 | .732 |
| v21 * v85 | 4.517 | .607 |
| v21 * v86 | 2.929 | .939 |
| v22 * v82 | 4.986 | .835 |
| v22 * v83 | 7.883 | .546 |
| v22 * v84 | 8.911 | .446 |
| v22 * v85 | 5.051 | .830 |
| v22 * v86 | 9.681 | .644 |
| v23 * v82 | 8.120 | .522 |
| v23 * v83 | 6.400 | .699 |
| v23 * v84 | 9.399 | .401 |
| v23 * v85 | 12.402 | .192 |
| v23 * v86 | 10.855 | .541 |
| v24 * v82 | 10.544 | .784 |
| v24 * v83 | 10.329 | .799 |

| | | |
|-----------|--------|------|
| v24 * v84 | 18.343 | .245 |
| v24 * v85 | 12.444 | .645 |
| v24 * v86 | 13.101 | .873 |
| v25 * v82 | 4.765 | .854 |
| v25 * v83 | 6.196 | .720 |
| v25 * v84 | 6.569 | .682 |
| v25 * v85 | 12.126 | .206 |
| v25 * v86 | 11.471 | .489 |
| v26 * v82 | 7.589 | .576 |
| v26 * v83 | 9.647 | .380 |
| v26 * v84 | 8.727 | .463 |
| v26 * v85 | 10.664 | .299 |
| v26 * v86 | 17.121 | .145 |
| v27 * v82 | 12.938 | .165 |
| v27 * v83 | 15.643 | .075 |
| v27 * v84 | 14.480 | .106 |
| v27 * v85 | 16.367 | .060 |
| v27 * v86 | 17.526 | .131 |
| v28 * v82 | 3.557 | .938 |
| v28 * v83 | 4.820 | .850 |
| v28 * v84 | 4.829 | .849 |
| v28 * v85 | 3.522 | .940 |
| v28 * v86 | 10.255 | .594 |
| v18 * v87 | 14.451 | .273 |
| v18 * v88 | 6.996 | .858 |
| v18 * v89 | 4.504 | .875 |
| v19 * v87 | 18.033 | .115 |
| v19 * v88 | 13.071 | .364 |
| v19 * v89 | 7.313 | .605 |
| v20 * v87 | 8.368 | .937 |
| v20 * v88 | 14.075 | .593 |
| v20 * v89 | 15.423 | .219 |
| v21 * v87 | 10.325 | .243 |
| v21 * v88 | 6.971 | .540 |
| v21 * v89 | 4.105 | .662 |
| v22 * v87 | 11.893 | .454 |
| v22 * v88 | 10.136 | .604 |
| v22 * v89 | 12.783 | .173 |
| v23 * v87 | 15.846 | .198 |
| v23 * v88 | 16.430 | .172 |
| v23 * v89 | 10.526 | .310 |
| v24 * v87 | 25.085 | .198 |
| v24 * v88 | 20.433 | .431 |

| | | |
|-----------|--------|------|
| v24 * v89 | 20.786 | .144 |
| v25 * v87 | 4.277 | .978 |
| v25 * v88 | 7.295 | .838 |
| v25 * v89 | 6.382 | .701 |
| v26 * v87 | 20.399 | .060 |
| v26 * v88 | 11.114 | .519 |
| v26 * v89 | 10.275 | .329 |
| v27 * v87 | 18.007 | .115 |
| v27 * v88 | 8.568 | .739 |
| v27 * v89 | 4.523 | .874 |
| v28 * v87 | 13.008 | .368 |
| v28 * v88 | 9.982 | .618 |
| v28 * v89 | 4.289 | .891 |
| v18 * v97 | 16.898 | .050 |
| v19 * v97 | 8.717 | .464 |
| v20 * v97 | 45.538 | .000 |
| v21 * v97 | 1.184 | .978 |
| v22 * v97 | 10.113 | .341 |
| v23 * v97 | 19.116 | .024 |
| v24 * v97 | 7.726 | .934 |
| v25 * v97 | 10.811 | .289 |
| v26 * v97 | 13.697 | .134 |
| v27 * v97 | 10.534 | .309 |
| v28 * v97 | 4.806 | .851 |
| v18 * v98 | 11.233 | .509 |
| v19 * v98 | 22.616 | .031 |
| v20 * v98 | 10.723 | .826 |
| v21 * v98 | 3.677 | .885 |
| v22 * v98 | 7.514 | .822 |
| v23 * v98 | 18.011 | .115 |
| v24 * v98 | 15.564 | .743 |
| v25 * v98 | 8.404 | .753 |
| v26 * v98 | 20.705 | .055 |
| v27 * v98 | 19.483 | .078 |
| v28 * v98 | 19.263 | .082 |
| v18 * v99 | 6.615 | .358 |
| v19 * v99 | 5.442 | .488 |
| v20 * v99 | 8.492 | .387 |
| v21 * v99 | 5.939 | .204 |
| v22 * v99 | 6.885 | .332 |
| v23 * v99 | 15.134 | .019 |
| v24 * v99 | 8.554 | .575 |
| v25 * v99 | 2.280 | .892 |

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| v26 * v99 | 8.452 | .207 |
| v27 * v99 | 3.844 | .698 |
| v28 * v99 | 6.345 | .386 |
| v29 * v74 | 4.390 | .884 |
| v29 * v75 | 7.784 | .556 |
| v29 * v76 | 9.017 | .436 |
| v29 * v77 | 9.364 | .672 |
| v30 * v74 | 3.896 | .918 |
| v30 * v75 | 12.573 | .183 |
| v30 * v76 | 13.811 | .129 |
| v30 * v77 | 11.675 | .472 |
| v31 * v74 | 22.229 | .035 |
| v31 * v75 | 15.891 | .196 |
| v31 * v76 | 15.850 | .198 |
| 31 * v77 | 14.420 | .567 |
| v32 * v74 | 21.135 | .012 |
| v32 * v75 | 15.975 | .067 |
| v32 * v76 | 12.778 | .173 |
| v32 * v77 | 6.856 | .867 |
| v29 * v78 | 3.414 | .755 |
| v29 * v79 | 3.797 | .704 |
| v29 * v80 | 14.392 | .026 |
| v29 * v81 | 21.135 | .048 |
| v30 * v78 | 5.225 | .515 |
| v30 * v79 | 4.971 | .547 |
| v30 * v80 | 7.029 | .318 |
| v30 * v81 | 20.414 | .060 |
| v31 * v78 | 4.448 | .815 |
| v31 * v79 | 4.842 | .774 |
| v31 * v80 | 10.358 | .241 |
| v31 * v81 | 20.342 | .205 |
| v32 * v78 | 4.384 | .625 |
| v32 * v79 | 7.118 | .310 |
| v32 * v80 | 6.297 | .391 |
| v32 * v81 | 14.988 | .242 |
| v29 * v82 | 8.010 | .533 |
| v29 * v83 | 20.028 | .018 |
| v29 * v84 | 10.317 | .325 |
| v29 * v85 | 11.254 | .259 |
| v29 * v86 | 8.608 | .736 |
| v30 * v82 | 7.769 | .558 |
| v30 * v83 | 11.577 | .238 |
| v30 * v84 | 12.358 | .194 |

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| v30 * v85 | 9.775 | .369 |
| v30 * v86 | 7.689 | .809 |
| v31 * v82 | 12.038 | .443 |
| v31 * v83 | 12.265 | .425 |
| v31 * v84 | 7.888 | .794 |
| v31 * v85 | 6.332 | .898 |
| v31 * v86 | 14.290 | .577 |
| v32 * v82 | 10.215 | .333 |
| v32 * v83 | 3.109 | .960 |
| v32 * v84 | 10.133 | .340 |
| v32 * v85 | 4.030 | .909 |
| v32 * v86 | 12.706 | .391 |
| v29 * v87 | 8.045 | .782 |
| v29 * v88 | 13.129 | .360 |
| v29 * v89 | 15.803 | .071 |
| v30 * v87 | 6.832 | .869 |
| v30 * v88 | 7.101 | .851 |
| v30 * v89 | 6.738 | .664 |
| v31 * v87 | 6.937 | .974 |
| v31 * v88 | 14.241 | .581 |
| v31 * v89 | 15.414 | .220 |
| v32 * v87 | 9.981 | .618 |
| v32 * v88 | 21.441 | .044 |
| v32 * v89 | 9.677 | .377 |
| v29 * v90 | 9.330 | .407 |
| v29 * v91 | 18.468 | .005 |
| v29 * v92 | 17.804 | .007 |
| v29 * v93 | 13.794 | .032 |
| v29 * v94 | 16.188 | .183 |
| v29 * v95 | 23.347 | .005 |
| v30 * v90 | 8.338 | .500 |
| v30 * v91 | 7.312 | .293 |
| v30 * v92 | 6.789 | .341 |
| v30 * v93 | 5.065 | .535 |
| v30 * v94 | 13.415 | .340 |
| v30 * v95 | 29.387 | .001 |
| v31 * v90 | 7.905 ^a | .793 |
| v31 * v91 | 14.110 | .079 |
| v31 * v92 | 10.980 | .203 |
| v31 * v93 | 10.052 | .261 |
| v31 * v94 | 15.957 | .456 |
| v31 * v95 | 47.546 | .000 |
| v32 * v90 | 4.078 | .906 |

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| v32 * v91 | 8.314 | .216 |
| v32 * v92 | 8.314 | .216 |
| v32 * v93 | 2.958 | .814 |
| v32 * v94 | 7.812 | .800 |
| v32 * v95 | 8.534 | .481 |
| v29 * v97 | 19.057 | .025 |
| v30 * v97 | 23.039 | .006 |
| v31 * v97 | 51.458 | .000 |
| v32 * v97 | 8.497 | .485 |
| v29 * v98 | 12.827 | .382 |
| v30 * v98 | 15.141 | .234 |
| v31 * v98 | 14.526 | .560 |
| v32 * v98 | 19.484 | .077 |
| v29 * v99 | 9.900 | .129 |
| v30 * v99 | 8.117 | .230 |
| v31 * v99 | 7.726 | .461 |
| v32 * v99 | 4.333 | .632 |
| v29 * v100 | 18.744 | .005 |
| v30 * v100 | 12.294 | .056 |
| v31 * v100 | 23.269 | .003 |
| v32 * v100 | 1.480 | .961 |
| v33 * v73 | 23.626 | .072 |
| v34 * v73 | 14.636 | .101 |
| v35 * v73 | 7.536 | .582 |
| v36 * v73 | 7.184 | .304 |
| v37 * v73 | 7.568 | .272 |
| v33 * v74 | 23.136 | .081 |
| v33 * v75 | 16.300 | .362 |
| v33 * v76 | 17.334 | .299 |
| v33 * v77 | 27.152 | .131 |
| v34 * v74 | 15.780 | .072 |
| v34 * v75 | 16.291 | .061 |
| v34 * v76 | 11.233 | .260 |
| v34 * v77 | 17.777 | .123 |
| v35 * v74 | 12.267 | .199 |
| v35 * v75 | 10.175 | .336 |
| v35 * v76 | 7.496 | .586 |
| v35 * v77 | 18.078 | .113 |
| v36 * v74 | 12.397 | .054 |
| v36 * v75 | 6.831 | .337 |
| v36 * v76 | 6.382 | .382 |
| v36 * v77 | 9.000 | .342 |
| v37 * v74 | 7.128 | .309 |

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| v37 * v75 | 6.031 | .420 |
| v37 * v76 | 12.054 | .061 |
| v37 * v77 | 11.890 | .156 |
| v33 * v82 | 7.099 | .955 |
| v33 * v83 | 10.746 | .770 |
| v33 * v84 | 13.162 | .590 |
| v33 * v85 | 9.473 | .852 |
| v33 * v86 | 19.668 | .479 |
| v34 * v82 | 13.814 | .129 |
| v34 * v83 | 12.772 | .173 |
| v34 * v84 | 7.542 | .581 |
| v34 * v85 | 19.127 | .024 |
| v34 * v86 | 20.893 | .052 |
| v35 * v82 | 3.607 | .935 |
| v35 * v83 | 3.931 | .916 |
| v35 * v84 | 8.916 | .445 |
| v35 * v85 | 5.922 | .748 |
| v35 * v86 | 12.361 | .417 |
| v36 * v82 | 3.514 | .742 |
| v36 * v83 | 7.199 | .303 |
| v36 * v84 | 4.095 | .664 |
| v36 * v85 | 2.235 | .897 |
| v36 * v86 | 4.998 | .758 |
| v37 * v82 | 12.353 | .055 |
| v37 * v83 | 12.574 | .050 |
| v37 * v84 | 5.921 | .432 |
| v37 * v85 | 7.048 | .316 |
| v37 * v86 | 7.365 | .498 |
| v33 * v87 | 14.838 | .786 |
| v33 * v88 | 16.896 | .660 |
| v33 * v89 | 14.771 | .468 |
| v34 * v87 | 23.774 | .022 |
| v34 * v88 | 21.520 | .043 |
| v34 * v89 | 17.892 | .036 |
| v35 * v87 | 15.783 | .201 |
| v35 * v88 | 15.787 | .201 |
| v35 * v89 | 7.106 | .626 |
| v36 * v87 | 11.724 | .164 |
| v36 * v88 | 14.766 | .064 |
| v36 * v89 | 14.058 | .029 |
| v37 * v87 | 10.718 | .218 |
| v37 * v88 | 11.567 | .172 |
| v37 * v89 | 6.077 | .415 |

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| v33 * v90 | 16.199 | .369 |
| v33 * v91 | 20.199 | .027 |
| v33 * v92 | 21.608 | .017 |
| v33 * v93 | 15.069 | .130 |
| v33 * v94 | 23.998 | .242 |
| v33 * v95 | 54.531 | .000 |
| v34 * v90 | 11.772 | .226 |
| v34 * v91 | 18.183 | .006 |
| v34 * v92 | 14.788 | .022 |
| v34 * v93 | 10.509 | .105 |
| v34 * v94 | 16.313 | .177 |
| v34 * v95 | 50.068 | .000 |
| v35 * v90 | 5.027 | .832 |
| v35 * v91 | 12.493 | .052 |
| v35 * v92 | 12.493 | .052 |
| v35 * v93 | 7.428 | .283 |
| v35 * v94 | 10.891 | .538 |
| v35 * v95 | 7.785 | .556 |
| v36 * v90 | 1.424 | .964 |
| v36 * v91 | 4.122 | .390 |
| v36 * v92 | 3.233 | .520 |
| v36 * v93 | 2.563 | .633 |
| v36 * v94 | 6.052 | .641 |
| v36 * v95 | 5.572 | .473 |
| v37 * v90 | 6.569 | .363 |
| v37 * v91 | 11.510 | .021 |
| v37 * v92 | 8.438 | .077 |
| v37 * v93 | 7.622 | .106 |
| v37 * v94 | 19.068 | .014 |
| v37 * v95 | 11.550 | .073 |
| v33 * v96 | 24.537 | .006 |
| v34 * v96 | 24.871 | .000 |
| v35 * v96 | 11.989 | .062 |
| v36 * v96 | 4.168 | .384 |
| v37 * v96 | 16.372 | .003 |
| v33 * v98 | 20.846 | .406 |
| v34 * v98 | 17.209 | .142 |
| v35 * v98 | 17.343 | .137 |
| v36 * v98 | 15.930 | .043 |
| v37 * v98 | 17.825 | .023 |
| v33 * v99 | 15.611 | .111 |
| v34 * v99 | 8.648 | .194 |
| v35 * v99 | 15.635 | .016 |

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| v36 * v99 | 2.531 | .639 |
| v37 * v99 | 6.401 | .171 |
| v38 * v82 | 10.585 | .102 |
| v38 * v83 | 14.214 | .027 |
| v38 * v84 | 3.818 | .701 |
| v38 * v85 | 12.172 | .058 |
| v38 * v86 | 10.266 | .247 |
| v39 * v82 | 20.440 | .015 |
| v39 * v83 | 10.958 | .279 |
| v39 * v84 | 7.922 | .542 |
| v39 * v85 | 7.945 | .540 |
| v39 * v86 | 13.706 | .320 |
| v40 * v82 | 17.482 | .042 |
| v40 * v83 | 9.054 | .432 |
| v40 * v84 | 8.803 | .456 |
| v40 * v85 | 11.231 | .260 |
| v40 * v86 | 12.302 | .422 |
| v41 * v82 | 7.160 | .620 |
| v41 * v83 | 10.917 | .281 |
| v41 * v84 | 10.295 | .327 |
| v41 * v85 | 3.932 | .916 |
| v41 * v86 | 17.351 | .137 |
| v42 * v82 | 14.579 | .024 |
| v42 * v83 | 9.561 | .144 |
| v42 * v84 | 12.889 | .045 |
| v42 * v85 | 2.850 ^a | .827 |
| v42 * v86 | 17.907 | .022 |
| v43 * v82 | 19.061 | .025 |
| v43 * v83 | 10.966 | .278 |
| v43 * v84 | 15.228 | .085 |
| v43 * v85 | 7.229 | .613 |
| v43 * v86 | 19.048 | .087 |
| v44 * v82 | 6.835 | .654 |
| v44 * v83 | 6.298 | .710 |
| v44 * v84 | 17.858 | .037 |
| v44 * v85 | 7.100 | .627 |
| v44 * v86 | 17.266 | .140 |
| v38 * v87 | 10.285 | .246 |
| v38 * v88 | 9.618 | .293 |
| v38 * v89 | 7.416 | .284 |
| v39 * v87 | 8.879 | .713 |
| v39 * v88 | 15.994 | .192 |
| v39 * v89 | 10.264 | .330 |

