# Developing Standard Indicators of Hospital Business Management in Thailand for Enhancing ASEAN Connectivity by the Application of Partial Least Squares Analysis

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## Abstract

This research aimed to develop standard indicators of Hospital Business Management in Thailand for enhancing ASEAN connectivity by the application of Partial Least Squares (PLS) analysis. The secondary order confirmatory factor analysis method was also conducted. This present survey research applied questionnaires to collect the data. Thirty indicators from the specific standard of total quality management, organization management and code of practice were identified and studied in the model. The results of overall model revealed that the developed model had construct validity; the convergent validity ($\rho c$) of 0.968 and average variance extracted ($\rho v$) of 0.909. Considering the component measure, it was found that organization management was given the highest priority ($\lambda=0.960$), followed by code of practice ($\lambda=0.955$) and total quality management ($\lambda=0.944$).
**Keywords:** Hospital Business Management, Partial Least Square, ASEAN

## Introduction

In a globalize environment with business, Thailand was a developing country that has recently embraced in the globalization in the area of trade, economic and social changes. Significantly, Thai government policies were implemented including the context of the twelfth National Economic and Social Development Plan (2017-2021), the commitment of ASEAN Member States to the ASEAN Economic Community and the Master Plan on ASEAN Connectivity. In addition, Thailand was prepared the strategic plan 'Medical Hub 2017-2026' to develop itself as a well-positioned international health center. To become an international health center (Medical Hub), the strategic plan will achieve the competitive advantage over the international market (Ministry of Public Health, 2016). Broadly, healthcare and hospital business is a service sector, which related to cross-border service, getting patients from abroad, the establishment of medical institutions abroad and the movement of medical personnel across the country play an important role in driving the Thai economy and society. By the statistical data of 2015 which indicated the Gross Domestic Product (GDP) 13.7 trillion Baht approximately represented the service-to-GDP ratio of 5.6 trillion Baht, with a proportion of 41 percent (Office of the national economic and social development board, 2016). Meanwhile, Kasikorn research center (2015) cited in Ministry of public health (2016) reported that the growth rate in the market of healthcare products in Thailand had increased continuously. Additionally, the market valued is not less than 107,000 million Baht. After opening of free trade with the ASEAN Economic Community (AEC), the health product and service will be continued. Furthermore, Bloomberg (2013) reported "10 Top Travel Destinations for Medical Tourism", which was based on the data from the assessment of patients and income, rating Thailand as the first world-class medical facilities welcomed approximately 1.2 million patients. On the other hand, the other ASEAN member as

Singapore was ranked in the fourth. However, the development direction by focusing on improving the quality and standards of health services was a driving force in preparing for Thailand's development as an international health center. By leveraging the strengths of the country's health service system, Thailand's policies might be implemented and leaded to Center of Excellent Health Care of Asia (Ministry of Public Health, 2013).

Thai hospital business operator should be recognition and awareness on the issue of good governance in business management. It could be controlled by executives or business owner, effectively. Additionally, for the success of the work in the organization, all of the activities should be developed and contributed the priority to society. However, the efficient organization can be accomplished by the organization's intended purpose. It depends on the ability of executives to make available resources and personnel in the organization with collaboration works. It will result in effective performance and achieve the goals of the organization. The preparation of good quality control will result in the management of other areas more effective. Some theorists, such as Edwards (2008) cited in The National Learning Consortium (2013), have suggested that continuous quality improvement is a quality management process that encourages all health care team members to continuously ask the questions, "How are we doing?" and "Can we do it better?." The continuous quality improvement is an important tools in driving business. In today's business environment, medical ethics preservation is an important when doing the business. Most importantly, medical ethics preservation should be consists of good governance, the morality of patients and society, organize and monitor, ethical conduct, a sense of right, duty and responsibility. According to the information mentioned, in terms of standard setting, indicator and evaluation, the sensitive issues and complicated standards perhaps recognized as international standards in ASEAN member countries. (Ministry of Commerce, 2015). In term of the standard indicator, it can be demonstrated as professional, trustworthiness and reliability in Thai hospital business. (Association of Southeast Asian Nations, 2013).

