QFD application using SERVQUAL for Private Physical Therapy Clinic in Thailand

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Abstract

Purpose – The purpose of this paper is to describe how quality function deployment (QFD) methodology focuses on the most important healthcare service attributes or qualities characteristics in a Private Physical Therapy Clinic setting. This case study illustrates how an existing approach of SERVQUAL and QFD integration can be applied for quality improvement.

Design/methodology/approach – Integrating SERVQUAL into QFD to set the success factors to improve quality in the Physical Therapy Clinic is the main aim of this paper was selected as the sampling frame.

(a) Research Design: - To serve the purpose of research paper descriptive research design was used. Primary data was collected with the help of close ended questionnaire.

(b) Sample Design: - Our target population involves the 400 patients of Private Physical Therapy Clinics were selected through stratified purposive sampling from Udaipur division.

(c) Analysis: - The data collected was analyzed with the help of Weighted Arithmetic Mean and factor analysis.

Findings – From the results of the QFD application it is seen that Quality and attitude of Physical Therapy staff has the highest weight score, meaning that when Skills of Physical therapy and attitude of staff is important to the Private Physical Therapy Clinic. Another finding was that there is strong relationship among Private Physical Therapist, behavior and attitude of staff, and having enough modern equipment.

Research limitations/implications – QFD technique is able to provide Private Physical Therapy Clinic with a better understanding of customers' expectations to translate these expectations into appropriate service specifications and perform existing process assessment.

Keywords: Physical Therapy Clinic, QFD, SERVQUAL

Introduction

The Physiotherapy Professional Act, B.E. 2547 (2005) defined physiotherapy profession as, “the occupation related to diagnose, assess and treat pat patients’ physical problem and condition which resulted from sickness or unusual bodily movement as well as develop and review treatment program that encourage exercise and movement by the use of a range of techniques; also including the review and rehabilitation of patients by teaching patients and their caregivers on how to prevent and improve physical and mental condition. This process involves the physical therapy or, the health science approach dealing with the prevention, rehabilitation and correct the unusual physical movement, not only caused by sickness, but also from sickness conditions and symptoms happened in very life span. The body of knowledge is rather extensive, therefore, some physical therapist must acquire profound knowledge as well as becoming a specialist in specific areas such as, orthopedic, Neurological, Pediatric, Geriatric, Scoliosis and Cardiopulmonary. The number of physical therapist in Thailand amounted to 1 per 10,000 persons as compared to the developed country with the ratio of 1per 5,000 persons. Presently, more physical therapists are interested in open up the private clinic whereas Thailand will be completely changed her population structure and entered aging society in 2021 and continue to increase at 30.2 % in 2035, including more people from neighboring countries entered Thailand to seek medical treatment in which turning Thailand into the Medical Hub. Furthermore, the 4.0 campaign of Thai government to move economy together with adding more value to products and services through innovation requires full developing cycle from the quality of population both in health education and services. Therefore, it is crucial to increase population competencies coinciding with the National Policy as well as referencing Evidence based. It is expected that the improvement among Thai physical therapists in elderly care could make substantial contribution to the country development and revenue generation, having Thailand as the center of Service Hub in Asia.

The quality function deployment (QFD) is driven by customers and focuses on their needs and requirements, which needs data collection from the competitors in the business. This practice helps to organize the resources and restructures them according to the information collected about the customers’ experiences. Quality of healthcare has become the latest hot topic everywhere. It is one of the fastest growing industries in the service sector. It is also widely known for its huge concerns about the quality of service. The quality of services-both technical and functional- is a key ingredient in the success of service organizations. With increasing pressure of competition and necessity to deliver satisfaction demanded or expected by the patients, the elements of quality control, quality assurance and effectiveness of medical treatments have become a vitally necessity. It is difficult for

patients to identify and prioritize their expectations and for management to include these expectations in the service package (Lim et al., 1999). Quality function deployment (QFD) technique is available to provide hospitals with a better understanding of customers' expectations translate these expectations into appropriate service specifications and perform existing process assessment.