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| v40 * v87 | 23.240 | .026 |
| v40 * v88 | 19.639 | .074 |
| v40 * v89 | 11.964 | .215 |
| v41 * v87 | 8.263 | .764 |
| v41 * v88 | 9.872 | .627 |
| v41 * v89 | 8.655 | .470 |
| v42 * v87 | 11.347 | .183 |
| v42 * v88 | 16.966 | .030 |
| v42 * v89 | 6.215 | .400 |
| v43 * v87 | 15.472 | .217 |
| v43 * v88 | 17.800 | .122 |
| v43 * v89 | 15.785 | .072 |
| v44 * v87 | 11.890 | .455 |
| v44 * v88 | 12.067 | .440 |
| v44 * v89 | 12.642 | .179 |
| v45 * v82 | 19.553 | .021 |
| v45 * v83 | 16.671 | .054 |
| v45 * v84 | 11.058 | .272 |
| v45 * v85 | 5.982 | .742 |
| v45 * v86 | 9.936 | .622 |
| v46 * v82 | 1.698 | .945 |
| v46 * v83 | 5.297 | .506 |
| v46 * v84 | 9.273 | .159 |
| v46 * v85 | 2.294 | .891 |
| v46 * v86 | 7.843 | .449 |
| v47 * v82 | 2.846 | .970 |
| v47 * v83 | 6.098 | .730 |
| v47 * v84 | 7.938 | .540 |
| v47 * v85 | 3.832 | .922 |
| v47 * v86 | 9.510 | .659 |
| v48 * v82 | 12.290 | .197 |
| v48 * v83 | 21.260 | .012 |
| v48 * v84 | 15.071 | .089 |
| v48 * v85 | 16.036 | .066 |
| v48 * v86 | 14.315 | .281 |
| v49 * v82 | 7.265 | .610 |
| v49 * v83 | 11.760 | .227 |
| v49 * v84 | 15.725 | .073 |
| v49 * v85 | 8.963 | .441 |
| v49 * v86 | 10.240 | .595 |
| v50 * v82 | 11.607 | .478 |
| v50 * v83 | 27.270 | .007 |
| v50 * v84 | 16.471 | .171 |

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| v50 * v85 | 13.488 | .335 |
| v50 * v86 | 20.088 | .216 |
| v45 * v87 | 12.735 | .389 |
| v45 * v88 | 14.768 | .254 |
| v45 * v89 | 6.187 | .721 |
| v46 * v87 | 18.912 | .015 |
| v46 * v88 | 8.673 | .371 |
| v46 * v89 | 10.884 | .092 |
| v47 * v87 | 17.302 | .139 |
| v47 * v88 | 13.700 | .320 |
| v47 * v89 | 10.653 | .300 |
| v48 * v87 | 20.483 | .058 |
| v48 * v88 | 15.213 | .230 |
| v48 * v89 | 7.935 | .541 |
| v49 * v87 | 21.727 | .041 |
| v49 * v88 | 14.348 | .279 |
| v49 * v89 | 12.149 | .205 |
| v50 * v87 | 31.340 | .012 |
| v50 * v88 | 13.672 | .623 |
| v50 * v89 | 9.200 | .686 |
| v45 * v98 | 19.276 | .082 |
| v46 * v98 | 4.041 | .853 |
| v47 * v98 | 8.690 | .729 |
| v48 * v98 | 14.601 | .264 |
| v49 * v98 | 20.230 | .063 |
| v50 * v98 | 14.387 | .570 |
| v45 * v99 | 11.142 | .084 |
| v46 * v99 | 7.858 | .097 |
| v47 * v99 | 8.703 | .191 |
| v48 * v99 | 5.037 | .539 |
| v49 * v99 | 4.656 | .589 |
| v50 * v99 | 15.729 | .046 |
| v51 * v74 | 8.011 | .533 |
| v51 * v75 | 13.099 | .158 |
| v51 * v76 | 7.749 | .560 |
| v51 * v77 | 14.898 | .247 |
| v52 * v74 | 26.893 | .001 |
| v52 * v75 | 11.184 | .263 |
| v52 * v76 | 13.512 | .141 |
| v52 * v77 | 12.403 | .414 |
| v53 * v74 | 12.252 | .199 |
| v53 * v75 | 11.577 | .238 |
| v53 * v76 | 10.576 | .306 |

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| v53 * v77 | 8.095 | .778 |
| v54 * v74 | 12.109 | .060 |
| v54 * v75 | 8.573 | .199 |
| v54 * v76 | 5.008 | .543 |
| v54 * v77 | 5.032 | .754 |
| v55 * v74 | 12.464 | .188 |
| v55 * v75 | 18.125 | .034 |
| v55 * v76 | 12.295 | .197 |
| v55 * v77 | 17.203 | .142 |
| v56 * v74 | 10.156 | .338 |
| v56 * v75 | 15.709 | .073 |
| v56 * v76 | 9.984 | .352 |
| v56 * v77 | 20.084 | .066 |
| v57 * v74 | 8.330 | .501 |
| v57 * v75 | 10.926 | .281 |
| v57 * v76 | 11.306 | .255 |
| v57 * v77 | 16.397 | .174 |
| v58 * v74 | 5.481 | .790 |
| v58 * v75 | 17.783 | .038 |
| v58 * v76 | 16.096 | .065 |
| v58 * v77 | 13.526 | .332 |
| v59 * v74 | 14.066 | .120 |
| v59 * v75 | 12.375 | .193 |
| v59 * v76 | 7.212 | .615 |
| v59 * v77 | 3.604 | .990 |
| v60 * v74 | 4.930 | .840 |
| v60 * v75 | 12.248 | .200 |
| v60 * v76 | 13.825 | .129 |
| v60 * v77 | 11.632 | .476 |
| v51 * v78 | 4.394 | .624 |
| v51 * v79 | 4.628 | .592 |
| v51 * v80 | 7.311 | .293 |
| v51 * v81 | 12.472 | .409 |
| v52 * v78 | 9.743 | .136 |
| v52 * v79 | 5.250 | .512 |
| v52 * v80 | 7.037 | .317 |
| v52 * v81 | 7.827 | .799 |
| v53 * v78 | 9.820 | .132 |
| v53 * v79 | 11.523 | .073 |
| v53 * v80 | 8.077 | .232 |
| v53 * v81 | 10.292 | .590 |
| v54 * v78 | 14.005 | .007 |
| v54 * v79 | 4.407 | .354 |

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| v54 * v80 | 9.636 | .047 |
| v54 * v81 | 8.825 | .357 |
| v55 * v78 | 9.248 | .160 |
| v55 * v79 | 11.731 | .068 |
| v55 * v80 | 30.130 | .000 |
| v55 * v81 | 8.832 | .717 |
| v56 * v78 | 3.567 | .735 |
| v56 * v79 | 7.960 | .241 |
| v56 * v80 | 16.343 | .012 |
| v56 * v81 | 16.858 | .155 |
| v57 * v78 | 4.483 | .612 |
| v57 * v79 | 4.983 | .546 |
| v57 * v80 | 15.957 | .014 |
| v57 * v81 | 10.025 | .614 |
| v58 * v78 | 11.135 | .084 |
| v58 * v79 | 9.154 | .165 |
| v58 * v80 | 11.490 | .074 |
| v58 * v81 | 16.139 | .185 |
| v59 * v78 | 4.507 | .608 |
| v59 * v79 | 8.015 | .237 |
| v59 * v80 | 7.308 | .293 |
| v59 * v81 | 8.188 | .770 |
| v60 * v78 | 2.138 | .907 |
| v60 * v79 | 6.988 | .322 |
| v60 * v80 | 9.693 | .138 |
| v60 * v81 | 19.051 | .087 |
| v51 * v82 | 7.471 | .588 |
| v51 * v83 | 9.079 | .430 |
| v51 * v84 | 13.209 | .153 |
| v51 * v85 | 10.766 | .292 |
| v51 * v86 | 17.200 | .142 |
| v52 * v82 | 6.471 | .692 |
| v52 * v83 | 6.177 | .722 |
| v52 * v84 | 11.999 | .213 |
| v52 * v85 | 9.335 | .407 |
| v52 * v86 | 13.396 | .341 |
| v53 * v82 | 2.515 | .980 |
| v53 * v83 | 3.541 | .939 |
| v53 * v84 | 8.380 | .496 |
| v53 * v85 | 6.170 | .723 |
| v53 * v86 | 21.485 | .044 |
| v54 * v82 | 4.993 | .545 |
| v54 * v83 | 9.338 | .155 |

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| v54 * v84 | 9.576 | .144 |
| v54 * v85 | 4.561 | .601 |
| v54 * v86 | 9.778 | .281 |
| v55 * v82 | 9.333 | .407 |
| v55 * v83 | 23.036 | .006 |
| v55 * v84 | 5.657 | .774 |
| v55 * v85 | 12.132 | .206 |
| v55 * v86 | 14.991 | .242 |
| v56 * v82 | 9.521 | .391 |
| v56 * v83 | 4.761 | .855 |
| v56 * v84 | 8.789 | .457 |
| v56 * v85 | 5.583 | .781 |
| v56 * v86 | 13.977 | .302 |
| v57 * v82 | 6.598 | .679 |
| v57 * v83 | 6.329 | .707 |
| v57 * v84 | 8.666 | .469 |
| v57 * v85 | 5.033 | .831 |
| v57 * v86 | 20.780 | .054 |
| v58 * v82 | 9.091 | .429 |
| v58 * v83 | 45.749 | .000 |
| v58 * v84 | 10.391 | .320 |
| v58 * v85 | 11.850 | .222 |
| v58 * v86 | 12.797 | .384 |
| v59 * v82 | 5.431 | .795 |
| v59 * v83 | 22.495 | .007 |
| v59 * v84 | 6.848 | .653 |
| v59 * v85 | 10.603 | .304 |
| v59 * v86 | 11.857 | .457 |
| v60 * v82 | 8.033 | .531 |
| v60 * v83 | 14.692 | .100 |
| v60 * v84 | 16.429 | .058 |
| v60 * v85 | 8.233 | .511 |
| v60 * v86 | 14.598 | .264 |
| v51 * v87 | 14.283 | .283 |
| v51 * v88 | 19.192 | .084 |
| v51 * v89 | 14.512 | .105 |
| v52 * v87 | 22.290 | .034 |
| v52 * v88 | 8.010 | .784 |
| v52 * v89 | 9.702 | .375 |
| v53 * v87 | 17.568 | .129 |
| v53 * v88 | 16.767 | .159 |
| v53 * v89 | 14.717 | .099 |
| v54 * v87 | 4.101 | .848 |

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| v54 * v88 | 5.815 | .668 |
| v54 * v89 | 3.627 | .727 |
| v55 * v87 | 23.192 | .026 |
| v55 * v88 | 20.324 | .061 |
| v55 * v89 | 10.361 | .322 |
| v56 * v87 | 23.535 | .024 |
| v56 * v88 | 25.390 | .013 |
| v56 * v89 | 8.753 | .460 |
| v57 * v87 | 23.781 | .022 |
| v57 * v88 | 18.780 | .094 |
| v57 * v89 | 9.791 | .368 |
| v58 * v87 | 13.596 | .327 |
| v58 * v88 | 18.673 | .097 |
| v58 * v89 | 15.415 | .080 |
| v59 * v87 | 19.612 | .075 |
| v59 * v88 | 8.394 | .754 |
| v59 * v89 | 8.669 | .468 |
| v60 * v87 | 8.702 | .728 |
| v60 * v88 | 10.465 | .575 |
| v60 * v89 | 13.286 | .150 |
| v61 * v74 | 8.774 | .458 |
| v61 * v75 | 7.205 | .616 |
| v61 * v76 | 8.529 | .482 |
| v61 * v77 | 13.070 | .364 |
| v62 * v74 | 9.407 | .401 |
| v62 * v75 | 15.002 | .091 |
| v62 * v76 | 8.833 | .453 |
| v62 * v77 | 11.373 | .497 |
| v63 * v74 | 12.858 | .045 |
| v63 * v75 | 3.767 | .708 |
| v63 * v76 | 2.807 | .833 |
| v63 * v77 | 19.534 | .012 |
| v64 * v74 | 3.109 | .960 |
| v64 * v75 | 6.882 | .649 |
| v64 * v76 | 4.531 | .873 |
| v64 * v77 | 15.793 | .201 |
| v61 * v78 | 7.879 | .247 |
| v61 * v79 | 3.962 | .682 |
| v61 * v80 | 3.190 | .785 |
| v61 * v81 | 12.571 | .401 |
| v62 * v78 | 12.935 | .044 |
| v62 * v79 | 9.438 | .150 |
| v62 * v80 | 21.838 | .001 |

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|-----------|--------|------|
| v62 * v81 | 12.536 | .404 |
| v63 * v78 | 6.835 | .145 |
| v63 * v79 | 8.679 | .070 |
| v63 * v80 | 15.122 | .004 |
| v63 * v81 | 7.701 | .463 |
| v64 * v78 | 5.478 | .484 |
| v64 * v79 | 18.515 | .005 |
| v64 * v80 | 17.358 | .008 |
| v64 * v81 | 24.297 | .019 |
| v61 * v82 | 3.662 | .932 |
| v61 * v83 | 7.466 | .589 |
| v61 * v84 | 9.013 | .436 |
| v61 * v85 | 3.064 | .962 |
| v61 * v86 | 10.239 | .595 |
| v62 * v82 | 7.463 | .589 |
| v62 * v83 | 6.164 | .723 |
| v62 * v84 | 8.690 | .466 |
| v62 * v85 | 11.414 | .248 |
| v62 * v86 | 8.468 | .748 |
| v63 * v82 | 8.065 | .233 |
| v63 * v83 | 9.396 | .153 |
| v63 * v84 | 7.807 | .253 |
| v63 * v85 | 5.14 | .525 |
| v63 * v86 | 8.576 | .379 |
| v64 * v82 | 10.218 | .333 |
| v64 * v83 | 13.231 | .152 |
| v64 * v84 | 13.439 | .144 |
| v64 * v85 | 13.957 | .124 |
| v64 * v86 | 18.273 | .108 |
| v61 * v87 | 13.321 | .346 |
| v61 * v88 | 11.182 | .513 |
| v61 * v89 | 6.208 | .719 |
| v62 * v87 | 15.689 | .206 |
| v62 * v88 | 26.614 | .009 |
| v62 * v89 | 18.879 | .026 |
| v63 * v87 | 7.664 | .467 |
| v63 * v88 | 9.895 | .272 |
| v63 * v89 | 3.356 | .763 |
| v64 * v87 | 11.263 | .507 |
| v64 * v88 | 9.465 | .663 |
| v64 * v89 | 9.076 | .430 |
| v65 * v74 | 12.176 | .432 |
| v65 * v75 | 16.113 | .186 |

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|-----------|--------|------|
| v65 * v76 | 9.766 | .636 |
| v65 * v77 | 11.559 | .774 |
| v66 * v74 | 14.783 | .097 |
| v66 * v75 | 13.690 | .134 |
| v66 * v76 | 12.929 | .166 |
| v66 * v77 | 11.112 | .519 |
| v67 * v74 | 15.719 | .073 |
| v67 * v75 | 9.980 | .352 |
| v67 * v76 | 14.650 | .101 |
| v67 * v77 | 12.706 | .391 |
| v68 * v74 | 17.199 | .046 |
| v68 * v75 | 16.016 | .067 |
| v68 * v76 | 9.634 | .381 |
| v68 * v77 | 6.121 | .910 |
| v65 * v78 | 8.461 | .390 |
| v65 * v79 | 14.397 | .072 |
| v65 * v80 | 14.717 | .065 |
| v65 * v81 | 10.136 | .859 |
| v66 * v78 | 7.579 | .271 |
| v66 * v79 | 15.612 | .016 |
| v66 * v80 | 13.004 | .043 |
| v66 * v81 | 8.843 | .716 |
| v67 * v78 | 7.465 | .280 |
| v67 * v79 | 13.536 | .035 |
| v67 * v80 | 17.580 | .007 |
| v67 * v81 | 16.717 | .161 |
| v68 * v78 | 6.525 | .367 |
| v68 * v79 | 11.791 | .067 |
| v68 * v80 | 10.592 | .102 |
| v68 * v81 | 8.612 | .736 |
| v65 * v82 | 12.337 | .419 |
| v65 * v83 | 11.902 | .454 |
| v65 * v84 | 13.685 | .321 |
| v65 * v85 | 11.800 | .462 |
| v65 * v86 | 28.082 | .031 |
| v66 * v82 | 8.396 | .495 |
| v66 * v83 | 6.036 | .736 |
| v66 * v84 | 12.931 | .166 |
| v66 * v85 | 6.164 | .723 |
| v66 * v86 | 15.427 | .219 |
| v67 * v82 | 25.419 | .003 |
| v67 * v83 | 16.977 | .049 |
| v67 * v84 | 22.428 | .008 |

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|-----------|--------|------|
| v67 * v85 | 15.485 | .078 |
| v67 * v86 | 12.594 | .399 |
| v68 * v82 | 2.451 | .982 |
| v68 * v83 | 3.109 | .960 |
| v68 * v84 | 11.144 | .266 |
| v68 * v85 | 5.129 | .823 |
| v68 * v86 | 13.427 | .339 |
| v65 * v86 | 28.082 | .031 |
| v65 * v87 | 21.211 | .171 |
| v65 * v88 | 22.820 | .119 |
| v65 * v89 | 8.904 | .711 |
| v66 * v86 | 15.427 | .219 |
| v66 * v87 | 21.143 | .048 |
| v66 * v88 | 20.813 | .053 |
| v66 * v89 | 11.933 | .217 |
| v67 * v86 | 12.594 | .399 |
| v67 * v87 | 12.052 | .442 |
| v67 * v88 | 11.321 | .502 |
| v67 * v89 | 6.216 | .718 |
| v68 * v86 | 13.427 | .339 |
| v68 * v87 | 6.527 | .887 |
| v68 * v88 | 10.958 | .532 |
| v68 * v89 | 5.331 | .805 |
| v65 * v87 | 21.211 | .171 |
| v65 * v88 | 22.820 | .119 |
| v65 * v89 | 8.904 | .711 |
| v66 * v87 | 21.143 | .048 |
| v66 * v88 | 20.813 | .053 |
| v66 * v89 | 11.933 | .217 |
| v67 * v87 | 12.052 | .442 |
| v67 * v88 | 11.321 | .502 |
| v67 * v89 | 6.216 | .718 |
| v68 * v87 | 6.527 | .887 |
| v68 * v88 | 10.958 | .532 |
| v68 * v89 | 5.331 | .805 |
| v65 * v90 | 14.822 | .251 |
| v65 * v91 | 22.923 | .003 |
| v65 * v92 | 22.923 | .003 |
| v65 * v93 | 15.860 | .044 |
| v65 * v94 | 20.115 | .215 |
| v65 * v95 | 15.415 | .220 |
| v66 * v90 | 5.211 | .815 |
| v66 * v91 | 14.376 | .026 |