According to the information mentioned above, in the points of the socio-economic dimension, the development approaches by transitioning Thailand from middle-income countries to high-income countries, stable and sustainable in economic. The understanding in the context of standardization, enhancing international competitiveness should be considered as the mindsets by integration between the quality management standards (TQM), organizational management (OM), and the code of practice (CP). Consequently, the researcher was developing standard indicators of Hospital Business Management in Thailand for enhancing ASEAN connectivity by the application of Partial Least Squares (PLS) analysis. The results can be used as a guideline for the business operators to plan the accurate management and enhance the appropriate business model in both public and commercial policies, which will additionally affect the overall business achievements and macroeconomic system of the country.

## Research Objective

To develop standard indicators of Hospital Business Management in Thailand for enhancing ASEAN connectivity by the application of Partial Least Squares (PLS) analysis.

## Literature Review and Research Framework

The present study was designed to explore the standard indicators in hospital business management. With increasing the globalization, dimension of economic change, Society and high competition, enterprises driven by market pressures need to include in their goals in order to improve their overall capacity in such quality, productivity, creativity, and flexibility (De Silva, 1998). Additionally, this research will develop the approach standard indicators in

hospital business management, Thailand, in order to creating a competitive advantage in the international markets. As a result, the research framework can be divided into 2 parts as follows. Part 1: Study the concepts, theories, and literature related to total quality management (TQM), organizational management, and the code of practice from the secondary data sources. Then synthesize, compile, and organize the obtained data to develop the research framework. To begin with the definition of total quality management, it is a participative, systematic approach to planning and implementing a continuous organizational improvement process. Its approach is focused on satisfying customers' expectations, identifying problems, building commitment, inter-linking of business processes, promoting open decision-making among workers. (Berwick, 1989; Petersen, 1999; Dahlgaard & Dahlgaard-Park, 2006). It is thought by some theorists, for example, Alolayyan, Mohd Ali and Idris (2011) that TQM practices significantly influence the intensity of operational flexibility in Jordanian hospitals. Additionally, one potential of concept in organization management refers to the art of getting people together on a common platform to make them work towards a common predefined goal. Moreover, the essential features of organization management include planning, organizing, staffing, leading, control, time management and motivation (John & Richard, 2014). Significantly, the organizational management of a business needs to be able to make decisions and resolve issues in order to be both effective and beneficial. Therefore, its approach is focused on policies and plans of the organization, evaluation, rules and regulations, good relationships, knowledgeable, responsibility, the ability to communicate, business partnerships, networks, both public and private. Basically, the code of practice on medical ethics preservation is particularly relevant to the ethics involving human subjects: the principles of respect of persons, beneficence, non-maleficence, autonomy, justice, dignity, truthfulness and honesty (The Medical Council of Thailand, 2017). Furthermore, the viewpoint of either business operators or businessman attempt to identify the elements of an effective business plan or business strategies to create the competitive advantages in order to the business survive. Sometime, the business ethics was neglected or ignored the code of practice (Chankoson, 2016). Consequently, business operators should rise awareness of social responsibility by being good role models for other co-workers and related professional field to societies.