This study employed Quality Function Deployment methodology for translating customer needs and expectations into the quality characteristics. The paper suggestsan approach which is integrating SERVQUAL into QFD to set the success factors toimprove quality in the healthcare industry.

2. Literature survey

The Quality Function Deployment (QFD) is a literal translation of the Japanese words hinshitsu kino tenkai, but was initially translated as quality function evolution in 1978. (Mizuno and Akao, 1978). At the first QFD seminar in the USA (Akao et al., 1983), Masaaki Imai felt that the term evolution inappropriately connoted the meaning of "change" and that hinshitsu tenkai was better translated as quality deployment (Akao and Mazur, 2003). QFD is an established and well-known methodology which translates the "voice of the customer" or customer needs (the "whats") into its means of accomplishment within an organization (the "hows") (Hamilton and Selen, 2004). The quality function deployment (QFD) is widely used as it helps to determine the voice of the customers and interprets it into the technical requirements that should be fulfilled in the product or service design to achieve customer satisfaction. Since then, the quality function deployment (QFD) was introduced worldwide, especially in the manufacturing sector of the United States of America. The use of quality function deployment (QFD) was not limited to manufacturing, it has been used in all process designs, starting with customers' needs analysis, process design, product design, quality management, and other engineering areas (Hunt & Killen, 2004). The house of quality (HoQ) consists of eight rooms: (1) Customer requirements, (2) Customer importance weight, (3) Engineering characteristics, (4) Correlation ratings matrix, (5) Benchmark satisfaction rating, (6) Benchmark performance, (7) New product or service target, and (8) Coupling matrix. As mentioned in the previous chapter (Chapter 1), the house of quality (HoQ) will be used to improve the healthcare services at the chosen hospital (Hospital A) (Hunt & Killen, 2004).

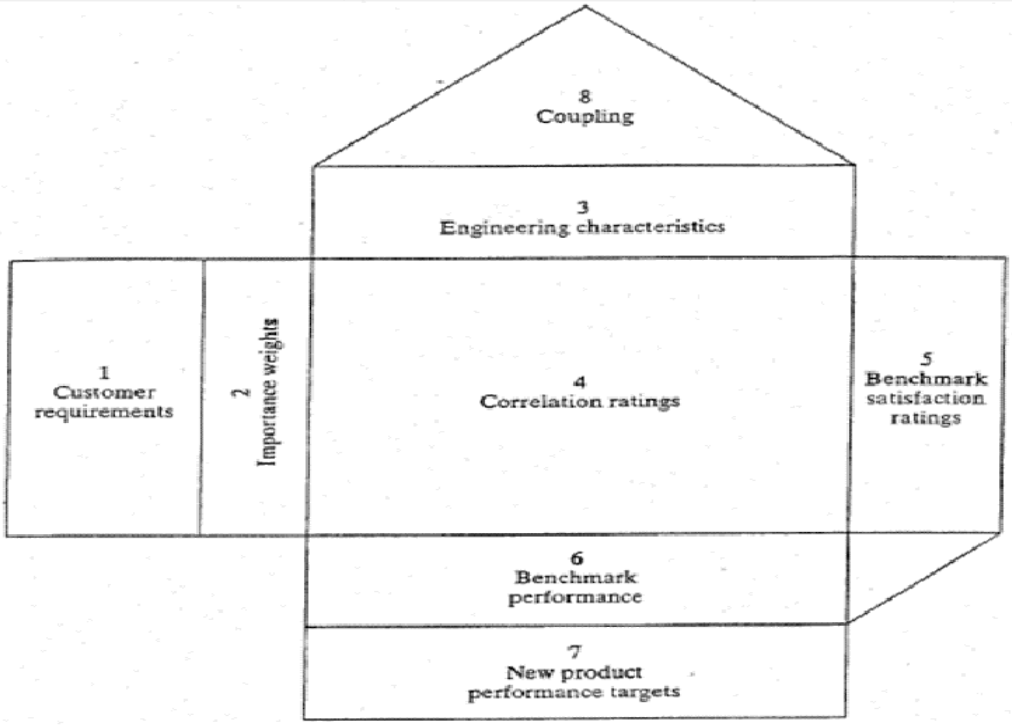

Figure 1.The house of quality (HoQ) model, (Hunt & Killen, 2004)