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|------------|--------|------|
| v66 * v92 | 14.538 | .024 |
| v66 * v93 | 11.058 | .087 |
| v66 * v94 | 15.041 | .239 |
| v66 * v95 | 17.242 | .045 |
| v67 * v90 | 10.778 | .291 |
| v67 * v91 | 10.126 | .119 |
| v67 * v92 | 5.600 | .469 |
| v67 * v93 | 15.471 | .017 |
| v67 * v94 | 14.004 | .300 |
| v67 * v95 | 10.061 | .346 |
| v68 * v90 | 6.507 | .688 |
| v68 * v91 | 8.698 | .191 |
| v68 * v92 | 8.698 | .191 |
| v68 * v93 | 7.554 | .273 |
| v68 * v94 | 9.314 | .676 |
| v68 * v95 | 21.329 | .011 |
| v65 * v98 | 17.835 | .334 |
| v66 * v98 | 13.494 | .334 |
| v67 * v98 | 18.490 | .102 |
| v68 * v98 | 24.948 | .015 |
| v65 * v99 | 8.714 | .367 |
| v66 * v99 | 8.965 | .176 |
| v67 * v99 | 5.044 | .538 |
| v68 * v99 | 6.214 | .400 |
| v65 * v100 | 9.351 | .314 |
| v66 * v100 | 9.035 | .172 |
| v67 * v100 | 8.498 | .204 |
| v68 * v100 | 6.875 | .333 |
| v69 * v74 | 11.464 | .245 |
| v69 * v75 | 10.822 | .288 |
| v69 * v76 | 5.344 | .803 |
| v69 * v77 | 5.208 | .951 |
| v70 * v74 | 11.102 | .269 |
| v70 * v75 | 14.019 | .122 |
| v70 * v76 | 8.241 | .510 |
| v70 * v77 | 13.430 | .339 |
| v71 * v74 | 6.488 | .690 |
| v71 * v75 | 8.812 | .455 |
| v71 * v76 | 6.861 | .652 |
| v71 * v77 | 22.209 | .035 |
| v72 * v74 | 9.264 | .413 |
| v72 * v75 | 11.019 | .274 |
| v72 * v76 | 6.642 | .674 |

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|-----------|--------|------|
| v72 * v77 | 8.459 | .748 |
| v69 * v78 | 8.409 | .210 |
| v69 * v79 | 8.468 | .206 |
| v69 * v80 | 10.704 | .098 |
| v69 * v81 | 13.356 | .344 |
| v70 * v78 | 5.108 | .530 |
| v70 * v79 | 6.355 | .385 |
| v70 * v80 | 8.100 | .231 |
| v70 * v81 | 8.126 | .775 |
| v71 * v78 | 9.765 | .135 |
| v71 * v79 | 11.629 | .071 |
| v71 * v80 | 17.765 | .007 |
| v71 * v81 | 13.981 | .302 |
| v72 * v78 | 3.688 | .719 |
| v72 * v79 | 11.600 | .072 |
| v72 * v80 | 14.548 | .024 |
| v72 * v81 | 12.541 | .403 |
| v69 * v82 | 7.788 | .556 |
| v69 * v83 | 27.094 | .001 |
| v69 * v84 | 8.924 | .444 |
| v69 * v85 | 28.328 | .001 |
| v69 * v86 | 5.485 | .940 |
| v70 * v82 | 11.240 | .260 |
| v70 * v83 | 22.513 | .007 |
| v70 * v84 | 13.217 | .153 |
| v70 * v85 | 20.283 | .016 |
| v70 * v86 | 4.496 | .973 |
| v71 * v82 | 6.617 | .677 |
| v71 * v83 | 43.702 | .000 |
| v71 * v84 | 5.956 | .744 |
| v71 * v85 | 24.819 | .003 |
| v71 * v86 | 10.106 | .607 |
| v72 * v82 | 26.262 | .002 |
| v72 * v83 | 8.104 | .524 |
| v72 * v84 | 9.402 | .401 |
| v72 * v85 | 13.764 | .131 |
| v72 * v86 | 16.084 | .187 |
| v69 * v87 | 13.753 | .317 |
| v69 * v88 | 9.028 | .700 |
| v69 * v89 | 11.000 | .276 |
| v70 * v87 | 13.863 | .310 |
| v70 * v88 | 17.018 | .149 |
| v70 * v89 | 6.999 | .637 |

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|-----------|--------|------|
| v71 * v87 | 10.895 | .538 |
| v71 * v88 | 9.701 | .642 |
| v71 * v89 | 13.473 | .142 |
| v72 * v87 | 20.226 | .063 |
| v72 * v88 | 21.954 | .038 |
| v72 * v89 | 9.003 | .437 |
| v69 * v90 | 6.291 | .711 |
| v69 * v91 | 7.785 | .254 |
| v69 * v92 | 7.785 | .254 |
| v69 * v93 | 7.248 | .299 |
| v69 * v94 | 16.590 | .166 |
| v69 * v95 | 8.564 | .478 |
| v70 * v90 | 5.296 | .808 |
| v70 * v91 | 13.392 | .037 |
| v70 * v92 | 13.392 | .037 |
| v70 * v93 | 11.614 | .071 |
| v70 * v94 | 20.278 | .062 |
| v70 * v95 | 5.654 | .774 |
| v71 * v90 | 8.117 | .522 |
| v71 * v91 | 18.528 | .005 |
| v71 * v92 | 18.113 | .006 |
| v71 * v93 | 16.041 | .014 |
| v71 * v94 | 19.101 | .086 |
| v71 * v95 | 16.050 | .066 |
| v72 * v90 | 10.612 | .303 |
| v72 * v91 | 12.633 | .049 |
| v72 * v92 | 13.603 | .034 |
| v72 * v93 | 14.793 | .022 |
| v72 * v94 | 17.456 | .133 |
| v72 * v95 | 20.135 | .017 |
| v69 * v98 | 11.053 | .524 |
| v70 * v98 | 14.370 | .278 |
| v71 * v98 | 10.207 | .598 |
| v72 * v98 | 9.971 | .619 |
| v69 * v99 | 5.970 | .427 |
| v70 * v99 | 5.986 | .425 |
| v71 * v99 | 8.274 | .219 |
| v72 * v99 | 11.205 | .082 |

Chi-square results for hospital

| Statements | Pearson Chi-square value | Asymp. Sig. |
|------------|--------------------------|-------------|
| V1*v82 | 6.348 | 0.608 |
| V1*v83 | 4.418 | 0.818 |
| V1*v84 | 4.354 | 0.824 |
| V1*v85 | 5.758 | 0.451 |
| V1*v86 | 5.390 | 0.864 |
| V2*v82 | 12.776 | 0.120 |
| V2*v83 | 9.248 | 0.322 |
| V2*v84 | 7.278 | 0.507 |
| V2*v85 | 19.834 | 0.003 |
| V2*v86 | 14.182 | 0.165 |
| V3*v82 | 12.912 | 0.115 |
| V3*v83 | 10.492 | 0.232 |
| V3*v84 | 7.490 | 0.485 |
| V3*v85 | 18.914 | 0.004 |
| V3*v86 | 15.436 | 0.117 |
| V4*v82 | 17.440 | 0.026 |
| V4*v83 | 16.464 | 0.036 |
| V4*v84 | 14.853 | 0.062 |
| V4*v85 | 22.983 | 0.001 |
| V4*v86 | 17.643 | 0.061 |
| V5*v82 | 6.986 | 0.538 |
| V5*v83 | 9.991 | 0.266 |
| V5*v84 | 11.422 | 0.179 |
| V5*v85 | 13.507 | 0.036 |
| V5*v86 | 12.206 | 0.271 |
| V6*v82 | 14.310 | 0.281 |
| V6*v83 | 7.168 | 0.846 |
| V6*v84 | 11.315 | 0.502 |
| V6*v85 | 9.343 | 0.406 |
| V6*v86 | 20.270 | 0.162 |
| V7*v82 | 11.664 | 0.473 |
| V7*v83 | 7.107 | 0.850 |
| V7*v84 | 16.529 | 0.168 |
| V7*v85 | 12.124 | 0.206 |
| V7*v86 | 16.255 | 0.365 |
| V8*v82 | 11.905 | 0.453 |
| V8*v83 | 4.984 | 0.959 |
| V8*v84 | 10.920 | 0.536 |
| V8*v85 | 8.459 | 0.489 |
| V8*v86 | 29.116 | 0.016 |
| V9*v82 | 20.206 | 0.063 |
| V9*v83 | 28.482 | 0.005 |
| V9*v84 | 24.986 | 0.015 |
| V9*v85 | 26.199 | 0.002 |
| V9*v86 | 22.023 | 0.107 |

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| V10*v82 | 3.747 | 0.988 |
| V10*v83 | 6.293 | 0.901 |
| V10*v84 | 3.110 | 0.995 |
| V10*v85 | 7.883 | 0.546 |
| V10*v86 | 21.458 | 0.123 |
| V11*v82 | 8.237 | 0.766 |
| V11*v83 | 11.469 | 0.489 |
| V11*v84 | 14.295 | 0.282 |
| V11*v85 | 9.128 | 0.426 |
| V11*v86 | 20.514 | 0.153 |
| V1*v87 | 13.388 | 0.203 |
| V1*v88 | 16.341 | 0.090 |
| V1*v89 | 13.218 | 0.212 |
| V2*v87 | 33.314 | 0.000 |
| V2*v88 | 24.383 | 0.007 |
| V2*v89 | 33.051 | 0.000 |
| V3*v87 | 26.749 | 0.003 |
| V3*v88 | 18.967 | 0.041 |
| V3*v89 | 27.443 | 0.002 |
| V4*v87 | 24.410 | 0.007 |
| V4*v88 | 23.238 | 0.010 |
| V4*v89 | 29.784 | 0.001 |
| V5*v87 | 6.106 | 0.806 |
| V5*v88 | 10.156 | 0.427 |
| V5*v89 | 12.929 | 0.228 |
| V6*v87 | 23.301 | 0.078 |
| V6*v88 | 29.018 | 0.016 |
| V6*v89 | 21.191 | 0.131 |
| V7*v87 | 28.212 | 0.020 |
| V7*v88 | 24.632 | 0.055 |
| V7*v89 | 40.419 | 0.000 |
| V8*v87 | 23.933 | 0.066 |
| V8*v88 | 18.327 | 0.246 |
| V8*v89 | 30.120 | 0.011 |
| V9*v87 | 31.049 | 0.009 |
| V9*v88 | 28.410 | 0.019 |
| V9*v89 | 32.364 | 0.006 |
| V10*v87 | 15.916 | 0.388 |
| V10*v88 | 16.216 | 0.368 |
| V10*v89 | 25.724 | 0.041 |
| V11*v87 | 16.492 | 0.350 |
| V11*v88 | 9.890 | 0.827 |
| V11*v89 | 22.429 | 0.097 |
| V12*v82 | 13.897 | 0.307 |
| V12*v83 | 15.162 | 0.233 |
| V12*v84 | 16.482 | 0.170 |
| V12*v85 | 10.199 | 0.335 |
| V12*v86 | 18.523 | 0.236 |

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|---------|--------|-------|
| V13*v82 | 7.678 | 0.810 |
| V13*v83 | 12.345 | 0.418 |
| V13*v84 | 14.724 | 0.257 |
| V13*v85 | 11.737 | 0.229 |
| V13*v86 | 26.463 | 0.033 |
| V14*v82 | 23.467 | 0.102 |
| V14*v83 | 23.692 | 0.096 |
| V14*v84 | 21.331 | 0.166 |
| V14*v85 | 11.466 | 0.489 |
| V14*v86 | 24.649 | 0.215 |
| V15*v82 | 10.707 | 0.554 |
| V15*v83 | 7.400 | 0.830 |
| V15*v84 | 17.309 | 0.138 |
| V15*v85 | 4.312 | 0.890 |
| V15*v86 | 19.610 | 0.187 |
| V16*v82 | 16.763 | 0.159 |
| V16*v83 | 13.222 | 0.353 |
| V16*v84 | 16.902 | 0.153 |
| V16*v85 | 4.353 | 0.887 |
| V16*v86 | 20.561 | 0.151 |
| V17*v82 | 27.759 | 0.006 |
| V17*v83 | 14.774 | 0.254 |
| V17*v84 | 12.821 | 0.382 |
| V17*v85 | 10.893 | 0.283 |
| V17*v86 | 13.101 | 0.594 |
| V12*v87 | 15.671 | 0.404 |
| V12*v88 | 20.737 | 0.145 |
| V12*v89 | 29.898 | 0.012 |
| V13*v87 | 26.896 | 0.030 |
| V13*v88 | 21.978 | 0.108 |
| V13*v89 | 26.710 | 0.031 |
| V14*v87 | 27.846 | 0.113 |
| V14*v88 | 25.972 | 0.167 |
| V14*v89 | 24.949 | 0.203 |
| V15*v87 | 19.021 | 0.213 |
| V15*v88 | 16.763 | 0.333 |
| V15*v89 | 24.519 | 0.057 |
| V16*v87 | 10.913 | 0.759 |
| V16*v88 | 20.235 | 0.163 |
| V16*v89 | 18.921 | 0.217 |
| V17*v87 | 13.235 | 0.584 |
| V17*v88 | 13.935 | 0.266 |
| V17*v89 | 21.881 | 0.111 |
| V18*v82 | 20.155 | 0.064 |
| V18*v83 | 17.391 | 0.135 |
| V18*v84 | 17.195 | 0.142 |
| V18*v85 | 9.183 | 0.421 |
| V18*v86 | 14.991 | 0.452 |

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| V19*v82 | 18.922 | 0.090 |
| V19*v83 | 17.999 | 0.116 |
| V19*v84 | 22.376 | 0.034 |
| V19*v85 | 21.173 | 0.012 |
| V19*v86 | 15.782 | 0.397 |
| V20*v82 | 14.557 | 0.267 |
| V20*v83 | 13.294 | 0.348 |
| V20*v84 | 19.731 | 0.072 |
| V20*v85 | 6.617 | 0.677 |
| V20*v86 | 10.954 | 0.756 |
| V21*v82 | 16.100 | 0.041 |
| V21*v83 | 11.061 | 0.198 |
| V21*v84 | 19.507 | 0.012 |
| V21*v85 | 7.869 | 0.248 |
| V21*v86 | 8.357 | 0.594 |
| V22*v82 | 19.867 | 0.070 |
| V22*v83 | 18.772 | 0.094 |
| V22*v84 | 19.955 | 0.068 |
| V22*v85 | 7.546 | 0.580 |
| V22*v86 | 14.427 | 0.493 |
| V23*v82 | 16.455 | 0.422 |
| V23*v83 | 17.009 | 0.385 |
| V23*v84 | 25.783 | 0.057 |
| V23*v85 | 9.869 | 0.627 |
| V23*v86 | 25.806 | 0.172 |
| V24*v82 | 16.274 | 0.434 |
| V24*v83 | 11.369 | 0.786 |
| V24*v84 | 13.999 | 0.599 |
| V24*v85 | 6.911 | 0.863 |
| V24*v86 | 13.952 | 0.833 |
| V25*v82 | 8.891 | 0.918 |
| V25*v83 | 13.800 | 0.614 |
| V25*v84 | 21.329 | 0.166 |
| V25*v85 | 4.681 | 0.968 |
| V25*v86 | 14.192 | 0.821 |
| V26*v82 | 9.062 | 0.911 |
| V26*v83 | 10.393 | 0.845 |
| V26*v84 | 25.528 | 0.061 |
| V26*v85 | 10.101 | 0.607 |
| V26*v86 | 15.882 | 0.724 |
| V27*v82 | 9.284 | 0.679 |
| V27*v83 | 8.428 | 0.751 |
| V27*v84 | 19.479 | 0.078 |
| V27*v85 | 6.063 | 0.734 |
| V27*v86 | 17.487 | 0.291 |
| V28*v82 | 8.031 | 0.783 |
| V28*v83 | 12.125 | 0.436 |
| V28*v84 | 15.369 | 0.222 |

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| V28*v85 | 10.011 | 0.350 |
| V28*v86 | 10.881 | 0.761 |
| V18*v87 | 21.393 | 0.125 |
| V18*v88 | 21.581 | 0.119 |
| V18*v89 | 20.420 | 0.156 |
| V19*v87 | 21.640 | 0.118 |
| V19*v88 | 19.130 | 0.208 |
| V19*v89 | 23.560 | 0.073 |
| V20*v87 | 21.979 | 0.108 |
| V10*v88 | 21.624 | 0.118 |
| V20*v89 | 16.395 | 0.356 |
| V21*v87 | 19.422 | 0.035 |
| V21*v88 | 10.824 | 0.371 |
| V21*v89 | 26.701 | 0.003 |
| V22*v87 | 28.407 | 0.019 |
| V22*v88 | 27.241 | 0.027 |
| V22*v89 | 30.447 | 0.010 |
| V23*v87 | 30.807 | 0.058 |
| V23*v88 | 24.762 | 0.211 |
| V23*v89 | 32.547 | 0.038 |
| V24*v87 | 20.109 | 0.451 |
| V24*v88 | 22.353 | 0.322 |
| V24*v89 | 25.004 | 0.201 |
| V25*v87 | 19.430 | 0.494 |
| V25*v88 | 11.531 | 0.931 |
| V25*v89 | 11.490 | 0.933 |
| V26*v87 | 15.461 | 0.749 |
| V26*v88 | 8.483 | 0.988 |
| V26*v89 | 13.023 | 0.876 |
| V27*v87 | 15.859 | 0.391 |
| V27*v88 | 17.981 | 0.264 |
| V27*v89 | 17.467 | 0.292 |
| V28*v87 | 15.674 | 0.404 |
| V28*v88 | 17.126 | 0.311 |
| V28*v89 | 15.219 | 0.436 |
| V18*v97 | 11.674 | 0.232 |
| V19*v97 | 5.442 | 0.794 |
| V20*v97 | 20.529 | 0.015 |
| V21*v97 | 6.497 | 0.370 |
| V22*v97 | 19.704 | 0.020 |
| V23*v97 | 17.061 | 0.147 |
| V24*v97 | 10.146 | 0.603 |
| V25*v97 | 11.555 | 0.482 |
| V26*v97 | 9.656 | 0.646 |
| V27*v97 | 14.205 | 0.115 |
| V28*v97 | 7.916 | 0.543 |
| V18*v98 | 22.270 | 0.035 |
| V19*v98 | 7.920 | 0.791 |

