



AN INTEGRATED MODEL FOR THE IMPLEMENTATION OF BOTH ISO 9001:2008 AND TQA

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Abstract

Currently, many organizations use various standards and awards to sustain competitive advantages. ISO 9001 is a standard for quality management system that has been accepted as the proliferation of several quality standards. If an ISO-certified organization wishes to improve its performance continuously, implementing Thailand Quality Award Model (TQA) would be a good idea, because it provides more detailed practices for continual improvement than the ISO standards. However, two problems must be solved when an ISO-certified organization implements TQA. First, it is difficult to identify any reusable parts of the ISO standards for implementing TQA so as to employ existing resources to the best advantage. Second, it is difficult for an ISO-certified organization to implement TQA in an easy way because of the differences in the language, structure, and details of the two sets of documents. This paper presents the integrated model for ISO 9001:2000 and TQA for dealing with these two problems. The developed model would be useful for ISO-certified organizations that plan to implement TQA.

Keywords : ISO 9001:2000; TQA; Mapping; Integrated model

Introduction

Currently, it is competitive on a national and a global marketplace; organizations must implement management system standards such as ISO 9001 to effectively control its processes. ISO 9001 registration is increasingly becoming a requirement for performing business in many industries and with organizations in Thailand. Moreover, ISO-certified organizations have to maintain continuous improvement based on ISO 9001:2008 requires. However, organizations need to go beyond ISO 9001 in order to sustain the competitive advantages. Thailand Quality Award Model (TQA) provides an integrated, results-oriented framework for designing, implementing, and assessing the management of operations in an organization. The TQA criteria concentrate on competitiveness and business results specifically in areas such as customer satisfaction and engagement and customer-perceived value; product and service performance; financial and marketplace performance; workforce capability, capacity, climate, satisfaction, engagement, and development and operational effectiveness. Thus, the awarded organization can provide customers the improving values. It can improve overall organizational effectiveness and capabilities, and organizational and personal learning. The organization will accomplish the performance excellence by implementing TQA criteria. However, TQA has a number of requirements for continual improvement. These requirements need the organizations to create many activities.



In addition, TQA criteria are more complicated than requirements found in ISO 9001:2008. To reuse parts of the ISO standards for implementing TQA, ISO 9001:2008-certified organizations have attempted to implement only some criteria of the TQA criteria. To implement TQA in an ISO-certified organization efficiently and effectively, both the common and different parts of the ISO standards and TQA criteria must be identified. ISO 9001:2008 requirements can be mapped to TQA criteria.

This paper proposes a model in which the requirements of ISO and TQA are integrated. The mapping of a requirement of ISO 9001:2000 to TQA criteria is presented. Conversely, TQA criteria can be mapped to many ISO 9001:2000 requirements. These mappings are useful for comparing these two frameworks. This paper presents these mapping by using a hierarchical structure. The obtained results can help organizations to understand and apply these mappings during TQA implementation. The remainder of this paper is organized as follows: Section 2 gives a brief explanation of ISO 9001:2008 and TQA. Section 3 discusses related works. Section 4 presents the integrated model of ISO 9001:2008 and TQA 2012. Section 5 determines impact of the proposed model. Finally, Section 6 provides the conclusions.


ISO 9000 and TQA

ISO 9000 series of standards

The ISO 9000 series of quality assurance standards, including ISO 9000 (Fundamentals and Vocabulary) (ISO, 2000a; Ketola and Roberts, 2000), ISO 9001 (Requirements) (ISO, 2000c), ISO 9004 (Guidelines for Performance Improvements) (ISO, 2000b), and ISO 19011 (Guidelines for Quality and Environmental Management Systems Auditing), were issued in 1987 and revised in 1994 by the International Organization for Standardization (ISO, 1994a, 1994b). The ISO 9000 series aim to provide purchasers an assurance that the quality of the products and services provided by a supplier meet their requirements. ISO 9001:2000 can be applied to every level of organization. To achieve an ISO certification, organizations must be compliant with every clause of ISO 9001:2000 (Cianfrani et al., 2001). The results would be presented in an organization's management control system through documented policies, manual and procedures, which help to ensure that quality is built into a process. In the ISO 9000 series, there are five individual standards divided into four parts. The companies can use the ISO 9000 series as a guideline to develop an effective quality system. The benefit of the implementation of the ISO 9000 are as follows: increase of the company quality awareness, increase of the product quality awareness, improve the company management, improve the customer relations, improve the products and the services offered, improvement of the relationship within the organization, increase satisfaction, and increase the respect from competitors (Brown and Van der Wiele, 1995)