SERVQUAL provides a technology for measuring and managing service quality (SQ). Since 1985, when the technology was first published, its innovators Parasuraman, Zeithaml and Berry, have further developed, promulgated and promoted the technology through a series of publications(Parasuraman et al., 1985; 1986; 1988; 1990; 1991a; 1991b; 1993; 1994; Zeithamlet al., 1990; 1991; 1992; 1993). Parasuraman et al. developed SERVQUAL from a modification of ten dimensions proposed in 1985 to five dimensions in 1988. These are tangibles, reliability, responsiveness, assurance, and empathy. In their study, the data on the 22 attributes were factor analyzed and resulted in five dimensions (Parasuraman et al., 1991). After Parasuraman et al. proposed SERVQUAL, James Carmen adapted the original SERVQUAL instrument for use in the hospital industry. The original 22 questions were extended to 34 questions. As stated by Tan and Pawitra (2001), SERVQUAL is not designed to address the element of innovation and even though it provides important information on the gaps between predicted service and perceived service, it is not able to address how the gaps can be closed. Tan and Pawitra (2001) also added that it would be good if SERVQUAL can be integrated with other service quality tools that are more focused on reducing theservice gaps.

The definition of each of the variables involved in the framework is shown below

Table 1 : 5 Dimensions of SERVQUAL

Tangibility	It refers to physical accessories which can be touched e.g. equipment, machinery, physical facilities and aspect of human resource as well.
Reliability	It refers how much staff is reliable about giving services perfectly and steadily.
Responsiveness	It refers how abundant staff is keen to give attention and help patients out.
Assurance	It refers to awareness regarding their fields of specialization and gentility competency to initiate trust and confidence.
Empathy	It denotes to feel care about patients and provide individual attention to their patient

Literature also includes many examples of integration of SERVQUAL and QFD in different ways. Lim et al. (1999) adopted SERVQUAL and QFD performance measurement in Singapore and used the empirical findings as an input for QFD in the process of designing services based on customer expectations for hospitals. Sahney et al. (2004) applied SERVQUAL to identify the gap between customer expectations and perceptions of the actual service received. Afterwards the QFD technique was then used to identify the set of minimum design characteristics/quality components that meet the requirements of student as customers of the educational system. In addition Baki et al. (2009) used SERVQUAL and Kano model to see how well the service quality attributers are able to satisfy customer needs and findings were transferred to QFD.

Objectives

The purpose of this paper is to describe how quality function deployment (QFD) methodology was employed for translating customer needs and expectations into the quality characteristics in a private healthcare setting. This case study illustrates how an existing approach of SERVQUAL and QFD integration can be applied for quality improvement.

4. Methodology

In order to achieve a proper understanding of the concept and a concrete evaluation of the previously-mentioned targets, at first a literature review was carried out and a questionnaire was constructed and used.

4.1 The case study

A privately physical therapy Clinic within the city of Bangkok in Thailand was selected as the sampling frame of this study to translate the customer expectation and needs. Participants were selected randomly by using simple random sampling. The respondents that were eligible to be selected were customers being admitted as in-patients. There were no diagnostic limitations on patient selection. However, customers who were in a critical state of health or those who were unable to respond to the questionnaires and did not have any family members to assist in answering the questionnaires were excluded. Total of 180 questionnaires were distributed and 200 of them were received. The majority of the respondents completing the questionnaire were in fact patients present in private clinic.

4.2 Survey instrument

A survey was conducted to measure service quality in the private physical theraphy clinic in Bangkok. To enable this study to be conducted, the survey instrument used is the SERVQUAL 5 dimensions model, adapted as recommended by Parasuraman et al. (1985). The SERVQUAL-type of questionnaire for use in the private healthcare sector is constructed by retaining some items from the updated SERVQUAL dimensions. Selected items are refined and paraphrased in both wording and contextual applications as appropriate for this research.