Part 2: Conduct an exploratory research and synthesize the variables. The concepts from part 1 were applied to assess and select the variables through the in-depth interviews. Three experts in public health experts, hospital business management and experts who involved in Thailand's development strategy to become an international health center were selected to participate in the interviews according to the principle of Rovinelli and Hambleton (1977), which stated that there should be 3 (or higher odd number of) informants in order to obtain sufficient and decisive data. Thirty variables from the specific standard are presented in figure 1.
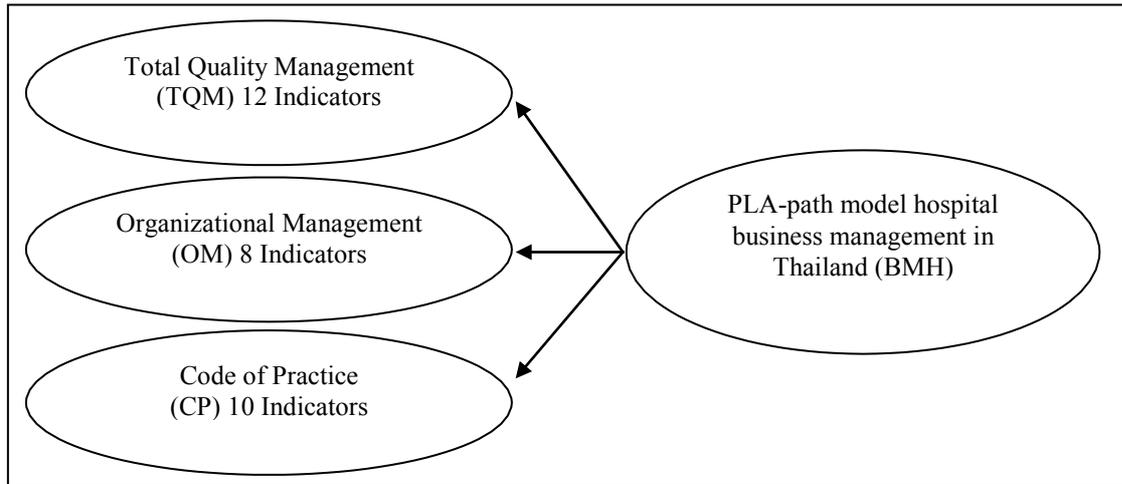
**Figure 1** Research framework

## Research Methodology

The methodology of this survey and development research can be described as follows.

**Research instrument and data providers:** The research area focuses on hospital business in Thailand. The population of this research was 547 hospitals in Thailand in the year 2015 (Statistics center for insurance business, 2016). Regarding to the sample size in this research, Taro Yamane formula (Yamane, 1973) was applied in calculating the number of the sample size as shown below: $n = N / (1 + Ne^2)$; N = 547, e = 0.05. Hence, the appropriate sample size of 231 hospitals (n =231.05 ~231) was determined. The multi-stage random sampling (Cochran, 2007) was used dividing all hospitals into 8 groups according to the location. Then the simple random sampling was applied to select one owner or one authorized representative by a purposive sampling. As a result, a total of 231 representatives from hospitals were the participants of this study. The details are presented in table 1.

**Table 1** Population and sample of the study classified by location

| Hospital in Thailand | Population (organizations) | Samples (organizations) |
|---|---|---|
| 1. Bangkok | 96 | 41 |
| 2. Bangkok metropolitan region | 31 | 13 |
| 3. Central region | 76 | 32 |
| 4. North region | 78 | 33 |
| 5. Southern region | 77 | 32 |
| 6. Northeastern region | 125 | 53 |
| 7. East region | 39 | 16 |
| 8. West region | 25 | 11 |
| **Total** | **547** | **231** |

Source: Statistics center for insurance business (2015)

**Data collection:** Measurement items in the questionnaire survey were developed based on the inputs from the literature reviews and interview with the experts relative to hospital business. The research tools were an interview form and a questionnaire. Both structured and unstructured interview techniques were applied to collect the data with relevant and interesting questions. Then the researcher synthesized, compiled, and organized the obtained data in order to find the suitable variables. Consequently, the thirty variables were identified