TQA

MBNQA was created in USA in 1987. The main reason for establishing MBNQA is connected in a need to create a change in the general business environment, especially in the performance of the businesses. The award winning firms reported a 44% higher stock-price return, 48% higher growth in operating income, and a 37% higher growth in sales than the control group of firms (Krasachol L. et al., 1998). The Thailand Quality Award (TQA) was a translation of Malcolm Baldrige National Quality Award (MBNQA). Organizations use various criteria to help them during implementation efforts to evaluate themselves against criteria to determine how well their improvement efforts are in progress. TQA was developed



for improving quality and productivity by helping to stimulate companies to improve quality and productivity establishing guidelines and criteria. The TQA criteria can be used by business, industrial, governmental, and other organizations in evaluating their own quality improvement efforts. In Thailand, Public Sector Management Quality Award (PMQA) criteria will be adopted as the quality management performance evaluation criteria for the governmental organizations. The TQA and PMQA have a hierarchical structure. It has seven strategic criteria. Each strategic criterion has its associated sub-criteria.

Related Work

MBNQA model is one of the most popular and influential Business Excellence models (BEMs) in the western world, launched by the US government. More than 60 national and state/regional awards base their frameworks upon the Baldrige criteria. Only a few studies have compared ISO 9001:2000 and BEMs. For instance, Ho (1999) proposed a sequence of adoption beginning from 5S, BPR, QCC, ISO, TPM and TQM. A five-stage of BEMs implementation was developed by Krasachol (2000). It was related to quality techniques beginning with no tools in the unaware stage, to Kaizen, 5S and QC tools in the basic stage, ISO 9001, SPC, TPM and TQM tools in the developing stage, BEMs in the mature stage and a complete set of tools for the sustaining stage. A self-assessed quality management system (SQMS) was developed by integrating criteria of the Baldrige Award with the conformity requirements of both ISO 9000: 1994 and ISO 14000: 1996. It can assist the organization in its quest for corporate performance, business results and financial health. A SQMS is built upon these criteria and requirements (Pun and Chin, 1999). However, it did not consider the basic requirements and multiple requirements of MBNQA criteria. In addition, ISO 9000 has been updated. ISO 9001:2008 was restructured as compared to the 1994 standard. The 2008 revision is consolidated into eight clauses, some of which operationalize the updated principles in the form of requirements. New requirements address monitoring customer feedback and using data analysis techniques to determine satisfaction. The requirements also cope with management of processes, treating them as systems with inputs and outputs. Wilson (2004) examined the economic benefits of ISO 9000 and the Baldrige Award to manufacturing firms. Results show that the economic success reported by companies may be exaggerated and certainly that this success cannot be guaranteed. Recommendations for further study and a simple program design for a summative evaluation of the Baldrige award winning companies is also suggested for future research. ISO 9001: 2008 is the final version of the revised ISO 9001 standards. ISO 9001:2008 brought the ISO 9000 standards closer to the Baldrige Criteria. Although, ISO 9001:2008 focuses on system defects and lacks a focus on business results and strategy, it can be the path to excellence and the path-building tools (www.nist.gov).

Integrated Model

The proposed model integrates ISO requirements with TQA criteria. The integration is accomplished by mapping TQA criteria to ISO requirements. Conversely, ISO requirements can be mapped to TQA criteria so that the integrated model better represents the criteria of TQA. Table 1 presents mapping TQA to ISO. The mapping is done at the main category level. “Leadership” in TQA 2012 criteria column means that the criteria associated with the Leadership category corresponds to that ISO statement. It is strong match between TQA 2012 criteria and ISO 9001:2008. Table 2 shows the criteria mapping from individual ISO sections to multiple criteria of TQA. The mapping from ISO to TQA was conducted simply from

TQA to an ISO mapping rather than from an independent analysis. “4.1General requirements” in ISO 9001:2008 column means that the requirement is related to the 4.1General requirements corresponds to the criteria of TQA 2012, namely 4.1 Measurement, Analysis, and Improvement of Organizational Performance, the 6.1 Work Systems and the 6.2 Work Processes.