The questionnaires were designed in a Likert scale five-point format ranging from “completely disagree” (1) to “completely agree” (5). This instrument includes 25 items for the expectations scale and the same 25 items for the perceptions scale.

The results of the questionnaire were then used to integrate the findings from the SERVQUAL instrument into QFD to set the success factors to improve quality in the healthcare industry.

5. Analysis and results

Following results have been produced using SPPS (version 18) using the collected data from the respondents.

1.Most of the interviewees were females (51.7%) and males were (48.3%).

2.The correlation between the patient satisfaction and SERVQUAL dimention

Table 2 Pearson Correlation

		Patient Satisfaction
Tangibility	Pierson Correlation	0.355
	Sig. (2 tailed)	0.054
Reliability	Pierson Correlation	0.754
	Sig. (2 tailed)	0.026
Responsiveness	Pierson Correlation	0.790
	Sig. (2 tailed)	0.028
Assurance	Pierson Correlation	0.861
	Sig. (2 tailed)	0.017
Empathy	Pierson Correlation	0.757
	Sig. (2 tailed)	0.025

Table 2 shows that the correlation between the patient satisfaction and tangibility is .355(**). that indicates that Patients are satisfied with the excellence of tangible physical therapy clinics. Has a relationship in the same direction.

The correlation between the patient satisfaction and Reliability is 0.754(**).that indicates that Patients are satisfied with the excellence of Reliability physical therapy clinics. Has a relationship in the same direction.

The correlation between the patient satisfaction and Responsiveness is 0.790 (**).that indicates that Patients are satisfied with Responsiveness of physical therapy clinics. Has a relationship in the same direction.

The correlation between the patient satisfaction and Empathy is 0.757 (**).that indicates that Patients are satisfied with Empathy of physical therapy clinics. Has a relationship in the same direction.

Table 3 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.000[a]	1.000	1.000	.00000

a. Predictors: (Constant), ค่าเฉลี่ยด้านความไว้วางใจ, ค่าเฉลี่ยด้านสิ่งที่จับต้องได้, ค่าเฉลี่ยด้านความน่าเชื่อถือ, ค่าเฉลี่ยด้านการเอาใจใส่, ค่าเฉลี่ยด้านการตอบสนองของพนักงาน

Table 4 Annova

Model	Sum of Squares	Df.	Mean Square	F.	Sig.
Regession	105.195	5	21.039	157.85	.000[b]
Residual	.000	371	.000		
Total	105.195	376			

Dependent variable : Patient Satisfaction

Predictors: tangibility, reliability, responsiveness, assurance, empathy.

Table 5 Coefficient

Model	Un-standardized Coefficient		Standardized Coefficient	t	Sig.
	B	Std.Error	Beta		
(constant)	7.568	.000		.000	1.000
Tangibility,	.200	.000	.188	4.853	.000
Reliability,	.200	.000	.170	3.203	.000
Responsiveness,	.200	.000	.278	2.533	.000
Assurance,	.200	.000	.296	2.903	.000
Empathy.	.200	.000	.309	3.711	.000

Dependent variable : Patient Satisfaction

จากตารางที่ 2-5 แปลผลตามสถิติ Regression หาความสัมพันธ์ระหว่างตัวแปรต้น 5 ด้านของผู้ใช้บริการที่ประเมินกับภาพรวมความพึงพอใจต่อการเป็นเลิศของคลินิกกายภาพบำบัด ดังนี้

• ด้าน Tangibility (ด้านค่าเฉลี่ยสิ่งที่จับต้องได้) ได้ค่า Sig.=0.00<นัยสำคัญที่ 0.05 แสดงว่า ด้านสิ่งที่จับต้องได้เป็นด้านหนึ่งที่มีความสัมพันธ์กับในการสร้างภาพรวมการบริการเป็นเลิศของคลินิกกายภาพบำบัด

