

Using the PEM Method to Determine Service Quality Improvement Strategies of Medical Industry

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Abstract: *This study is in order to understand the customers' satisfaction of medical industry. Firstly use performance evaluation matrix (PEM) to confirm the service items needing improvement. This study applied questionnaire to discuss the medical service quality of seven hospitals in Taiwan. Data were analyzed through PEM to sort out eight items needed to be improved. Therefore, the result provide for the service quality improvement and to enhance the hospital standard process to meet the customers' needs. This serves as a guideline for hospitals to improve service quality.*

1. INTRODUCTION

Service quality of medical industry is intangible and often requires patient involvement in the operation process (Singh, 1991). This normally involves intimate interactions and extensive communications between patient and staff (Winsted, 2000). The service quality is difficult to define and measure (Donabedian, 2005). Medical industry professionals and patients may view it from different perspectives (Williams, 1998). Although there is no consensus or standard definition of service quality, patient satisfaction is regarded as an important indicator of medical industry quality (Mullen, 2000). The study described here focuses on patients' satisfaction with various aspects of a medical encounter. Patients generally lack the knowledge and ability to judge the technical competence of doctors and nurses, but they may consider themselves to have a better ability to make judgments about non-technical characteristics. Singh (1991) proposed that the domain of medical service evaluation should be enlarged to add non-technical quality perceptions to technical quality perceptions. A review of the literature suggests several important factors relevant to patient satisfaction with a medical service, such as: doctors' technical ability and interpersonal care skills; accessibility and convenience of the service; the physical environment of hospital; doctors' duration of consultation; length of wait (Di-Paula et al., 2002).

PEM has been applied as an effective means of evaluating a firm's competitive position in the market, identifying improvement opportunities, and guiding strategic planning efforts. The matrix has been applied in higher education sectors (Chen, 2011), machinery industries (Lin et al., 2005), and semiconductor industries (Lin et al., 2006). However, few studies have applied the PEM within the medical industry; therefore this study aims to discuss the PEM application in service quality improvement of medical industry. Firstly the study uses PEM to confirm the items needing improvement. This serves as a guideline for hospitals to improve various service items. Good customer satisfaction leads to loyal customer group, which increases the hospitals competitive ability. Therefore hospital should view patients' satisfaction as a major consideration of service quality; this should be the focus when discussing the importance of medical service quality.

2. LITERATURE REVIEW

2.1. Characteristics of Medical Industry and Medical Service Quality

Since the establishment national health insurance in Taiwan, the number of existing hospitals has quickly diminished from 828 to 515 in 2008. Along with the payment system adjustments made by national health insurance scheme, the medical environment has been rapidly changing, causing national healthcare to undergo highly competitive yet low-profit trends. Hospitals became increasingly difficult to run (Lee et al., 2007). Besides the uneven distribution of medical

information between medical service providers and patients, progression of disease and provision of medical service encompass considerable level of uncertainty. Patient satisfaction is of paramount importance for medical service providers, not only because it is a quality indicator but also because of increased competition in the profession (Yellen et al., 2002). Continuous quality improvement programmes improve patient satisfaction and enable medical providers to succeed in an increasingly competitive environment (Tam, 2007). Achieving higher patient satisfaction can lead to loyalty and generate referrals that enhance long-term success (Yucelt, 1994). Tsai (2008) pointed out the characteristics of the medical industry as follow:

1. Severe asymmetry in possession of medical information.
2. Medical industry has high location factors.
3. Abundance of legal regulations but weak market pricing regulations.
4. Easy for litigations to arise.
5. Economy scale of medical industry phenomena is obvious.
6. Medical information system support is very important.

According to the above literatures, in early discussions of medical service quality, the care quality provided by hospitals has been the main focus; medical environment and equipment as well as actual patients' feelings have been less discussed. Through the years and change in environment, increased general education have caused people to start valuing medical quality; gradually scholars started incorporating care quality, hospital administration, and patient satisfaction into the scope of medical service quality. The perimeters of these researches also include medical skills and the relationship between staff and patient, and even hospital hardware/software facilities. The aim has been to fulfill the hopes and needs of patients to elevate the standards of medical service.

2.2. Performance Evaluation Matrix (PEM) Method

PEM has been proposed to determine the best strategy for improving service quality and customers' satisfaction. The PEM consists of nine zones that represent the effectiveness of various system-improvement items (Lambert & Sharma, 1990). The performance matrix is illustrated Figure 1 and service strategy in Table 1.