Table 1 Mapping TQA to ISO 9001:2008

TQA 2012 criteria (point values)	ISO 9001:2008 Standard Clause references
1. Leadership (110)	4. Quality management system
	5. Management responsibility
	7. Product realization
2. Strategic Planning (90)	5. Management responsibility
	7. Product realization
	8. Measurement, analysis and improvement
3. Customer Focus (100)	5. Management responsibility
	6. Resource management
	7. Product realization
	8. Measurement, analysis and improvement
4. Measurement, Analysis, and Knowledge Management (90)	4. Quality management system
	5. Management responsibility
	7. Product realization
	8. Measurement, analysis and improvement
5. Workforce Focus (100)	6. Resource management
6. Operations Focus (110)	4. Quality management system
	5. Management responsibility
	6. Resource management
	7. Product realization
	8. Measurement, analysis and improvement

Table 2 Mapping ISO 9001:2008 to TQA 2012

ISO 9001:2008 Standard Clause references	TQA 2012 criteria (point values)
4. Quality management system	1 Leadership (110) 4. Measurement, Analysis, and Knowledge Management (90) 6. Operations Focus (110)
4.1 General requirements	4.1 Measurement, Analysis, and Improvement of Organizational Performance (50) 6.1 Work Systems (60) 6.2 Work Processes (50)
4.2 Documentation requirements	1.1 Senior Leadership (60) 4.1 Measurement, Analysis, and Improvement of Organizational Performance (50) 4.2 Management of Information, Knowledge, and Information Technology (40) 6.1 Work Systems (61) 6.2 Work Processes (50)

Table 2 Mapping ISO 9001:2008 to TQA 2012

ISO 9001:2008 Standard Clause references	TQA 2012 criteria (point values)
5. Management responsibility	2 Leadership (110)
	2 Strategic Planning (90)
	4. Measurement, Analysis, and Knowledge Management (90)
	6. Operations Focus (110)
	3. Customer Focus (100)
5.1 Management commitment	1.1 Senior Leadership (60) 1.2 Governance and Societal Responsibilities (50)
5.2 Customer focus	1.1 Senior Leadership (60) 3. Customer Focus (100)
5.3 Quality policy	1.1 Senior Leadership (60) 4.1 Measurement, Analysis, and Improvement of Organizational Performance (50)
5.4 Planning	2.1 Strategy Development (40)
5.5 Responsibility, authority and communication	1.1 Senior Leadership (60) 2.1 Strategy Development (40)
5.6 Management review	3.1 Voice of the Customer (50) 4.1 Measurement, Analysis, and Improvement of Organizational Performance (50) 6.2 Work Processes (50) 1.1 Senior Leadership (60)
6. Resource management	3. Customer Focus (100) 5. Workforce Focus (100) 6. Operations Focus (110)
6.1 Provision of resources	3.2 Customer Engagement (50) 6.2 Work Processes (50)

6.2 Human resources	5.1 Workforce Environment (45) 5.1 Workforce Environment (45)
6.3 Infrastructure	4.2 Management of Information, Knowledge, and Information Technology (40) 5.1 Workforce Environment (45)
6.4 Work environment	5.1 Workforce Environment (45)
7. Product realization	3 Leadership (110) 3 Strategic Planning (90) 3. Customer Focus (100) 4. Measurement, Analysis, and Knowledge Management (90) 6. Operations Focus (110)
7.1 Planning of product realization	2.1 Strategy Development (40) 4.1 Measurement, Analysis, and Improvement of Organizational Performance (50) 4.2 Management of Information, Knowledge, and Information Technology (40) 6.2 Work Processes (50)
7.2 Customer-related processes	3.1 Voice of the Customer 50 1.2 Governance and Societal Responsibilities (50) 4.1 Measurement, Analysis, and Improvement of Organizational Performance (50)