• ด้าน Reliability (ด้านความน่าเชื่อถือ) ได้ค่า Sig.=0.00<นัยสำคัญที่ 0.05 แสดงว่า ด้านความน่าเชื่อถือเป็นด้านหนึ่งที่มีความสัมพันธ์กับในการสร้างภาพรวมการบริการเป็นเลิศของคลินิกกายภาพบำบัด

• ด้าน Responsiveness (ด้านการตอบสนองของพนักงาน) ได้ค่า Sig.=0.00<นัยสำคัญที่ 0.05 แสดงว่า ด้านการตอบสนองของพนักงานเป็นด้านหนึ่งที่มีความสัมพันธ์กับในการสร้างภาพรวมการบริการเป็นเลิศของคลินิกกายภาพบำบัด

• ด้าน Assurance (ด้านการเอาใจใส่) ได้ค่า Sig.=0.00<นัยสำคัญที่ 0.05 แสดงว่า ผู้ใช้บริการมีความพึงพอใจในด้านการเอาใจใส่เป็นด้านหนึ่งที่มีความสัมพันธ์กับในการสร้างภาพรวมการบริการเป็นเลิศของคลินิกกายภาพบำบัด

• ด้าน Empathy (ด้านความไว้วางใจ) ได้ค่า Sig.=0.00<นัยสำคัญที่ 0.05 แสดงว่า ผู้ใช้บริการมีความพึงพอใจในด้านความไว้วางใจเป็นด้านหนึ่งที่มีความสัมพันธ์กับในการสร้างภาพรวมการบริการเป็นเลิศของคลินิกกายภาพบำบัด

Application of QFD to healthcare satisfaction is described step by step as follows:

(1) This step focuses on understanding the customer. This information is refined and then a second subset of the information becomes the input for the second step. For this paper, customer (patient) expectations were determined by 400 patients with survey.

(2) This step involves gathering the voice of the customer and understanding the context in which customer makes statements. The purpose of this activity is to establish a clear understanding of all customers' needs and expectations, particularly the subjective performance. After understanding all customers' needs and expectations, these customer needs, expectations and weights must be rated over 9.

(3) In this step, technical requirements related to customer expectation were determined and explained. Technical requirements are very important for QFD analysis because engineers and experts consider these requirements when they struggle to meet the customer expectations (Kurtay, 2005). To determine the requirements, experts from different departments should work together.

(4) After determining the technical requirements, experts constructed the relationships between customer expectations and technical requirements keeping in mind the importance of ratings and direction of improvement that were crucial points for QFD analysis. This information was evaluated and determined by experts.

(5) Physicians and experts of the hospital defined which customer expectations were related with which technical requirement. The resulting relationships, direction of improvement and importance degrees are shown in Figure 1.

(6) In the sixth step, experts calculated the technical importance degree of each requirement. These values are calculated for each technical requirement as summation of the importance degree of customer expectation which has relationship with the technical requirement multiplied with the weight of relationship.

(7) Maximum relationship degree is the degree of relationship between the customer expectation(s) and technical requirement(s). If no relationship is found between customer expectation and technical requirements, the components of customer expectations are deleted from the matrix to save space. Direction of improvement for technical requirements are symbolized with an upward triangle, downward triangle and an X. Upward triangle means needs improvement by increasing the relationship. While a downward triangle means for improvement one should decrease for example the waiting time of patient. If it is decided that there is no need for improvement then that requirement direction of improvement is shown with an X. Also provided are the calculated degrees of importance, relative weights and maximum relationship degree and matrix and direction of improvement.

(8) In addition to the information given in the house of quality matrix, it should be realized that there can be a relationship between each technical requirements in itself. Improvement for one technical requirement can also indirectly or directly affect another technical requirement positively or negatively or vice versa.