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| V20*v98 | 25.154 | 0.014 |
| V21*v98 | 8.922 | 0.349 |
| V22v*v98 | 20.572 | 0.057 |
| V23*v98 | 53.566 | 0.000 |
| V24*v98 | 13.767 | 0.616 |
| V25*v98 | 53.229 | 0.000 |
| V26*v98 | 25.674 | 0.059 |
| V27*v98 | 24.405 | 0.018 |
| V28*v98 | 10.418 | 0.579 |
| V18v*v99 | 14.141 | 0.117 |
| V19*v99 | 12.960 | 0.164 |
| V20*v99 | 23.878 | 0.004 |
| V21*v99 | 15.083 | 0.020 |
| V22*v99 | 24.590 | 0.003 |
| V23v*v99 | 25.038 | 0.015 |
| V24*v99 | 44.397 | 0.000 |
| V25*v99 | 31.660 | 0.002 |
| V26*v99 | 20.351 | 0.061 |
| V27*v99 | 15.809 | 0.071 |
| V28*v99 | 14.133 | 0.118 |
| V29*v74 | 31.970 | 0.044 |
| V29*v75 | 26.541 | 0.149 |
| V29*v76 | 24.403 | 0.225 |
| V29*v77 | 22.480 | 0.315 |
| V30*v74 | 22.835 | 0.297 |
| V30*v75 | 17.083 | 0.648 |
| V30*v76 | 17.976 | 0.589 |
| V30*v77 | 16.432 | 0.689 |
| V31*v74 | 35.806 | 0.016 |
| V31*v75 | 32.038 | 0.043 |
| V31*v76 | 31.368 | 0.051 |
| V31*v77 | 17.716 | 0.606 |
| V32*v74 | 17.414 | 0.626 |
| V32*v75 | 20.636 | 0.419 |
| V32*v76 | 13.752 | 0.843 |
| V32*v77 | 19.944 | 0.461 |
| V29*v78 | 10.565 | 0.835 |
| V29*v79 | 10.582 | 0.835 |
| V29*v80 | 8.320 | 0.939 |
| V29*v81 | 17.759 | 0.603 |
| V30*v78 | 10.922 | 0.814 |
| V30*v79 | 13.375 | 0.645 |
| V30*v80 | 11.286 | 0.792 |
| V30*v81 | 15.983 | 0.718 |
| V31*v78 | 4.247 | 0.998 |
| V31*v79 | 8.542 | 0.931 |
| V31*v80 | 10.666 | 0.830 |
| V31*v81 | 14.451 | 0.807 |

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| V32*v78 | 16.435 | 0.423 |
| V32*v79 | 16.246 | 0.436 |
| V32*v80 | 16.475 | 0.420 |
| V32*v81 | 21.293 | 0.380 |
| V29*v82 | 9.827 | 0.876 |
| V29*v83 | 7.280 | 0.967 |
| V29*v84 | 17.558 | 0.350 |
| V29*v85 | 9.389 | 0.669 |
| V29*v86 | 18.994 | 0.522 |
| V30*v82 | 13.866 | 0.609 |
| V30*v83 | 14.478 | 0.563 |
| V30*v84 | 11.865 | 0.753 |
| V30*v85 | 10.107 | 0.607 |
| V30*v86 | 33.638 | 0.029 |
| V31*v82 | 11.413 | 0.783 |
| V31*v83 | 12.643 | 0.699 |
| V31*v84 | 15.378 | 0.497 |
| V31*v85 | 9.072 | 0.697 |
| V31*v86 | 22.847 | 0.296 |
| V32*v82 | 17.282 | 0.368 |
| V32*v83 | 21.708 | 0.153 |
| V32*v84 | 9.832 | 0.875 |
| V32*v85 | 9.778 | 0.635 |
| V32*v86 | 42.708 | 0.002 |
| V29*v87 | 29.072 | 0.086 |
| V29*v88 | 20.345 | 0.437 |
| V29*v89 | 25.335 | 0.189 |
| V30*v87 | 28.253 | 0.104 |
| V30*v88 | 18.061 | 0.583 |
| V30*v89 | 33.972 | 0.026 |
| V31*v87 | 24.337 | 0.228 |
| V31*v88 | 17.417 | 0.626 |
| V31*v89 | 18.750 | 0.538 |
| V32*v87 | 44.701 | 0.001 |
| V32*v88 | 24.133 | 0.237 |
| V32*v89 | 52.43 | 0.000 |
| V29*v90 | 5.452 | 0.993 |
| V29*v91 | 4.059 | 0.852 |
| V29*v92 | 4.208 | 0.838 |
| V29*v93 | 5.744 | 0.928 |
| V29*v94 | 16.708 | 0.405 |
| V29*v95 | 7.640 | 0.959 |
| V30*v90 | 10.246 | 0.853 |
| V30*v91 | 5.341 | 0.721 |
| V30*v92 | 11.951 | 0.153 |
| V30*v93 | 5.352 | 0.945 |
| V30*v94 | 21.488 | 0.161 |
| V30*v95 | 12.446 | 0.713 |

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| V31*v90 | 16.438 | 0.423 |
| V31*v91 | 4.094 | 0.849 |
| V31*v92 | 5.935 | 0.655 |
| V31*v93 | 11.959 | 0.449 |
| V31*v94 | 11.190 | 0.798 |
| V31*v95 | 14.096 | 0.592 |
| V32*v90 | 14.036 | .596 |
| v32 * v92 | 9.537 | .299 |
| v32 * v93 | 6.471 | .891 |
| v32*v94 | 11.049 | .525 |
| v32 * v95 | 10.044 | .864 |
| v29 * v97 | 11.049 | .525 |
| v30 * v97 | 8.030 | .783 |
| v31 * v97 | 9.824 | .631 |
| v32 * v97 | 10.917 | .536 |
| v29 * v98 | 17.731 | .340 |
| v30 * v98 | 54.425 | .000 |
| v31 * v98 | 14.168 | .586 |
| v32 * v98 | 40.593 | .001 |
| v29 * v99 | 20.033 | .066 |
| v30 * v99 | 27.283 | .007 |
| v31 * v99 | 26.699 | .009 |
| v32 * v99 | 25.735 | .012 |
| v29 * v100 | 5.401 | .943 |
| v30 * v100 | 5.560 | .937 |
| v31 * v100 | 5.319 | .946 |
| v32 * v100 | 11.589 | .479 |
| v33 * v73 | 3.495 | .991 |
| v34 * v73 | 24.095 | .020 |
| v35 * v73 | 18.023 | .115 |
| v36 * v73 | 17.097 | .379 |
| v37 * v73 | 15.234 | .229 |
| v33 * v74 | 25.903 | .039 |
| v33 * v75 | 31.962 | .007 |
| v33 * v76 | 27.783 | .023 |
| v33 * v77 | 14.977 | .453 |
| v34 * v74 | 30.428 | .010 |
| v34 * v75 | 31.075 | .009 |
| v34 * v76 | 23.307 | .078 |
| v34 * v77 | 22.541 | .094 |
| v35 * v74 | 26.729 | .031 |
| v35 * v75 | 32.013 | .006 |
| v35 * v76 | 19.705 | .184 |
| v35 * v77 | 19.258 | .202 |
| v36 * v74 | 29.174 | .084 |
| v36 * v75 | 32.299 | 040 |
| v36 * v76 | 31.639 | .047 |
| v36 * v77 | 9.044 | .982 |

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| v37 * v74 | 24.421 | .058 |
| v37 * v75 | 28.421 | .019 |
| v37 * v76 | 19.982 | .173 |
| v37 * v77 | 15.315 | .429 |
| v33 * v82 | 12.607 | .398 |
| v33 * v83 | 17.439 | .134 |
| v33 * v84 | 17.685 | .126 |
| v33 * v85 | 11.787 | .226 |
| v33 * v86 | 21.585 | .119 |
| v34 * v82 | 24.660 | .017 |
| v34 * v83 | 21.446 | .044 |
| v34 * v84 | 28.965 | .004 |
| v34 * v85 | 16.529 | .057 |
| v34 * v86 | 22.185 | .103 |
| v35 * v82 | 23.920 | .021 |
| v35 * v83 | 15.800 | .201 |
| v35 * v84 | 16.995 | .150 |
| v35 * v85 | 15.199 | .086 |
| v35 * v86 | 18.393 | .243 |
| v36 * v82 | 19.270 | .255 |
| v36 * v83 | 25.286 | .065 |
| v36 * v84 | 19.643 | .237 |
| v36 * v85 | 13.397 | .341 |
| v36 * v86 | 22.246 | .327 |
| v37 * v82 | 20.303 | .062 |
| v37 * v83 | 17.665 | .126 |
| v37 * v84 | 17.986 | .116 |
| v37 * v85 | 16.895 | .050 |
| v37 * v86 | 20.704 | .147 |
| v33 * v87 | 21.007 | .137 |
| v33 * v88 | 15.718 | .401 |
| v33 * v89 | 29.316 | .015 |
| v34 * v87 | 21.722 | .115 |
| v34 * v88 | 29.414 | .014 |
| v34 * v89 | 25.242 | .047 |
| v35 * v87 | 24.098 | .063 |
| v35 * v88 | 27.836 | .023 |
| v35 * v89 | 24.066 | .064 |
| v36 * v87 | 11.988 | .916 |
| v36 * v88 | 17.984 | .588 |
| v36 * v89 | 13.110 | .873 |
| v37 * v87 | 10.137 | .811 |
| v37 * v88 | 18.513 | .237 |
| v37 * v89 | 10.827 | .765 |
| v33 * v90 | 14.358 | .278 |
| v33 * v91 | 4.494 | .610 |
| v33 * v92 | 4.315 | .634 |
| v33 * v93 | 11.091 | .270 |

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| v33 * v94 | 18.564 | .100 |
| v33 * v95 | 10.417 | .579 |
| v34 * v90 | 15.231 | .229 |
| v34 * v91 | 25.015 | .000 |
| v34 * v92 | 15.246 | .018 |
| v34 * v93 | 15.066 | .089 |
| v34 * v94 | 21.362 | .045 |
| v34 * v95 | 26.287 | .010 |
| v35 * v90 | 14.660 | .261 |
| v35 * v91 | 6.612 | .358 |
| v35 * v92 | 5.313 | .504 |
| v35 * v93 | 5.016 | .833 |
| v35 * v94 | 14.726 | .257 |
| v35 * v95 | 15.223 | .229 |
| v36 * v90 | 12.933 | .678 |
| v36 * v91 | 10.695 | .220 |
| v36 * v92 | 11.920 | .155 |
| v36 * v93 | 12.926 | .374 |
| v36 * v94 | 20.470 | .200 |
| v36 * v95 | 16.982 | .387 |
| v37 * v90 | 16.275 | .179 |
| v37 * v91 | 17.549 | .007 |
| v37 * v92 | 9.365 | .154 |
| v37 * v93 | 10.942 | .280 |
| v37 * v94 | 14.438 | .274 |
| v37 * v95 | 22.398 | .033 |
| v33 * v96 | 5.185 | .159 |
| v34 * v96 | 10.050 | .018 |
| v35 * v96 | 8.381 | .039 |
| v36 * v96 | 6.815 | .146 |
| v37 * v96 | 7.739 | .052 |
| v33 * v98 | 15.380 | .221 |
| v34 * v98 | 10.902 | .537 |
| v35 * v98 | 16.827 | .156 |
| v36 * v98 | 8.727 | .924 |
| v37 * v98 | 6.934 | .862 |
| v33 * v99 | 49.304 | .000 |
| v34 * v99 | 16.483 | .057 |
| v35 * v99 | 15.825 | .071 |
| v36 * v99 | 35.523 | .000 |
| v37 * v99 | 25.357 | .003 |
| v38 * v82 | 51.746 | .000 |
| v38 * v83 | 49.372 | .000 |
| v38 * v84 | 46.726 | .000 |
| v38 * v85 | 26.298 | .002 |
| v38 * v86 | 47.925 | .000 |
| v39 * v82 | 14.714 | .546 |
| v39 * v83 | 10.097 | .862 |

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| v39 * v84 | 14.296 | .577 |
| v39 * v85 | 8.360 | .756 |
| v39 * v86 | 17.505 | .620 |
| v40 * v82 | 20.891 | .052 |
| v40 * v83 | 13.315 | .347 |
| v40 * v84 | 16.959 | .151 |
| v40 * v85 | 8.722 | .463 |
| v40 * v86 | 13.414 | .570 |
| v41 * v82 | 12.177 | .143 |
| v41 * v83 | 6.378 | .605 |
| v41 * v84 | 12.202 | .142 |
| v41 * v85 | 6.721 | .347 |
| v41 * v86 | 9.784 | .460 |
| v42 * v82 | 19.355 | .080 |
| v42 * v83 | 9.660 | .646 |
| v42 * v84 | 19.430 | .079 |
| v42 * v85 | 26.904 | .001 |
| v42 * v86 | 10.540 | .784 |
| v43 * v82 | 18.105 | .580 |
| v43 * v83 | 15.762 | .731 |
| v43 * v84 | 17.362 | .629 |
| v43 * v85 | 19.649 | .186 |
| v43 * v86 | 15.990 | .915 |
| v44 * v82 | 10.538 | .837 |
| v44 * v83 | 8.091 | .946 |
| v44 * v84 | 14.566 | .557 |
| v44 * v85 | 8.081 | .779 |
| v44 * v86 | 18.230 | .572 |
| v38 * v87 | 49.633 | .000 |
| v38 * v88 | 61.609 | .000 |
| v38 * v89 | 52.082 | .000 |
| v39 * v87 | 18.614 | .547 |
| v39 * v88 | 25.892 | .169 |
| v39 * v89 | 28.444 | .099 |
| v40 * v87 | 22.112 | .105 |
| v40 * v88 | 20.171 | .165 |
| v40 * v89 | 14.157 | .514 |
| v41 * v88 | 20.131 | .028 |
| v41 * v89 | 12.006 | .285 |
| v42 * v87 | 11.520 | .715 |
| v42 * v88 | 20.469 | .155 |
| v42 * v89 | 15.238 | .434 |
| v43 * v87 | 26.936 | .359 |
| v43 * v88 | 22.377 | .614 |
| v43 * v89 | 29.405 | .247 |
| v44 * v87 | 23.318 | .273 |
| v44 * v88 | 15.583 | .742 |
| v44 * v89 | 28.466 | .099 |

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| V45*v82 | 15.714 | 0.205 |
| V45*v83 | 15.237 | 0.229 |
| V45*v84 | 19.777 | 0.071 |
| V45*v85 | 17.252 | 0.045 |
| V45*v86 | 25.264 | 0.047 |
| V46*v82 | 16.738 | 0.160 |
| V46*v83 | 14.114 | 0.293 |
| V46*v84 | 12.898 | 0.377 |
| V46*v85 | 13.400 | 0.145 |
| V46*v86 | 14.004 | 0.525 |
| V47*v82 | 11.657 | 0.474 |
| V47*v83 | 8.390 | 0.754 |
| V47*v84 | 14.375 | 0.277 |
| V47*v85 | 12.107 | 0.207 |
| V47*v86 | 20.294 | 0.161 |
| V48*v82 | 12.211 | 0.429 |
| V48*v83 | 8.933 | 0.709 |
| V48*v84 | 9.750 | 0.638 |
| V48*v85 | 5.639 | 0.775 |
| V48*v86 | 11.625 | 0.707 |
| V49*v82 | 14.451 | 0.273 |
| V49*v83 | 10.091 | 0.608 |
| V49*v84 | 11.532 | 0.484 |
| V49*v85 | 6.697 | 0.669 |
| V49*v86 | 24.447 | 0.058 |
| V50*v82 | 12.536 | 0.404 |
| V50*v83 | 8.409 | 0.752 |
| V50*v84 | 3.718 | 0.988 |
| V50*v85 | 16.882 | 0.051 |
| V50*v86 | 16.118 | 0.374 |
| V45*v87 | 22.463 | 0.096 |
| V45*v88 | 13.768 | 0.543 |
| V45*v89 | 22.399 | 0.098 |
| V46*v87 | 14.348 | 0.499 |
| V46*v88 | 18.966 | 0.215 |
| V46*v89 | 15.819 | 0.394 |
| V47*v87 | 6.389 | 0.972 |
| V47*v88 | 13.581 | 0.558 |
| V47*v89 | 7.377 | 0.946 |
| V48*v87 | 11.939 | 0.684 |
| V48*v88 | 17.571 | 0.286 |
| V48*v89 | 16.738 | 0.335 |
| V49*v87 | 14.819 | 0.465 |
| V49*v88 | 20.850 | 0.142 |
| V49*v89 | 19.695 | 0.173 |
| V50*v87 | 14.989 | 0.452 |
| V50*v88 | 26.934 | 0.029 |
| V50*v89 | 13.936 | 0.530 |