from elements of total quality management, organizational management, and the code of practice. After that the self-administered questionnaire was developed to collect data from the participants. The developed questionnaire was composed of the following: 1) the overview part was the checklist questions about the overview of hospital business management in Thailand, and 2) the assessment of hospital business management in Thailand, including thirty variables. The close-ended questions were designed using the Ruler and Option Scale (Rohana & Roziah, 2014), which was the 0-10 scale with 11 possible responses ranging. The design of the questionnaire were coded on an eleven-rating scale pattern of response, ranging from "0=never" to "10=always". Consequently, the thirty variables were identified from elements of total quality management, organizational management, and the code of practice. After that the self-administered questionnaire was developed to collect data from the participants. The developed questionnaire was composed of the following: 1) the overview part was the checklist questions about the overview of hospital business management in Thailand, and 2) the assessment of hospital business management in Thailand, including thirty variables. The close-ended questions were designed using the Ruler and Option Scale (Rohana & Roziah, 2014), which was the 0-10 scale with 11 possible responses ranging. The design of the questionnaire were coded on an eleven-rating scale pattern of response, ranging from "0=never" to "10=always". Considering the research tool of this study, relevant  concepts and theories were applied to develop the questionnaire focusing on the present research objectives. Content Validity for Scale/Average (S-CVI/Ave) technique was applied to measure the content validity of the questionnaire. Item Content Validity Index (I-CVI) was used to calculate the average content validity index (the sum of I-CVIs divided by the number of questions). Considering the content validity, the developed questionnaire was examined by three experts to ascertain its validity and accuracy with the content validity for Scale/Average (S-CVI/Ave) values, which should be higher than 0.80 (Waltz & Bausell, 1981; Polit & Beck, 2006). The results revealed that this questionnaire had the content validity with I-CVI of 0.60- 1.00, which exceeded the minimum of 0.50. The S-CVI/Ave was 0.83 and 0.84, which were greater than the target of 0.80. Regarding the reliability test, it was found that the reliability values of the questions measure ranged from 0.907 to 0.949, and the total score was 0.954. As its reliability values were above 0.7, the questionnaire was considered highly acceptable for the data collection (Cronbach, 2003).

**Data analysis:** after the data were received, the researcher recorded, checked, and coded the data by using statistical computer software for a social study. The techniques of statistical analysis used in data analysis were frequencies distribution and percentages. Moreover, this research was developed by the application of Partial Least Squares (PLS) analysis. Secondary order confirmatory factor analysis method was conducted. The purpose of this analysis is to investigate the significance of the path. There is no need for normal distribution. It can be analyzed by confirmatory factor analysis and exploratory factor analysis. According to Sellin (1986), the PLS is a general technique for estimating path model involving latent constructs indirectly observed by multiple indicators. The potential of PLS is the explicit estimation of latent variable scores by means of least squares methods. Furthermore, it can be also tested the consistency of empirical data with the conceptual framework or convergence (Martin, 2008). Nevertheless, the PLA-path model is a construct model called latent variable (LV), which is intangible. Therefore, by generalization, it will be used manifest variable (MV) or indicator or proxy for this analysis technique. According to Piriyakul (2010), the sample size should be at least 30, appropriately.

## Research Results and Discussions

Considering the overview of the hospital businesses in Thailand, it was found that the majority of the samples were the private hospitals, which accounted for 72.7%. Their average length of business operation was 15-20 years (38.5%). In terms of employees, most of the hospital businesses had 300-500 employees (37.6%), number of beds were 100-300 beds (41.5%). Because of the health care system, in Thailand, only public hospitals is not enough. In addition, the private hospital was set up to support and help the patients who have an ability to pay, sufficiently. Furthermore, the most hospital, at the moments, are old and the limitation of healthcare providers (Deharin, 2004).