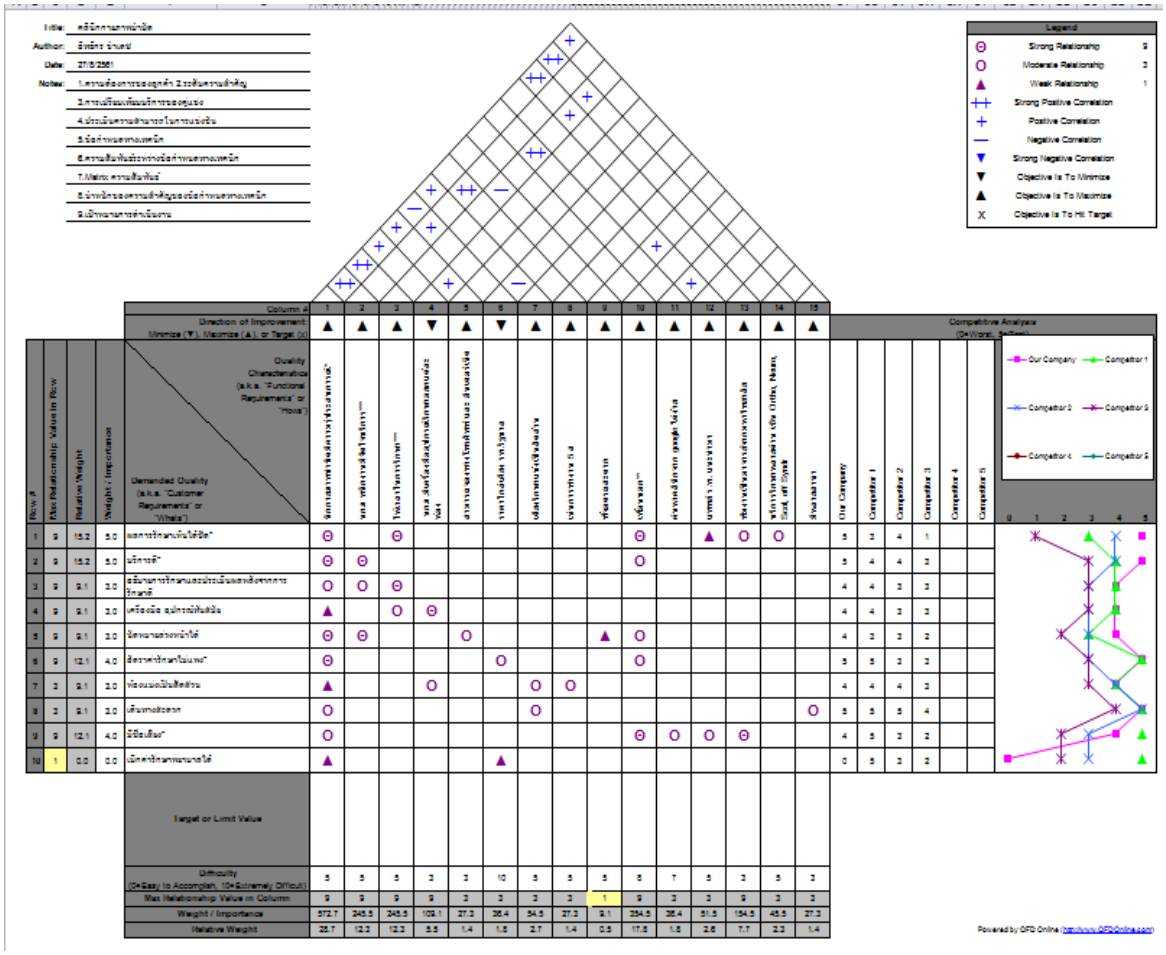

Figure 2 House of Quality of Private Physical Therapy Clinic

Figure 2 shows the customer requirements, technical requirements, maximum relationship degree, relative weight of relationships, improvement direction and correlation among technical requirements. For example; it is obvious that there is strong relationship among skills of physical therapist, behavior and attitude of staff, and having the modern equipment available have impacts in the final results. There is a lower relationship between doctor attitudes and modern equipment used in hospital, but still it must be realized that there is a relationship, which means the modernization of equipment has a slight effect on doctor attitude.