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| V45*v98 | 18.119 | 0.112 |
| V46*v98 | 11.839 | 0.459 |
| V47*v98 | 12.191 | 0.430 |
| V48*v98 | 48.649 | 0.000 |
| V49*v98 | 35.248 | 0.000 |
| V50*v98 | 15.056 | 0.238 |
| V45*v99 | 8.815 | 0.455 |
| V46*v99 | 19.348 | 0.022 |
| V47*v99 | 20.309 | 0.016 |
| V48*v99 | 27.361 | 0.001 |
| V49*v99 | 29.995 | 0.000 |
| V50*v99 | 10.969 | 0.278 |
| V51*v74 | 21.778 | 0.114 |
| V51*v75 | 24.684 | 0.054 |
| V51*v76 | 21.494 | 0.122 |
| V51*v77 | 19.954 | 0.174 |
| V52*v74 | 44.353 | 0.001 |
| V52*v75 | 43.811 | 0.002 |
| V52*v76 | 45.317 | 0.001 |
| V52*v77 | 18.078 | 0.582 |
| V53*v74 | 21.375 | 0.125 |
| V53*v75 | 20.053 | 0.170 |
| V53*v76 | 8.615 | 0.897 |
| V53*v77 | 37.097 | 0.001 |
| V54*v74 | 19.962 | 0.460 |
| V54*v75 | 30.902 | 0.057 |
| V54*v76 | 28.774 | 0.092 |
| V54*v77 | 45.505 | 0.001 |
| V55*v74 | 18.828 | 0.222 |
| V55*v75 | 21.551 | 0.120 |
| V55*v76 | 17.190 | 0.308 |
| V55*v77 | 46.659 | 0.000 |
| V56*v74 | 22.868 | 0.087 |
| V56*v75 | 20.223 | 0.164 |
| V56*v76 | 11.883 | 0.688 |
| V56*v77 | 33.336 | 0.004 |
| V57*v74 | 19.064 | 0.211 |
| V57*v75 | 17.976 | 0.264 |
| V57*v76 | 10.665 | 0.776 |
| V57*v77 | 42.281 | 0.000 |
| V58*v74 | 13.529 | 0.561 |
| V58*v75 | 17.498 | 0.290 |
| V58*v76 | 10.850 | 0.763 |
| V58*v77 | 25.684 | 0.041 |
| V59*v74 | 18.050 | 0.260 |
| V59*v75 | 21.079 | 0.134 |
| V59*v76 | 14.221 | 0.509 |
| V59*v77 | 21.673 | 0.117 |

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| V60*v74 | 28.667 | 0.018 |
| V60*v75 | 22.081 | 0.106 |
| V60*v76 | 20.671 | 0.148 |
| V60*v77 | 21.992 | 0.108 |
| V51*v78 | 19.429 | 0.079 |
| V51*v79 | 24.282 | 0.019 |
| V51*v80 | 21.199 | 0.048 |
| V51*v81 | 21.889 | 0.111 |
| V52*v78 | 25.567 | 0.060 |
| V52*v79 | 20.018 | 0.219 |
| V52*v80 | 14.399 | 0.569 |
| V52*v81 | 32.799 | 0.035 |
| V53*v78 | 12.066 | 0.440 |
| V53*v79 | 6.795 | 0.871 |
| V53*v80 | 16.168 | 0.184 |
| V53*v81 | 22.811 | 0.088 |
| V54*v78 | 28.391 | 0.028 |
| V54*v79 | 31.931 | 0.010 |
| V54*v80 | 27.808 | 0.033 |
| V54*v81 | 18.861 | 0.531 |
| V55*v78 | 17.333 | 0.137 |
| V55*v79 | 10.113 | 0.606 |
| V55*v80 | 14.066 | 0.297 |
| V55*v81 | 17.175 | 0.308 |
| V56*v78 | 18.147 | 0.111 |
| V56*v79 | 16.145 | 0.185 |
| V56*v80 | 18.913 | 0.091 |
| V56*v81 | 14.942 | 0.456 |
| V57*v78 | 14.530 | 0.268 |
| V57*v79 | 16.558 | 0.167 |
| V57*v80 | 20.715 | 0.055 |
| V57*v81 | 14.009 | 0.525 |
| V58*v78 | 13.612 | 0.326 |
| V58*v79 | 12.444 | 0.411 |
| V58*v80 | 16.536 | 0.168 |
| V58*v81 | 19.559 | 0.190 |
| V59*v78 | 54.946 | 0.000 |
| V59*v79 | 64.580 | 0.000 |
| V59*v80 | 62.521 | 0.000 |
| V59*v81 | 26.042 | 0.038 |
| V60*v78 | 13.272 | 0.350 |
| V60*v79 | 11.674 | 0.472 |
| V60*v80 | 16.009 | 0.191 |
| V60*v81 | 17.021 | 0.318 |
| V51*v82 | 19.559 | 0.076 |
| V51*v83 | 23.150 | 0.026 |
| V51*v84 | 12.191 | 0.430 |
| V51*v85 | 11.599 | 0.237 |

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|---------|--------|-------|
| V51*v86 | 12.735 | 0.623 |
| V52*v82 | 14.496 | 0.562 |
| V52*v83 | 14.627 | 0.552 |
| V52*v84 | 19.423 | 0.247 |
| V52*v85 | 11.485 | 0.488 |
| V52*v86 | 17.304 | 0.633 |
| V53*v82 | 23.750 | 0.022 |
| V53*v83 | 15.762 | 0.202 |
| V53*v84 | 11.938 | 0.451 |
| V53*v85 | 12.083 | 0.209 |
| V53*v86 | 6.553 | 0.969 |
| V54*v82 | 19.294 | 0.254 |
| V54*v83 | 19.926 | 0.224 |
| V54*v84 | 15.904 | 0.460 |
| V54*v85 | 11.854 | 0.457 |
| V54*v86 | 17.029 | 0.651 |
| V55*v82 | 18.490 | 0.102 |
| V55*v83 | 24.041 | 0.020 |
| V55*v84 | 11.303 | 0.503 |
| V55*v85 | 11.151 | 0.265 |
| V55*v86 | 11.215 | 0.737 |
| V56*v82 | 18.690 | 0.096 |
| V56*v83 | 16.704 | 0.161 |
| V56*v84 | 11.962 | 0.449 |
| V56*v85 | 7.667 | 0.568 |
| V56*v86 | 14.716 | 0.472 |
| V57*v82 | 19.495 | 0.077 |
| V57*v83 | 15.285 | 0.226 |
| V57*v84 | 14.918 | 0.246 |
| V57*v85 | 10.330 | 0.324 |
| V57*v86 | 13.839 | 0.538 |
| V58*v82 | 18.443 | 0.103 |
| V58*v83 | 19.308 | 0.081 |
| V58*v84 | 15.821 | 0.200 |
| V58*v85 | 7.374 | 0.598 |
| V58*v86 | 15.867 | 0.391 |
| V59*v82 | 26.296 | 0.010 |
| V59*v83 | 18.006 | 0.116 |
| V59*v84 | 13.389 | 0.341 |
| V59*v85 | 11.630 | 0.235 |
| V59*v86 | 21.399 | 0.125 |
| V60*v82 | 26.287 | 0.010 |
| V60*v83 | 19.377 | 0.080 |
| V60*v84 | 18.495 | 0.101 |
| V60*v85 | 9.180 | 0.421 |
| V60*v86 | 14.038 | 0.523 |
| V51*v87 | 13.457 | 0.567 |
| V51*v88 | 18.480 | 0.238 |

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|---------|--------|-------|
| V51*v89 | 14.196 | 0.511 |
| V52*v87 | 13.498 | 0.855 |
| V52*v88 | 11.775 | 0.924 |
| V52*v89 | 22.887 | 0.294 |
| V53*v87 | 10.296 | 0.801 |
| V53*v88 | 13.115 | 0.593 |
| V53*v89 | 12.699 | 0.626 |
| V54*v87 | 15.063 | 0.773 |
| V54*v88 | 20.643 | 0.418 |
| V54*v89 | 24.202 | 0.234 |
| V55*v87 | 12.872 | 0.612 |
| V55*v88 | 18.155 | 0.255 |
| V55*v89 | 18.696 | 0.228 |
| V56*v87 | 9.742 | 0.836 |
| V56*v88 | 14.430 | 0.493 |
| V56*v89 | 10.411 | 0.793 |
| V57*v87 | 13.634 | 0.553 |
| V57*v88 | 20.868 | 0.141 |
| V57*v89 | 12.962 | 0.605 |
| V58*v87 | 14.694 | 0.474 |
| V58*v88 | 16.276 | 0.364 |
| V58*v89 | 13.680 | 0.550 |
| V59*v87 | 39.965 | 0.000 |
| V59*v88 | 33.929 | 0.003 |
| V59*v89 | 22.961 | 0.085 |
| V60*v87 | 18.631 | 0.231 |
| V60*v88 | 23.778 | 0.069 |
| V60*v89 | 13.713 | 0.547 |
| V61*v74 | 22.004 | 0.015 |
| V61*v75 | 11.156 | 0.346 |
| V61*v76 | 13.347 | 0.205 |
| V61*v77 | 19.598 | 0.033 |
| V62*v74 | 13.701 | 0.548 |
| V62*v75 | 25.319 | 0.046 |
| V62*v76 | 15.597 | 0.409 |
| V62*v77 | 19.204 | 0.205 |
| V63*v74 | 12.455 | 0.256 |
| V63*v75 | 11.501 | 0.320 |
| V63*v76 | 15.586 | 0.112 |
| V63*v77 | 13.385 | 0.203 |
| V64*v74 | 12.551 | 0.637 |
| V64*v75 | 11.661 | 0.704 |
| V64*v76 | 8.709 | 0.892 |
| V64*v77 | 32.189 | 0.006 |
| V61*v78 | 18.172 | 0.020 |
| V61*v79 | 17.825 | 0.023 |
| V61*v80 | 17.718 | 0.023 |
| V61*v81 | 14.240 | 0.162 |

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|---------|--------|-------|
| V62*v78 | 11.574 | 0.480 |
| V62*v79 | 14.605 | 0.264 |
| V62*v80 | 7.532 | 0.821 |
| V62*v81 | 19.258 | 0.202 |
| V63*v78 | 9.704 | 0.286 |
| V63*v79 | 23.758 | 0.003 |
| V63*v80 | 15.712 | 0.047 |
| V63*v81 | 14.627 | 0.146 |
| V64*v78 | 25.543 | 0.012 |
| V64*v79 | 24.760 | 0.016 |
| V64*v80 | 22.838 | 0.029 |
| V64*v81 | 14.049 | 0.522 |
| V61*v82 | 10.628 | 0.224 |
| V61*v83 | 9.524 | 0.300 |
| V61*v84 | 9.872 | 0.274 |
| V61*v85 | 4.080 | 0.666 |
| V61*v86 | 8.727 | 0.558 |
| V62*v82 | 15.732 | 0.204 |
| V62*v83 | 13.362 | 0.343 |
| V62*v84 | 9.564 | 0.654 |
| V62*v85 | 6.112 | 0.729 |
| V62*v86 | 9.868 | 0.828 |
| V63*v82 | 6.875 | 0.550 |
| V63*v83 | 12.413 | 0.134 |
| V63*v84 | 11.667 | 0.167 |
| V63*v85 | 12.657 | 0.049 |
| V63*v86 | 3.498 | 0.967 |
| V64*v82 | 22.104 | 0.036 |
| V64*v83 | 15.061 | 0.238 |
| V64*v84 | 32.831 | 0.001 |
| V64*v85 | 7.595 | 0.575 |
| V64*v86 | 15.238 | 0.434 |
| V61*v87 | 16.512 | 0.086 |
| V61*v88 | 30.153 | 0.001 |
| V61*v89 | 21.262 | 0.019 |
| V62*v87 | 19.414 | 0.196 |
| V62*v88 | 15.483 | 0.417 |
| V62*v89 | 24.358 | 0.059 |
| V63*v87 | 11.519 | 0.319 |
| V63*v88 | 13.685 | 0.188 |
| V63*v89 | 11.296 | 0.335 |
| V64*v87 | 11.950 | 0.683 |
| V64*v88 | 10.894 | 0.760 |
| V64*v89 | 8.933 | 0.881 |
| V65*v74 | 27.969 | 0.022 |
| V65*v75 | 28.696 | 0.018 |
| V65*v76 | 13.650 | 0.552 |
| V65*v77 | 65.240 | 0.000 |

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|---------|--------|-------|
| V66*v74 | 26.119 | 0.037 |
| V66*v75 | 24.927 | 0.051 |
| V66*v76 | 19.377 | 0.197 |
| V66*v77 | 39.977 | 0.000 |
| V67*v74 | 19.665 | 0.033 |
| V67*v75 | 23.004 | 0.011 |
| V67*v76 | 18.337 | 0.050 |
| V67*v77 | 14.892 | 0.136 |
| V68*v74 | 19.659 | 0.185 |
| V68*v75 | 17.564 | 0.286 |
| V68*v76 | 14.703 | 0.473 |
| V68*v77 | 18.263 | 0.249 |
| V65*v78 | 14.470 | 0.272 |
| V65*v79 | 13.443 | 0.338 |
| V65*v80 | 18.545 | 0.100 |
| V65*v81 | 13.351 | 0.575 |
| V66*v78 | 6.368 | 0.896 |
| V66*v79 | 6.473 | 0.890 |
| V66*v80 | 9.242 | 0.682 |
| V66*v81 | 13.421 | 0.570 |
| V67*v78 | 10.676 | 0.221 |
| V67*v79 | 9.523 | 0.300 |
| V67*v80 | 15.595 | 0.049 |
| V67*v81 | 12382 | 0.260 |
| V68*v78 | 8.711 | 0.727 |
| V68*v79 | 8.576 | 0.739 |
| V68*v80 | 8.509 | 0.744 |
| V68*v81 | 14.671 | 0.475 |
| V65*v82 | 26.803 | 0.008 |
| V65*v83 | 18.366 | 0.105 |
| V65*v84 | 20.042 | 0.066 |
| V65*v85 | 7.219 | 0.614 |
| V65*v86 | 11.172 | 0.740 |
| V66*v82 | 11.231 | 0.509 |
| V66*v83 | 14.651 | 0.261 |
| V66*v84 | 15.591 | 0.211 |
| V66*v85 | 3.961 | 0.914 |
| V66*v86 | 11.490 | 0.717 |
| V67*v82 | 14.053 | 0.080 |
| V67*v83 | 7.767 | 0.457 |
| V67*v84 | 8.703 | 0.368 |
| V67*v85 | 14.893 | 0.021 |
| V67*v86 | 11.435 | 0.325 |
| V68*v82 | 10.077 | 0.609 |
| V68*v83 | 11.769 | 0.464 |
| V68*v84 | 10.819 | 0.545 |
| V68*v85 | 6.054 | 0.734 |
| V68*v86 | 11.584 | 0.710 |

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| V65*v87 | 14.687 | 0.474 |
| V65*v88 | 23.353 | 0.077 |
| V65*v89 | 18.285 | 0.248 |
| V66*v87 | 6.798 | 0.963 |
| V66*v88 | 20.256 | 0.162 |
| V66*v89 | 11.592 | 0.710 |
| V67*v87 | 20.113 | 0.028 |
| V67*v88 | 16.729 | 0.081 |
| V67*v89 | 13.659 | 0.189 |
| V68*v87 | 16.808 | 0.330 |
| V68*v88 | 13.179 | 0.588 |
| V68*v89 | 12.390 | 0.649 |
| V65*v90 | 10.916 | 0.536 |
| V65*v91 | 10.199 | 0.117 |
| V65*v92 | 9.801 | 0.133 |
| V65*v93 | 16.105 | 0.065 |
| V65*v94 | 22.592 | 0.031 |
| V65*v95 | 26.847 | 0.008 |
| V66*v90 | 16.965 | 0.151 |
| V66*v91 | 17.511 | 0.008 |
| V66*v92 | 18.780 | 0.005 |
| V66*v93 | 18.682 | 0.028 |
| V66*v94 | 16.551 | 0.167 |
| V66*v95 | 18.024 | 0.115 |
| V67*v90 | 6.879 | 0.550 |
| V67*v91 | 10.923 | 0.027 |
| V67*v92 | 8.813 | 0.066 |
| V67*v93 | 10.518 | 0.104 |
| V67*v94 | 14.896 | 0.061 |
| V67*v95 | 17.638 | 0.024 |
| V68*v90 | 11.425 | 0.493 |
| V68*v91 | 6.032 | 0.420 |
| V68*v92 | 5.259 | 0.511 |
| V68*v93 | 3.186 | 0.956 |
| V68*v94 | 13.697 | 0.320 |
| V68*v95 | 12.935 | 0.374 |
| V65*v98 | 19.089 | 0.086 |
| V66*v98 | 21.727 | 0.041 |
| V67*v98 | 8.386 | 0.397 |
| V68*v98 | 9.561 | 0.654 |
| V65*v99 | 49.309 | 0.000 |
| V66*v99 | 20.755 | 0.014 |
| V67*v99 | 7.358 | 0.289 |
| V68*v99 | 22.904 | 0.006 |
| V65*v100 | 22.679 | 0.007 |
| V66*v100 | 19.729 | 0.020 |
| V67*v100 | 12.727 | 0.048 |
| V68*v100 | 7.457 | 0.590 |