This research apply Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) and Bartlett's test of sphericity to provide guidance on the suitability of the data for factor analysis, which KMO value and Bartlett's test of sphericity were greater than 0.50 was 0.05 (Vanichbuncha, 2011). Regarding to the standardized of business management indicators, it was found that (i) Indicators of standard: total quality management had the relationships between twelve variables with the standardized factor loadings of 0.332 to 0.687. KMO value is 0.870 and Bartlett's test of sphericity=1,507.795* at a statistical significance level of 0.05. (ii) Indicators of standard: organization management had the relationships between eight variables with the standardized factor loadings of 0.432 to 0.739. KMO value is 0.901 and Bartlett's test of sphericity =1,267.715* at a statistical significance level of 0.05. (iii) Indicators of standard: code of practice had a relationship ten variables with the standardized factor loadings of 0.305 to 0.789. KMO value is 0.926 and Bartlett's Test of Sphericity=1,523.935* at a statistical significance level of 0.05. This indicated that these three indicators of standard had validity, which above 0.3 threshold value (Wiratchai, 2008). The development model of the partial least square as indicators of standard for hospital business management in Thailand, for moving forward with ASEAN connectivity is displayed in figure 2.
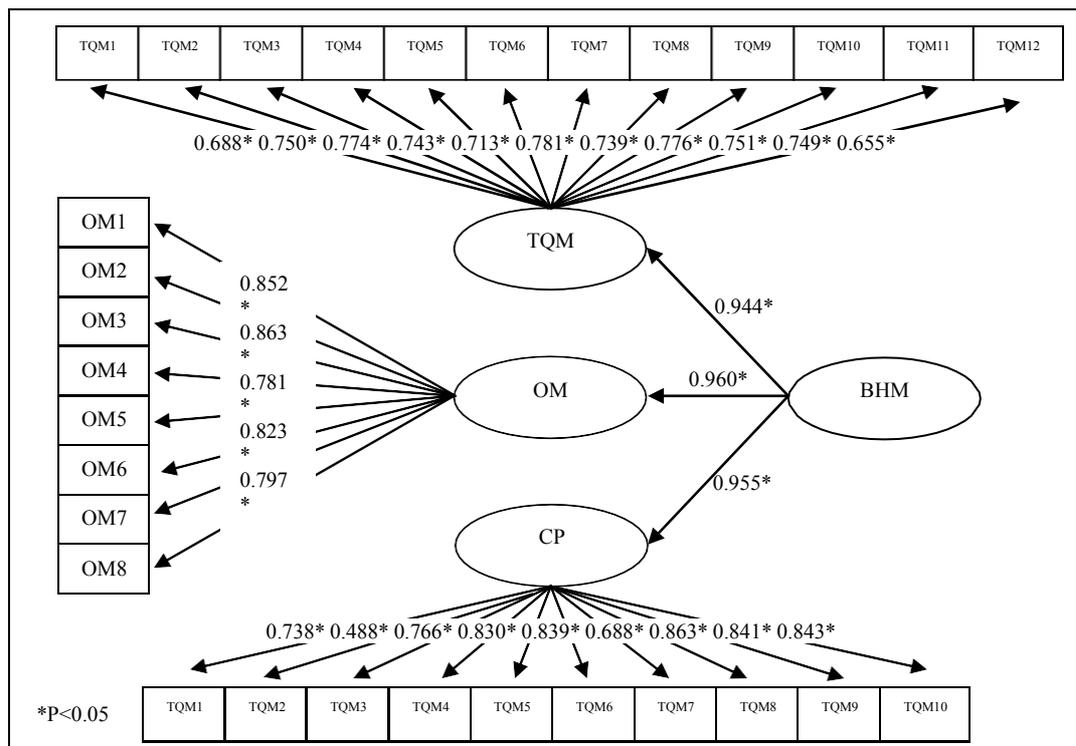


**Figure 2** The application of Partial Least Squares analysis based on the research framework

From figure 2, it was found that (i) Indicators of standard: Total quality management comprised twelve variables, was value positive (+). The factor loadings ranged from 0.655 to 0.781, which had covariance with total quality management in the range of 42.9% to 61%. (ii) Indicators of standard: organization management comprised eight variables, was value positive (+). The factor loadings ranged from 0.706 and 0.863, which had covariance with organization management in the range of 49.8% to 74.5%. (iii) Indicators of standard: code of practice comprised ten variables, was value positive (+). The factor loadings ranged from 0.488 and 0.863, which had covariance with code of practice in the range of 23.8% to 74.5%. To conclude, the results of overall model revealed that the developed model had construct validity; the convergent validity (ρc) ranged from 0.930 to 0.938, and the total score was 0.968, which was higher than the minimum of 0.60 (Hair et al., 2010) and average variance extracted (ρv) ranged from 0.527 to 0.655, and the total score was 0.909, which exceeded the minimum of 0.50 (Fornell & Larcker, 1981 and Diamantopoulos & Siguaw, 2000). Considering the component measure, it was found that organization management was given the highest priority, followed by code of practice and total quality management. This indicated that the Partial Least Square path model had validity, with factor loadings greater than .30 in absolute value, which was considered to be statistically significant (Kline, 2002). The details are presented in Table 2.