Table 2 Mapping ISO 9001:2008 to TQA 2012

ISO 9001:2008 Standard Clause references	TQA 2012 criteria (point values)
7.2 Customer-related processes	6.2 Work Processes (50)
7.3 Design and development	2.1 Strategy Development (40) 1.2 Governance and Societal Responsibilities (50) 4.1 Measurement, Analysis, and Improvement of Organizational Performance (50) 4.2 Management of Information, Knowledge, and Information Technology (40) 6.1 Work Systems (60) 6.2 Work Processes (50)
7.4 Purchasing	4.1 Measurement, Analysis, and Improvement of Organizational Performance (50) 4.2 Management of Information, Knowledge, and Information Technology (40) 6.2 Work Processes (50)
7.5 Production and service provision	4.1 Measurement, Analysis, and Improvement of Organizational Performance (50) 4.2 Management of Information, Knowledge, and Information Technology (40) 6.2 Work Processes (50)
7.6 Control of monitoring and measuring equipment	4.1 Measurement, Analysis, and Improvement of Organizational Performance (50) 4.2 Management of Information, Knowledge, and Information Technology (40)
8. Measurement, analysis and improvement	4 Strategic Planning (90) 3. Customer Focus (100) 4. Measurement, Analysis, and Knowledge Management (90) 6. Operations Focus (110)

8.1 General	4.1 Measurement, Analysis, and Improvement of Organizational Performance (50)
8.2 Monitoring and measurement	3.1 Voice of the Customer (50) 2.1 Strategy Development (40) 4.1 Measurement, Analysis, and Improvement of Organizational Performance (50)
8.3 Control of nonconforming product	2.1 Strategy Development (40) 4.1 Measurement, Analysis, and Improvement of Organizational Performance (50) 6.2 Work Processes (50)
8.4 Analysis of data	2.2 Strategy Implementation (50) 3.1 Voice of the Customer (50) 4.1 Measurement, Analysis, and Improvement of Organizational Performance (50) 6.2 Work Processes (50)
8.5 Improvement	4.1 Measurement, Analysis, and Improvement of Organizational Performance (50) 6.2 Work Processes (50)

The mapping is performed based on subjective judgments of assessors according to individual's interpretations of the ISO and TQA criteria.

The integrated model provides the following benefits:

(1) Many-to-many mappings. The mapping shown in Figure 1 presents that the TQA criteria correspond to many ISO requirements. The objective of the proposed model is to make the multiple relationships between TQA criteria and ISO requirements clear and concise. The model determines the ISO requirements that are related to each TQA criterion. Then, the mapping tables and hierarchical structures are developed to define the mapping of the integrated model.

(2) Hierarchical structure. The hierarchical structure of how to associate ISO and TQA criteria is useful for organizations to be able to understand and apply our model in a practical manner. However, it is not possible to prove that the mapping is correct because it is depended on subjective judgments according to individual's interpretations of the ISO and TQA criteria. Figure 1 illustrates mapping TQA to ISO. Figure 2 demonstrates mapping ISO to TQA.