Conclusion

Service quality is one of the key attributes of quality in healthcare sector. Hypothesis testing and data analyses concluded that service quality of private physical therapy clinic fulfill the requirements of the patients according to their service quality demand. Private physical theraphy charge high amount of charges regarding service quality facilities, these facilities are satisfied but every person cannot afford that treatment while in public hospital every person can easily avail medical facilities. Furthermore, using two methods in a complementary way creates some methodological and practical advantages. Integrating QFD to SERVQUALsuccessfully identifies and optimizes internal capabilities and addresses specific customer opportunities by improving hospitals' services design in parallel with the customer needs (Killen et al., 2005). Even though using these two methods has benefits of their own, it should be mentioned that there are limitations involved in each method. For SERVQUAL, limitations such as measuring the expectations of excellence which might not exist, weak discrimination between the dimensions can result, and the results of gap analysis which cannot be easily generalized to the other areas can become somewhat tedious (Alves and Vieira, 2006). Since QFD is sensitive to the measurement of customer needs and expectations, the success of the method largely depends on the power of data collections on each level.

Reference:

Alves, A.R. and Vieira, A. (2006), **"SERVQUAL as a marketing instrument to measure servicequality in higher education institutions", paper presented at the Second International Conference:** Product Management-Challenges of the Future, Poznan.

Baki, B., Basfirinci, C.S., Cilingir, Z. and Ar, I.M. (2009), **"An application of integrating SERVQUAL and Kano's model into QFD for logistics services: a case study from Turkey",**Asia Pacific Journal of Marketing and Logistics, Vol. 21 No. 1, pp. 106-126.

Bloemer, J., de Ruyter, K. and Wetzels, M. (1999), **"Lining perceived service quality and service loyalty: a multi-dimensional perspective",** European Journal of Marketing, Vol. 33 Nos 11/12, pp. 1082-1106.

Denzin N. (2006). ***Sociological Methods: A Sourcebook***. Aldine Transaction. (5th edition).

Hoque, Z. (2005). ***Handbook of cost and management accounting***. Spiramus Press, Ltd.

Khamdej, I. Kanlaya, S., Khamdej, J. et al. ***Exploring Investment Cost and Return in Elderly Care Business Venture in Thailand***. 9th International Science, Social Science, Engineering and Energy Conference May 2nd- 4th, 2018, Ambassador Hotel Bangkok, Thailand.

Khamdej, I. Khamdej J. (2018). **Open Your Own Private Physical Therapy Practice**. Physical Therapy Association of Thailand. Bangkok, Thailand.

Older Population and Health System: A profile of Thailand (2018). Retrieved from http://www.who.int/ageing/projects/intra/phase_one/alc_intra1_cp_thailand.pdf

Thailand Economic Monitor - June 2016

Vanesha Budiwana, Efendib (2015). **The Understanding of Indonesian Patients of Hospital Service Quality in Singapore.** 6th International Research Symposium in Service Management, IRSSM-6 2015, 11-15 August 2015, UiTM Sarawak, Kuching, Malaysia

Buttigieg SC1, Dey PK, Cassar MR (2016).**Combined quality function deployment and logical framework analysis to improve quality of emergency care in Malta.** Int J Health Care Qual Assur. 2016;29(2):123-40

Gremyr I, Raharjo H.(2013). **Quality function deployment in healthcare:** a literature review and case study. Int J Health Care Qual Assur. 2013;26(2):135-46.

Lim PC1, Tang NK. (2000). **A study of patients' expectations and satisfaction in Singapore hospitals.** Int J Health Care Qual Assur Inc Leadersh Health Serv. 2000;13(6-7):290-9.

Kavosi Z, Rahimi H, and el.(2018).**Factors influencing decision making for healthcare services outsourcing: A review and Delphi study.**Med J Islam Repub Iran. 2018 Jul 5;32:56. doi: 10.14196/mjiri.32.56. eCollection 2018.

Aging Society and Economy (2018). Retrieved from http://www.worldbank.org/en/country/thailand/publication/thailand-economic-monitor-june-2016-aging-society-and-economy date 30 January 2019.