**Table 2** Analysis results of factor loading in indicators of standard for Hospital Business Management

| Code | Indicators of standard | λ | R2 | ρc | ρv |
|------|------------------------|-----|-----|-----|-----|
| **TQM** | **Standard: Total Quality Management** | **0.944*** | **0.894** | **0.930** | **0.527** |
| TQM1 | A well appropriated arrangement between sufficient medical devices and corresponding diseases | 0.688* | 0.473 | | |
| TQM2 | A well-controlled treatment quality for eligible persons e.g. state officials, private officers, destitute people, and customers of insurance companies etc. | 0.750* | 0.563 | | |
| TQM3 | More emphasis should be put on emergency management oppose to income generation | 0.774* | 0.599 | | |
| TQM4 | Maintaining a high standard of patient service to meet patients' satisfaction | 0.743* | 0.552 | | |
| TQM5 | Consistently enhancing service of total quality management | 0.713* | 0.508 | | |
| TQM6 | Inspecting service quality for all stages of service | 0.781* | 0.610 | | |
| TQM7 | Organizing a specialized care team to support and provide services to patients and families | 0.739* | 0.546 | | |
| TQM8 | Providing 'Total Quality Management' training for all staff | 0.776* | 0.602 | | |
| TQM9 | Availability of medical records upon request | 0.751* | 0.564 | | |
| TQM10 | Disclosing treatment outcomes, cost and payment term to patients' relatives | 0.749* | 0.561 | | |
| TQM11 | Allowing treatment outcome tracking in case of medical mistakes | 0.655* | 0.429 | | |
| TQM12 | Adopting 5S (phases/activities) to a total quality environment: "sort", "set in order", "shine", "standardize", and "sustain" | 0.734* | 0.539 | | |
| **OM** | **Organization management** | **0.960*** | **0.923** | **0.938** | **0.655** |
| OM1 | Developing organizational policy and planning which are practical implementations | 0.852* | 0.726 | | |
| OM2 | Evaluating and improving organizational policy and planning | 0.863* | 0.745 | | |
| OM3 | Developing well-written organizational rules and regulations | 0.781* | 0.610 | | |
| OM4 | Informing all staff about organizational rules and regulations | 0.823* | 0.677 | | |
| OM5 | Building a good relationship between medical service providers and patients | 0.797* | 0.635 | | |
| OM6 | Having well-trained staff with professional knowledge | 0.817* | 0.667 | | |
| OM7 | Having staff with good communication skills and language proficiency | 0.827* | 0.684 | | |

**Table 2** (Con.)

| Code | Indicators of standard | λ | R2 | ρc | ρv |
|------|------------------------|-----|-----|-----|-----|
| OM8 | Establish hospital alliance by collaborating with both state and private hospitals to improve service efficiency | 0.706* | 0.498 | | |
| **CP** | **Code of practice** | **0.955*** | **0.913** | **0.938** | **0.607** |
| CP1 | Adopting effective internal control for ensuring good governance | 0.738* | 0.545 | | |
| CP2 | Adopting total quality management in medical service to maintain/improve medical ethics | 0.488* | 0.238 | | |
| CP3 | Inspecting staff's performance and follow-up on inspection recommendations. | 0.766* | 0.587 | | |
| CP4 | Boosting staff's morale (recognition, incentives, praising) | 0.830* | 0.689 | | |
| CP5 | Taking into account morality and ethics in the workplace | 0.839* | 0.704 | | |
| CP6 | Taking responsibility on overall performance of staff | 0.688* | 0.473 | | |
| CP7 | Helping patients upon request without hesitation | 0.863* | 0.745 | | |
| CP8 | Keeping in mind rights, roles ,duties, and responsibilities while working and offering services to patients | 0.841* | 0.707 | | |
| CP9 | Respecting patients' individual rights. Conceal patients' personal information without prior consent | 0.843* | 0.711 | | |
| CP10 | Train staff to realize corporate social responsibility | 0.818* | 0.669 | | |
| **BMH** | **Hospital Business Management in Thailand** | | | **0.968** | **0.909** |