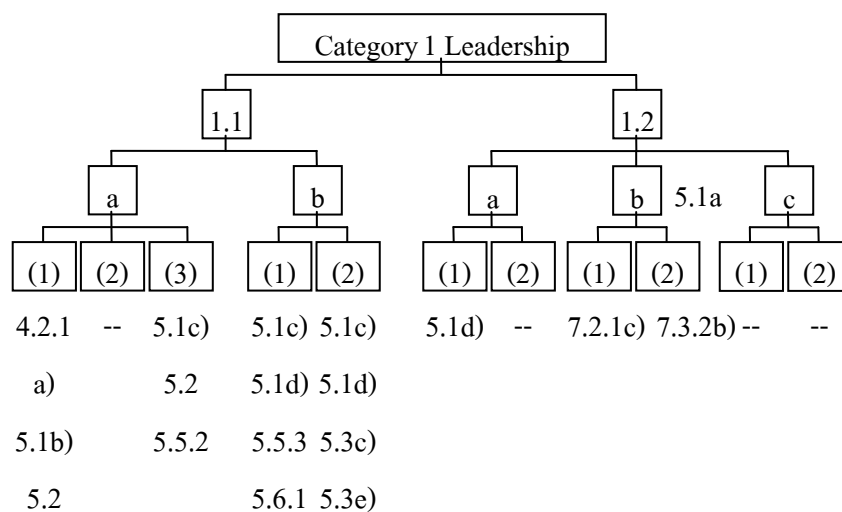


Figure 1 Mapping TQA(Category 1: Leadership) to ISO 9001:2008

Figure 1 presents an example of TQA to ISO mapping. For the first category of TQA 2012, Leadership, 11 criteria are classified into 2 groups, namely, 1.1 Senior Leadership and 1.2 Governance and Social Responsibilities. Each criterion corresponds to requirements of ISO 9000:2008, differently. For example, the first criterion, Vision and Values, is associated with the requirements 4.2.1 a), 5.1b) and 5.2 of ISO 9000:2008.

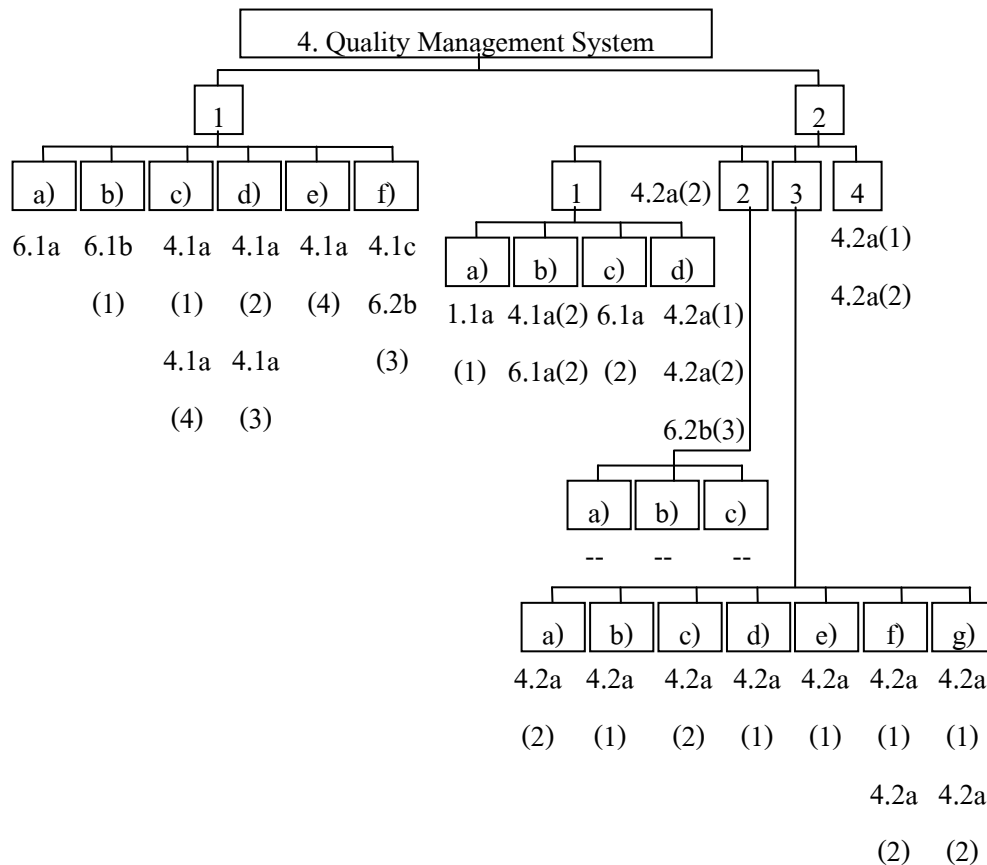



Figure 2 Mapping ISO 9001:2008 (4. Quality Management System) to TQA 2012

Figure 2 presents an example of ISO to TQA mapping. For the fourth category of ISO 9000:2008, Quality Management System, 14 requirements are classified into 2 groups, namely, 4.1 General requirements and 4.2 Documentation requirements. Each requirement corresponds to criteria of TQA 2012, differently. For example, the first requirement, Core Process for quality management system, is related to the criterion 6.1a of TQA 2012.