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|---------|---------|-------|
| V69*v74 | 21.749 | 0.115 |
| V69*v75 | 19.703 | 0.184 |
| V69*v76 | 14.505 | 0.488 |
| V69*v77 | 36.121 | 0.002 |
| V70*v74 | 29.799 | 0.073 |
| V70*v75 | 27.082 | 0.133 |
| V70*v76 | 21.147 | 0.389 |
| V70*v77 | 47.677 | 0.000 |
| V71*v74 | 49.732 | 0.000 |
| V71*v75 | 46.619 | 0.001 |
| V71*v76 | 32.005 | 0.043 |
| V71*v77 | 26.812 | 0.141 |
| V72*v74 | 110.506 | 0.000 |
| V72*v75 | 108.553 | 0.000 |
| V72*v76 | 93.769 | 0.000 |
| V72*v77 | 99.691 | 0.000 |
| V69*v78 | 29.001 | 0.004 |
| V69*v79 | 24.671 | 0.016 |
| V69*v80 | 30.276 | 0.003 |
| V69*v81 | 21.961 | 0.109 |
| V70*v78 | 10.636 | 0.831 |
| V70*v79 | 15.005 | 0.524 |
| V70*v80 | 15.304 | 0.502 |
| V70*v81 | 14.517 | 0.803 |
| V71*v78 | 17.665 | 0.344 |
| V71*v79 | 20.370 | 0.204 |
| V71*v80 | 19.284 | 0.254 |
| V71*v81 | 31.276 | 0.052 |
| V72*v78 | 47.712 | 0.000 |
| V72*v79 | 90.959 | 0.000 |
| V72*v80 | 90.401 | 0.000 |
| V72*v81 | 98.928 | 0.000 |
| V69*v82 | 23.146 | 0.027 |
| V69*v83 | 21.124 | 0.049 |
| V69*v84 | 18.389 | 0.104 |
| V69*v85 | 9.145 | 0.424 |
| V69*v86 | 12.287 | 0.657 |
| V70*v82 | 19.989 | 0.221 |
| V70*v83 | 13.499 | 0.636 |
| V70*v84 | 11.316 | 0.790 |
| V70*v85 | 8.998 | 0.703 |
| V70*v86 | 11.577 | 0.930 |
| V71*v82 | 56.894 | 0.000 |
| V71*v83 | 28.483 | 0.028 |
| V71*v84 | 13.337 | 0.648 |
| V71*v85 | 7.087 | 0.852 |
| V71*v86 | 11.615 | 0.929 |
| V72*v82 | 104.394 | 0.000 |

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|---------|--------|-------|
| V72*v83 | 95.072 | 0.000 |
| V72*v84 | 96.275 | 0.000 |
| V72*v85 | 46.915 | 0.000 |
| V72*v86 | 96.541 | 0.000 |
| V69*v87 | 24.351 | 0.059 |
| V69*v88 | 26.461 | 0.033 |
| V69*v89 | 20.662 | 0.148 |
| V70*v87 | 18.293 | 0.568 |
| V70*v88 | 20.031 | 0.456 |
| V70*v89 | 19.104 | 0.515 |
| V71*v87 | 14.744 | 0.791 |
| V71*v88 | 15.976 | 0.718 |
| V71*v89 | 19.080 | 0.517 |
| V72*v87 | 99.367 | 0.000 |
| V72*v88 | 98.127 | 0.000 |
| V72*v89 | 97.476 | 0.000 |
| V69*v90 | 28.116 | 0.005 |
| V69*v91 | 14.799 | 0.022 |
| V69*v92 | 10.749 | 0.096 |
| V69*v93 | 11.179 | 0.264 |
| V69*v94 | 10.155 | 0.602 |
| V69*v95 | 26.954 | 0.008 |
| V70*v90 | 13.355 | 0.647 |
| V70*v91 | 13.796 | 0.087 |
| V70*v92 | 8.566 | 0.380 |
| V70*v93 | 12.237 | 0.427 |
| V70*v94 | 19.482 | 0.244 |
| V70*v95 | 16.927 | 0.390 |
| V71*v90 | 11.892 | 0.751 |
| V71*v91 | 12.748 | 0.121 |
| V71*v92 | 19.409 | 0.013 |
| V71*v93 | 16.372 | 0.175 |
| V71*v94 | 22.497 | 0.128 |
| V71*v95 | 17.152 | 0.376 |
| V72*v90 | 95.591 | 0.000 |
| V72*v91 | 10.508 | 0.105 |
| V72*v92 | 12.154 | 0.059 |
| V72*v93 | 12.759 | 0.174 |
| V72*v94 | 13.064 | 0.364 |
| V72*v95 | 14.087 | 0.295 |
| V69*v98 | 16.651 | 0.163 |
| V70*v98 | 14.043 | 0.596 |
| V71*v98 | 50.362 | 0.000 |
| V72*v98 | 9.239 | 0.682 |
| V69*v99 | 22.857 | 0.007 |
| V70*v99 | 10.165 | 0.601 |
| V71*v99 | 14.149 | 0.291 |
| V72*v99 | 22.788 | 0.007 |

Chi-square results for overall sector

| Statements | Pearson Chi-square value | Asymp. Sig. |
|------------|--------------------------|-------------|
| v1 * v82 | 12.436 | .257 |
| v1 * v83 | 8.748 | .364 |
| v1 * v84 | 6.360 | .607 |
| v1 * v85 | 13.947 | .083 |
| v1 * v86 | 5.798 | .832 |
| v2 * v82 | 15.648 | .110 |
| v2 * v83 | 9.107 | .333 |
| v2 * v84 | 9.458 | .305 |
| v2 * v85 | 24.229 | .002 |
| v2 * v86 | 11.104 | .349 |
| v3 * v82 | 13.130 | .216 |
| v3 * v83 | 9.213 | .325 |
| v3 * v84 | 10.990 | .202 |
| v3 * v85 | 12.107 | .147 |
| v3 * v86 | 15.754 | .107 |
| v4 * v82 | 18.759 | .043 |
| v4 * v83 | 16.068 | .041 |
| v4 * v84 | 17.120 | .029 |
| v4 * v85 | 17.075 | .029 |
| v4 * v86 | 9.345 | .500 |
| v5 * v82 | 6.109 | .806 |
| v5 * v83 | 6.346 | .609 |
| v5 * v84 | 7.419 | .492 |
| v5 * v85 | 11.199 | .191 |
| v5 * v86 | 13.114 | .217 |
| v6 * v82 | 17.785 | .274 |
| v6 * v83 | 5.665 | .932 |
| v6 * v84 | 11.369 | .498 |
| v6 * v85 | 15.732 | .204 |
| v6 * v86 | 17.389 | .296 |
| v7 * v82 | 13.183 | .588 |
| v7 * v83 | 8.594 | .737 |
| v7 * v84 | 15.898 | .196 |
| v7 * v85 | 16.954 | .151 |
| v7 * v86 | 12.823 | .616 |
| v8 * v82 | 19.676 | .185 |
| v8 * v83 | 5.013 | .958 |

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| v8 * v84 | 9.540 | .656 |
| v8 * v85 | 7.425 | .828 |
| v8 * v86 | 20.816 | .143 |
| v9 * v82 | 30.060 | .069 |
| v9 * v83 | 33.325 | .007 |
| v9 * v84 | 33.233 | .007 |
| v9 * v85 | 36.636 | .002 |
| v9 * v86 | 29.290 | .082 |
| v10 * v8 | 7.690 | .936 |
| v10 * v83 | 11.106 | .520 |
| v10 * v84 | 2.048 | .999 |
| v10 * v85 | 5.257 | .949 |
| v10 * v86 | 14.769 | .468 |
| v11 * v82 | 7.085 | .955 |
| v11 * v83 | 9.317 | .676 |
| v11 * v84 | 9.270 ^a | .680 |
| v11 * v85 | 12.273 | .424 |
| v11 * v86 | 22.077 | .106 |
| v1 * v87 | 16.254 | .093 |
| v1 * v88 | 17.126 | .072 |
| v1 * v89 | 20.894 | .022 |
| v2 * v87 | 30.524 | .001 |
| v2 * v88 | 23.068 | .010 |
| v2 * v89 | 35.584 | .000 |
| v3 * v87 | 16.411 | .088 |
| v3 * v88 | 14.102 | .168 |
| v3 * v89 | 18.731 | .044 |
| v4 * v87 | 25.101 | .005 |
| v4 * v88 | 21.095 | .020 |
| v4 * v89 | 23.740 | .008 |
| v5 * v87 | 7.726 | .656 |
| v5 * v88 | 5.713 | .839 |
| v5 * v89 | 6.587 | .764 |
| v6 * v87 | 17.288 | .302 |
| v6 * v88 | 22.296 | .100 |
| v6 * v89 | 19.937 | .174 |
| v7 * v87 | 19.692 | .184 |
| v7 * v88 | 26.997 | .029 |
| v7 * v89 | 35.423 | .002 |
| v8 * v87 | 11.139 | .743 |
| v8 * v88 | 15.333 | .428 |
| v8 * v89 | 24.978 | .050 |
| v9 * v87 | 30.307 | .065 |

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| v9 * v88 | 33.766 | .028 |
| v9 * v89 | 42.503 | .002 |
| v10 * v87 | 18.035 | .261 |
| v10 * v88 | 16.582 | .344 |
| v10 * v89 | 22.201 | .103 |
| v11 * v87 | 7.746 | .934 |
| v11 * v88 | 11.604 | .709 |
| v11 * v89 | 18.529 | .236 |
| v12 * v82 | 15.552 | .412 |
| v12 * v83 | 11.956 | .449 |
| v12 * v84 | 13.894 | .308 |
| v12 * v85 | 8.634 | .734 |
| v12 * v86 | 10.462 | .790 |
| v13 * v82 | 11.580 | .930 |
| v13 * v83 | 14.152 | .587 |
| v13 * v84 | 18.112 | .317 |
| v13 * v85 | 23.423 | .103 |
| v13 * v86 | 16.070 | .712 |
| v14 * v82 | 29.756 | .234 |
| v14 * v83 | 30.622 | .060 |
| v14 * v84 | 28.910 | .090 |
| v14 * v85 | 18.926 | .527 |
| v14 * v86 | 29.180 | .256 |
| v15 * v82 | 10.620 | .779 |
| v15 * v83 | 4.218 | .979 |
| v15 * v84 | 13.000 | .369 |
| v15 * v85 | 4.788 | .965 |
| v15 * v86 | 15.230 | .435 |
| v16 * v82 | 15.730 | .400 |
| v16 * v83 | 8.576 | .739 |
| v16 * v84 | 12.226 | .428 |
| v16 * v85 | 6.979 | .859 |
| v16 * v86 | 18.711 | .227 |
| v17 * v82 | 34.254 | .003 |
| v17 * v83 | 14.735 | .256 |
| v17 * v84 | 19.108 | .086 |
| v17 * v85 | 16.040 | .189 |
| v17 * v86 | 19.522 | .191 |
| v12 * v87 | 11.216 | .737 |
| v12 * v88 | 16.320 | .361 |
| v12 * v89 | 20.815 | .143 |
| v13 * v87 | 28.278 | .103 |
| v13 * v88 | 29.223 | .083 |

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| v13 * v89 | 33.894 | .027 |
| v14 * v87 | 29.996 | .224 |
| v14 * v88 | 27.158 | .348 |
| v14 * v89 | 30.225 | .216 |
| v15 * v87 | 21.888 | .111 |
| v15 * v88 | 18.335 | .245 |
| v15 * v89 | 24.255 | .061 |
| v16 * v87 | 12.227 | .662 |
| v16 * v88 | 16.863 | .327 |
| v16 * v89 | 16.652 | .340 |
| v17 * v87 | 22.472 | .096 |
| v17 * v88 | 14.513 | .487 |
| v17 * v89 | 19.777 | .181 |
| v18 * v82 | 20.842 | .142 |
| v18 * v83 | 15.460 | .217 |
| v18 * v84 | 11.006 | .528 |
| v18 * v85 | 5.535 | .938 |
| v18 * v86 | 14.037 | .523 |
| v19 * v82 | 24.351 | .059 |
| v19 * v83 | 22.485 | .032 |
| v19 * v84 | 21.471 | .044 |
| v19 * v85 | 17.295 | .139 |
| v19 * v86 | 19.033 | .212 |
| v20 * v82 | 14.944 | .780 |
| v20 * v83 | 7.912 | .951 |
| v20 * v84 | 16.117 | .445 |
| v20 * v85 | 9.377 | .897 |
| v20 * v86 | 13.634 | .849 |
| v21 * v82 | 13.348 | .205 |
| v21 * v83 | 7.287 | .506 |
| v21 * v84 | 9.955 | .268 |
| v21 * v85 | 8.572 | 0.380 |
| v21 * v86 | 5.716 | 0.838 |
| v22 * v82 | 18.194 | .253 |
| v22 * v83 | 8.672 | .731 |
| v22 * v84 | 16.708 | .161 |
| v22 * v85 | 8.991 | .704 |
| v22 * v86 | 8.756 | .890 |
| v23 * v82 | 16.669 | .674 |
| v23 * v83 | 15.412 | .495 |
| v23 * v84 | 23.967 | .090 |
| v23 * v85 | 14.215 | .583 |
| v23 * v86 | 20.852 | .406 |

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| v24 * v82 | 26.099 | .402 |
| v24 * v83 | 9.557 | .976 |
| v24 * v84 | 12.592 | .894 |
| v24 * v85 | 12.463 | .899 |
| v24 * v86 | 18.229 | .833 |
| v25 * v82 | 10.386 | .961 |
| v25 * v83 | 11.478 | .779 |
| v25 * v84 | 21.820 | .149 |
| v25 * v85 | 18.712 | .284 |
| v25 * v86 | 15.374 | .755 |
| v26 * v82 | 13.226 | .867 |
| v26 * v83 | 11.682 | .766 |
| v26 * v84 | 24.438 | .080 |
| v26 * v85 | 12.402 | .716 |
| v26 * v86 | 14.155 | .823 |
| v27 * v82 | 19.857 | .177 |
| v27 * v83 | 13.458 | .337 |
| v27 * v84 | 18.931 | .090 |
| v27 * v85 | 18.901 | .091 |
| v27 * v86 | 12.880 | .612 |
| v28 * v82 | 8.893 | .883 |
| v28 * v83 | 7.720 | .807 |
| v28 * v84 | 12.020 | .444 |
| v28 * v85 | 7.362 | .833 |
| v28 * v86 | 10.993 | .753 |
| v18 * v87 | 24.279 | .061 |
| v18 * v88 | 13.768 | .543 |
| v18 * v89 | 17.371 | .297 |
| v19 * v87 | 29.918 | .012 |
| v19 * v88 | 17.237 | .305 |
| v19 * v89 | 20.311 | .160 |
| v20 * v87 | 11.810 | .922 |
| v20 * v88 | 16.594 | .679 |
| v20 * v89 | 14.491 | .805 |
| v21 * v87 | 25.505 | .004 |
| v21 * v88 | 15.843 | .104 |
| v21 * v89 | 27.765 | .002 |
| v22 * v87 | 24.687 | .054 |
| v22 * v88 | 24.534 | .057 |
| v22 * v89 | 33.404 | .004 |
| v23 * v87 | 26.753 | .142 |
| v23 * v88 | 20.064 | .454 |
| v23 * v89 | 26.060 | .164 |

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| v24 * v87 | 27.122 | .350 |
| v24 * v88 | 22.529 | .605 |
| v24 * v89 | 31.087 | .186 |
| v25 * v87 | 19.427 | .494 |
| v25 * v88 | 12.506 | .898 |
| v25 * v89 | 11.918 | .919 |
| v26 * v87 | 20.453 | .430 |
| v26 * v88 | 12.787 | .886 |
| v26 * v89 | 12.871 | .883 |
| v27 * v87 | 19.008 | .213 |
| v27 * v88 | 21.199 | .131 |
| v27 * v89 | 20.116 | .168 |
| v28 * v87 | 20.101 | .168 |
| v28 * v88 | 23.716 | .070 |
| v28 * v89 | 15.506 | .416 |
| v18 * v97 | 10.853 | .286 |
| v19 * v97 | 8.261 | .508 |
| v20 * v97 | 24.736 | .016 |
| v21 * v97 | 3.273 | .774 |
| v22 * v97 | 16.307 | .061 |
| v23 * v97 | 21.070 | .049 |
| v24 * v97 | 8.059 | .921 |
| v25 * v97 | 16.496 | .170 |
| v26 * v97 | 12.866 | .379 |
| v27 * v97 | 12.177 | .204 |
| v28 * v97 | 7.032 | .634 |
| v18 * v98 | 16.127 | .186 |
| v19 * v98 | 25.082 | .014 |
| v20 * v98 | 15.777 | .469 |
| v21 * v98 | 3.528 | .897 |
| v22 * v98 | 11.571 | .481 |
| v23 * v98 | 33.915 | .006 |
| v24 * v98 | 16.473 | .687 |
| v25 * v98 | 35.302 | .004 |
| v26 * v98 | 31.951 | .010 |
| v27 * v98 | 38.233 | .000 |
| v28 * v98 | 15.266 | .227 |
| v18 * v99 | 16.967 | .049 |
| v19 * v99 | 13.037 | .161 |
| v20 * v99 | 20.487 | .058 |
| v21 * v99 | 9.571 | .144 |
| v22 * v99 | 12.507 | .186 |
| v23 * v99 | 19.986 | .067 |

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| v24 * v99 | 25.230 | .047 |
| v25 * v99 | 24.885 | .015 |
| v26 * v99 | 22.215 | .035 |
| v27 * v99 | 14.664 | .101 |
| v28 * v99 | 14.167 | .117 |
| v29 * v74 | 22.875 | .295 |
| v29 * v75 | 24.418 | .225 |
| v29 * v76 | 23.480 | .266 |
| v29 * v77 | 26.870 | .139 |
| v30 * v74 | 18.114 | .580 |
| v30 * v75 | 26.303 | .156 |
| v30 * v76 | 26.725 | .143 |
| v30 * v77 | 16.983 | .654 |
| v31 * v74 | 38.860 | .007 |
| v31 * v75 | 37.541 | .010 |
| v31 * v76 | 38.303 | .008 |
| 31 * v77 | 20.697 | .415 |
| v32 * v7 | 22.063 | .337 |
| v32 * v75 | 29.102 | .086 |
| v32 * v76 | 17.313 | .633 |
| v32 * v77 | 16.986 | .654 |
| v29 * v78 | 8.464 | .934 |
| v29 * v79 | 9.050 | .911 |
| v29 * v80 | 10.627 | .832 |
| v29 * v81 | 19.842 | .468 |
| V29* v82 | 8.146 | .991 |
| v30 * v78 | 8.949 | .915 |
| v30 * v79 | 8.656 | .927 |
| v30 * v80 | 7.518 | .962 |
| v30 * v81 | 19.244 | .506 |
| v31 * v78 | 5.814 | .990 |
| v31 * v79 | 12.281 | .724 |
| v31 * v80 | 15.106 | .517 |
| v31 * v81 | 22.662 | .306 |
| v32 * v78 | 17.334 | .364 |
| v32 * v79 | 17.875 | .331 |
| v32 * v80 | 17.236 | .370 |
| v32 * v81 | 20.429 | .431 |
| v29 * v82 | 8.146 | .991 |
| v29 * v83 | 15.659 | .477 |
| v29 * v84 | 13.638 | .626 |
| v29 * v85 | 11.306 | .790 |
| v29 * v86 | 15.329 | .757 |