*$P < .05$; Remark: λ = Factor Loading, $R^2$ = Square Multiple Correlation, ρc = CR, ρv = AVE

From table 2, the result of factor analysis stated that the factor loading in indicators of standard for hospital business management can be concluded in descending order of priority as follows. Most of the Indicators of standard were priority organization management (λ=0.960), following by code of practice (λ=0.955) and total quality management (λ=0.944), respectively. After considering the result from the techniques of statistical analysis, the development of second order confirmatory factor analysis method suggested way to guideline as follow; firstly, the indicator of organization management, the evaluating and improving organizational policy and planning was an important (factor loadings 0.863). Then, for the indicator of code of practice, helping patients upon request without hesitation was significant (factor loadings 0.863) and lastly, the highly indicator of total quality management was conducted by the inspecting service quality for all stages of service (factor loadings 0.781).

Considering the discriminant validity, it was found that the construct focusing on the value of $\sqrt{AVE}$ , which were higher than all of the cross construct correlation values. This indicated that the discriminating scale in every construct was considered to be construct. The details are presented in Table 3.

**Table 3** Summary of discriminant validity

| Construct | ρc | ρv | Cross construct correlation | | | |
|-----------|-----|-----|------|------|------|------|
| | | | TQM | MO | EP | BMH |
| TQM | 0.930 | 0.527 | 0.726 | | | |
| OM | 0.938 | 0.655 | 0.657 | 0.810 | | |
| CP | 0.938 | 0.607 | 0.645 | 0.786 | 0.779 | |
| BMH | 0.968 | 0.909 | 0.644 | 0.760 | 0.755 | 0.953 |

Source: Hair et al. (2010)

Considering the component measure, it was found that organization management was given the highest priority, followed by code of practice and total quality management. This indicated that the Partial Least Square path model had validity, with factor loadings greater than .30 in absolute value, which was considered to be statistically significant (Kline, 2002).

By analysis results of factor loading in indicators of standard for hospital business management, it was found that the highest priority was given to the organization management (OM) with standardized factor loadings of 0.960 and square multiple correlation ($R^2$) of 0.923, followed by code of practice (CP) with standardized factor loadings of 0.955 and square multiple correlation ($R^2$) of 0.913 and total quality management (TQM) with standardized factor loadings of 0.944 and square multiple correlation ($R^2$) of 0.894 respectively.

**Acknowledgement**

**References**

Alolayyan, N., Mohd Ali, A., & Idris, F. 2011. "The Influence of Total Quality Management (TQM) on Operational Flexibility in Jordanian Hospitals: Medical Workers' Perspectives." **Asian Journal on Quality** 12 (2): 204-222.

Association of Southeast Asian Nations. 2013. **ASEAN tourism strategic plan 2011-2015.** Jakarta: ASEAN Secretariat.

Berwick, D. 1989. "Continuous Improvement as an Ideal in Health Care." **N Engl J Med.** 320 (1): 53-6.

Bloomberg. 2013. **10 Top Travel Destinations for Medical Tourism**. Retrieved from www.bloomberg.com/slideshow/2013-06-25/top-travel-destinations-for-medical-tourism.html#slide9.

Chankoson, T. 2016. **Service Innovation in Hotel and Restaurant Businesses.** Nonthaburi: Sukhothai Thammathirat Open University.