Impact of Integrated Model

To determine impact of the integrated model on ISO certified organizations in construction industry of Thailand, the questionnaires were employed to collect data from a sample group of company names that appeared in the database of the National Production Development Institution. A total of 30 organizations were sampled and the data analyzed with statistical methods which considered frequency, percentages, averages and standard deviations. The questionnaires revealed that companies had adopted the ISO 9000:2008 standard.




The companies in construction industry had not been awarded. The opinions collected according to the implementation of the integrated model presented that the integrated model will be useful to ISO certified organizations that plan to apply TQA, because the integrated model has the same structure as ISO. It would be easy for organizations to determine the status of the organization regarding ISO 9000 and TQA as illustrated by the integrated model. In addition, it would be beneficial for non ISO certified organizations to have the path to excellence by using ISO 9000 as the path-building tool. The organization can use the integrated model to update the quality manuals. When an organization wants to adopt TQA, process changes are required to be demonstrated in the organization's quality documentation. The organizations would be able to examine what is in the integrated model, but not in the quality manual. The organization's quality manual would be easily updated by using the integrated model. The survey also provided data associated with obstacles to implementing the integrated model. The major problems were the lack organization resources to work with the integrated model and the lack motivation and involvement of the managers and employees. The organizations required time and training needs of the integrated model.

Discussion and Conclusion

This paper has presented the integrated model of ISO 9001:2008 and TQA2012. The proposed model would assist the ISO-certified organizations implement TQA criteria. The correspondence existing between TQA and ISO 9001:2000 is described in the integrated model. The proposed model would be helpful in the decision making process. In addition, it gives hierarchical structure to help elucidate the application of the proposed model in the implementation of TQA criteria by an ISO-certified organization and non ISO- certified organizations. The first hierarchical structure is familiar to ISO-certified organizations. Non-certified organization can use the second hierarchical structure to be the path to excellence. It is easy for organizations to perform the gap analysis, comparing current status with the excellence organization. When the organizations want to adopt TQA, it is easy to update the quality documentation. Finally, the ISO 9001:2000 and TQA can be simultaneously implemented in an ISO certified organization and non-ISO certified organization by using the integrated model. However, the integrated model is performed based on subjective judgments of assessors according to individual's interpretations of the ISO and TQA criteria. The proposed model has to be empirically proven before implementing in an organization.

References

1. Brown, A. and Van der Wiele, T. (1995) Industry experience with ISO 9000, *Asia Pacific Journal of Quality Management*, 4(2), 8-17.
2. Cianfrani, C.A., Tsiakals, J.J., West, J.E., 2001. *ISO 9001:2000 Explained*, second ed. ASQ Quality Press, Milwaukee, WI.
3. Ho, S.K.M. (1999) From TQM to business excellence", *Production Planning & Control*, 10(1), 87-96.
4. ISO, 1994a. *Quality Management Systems—Fundamentals and Vocabulary*, ISO 9000:1994.
5. ISO, 1994b. *Quality Management Systems—Guidelines for Performance Improvements*, ISO 9004:1994.
6. ISO, 2000a. *Quality Management Systems—Fundamentals and Vocabulary*, ISO 9000:2000.
7. ISO, 2000b. *Quality Management Systems—Guidelines for Performance Improvements*, ISO 9004:2000.

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8. ISO, 2000c. Quality Management Systems—Requirements, ISO 9001:2000.
 9. Pun, K.F. and Chin, K.S. (1999) A self-assessed quality management system based on integration of MBNQA/ISO 9000/ISO 14000, *International Journal of Quality & Reliability Management*, 16(6), 606-629.
 10. Ketola, J., Roberts, K. (2000) *ISO 9000:2000 in a Nutshell*. Patton Press, Chico, CA.
 11. Krasachol, L. (2000) *The development of quality management in Thailand*, PhD thesis, University of Nottingham Press, United Kingdom.
 12. Krasachol, L., Willy, P.C.T. and Tannock, J.D.T. (1998) The progress of quality management in Thailand, *The TQM Magazine*, 10(1), 40-44.
 13. Wilson (2002) examined the economic benefits of ISO 9000
 14. Wilson, J.P. (2004) *An examination of the economic benefits of ISO 9000 and the Baldrige Award to manufacturing firms*, thesis, Master of Science in Industrial Engineering, University of Pittsburgh.
 15. www.nist.gov