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| v30 * v82 | 14.146 | .823 |
| v30 * v83 | 14.046 | .595 |
| v30 * v84 | 10.796 | .822 |
| v30 * v85 | 12.801 | .687 |
| v30 * v86 | 23.632 | .259 |
| v31 * v82 | 19.456 | .492 |
| v31 * v83 | 11.966 | .746 |
| v31 * v84 | 13.603 | .628 |
| v31 * v85 | 14.329 | .574 |
| v31 * v86 | 20.572 | .423 |
| v32 * v82 | 25.039 | .200 |
| v32 * v83 | 17.810 | .335 |
| v32 * v84 | 11.123 | .802 |
| v32 * v85 | 11.908 | .750 |
| v32 * v86 | 36.258 | .014 |
| v29 * v87 | 19.608 | .483 |
| v29 * v88 | 21.853 | .349 |
| v29 * v89 | 25.706 | .176 |
| v30 * v87 | 18.106 | .580 |
| v30 * v88 | 13.971 | .832 |
| v30 * v89 | 28.191 | .105 |
| v31 * v87 | 19.065 | .518 |
| v31 * v88 | 13.977 | .832 |
| v31 * v89 | 21.541 | .366 |
| v32 * v87 | 32.886 | .035 |
| v32 * v88 | 21.893 | .346 |
| v32 * v89 | 50.459 | .000 |
| v29 * v90 | 9.894 | .872 |
| v29 * v91 | 21.723 | .005 |
| v29 * v92 | 18.499 | .018 |
| v29 * v93 | 14.361 | .278 |
| v29 * v94 | 24.607 | .077 |
| v29 * v95 | 24.774 | .074 |
| v30 * v90 | 11.288 | .791 |
| v30 * v91 | 6.930 | .544 |
| v30 * v92 | 11.130 | .194 |
| v30 * v93 | 6.119 | .910 |
| v30 * v94 | 16.371 | .427 |
| v30 * v95 | 27.160 | .040 |
| v31 * v90 | 13.880 | .608 |
| v31 * v91 | 13.087 | .109 |
| v31 * v92 | 8.757 | .363 |
| v31 * v93 | 13.186 | .356 |

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| v31 * v94 | 9.201 | .905 |
| v31 * v95 | 41.633 | .000 |
| v32 * v90 | 15.906 | .460 |
| v32 * v91 | 9.352 | .313 |
| v32 * v92 | 12.475 | .131 |
| v32 * v93 | 5.795 | .926 |
| v32 * v94 | 22.311 | .133 |
| v32 * v95 | 8.870 | .919 |
| v29 * v97 | 18.297 | .107 |
| v30 * v97 | 13.299 | .348 |
| v31 * v97 | 28.093 | .005 |
| v32 * v97 | 12.503 | .406 |
| v29 * v98 | 17.392 | .361 |
| v30 * v98 | 33.705 | .006 |
| v31 * v98 | 12.519 | .708 |
| v32 * v98 | 36.033 | .003 |
| v29 * v99 | 24.947 | .015 |
| v30 * v99 | 23.446 | .024 |
| v31 * v99 | 17.407 | .135 |
| v32 * v99 | 29.662 | .003 |
| v29 * v100 | 26.374 | .009 |
| v30 * v100 | 10.583 | .565 |
| v31 * v100 | 19.344 | .081 |
| v32 * v100 | 10.434 | .578 |
| v33 * v73 | 24.895 | .205 |
| v34 * v73 | 31.611 | .002 |
| v35 * v73 | 17.398 | .135 |
| v36 * v73 | 17.996 | .324 |
| v37 * v73 | 20.532 | .058 |
| v33 * v74 | 43.401 | .013 |
| v33 * v75 | 38.741 | .039 |
| v33 * v76 | 32.058 | .156 |
| v33 * v77 | 27.809 | .317 |
| v34 * v74 | 39.973 | .000 |
| v34 * v75 | 41.619 | .000 |
| v34 * v76 | 29.185 | .015 |
| v34 * v77 | 31.756 | .007 |
| v35 * v74 | 30.933 | .009 |
| v35 * v75 | 35.979 | .002 |
| v35 * v76 | 20.641 | .149 |
| v35 * v77 | 23.545 | .073 |
| v36 * v74 | 30.853 | .057 |
| v36 * v75 | 36.380 | .014 |

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| v36 * v76 | 31.674 | .047 |
| v36 * v77 | 9.943 | .969 |
| v37 * v74 | 22.794 | .089 |
| v37 * v75 | 30.022 | .012 |
| v37 * v76 | 22.728 | .090 |
| v37 * v77 | 21.455 | .123 |
| v33 * v82 | 15.681 | .924 |
| v33 * v83 | 21.077 | .393 |
| v33 * v84 | 22.253 | .327 |
| v33 * v85 | 18.489 | .555 |
| v33 * v86 | 23.174 | .567 |
| v34 * v82 | 34.046 | .003 |
| v34 * v83 | 26.714 | .008 |
| v34 * v84 | 26.156 | .010 |
| v34 * v85 | 31.042 | .002 |
| v34 * v86 | 25.380 | .045 |
| v35 * v82 | 21.890 | .111 |
| v35 * v83 | 13.229 | .353 |
| v35 * v84 | 18.016 | .115 |
| v35 * v85 | 19.791 | .071 |
| v35 * v86 | 11.434 | .721 |
| v36 * v82 | 15.324 | .758 |
| v36 * v83 | 14.607 | .554 |
| v36 * v84 | 16.960 | .388 |
| v36 * v85 | 12.883 | .681 |
| v36 * v86 | 17.167 | .642 |
| v37 * v82 | 24.425 | .058 |
| v37 * v83 | 25.675 | .012 |
| v37 * v84 | 14.181 | .289 |
| v37 * v85 | 19.976 | .068 |
| v37 * v86 | 25.123 | .048 |
| v33 * v87 | 23.938 | .523 |
| v33 * v88 | 24.382 | .497 |
| v33 * v89 | 34.731 | .093 |
| v34 * v87 | 29.089 | .016 |
| v34 * v88 | 40.131 | .000 |
| v34 * v89 | 28.944 | .016 |
| v35 * v87 | 12.927 | .608 |
| v35 * v88 | 25.563 | .043 |
| v35 * v89 | 18.013 | .262 |
| v36 * v87 | 15.064 | .773 |
| v36 * v88 | 18.099 | .581 |
| v36 * v89 | 11.864 | .921 |

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| v37 * v87 | 16.364 | .358 |
| v37 * v88 | 16.928 | .323 |
| v37 * v89 | 12.868 | .612 |
| v33 * v90 | 21.564 | .365 |
| v33 * v91 | 31.039 | .001 |
| v33 * v92 | 29.603 | .001 |
| v33 * v93 | 24.881 | .052 |
| v33 * v94 | 21.028 | .395 |
| v33 * v95 | 78.984 | .000 |
| v34 * v90 | 14.721 | .257 |
| v34 * v91 | 35.035 | .000 |
| v34 * v92 | 5.609 | .000 |
| v34 * v93 | 20.091 | .017 |
| v34 * v94 | 19.455 | .078 |
| v34 * v95 | 53.339 | .000 |
| v35 * v90 | 9.027 | .701 |
| v35 * v91 | 19.461 | .003 |
| v35 * v92 | 15.476 | .017 |
| v35 * v93 | 7.405 | .595 |
| v35 * v94 | 16.575 | .166 |
| v35 * v95 | 20.913 | .052 |
| v36 * v90 | 10.018 | .866 |
| v36 * v91 | 12.429 | .133 |
| v36 * v92 | 9.978 | .267 |
| v36 * v93 | 14.159 | .291 |
| v36 * v94 | 18.927 | .272 |
| v36 * v95 | 15.494 | .489 |
| v37 * v90 | 21.212 | .047 |
| v37 * v91 | 26.363 | .000 |
| v37 * v92 | 18.364 | .005 |
| v37 * v93 | 15.337 | .082 |
| v37 * v94 | 22.733 | .030 |
| v37 * v95 | 24.697 | .016 |
| v33 * v96 | 52.747 | .000 |
| v34 * v96 | 38.766 | .000 |
| v35 * v96 | 27.058 | .000 |
| v36 * v96 | 9.889 | .273 |
| v37 * v96 | 26.226 | .000 |
| v33 * v98 | 30.303 | .065 |
| v34 * v98 | 18.127 | .112 |
| v35 * v98 | 12.787 | .385 |
| v36 * v98 | 12.271 | .725 |
| v37 * v98 | 16.521 | .169 |

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| v33 * v99 | 56.943 | .000 |
| v34 * v99 | 23.621 | .005 |
| v35 * v99 | 26.623 | .002 |
| v36 * v99 | 29.119 | .004 |
| v37 * v99 | 29.908 | .000 |
| v38 * v82 | 82.276 | .000 |
| v38 * v83 | 78.093 | .000 |
| v38 * v84 | 70.843 | .000 |
| v38 * v85 | 44.331 | .000 |
| v38 * v86 | 70.361 | .000 |
| v39 * v82 | 28.544 | .097 |
| v39 * v83 | 9.090 | .910 |
| v39 * v84 | 9.513 | .891 |
| v39 * v85 | 9.877 | .873 |
| v39 * v86 | 17.575 | .615 |
| v40 * v82 | 37.338 | .011 |
| v40 * v83 | 13.924 | .604 |
| v40 * v84 | 23.491 | .101 |
| v40 * v85 | 12.339 | .720 |
| v40 * v86 | 12.342 | .904 |
| v41 * v82 | 13.458 | .567 |
| v41 * v83 | 7.462 | .826 |
| v41 * v84 | 14.033 | .299 |
| v41 * v85 | 6.148 | .908 |
| v41 * v86 | 6.518 | .970 |
| v42 * v82 | 28.613 | .018 |
| v42 * v83 | 10.583 | .565 |
| v42 * v84 | 22.806 | .029 |
| v42 * v85 | 25.661 | .012 |
| v42 * v86 | 11.092 | .746 |
| v43 * v82 | 29.993 | .225 |
| v43 * v83 | 11.061 | .945 |
| v43 * v84 | 18.652 | .545 |
| v43 * v85 | 22.101 | .335 |
| v43 * v86 | 16.905 | .885 |
| v44 * v82 | 11.085 | .944 |
| v44 * v83 | 6.230 | .985 |
| v44 * v84 | 17.326 | .365 |
| v44 * v85 | 10.504 | .839 |
| v44 * v86 | 19.133 | .513 |
| v38 * v87 | 77.827 | .000 |
| v38 * v88 | 80.882 | .000 |
| v38 * v89 | 73.480 | .000 |

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| v39 * v87 | 15.262 | .761 |
| v39 * v88 | 24.395 | .226 |
| v39 * v89 | 29.400 | .080 |
| v40 * v87 | 41.556 | .003 |
| v40 * v88 | 28.642 | .095 |
| v40 * v89 | 16.234 | .702 |
| v41 * v87 | 8.063 | .921 |
| v41 * v88 | 17.093 | .313 |
| v41 * v89 | 15.266 | .432 |
| v42 * v87 | 14.408 | .495 |
| v42 * v88 | 22.043 | .107 |
| v42 * v89 | 15.162 | .440 |
| v43 * v87 | 30.447 | .208 |
| v43 * v88 | 27.802 | .317 |
| v43 * v89 | 30.777 | .197 |
| v44 * v87 | 20.871 | .405 |
| v44 * v88 | 17.822 | .599 |
| v44 * v89 | 28.836 | .091 |
| v45 * v82 | 22.542 | .094 |
| v45 * v83 | 13.068 | .364 |
| v45 * v84 | 24.816 | .016 |
| v45 * v85 | 13.097 | .362 |
| v45 * v86 | 17.715 | .278 |
| v46 * v82 | 14.812 | .465 |
| v46 * v83 | 11.754 | .466 |
| v46 * v84 | 13.011 | .368 |
| v46 * v85 | 15.186 | .231 |
| v46 * v86 | 12.401 | .648 |
| v47 * v82 | 12.078 | .673 |
| v47 * v83 | 6.433 | .893 |
| v47 * v84 | 11.326 | .501 |
| v47 * v85 | 10.272 | .592 |
| v47 * v86 | 15.384 | .424 |
| v48 * v82 | 26.557 | .033 |
| v48 * v83 | 20.246 | .063 |
| v48 * v84 | 17.471 | .133 |
| v48 * v85 | 11.274 | .506 |
| v48 * v86 | 16.813 | .330 |
| v49 * v82 | 17.597 | .284 |
| v49 * v83 | 9.732 | .639 |
| v49 * v84 | 11.230 | .509 |
| v49 * v85 | 8.903 | .711 |
| v49 * v86 | 11.057 | .749 |

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| v50 * v82 | 20.420 | .432 |
| v50 * v83 | 25.367 | .064 |
| v50 * v84 | 12.210 | .729 |
| v50 * v85 | 18.259 | .309 |
| v50 * v86 | 16.741 | .670 |
| v45 * v87 | 22.724 | .090 |
| v45 * v88 | 15.966 | .384 |
| v45 * v89 | 23.522 | .074 |
| v46 * v87 | 17.839 | .271 |
| v46 * v88 | 20.660 | .148 |
| v46 * v89 | 19.215 | .204 |
| v47 * v87 | 10.607 | .780 |
| v47 * v88 | 14.827 | .464 |
| v47 * v89 | 9.329 | .860 |
| v48 * v87 | 22.493 | .096 |
| v48 * v88 | 22.744 | .090 |
| v48 * v89 | 13.325 | .577 |
| v49 * v87 | 20.582 | .151 |
| v49 * v88 | 15.383 | .424 |
| v49 * v89 | 20.001 | .172 |
| v50 * v87 | 29.490 | .079 |
| v50 * v88 | 19.795 | .471 |
| v50 * v89 | 14.359 | .812 |
| v45 * v98 | 23.778 | .022 |
| v46 * v98 | 6.813 | .870 |
| v47 * v98 | 11.541 | .483 |
| v48 * v98 | 15.479 | .216 |
| v49 * v98 | 30.141 | .003 |
| v50 * v98 | 16.660 | .408 |
| v45 * v99 | 12.965 | .164 |
| v46 * v99 | 24.741 | .003 |
| v47 * v99 | 26.071 | .002 |
| v48 * v99 | 20.635 | .014 |
| v49 * v99 | 24.141 | .004 |
| v50 * v99 | 20.755 | .054 |
| v51 * v74 | 22.766 | .089 |
| v51 * v75 | 32.012 | .006 |
| v51 * v76 | 22.493 | .096 |
| v51 * v77 | 24.885 | .052 |
| v52 * v74 | 65.051 | .000 |
| v52 * v75 | 52.045 | .000 |
| v52 * v76 | 50.391 | .000 |
| v52 * v77 | 18.092 | .581 |

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| v53 * v74 | 16.990 | .319 |
| v53 * v75 | 19.289 | .201 |
| v53 * v76 | 11.582 | .710 |
| v53 * v77 | 32.146 | .006 |
| v54 * v74 | 24.047 | .240 |
| v54 * v75 | 35.558 | .017 |
| v54 * v76 | 29.899 | .072 |
| v54 * v77 | 42.123 | .003 |
| v55 * v74 | 21.339 | .126 |
| v55 * v75 | 26.793 | .030 |
| v55 * v76 | 19.339 | .199 |
| v55 * v77 | 35.878 | .002 |
| v56 * v74 | 25.375 | .045 |
| v56 * v75 | 23.343 | .077 |
| v56 * v76 | 15.116 | .443 |
| v56 * v77 | 34.828 | .003 |
| v57 * v74 | 19.075 | .210 |
| v57 * v75 | 19.889 | .176 |
| v57 * v76 | 13.597 | .556 |
| v57 * v77 | 35.934 | .002 |
| v58 * v74 | 12.19 | .664 |
| v58 * v75 | 12.486 | .642 |
| v58 * v76 | 10.055 | .816 |
| v58 * v77 | 23.539 | .073 |
| v59 * v74 | 27.995 | .022 |
| v59 * v75 | 19.340 | .199 |
| v59 * v76 | 16.564 | .346 |
| v59 * v77 | 13.264 | .582 |
| v60 * v74 | 22.942 | .085 |
| v60 * v75 | 30.485 | .010 |
| v60 * v76 | 26.204 | .036 |
| v60 * v77 | 14.043 | .522 |
| v51 * v78 | 11.950 | .450 |
| v51 * v79 | 23.838 | .021 |
| v51 * v80 | 25.574 | .012 |
| v51 * v81 | 28.047 | .021 |
| v52 * v78 | 20.991 | .179 |
| v52 * v79 | 21.665 | .154 |
| v52 * v80 | 18.305 | .306 |
| v52 * v81 | 21.722 | .356 |
| v53 * v78 | 11.701 | .470 |
| v53 * v79 | 11.331 | .501 |
| v53 * v80 | 17.792 | .122 |