Cochran, W. 2007. **Sampling Techniques.** New York: John Wiley & Sons.

Cronbach, L. 2003. **Essential of Psychology Testing.** New York: Hanpercollishes.

Dahlgaard, J. & Dahlgaard-Park, S. 2006. "Lean Production, Six Sigma Quality, TQM and Company Culture." **The TQM Magazine** 18 (3): 263-281.

Decharin, P. 2004. **Building Key Performance Indicators for the Convergence and Divergence of the Strategic Decision Making for Hospitals and Hotel Businesses.** Bangkok: Faculty of Commerce and Accountancy, Chulalongkorn University.

De Silva, S. 1998. **Human Resource Management, Industrial Relations and Achieving Management Objectives.** Bangkok: International Labour Office.

Diamantopoulos, A. & Siguaw, J. 2000. **Introducing Lisrel.** London: Sage

Fornell, C. & Larcker, F. 1981. "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error." **Journal of Marketing Research** 18 (1): 39-50.

Hair, J., Anderson, R., Tatham, R., & Black, W. 2010. **Multivariate Data Analysis.** New Jersey: Prentice-Hall

John, A. & Richard B. 2014. **Management.** New York: Random House

Kline, P. 2002. **An Easy Guide to Factor Analysis**. London: Routledge.

Martin, N. 2008. **Development of a Satisfaction Survey Analyzer Using Partial Least Square Path Modeling (PLS-PM).** Retrieved from noco.mart.free.fr/martin.pdf.

Ministry of Public Health. 2013. **Summary Report: The Project of Thailand Development Project Is to Become an International Health Center.** Nonthaburi: Ministry of Public Health.

Ministry of Public Health. 2016. **Development Strategies for Thailand as an International Health Center.** Nonthaburi: Department Of Health Service Support.

Office of the National Economics and Social Development Board. 2016. **National Income Account report for 2015.** Bangkok: The National Economic and Social Development Board.

Petersen, B. 1999. "Total Quality Management and the Deming Approach to Quality Management." **Journal of Management History** 5 (8): 468-488.

Piriyakul, M. 2010. **Partial Least Square Path Modeling (PLS Path Modeling).** (A paper presented in the 11th Academic Conference of Applied Statistics, November 19, 2010, Bucharest).

Polit, D. & Beck, C. 2006. "The Content Validity Index: Are You Sure You Know What's Being Reported? Critique and Recommendations." **Research in Nursing & Health** 29: 489-497.

Rovinelli, R. & Hambleton, R. 1977. "On the Use of Content Specialists in the Assessment of Criterion-Referenced Test Item Validity." **Dutch Journal of Educational Research** 2: 49-60.

Sellin, N. 1986. "Partial Least Squares Analysis." **International Journal of Educational Research** 10 (2): 189-200

Statistics Center for Insurance Business. 2016. **List of Hospitals in Thailand.** Retrieved from www.insure.co.th/index.php/2010-07-19-04-16-36/2012-03-30-03-02-20.

The National Learning Consortium. 2013. **Continuous Quality Improvement (CQI) Strategies to Optimize Your Practice.** Retrieved from www.healthit.gov/sites/default/files/tools/nlc_continuousqualityimprovementprimer.pdf.

The Medical Council of Thailand. 2017. **The Medical Council Regulations on Medical Ethics Preservation, B.E. 2549 (2006)**. Retrieved from www.tmc.or.th/en_act-and- rules.php.

Vanichbuncha, K. 2011. **Structural Equation Model Analysis: SEM by AMOS**. Bangkok: Samlada.

Waltz, C. & Bausell, R. 1981. **Nursing Research: Design, Statistics, and Computer Analysis.** Philadelphia: F. A. Davis.

Wiratchai, N. 2008. **Linear Structural Relationship (LISREL): Statistical Methods for Research in Social and Behavioral Sciences.** Bangkok: Chulalongkorn University Press.

Yamane, T. 1973. **Statistic: An Introductory Analysis.** New York: Harper & Row