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| v53 * v81 | 21.462 | .123 |
| v54 * v78 | 29.592 | .020 |
| v54 * v79 | 27.648 | .035 |
| v54 * v80 | 31.605 | .011 |
| v54 * v81 | 15.015 | .776 |
| v55 * v78 | 17.840 | .121 |
| v55 * v79 | 14.690 | .259 |
| v55 * v80 | 25.317 | .013 |
| v55 * v81 | 13.302 | .579 |
| v56 * v78 | 12.130 | .435 |
| v56 * v79 | 20.226 | .063 |
| v56 * v80 | 22.313 | .034 |
| v56 * v81 | 17.807 | .273 |
| v57 * v78 | 12.697 | .391 |
| v57 * v79 | 18.462 | .102 |
| v57 * v80 | 18.776 | .094 |
| v57 * v81 | 13.066 | .597 |
| v58 * v78 | 11.978 | .447 |
| v58 * v79 | 9.599 | .651 |
| v58 * v80 | 13.395 | .341 |
| v58 * v81 | 19.530 | .191 |
| v59 * v78 | 42.240 | .000 |
| v59 * v79 | 47.698 | .000 |
| v59 * v80 | 52.839 | .000 |
| v59 * v81 | 23.997 | .065 |
| v60 * v78 | 14.669 | .260 |
| v60 * v79 | 16.971 | .151 |
| v60 * v80 | 22.705 | .030 |
| v60 * v81 | 27.220 | .027 |
| v51 * v82 | 21.649 | .117 |
| v51 * v83 | 21.511 | .043 |
| v51 * v84 | 11.887 | .455 |
| v51 * v85 | 16.765 | .159 |
| v51 * v86 | 11.675 | .703 |
| v52 * v82 | 15.012 | .776 |
| v52 * v83 | 13.053 | .669 |
| v52 * v84 | 21.353 | .165 |
| v52 * v85 | 13.751 | .617 |
| v52 * v86 | 17.244 | .637 |
| v53 * v82 | 22.263 | .101 |
| v53 * v83 | 13.247 | .351 |
| v53 * v84 | 14.928 | .245 |
| v53 * v85 | 8.057 | .781 |

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| v53 * v86 | 6.227 | .976 |
| v54 * v82 | 16.280 | .699 |
| v54 * v83 | 14.365 | .572 |
| v54 * v84 | 14.739 | .544 |
| v54 * v85 | 7.441 | .964 |
| v54 * v86 | 14.901 | .782 |
| v55 * v82 | 14.214 | .509 |
| v55 * v83 | 22.579 | .032 |
| v55 * v84 | 10.905 | .537 |
| v55 * v85 | 9.158 | .689 |
| v55 * v86 | 8.050 | .922 |
| v56 * v82 | 21.203 | .130 |
| v56 * v83 | 11.945 | .450 |
| v56 * v84 | 10.685 | .556 |
| v56 * v85 | 7.495 | .823 |
| v56 * v86 | 17.216 | .306 |
| v57 * v82 | 19.594 | .188 |
| v57 * v83 | 13.795 | .314 |
| v57 * v84 | 12.815 | .383 |
| v57 * v85 | 10.017 | .614 |
| v57 * v86 | 16.705 | .337 |
| v58 * v82 | 16.424 | .354 |
| v58 * v83 | 23.438 | .024 |
| v58 * v84 | 19.853 | .070 |
| v58 * v85 | 5.518 | .938 |
| v58 * v86 | 12.146 | .668 |
| v59 * v82 | 28.145 | .021 |
| v59 * v83 | 25.746 | .012 |
| v59 * v84 | 11.172 | .514 |
| v59 * v85 | 16.982 | .150 |
| v59 * v86 | 17.371 | .297 |
| v60 * v82 | 32.364 | .006 |
| v60 * v83 | 25.933 | .011 |
| v60 * v84 | 31.775 | .001 |
| v60 * v85 | 10.910 | .537 |
| v60 * v86 | 13.053 | .598 |
| v51 * v87 | 13.726 | .546 |
| v51 * v88 | 21.756 | .114 |
| v51 * v89 | 15.093 | .445 |
| v52 * v87 | 21.986 | .341 |
| v52 * v88 | 12.924 | .881 |
| v52 * v89 | 22.807 | .298 |
| v53 * v87 | 13.624 | .554 |

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| v53 * v88 | 22.159 | .104 |
| v53 * v89 | 14.115 | .517 |
| v54 * v87 | 12.793 | .886 |
| v54 * v88 | 18.570 | .550 |
| v54 * v89 | 20.278 | .441 |
| v55 * v87 | 9.941 | .823 |
| v55 * v88 | 18.294 | .248 |
| v55 * v89 | 14.446 | .492 |
| v56 * v87 | 16.425 | .354 |
| v56 * v88 | 21.130 | .133 |
| v56 * v89 | 13.966 | .528 |
| v57 * v87 | 15.023 | .450 |
| v57 * v88 | 21.304 | .127 |
| v57 * v89 | 11.112 | .745 |
| v58 * v87 | 14.764 | .469 |
| v58 * v88 | 17.746 | .276 |
| v58 * v89 | 13.955 | .529 |
| v59 * v87 | 46.772 | .000 |
| v59 * v88 | 33.787 | .004 |
| v59 * v89 | 21.086 | .134 |
| v60 * v87 | 18.012 | .262 |
| v60 * v88 | 22.317 | .100 |
| v60 * v89 | 16.911 | .324 |
| v61 * v74 | 25.675 | .042 |
| v61 * v75 | 17.205 | .307 |
| v61 * v76 | 21.236 | .129 |
| v61 * v77 | 24.535 | .057 |
| v62 * v74 | 18.307 | .567 |
| v62 * v75 | 24.111 | .238 |
| v62 * v76 | 14.771 | .789 |
| v62 * v77 | 21.439 | .372 |
| v63 * v74 | 19.823 | .031 |
| v63 * v75 | 13.006 | .223 |
| v63 * v76 | 17.207 | .070 |
| v63 * v77 | 20.285 | .027 |
| v64 * v74 | 10.623 | .779 |
| v64 * v75 | 13.400 | .571 |
| v64 * v76 | 10.363 | .796 |
| v64 * v77 | 33.091 | .005 |
| v61 * v78 | 11.585 | .480 |
| v61 * v79 | 17.090 | .146 |
| v61 * v80 | 16.990 | .150 |
| v61 * v81 | 12.442 | .645 |

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| v62 * v78 | 16.653 | .408 |
| v62 * v79 | 24.546 | .078 |
| v62 * v80 | 22.273 | .135 |
| v62 * v81 | 23.038 | .287 |
| v63 * v78 | 13.691 | .090 |
| v63 * v79 | 30.471 | .000 |
| v63 * v80 | 27.007 | .001 |
| v63 * v81 | 16.552 | .085 |
| v64 * v78 | 26.676 | .009 |
| v64 * v79 | 41.311 | .000 |
| v64 * v80 | 31.097 | .002 |
| v64 * v81 | 14.557 | .484 |
| v61 * v82 | 13.223 | .585 |
| v61 * v83 | 13.672 | .322 |
| v61 * v84 | 12.643 | .396 |
| v61 * v85 | 5.536 | .938 |
| v61 * v86 | 13.276 | .581 |
| v62 * v82 | 21.390 | .374 |
| v62 * v83 | 14.887 | .533 |
| v62 * v84 | 13.962 | .602 |
| v62 * v85 | 14.811 | .538 |
| v62 * v86 | 13.132 | .872 |
| v63 * v82 | 12.531 | .251 |
| v63 * v83 | 9.961 | .268 |
| v63 * v84 | 11.408 | .180 |
| v63 * v85 | 15.839 | .045 |
| v63 * v86 | 3.906 | .951 |
| v64 * v82 | 23.994 | .065 |
| v64 * v83 | 18.707 | .096 |
| v64 * v84 | 34.229 | .001 |
| v64 * v85 | 17.109 | .146 |
| v64 * v86 | 7.934 | .926 |
| v61 * v87 | 18.160 | .254 |
| v61 * v88 | 29.160 | .015 |
| v61 * v89 | 17.339 | .299 |
| v62 * v87 | 22.129 | .334 |
| v62 * v88 | 20.540 | .425 |
| v62 * v89 | 27.678 | .117 |
| v63 * v87 | 12.622 | .246 |
| v63 * v88 | 15.484 | .115 |
| v63 * v89 | 11.857 | .295 |
| v64 * v87 | 4.468 | .996 |
| v64 * v88 | 8.627 | .896 |

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| v64 * v89 | 11.157 | .741 |
| v65 * v74 | 27.488 | .122 |
| v65 * v75 | 28.629 | .095 |
| v65 * v76 | 21.787 | .352 |
| v65 * v77 | 45.714 | .001 |
| v66 * v74 | 24.146 | .063 |
| v66 * v75 | 24.167 | .062 |
| v66 * v76 | 22.233 | .102 |
| v66 * v77 | 33.468 | .004 |
| v67 * v74 | 33.291 | .004 |
| v67 * v75 | 31.438 | .008 |
| v67 * v76 | 32.181 | .006 |
| v67 * v77 | 23.416 | .076 |
| v68 * v74 | 23.498 | .074 |
| v68 * v75 | 21.788 | .113 |
| v68 * v76 | 18.950 | .216 |
| v68 * v77 | 16.677 | .339 |
| v65 * v78 | 18.616 | .289 |
| v65 * v79 | 26.682 | .045 |
| v65 * v80 | 27.810 | .033 |
| v65 * v81 | 15.659 | .738 |
| v66 * v78 | 8.306 | .761 |
| v66 * v79 | 12.051 | .442 |
| v66 * v80 | 16.428 | .172 |
| v66 * v81 | 15.631 | .407 |
| v67 * v78 | 12.504 | .406 |
| v67 * v79 | 18.299 | .107 |
| v67 * v80 | 27.477 | .007 |
| v67 * v81 | 24.928 | .051 |
| v68 * v78 | 5.495 | .939 |
| v68 * v79 | 17.789 | .122 |
| v68 * v80 | 15.151 | .233 |
| v68 * v81 | 10.592 | .781 |
| v65 * v82 | 35.906 | .016 |
| v65 * v83 | 24.068 | .088 |
| v65 * v84 | 22.982 | .114 |
| v65 * v85 | 14.463 | .564 |
| v65 * v86 | 19.747 | .474 |
| v66 * v82 | 15.690 | .403 |
| v66 * v83 | 8.912 | .710 |
| v66 * v84 | 19.541 | .076 |
| v66 * v85 | 5.217 | .950 |
| v66 * v86 | 10.518 | .786 |

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| v67 * v82 | 55.986 | .000 |
| v67 * v83 | 17.255 | .140 |
| v67 * v84 | 24.570 | .017 |
| v67 * v85 | 26.598 | .009 |
| v67 * v86 | 18.683 | .228 |
| v68 * v82 | 10.894 | .760 |
| v68 * v83 | 12.392 | .415 |
| v68 * v84 | 8.175 | .771 |
| v68 * v85 | 8.458 | .748 |
| v68 * v86 | 9.005 | .877 |
| v65 * v87 | 19.295 | .503 |
| v65 * v88 | 32.417 | .039 |
| v65 * v89 | 23.392 | .270 |
| v66 * v87 | 10.360 | .797 |
| v66 * v88 | 23.745 | .070 |
| v66 * v89 | 16.902 | .325 |
| v67 * v87 | 23.617 | .072 |
| v67 * v88 | 21.900 | .110 |
| v67 * v89 | 19.156 | .207 |
| v68 * v87 | 16.220 | .368 |
| v68 * v88 | 8.760 | .890 |
| v68 * v89 | 9.830 | .830 |
| v65 * v90 | 19.691 | .234 |
| v65 * v91 | 31.949 | .000 |
| v65 * v92 | 28.692 | .000 |
| v65 * v93 | 25.366 | .013 |
| v65 * v94 | 32.711 | .008 |
| v65 * v95 | 40.807 | .001 |
| v66 * v90 | 11.022 | .527 |
| v66 * v91 | 28.692 | .000 |
| v66 * v92 | 30.330 | .000 |
| v66 * v93 | 26.537 | .002 |
| v66 * v94 | 21.315 | .046 |
| v66 * v95 | 27.855 | .006 |
| v67 * v90 | 12.943 | .373 |
| v67 * v91 | 16.337 | .012 |
| v67 * v92 | 12.832 | .046 |
| v67 * v93 | 21.613 | .010 |
| v67 * v94 | 23.020 | .028 |
| v67 * v95 | 26.965 | .008 |
| v68 * v90 | 9.778 | .635 |
| v68 * v91 | 12.558 | .051 |
| v68 * v92 | 11.350 | .078 |

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| v68 * v93 | 8.042 | .530 |
| v68 * v94 | 17.321 | .138 |
| v68 * v95 | 26.334 | .010 |
| v65 * v98 | 17.391 | .361 |
| v66 * v98 | 24.342 | .018 |
| v67 * v98 | 12.940 | .373 |
| v68 * v98 | 10.626 | .561 |
| v65 * v99 | 42.456 | .000 |
| v66 * v99 | 12.874 | .168 |
| v67 * v99 | 10.686 | .298 |
| v68 * v99 | 17.518 | .041 |
| v65 * v100 | 29.178 | .004 |
| v66 * v100 | 17.755 | .038 |
| v67 * v100 | 15.143 | .087 |
| v68 * v100 | 9.083 | .430 |
| v69 * v74 | 19.609 | .187 |
| v69 * v75 | 20.206 | .164 |
| v69 * v76 | 15.235 | .435 |
| v69 * v77 | 28.411 | .019 |
| v70 * v74 | 29.391 | .080 |
| v70 * v75 | 35.178 | .019 |
| v70 * v76 | 26.315 | .156 |
| v70 * v77 | 50.101 | .000 |
| v71 * v74 | 42.411 | .002 |
| v71 * v75 | 47.934 | .000 |
| v71 * v76 | 31.003 | .055 |
| v71 * v77 | 39.407 | .006 |
| v72 * v74 | 156.290 | .000 |
| v72 * v75 | 162.686 | .000 |
| v72 * v76 | 142.921 | .000 |
| v72 * v77 | 146.663 | .000 |
| v69 * v78 | 26.735 | .008 |
| v69 * v79 | 27.669 | .006 |
| v69 * v80 | 38.230 | .000 |
| v69 * v81 | 23.185 | .080 |
| v70 * v78 | 8.891 | .918 |
| v70 * v79 | 14.523 | .560 |
| v70 * v80 | 18.993 | .269 |
| v70 * v81 | 17.158 | .643 |
| v71 * v78 | 22.580 | .125 |
| v71 * v79 | 28.155 | .030 |
| v71 * v80 | 31.987 | .010 |
| v71 * v81 | 23.554 | .262 |

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| v72 * v78 | 70.841 | .000 |
| v72 * v79 | 145.797 | .000 |
| v72 * v80 | 139.047 | .000 |
| v72 * v81 | 149.004 | .000 |
| v69 * v82 | 25.858 | .040 |
| v69 * v83 | 32.238 | .001 |
| v69 * v84 | 15.870 | .197 |
| v69 * v85 | 17.285 | .139 |
| v69 * v86 | 12.718 | .624 |
| v70 * v82 | 21.518 | .367 |
| v70 * v83 | 25.520 | .061 |
| v70 * v84 | 12.540 | .706 |
| v70 * v85 | 17.564 | .350 |
| v70 * v86 | 11.292 | .938 |
| v71 * v82 | 54.450 | .000 |
| v71 * v83 | 63.361 | .000 |
| v71 * v84 | 14.515 | .560 |
| v71 * v85 | 14.869 | .534 |
| v71 * v86 | 13.681 | .846 |
| v72 * v82 | 210.302 | .000 |
| v72 * v83 | 138.575 | .000 |
| v72 * v84 | 141.070 | .000 |
| v72 * v85 | 79.384 | .000 |
| v72 * v86 | 139.137 | .000 |
| v69 * v87 | 23.878 | .067 |
| v69 * v88 | 24.575 | .056 |
| v69 * v89 | 18.690 | .228 |
| v70 * v87 | 31.218 | .052 |
| v70 * v88 | 18.888 | .529 |
| v70 * v89 | 14.272 | .816 |
| v71 * v87 | 12.550 | .896 |
| v71 * v88 | 12.719 | .889 |
| v71 * v89 | 18.064 | .583 |
| v72 * v87 | 143.588 | .000 |
| v72 * v88 | 142.809 | .000 |
| v72 * v89 | 142.377 | .000 |
| v69 * v90 | 25.856 | .011 |
| v69 * v91 | 18.263 | .006 |
| v69 * v92 | 15.339 | .018 |
| v69 * v93 | 15.214 | .085 |
| v69 * v94 | 11.349 | .499 |
| v69 * v95 | 31.096 | .002 |
| v70 * v90 | 13.393 | .644 |

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| v70 * v91 | 25.945 | .001 |
| v70 * v92 | 20.076 | .010 |
| v70 * v93 | 21.657 | .042 |
| v70 * v94 | 26.403 | .049 |
| v70 * v95 | 18.627 | .288 |
| v71 * v90 | 12.466 | .711 |
| v71 * v91 | 26.778 | .001 |
| v71 * v92 | 34.170 | .000 |
| v71 * v93 | 26.695 | .009 |
| v71 * v94 | 27.240 | .039 |
| v71 * v95 | 28.396 | .028 |
| v72 * v90 | 82.094 | .000 |
| v72 * v91 | 18.058 | .021 |
| v72 * v92 | 18.058 | .021 |
| v72 * v93 | 21.946 | .038 |
| v72 * v94 | 17.230 | .371 |
| v72 * v95 | 35.317 | .004 |
| v69 * v98 | 17.088 | .146 |
| v70 * v98 | 11.157 | .800 |
| v71 * v98 | 23.404 | .103 |
| v72 * v98 | 14.003 | .599 |
| v69 * v99 | 19.599 | .021 |
| v70 * v99 | 12.852 | .380 |
| v71 * v99 | 14.230 | .286 |
| v72 * v99 | 25.471 | .013 |