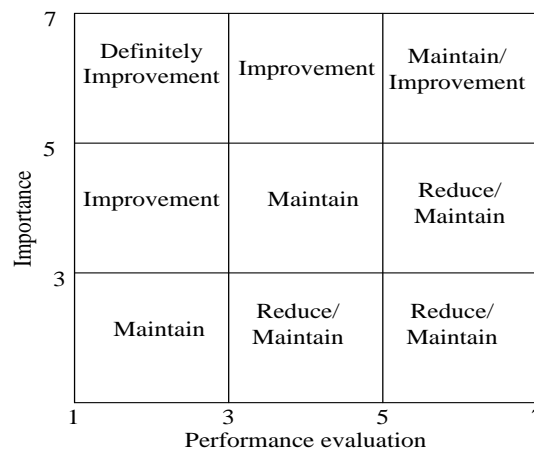


Figure1. Performance evaluation matrix

Source: Lambert & Sharma (1990)

Table 1. Service strategy of the PEM

Zones	Service strategy
High importance, high performance	Maintain or improve service quality
High importance, medium performance	Improve service quality
High importance, low performance	Definitely service quality
Medium importance, high performance	Reduce or maintain service quality
Medium importance, medium performance	Maintain service quality
Medium importance, low performance	Improve service quality
Low importance, high performance	Reduce or maintain service quality
Low importance, medium performance	Reduce or maintain service quality
Low importance, low performance	Maintain service quality

Source: Lambert & Sharma (1990)

PEM has been used in recent years by logistics industry, semi-conductor industry and finance industry; there are few applications in the medical industry. This study chooses PEM as a research tool. Based on “service quality” viewpoints, PEM has been re-arranged to redefine respective management strategies: “maintain, improvement, and priority improvement” (see Figure 2). Zon1 Zon2 Zon4 three areas are where perceived customer satisfaction surpass importance; hospitals need only maintain status quo. Zon3 Zon5 Zon7 three areas are where satisfaction equal importance; hospitals need to improve current service quality. Zon6 Zon8 Zon9 three areas are where importance surpasses satisfaction, meaning customer perceived service quality items are not satisfactory; therefore hospitals need to improve the items. Medical service items falling in this zone need to be improvement priority.

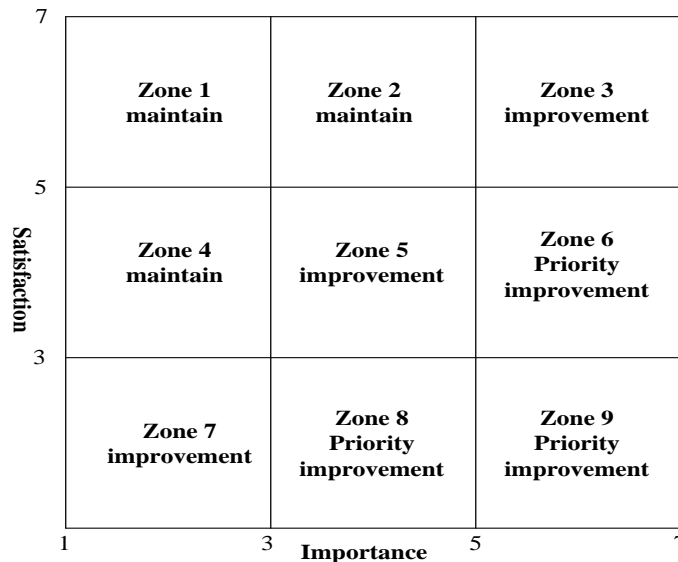


Figure2. Modified the performance evaluation matrix

3. EMPIRICAL STUDY

3.1. Questionnaire Design

The present dimensions and questionnaire were therefore based on the following: (i) A review of the literature (PZB, 1985); (ii) discussions with three experts and (iii) discussions with 12 customers in a medical industry. This led to the following dimensions being used in the questionnaire:

The final questionnaire was divided into the following three parts.

- Importance survey: responses requested on a Likert-type scale of 1 to 7 (with 1 representing ‘extremely unimportant’ and 7 representing ‘extremely important’);
- Performance scale: responses requested on a Likert-type scale of 1 to 7 (with 1 representing ‘extremely un-performance’ and 7 representing ‘extremely performance’);
- Demographics: gender, age, and qualifications.

The 33 service items regarding medical service quality in Taiwan were classified into five dimensions, namely empathy, assurance, responsibility, tangibility and reliability. Tangibility dimension includes hospital medical equipment, space, appearance, facilities, staff clothing, and explanation labels of various service items. Reliability dimension includes explanation of disease given from doctors to patients, treatment process, doctor problem-solving skills, and clarity of treatment explanation. Responsibility dimension includes the entire process of medical care, answers to medical inquiries, service attitude, and response to patient questions. Assurance dimension includes professionalism of medical staff, protection during service process and attitude during treatment, and teamwork. Empathy dimension includes giving various care to various patients, appropriately management of service time, care for the patient, and giving priority to patient in understanding patient needs.

3.2. Samples

This study applied questionnaire to discuss the medical service quality of seven hospitals in Taiwan. In all, 800 questionnaires were random distributed and 567 were returned (a response rate of 70.88%). Among the returned questionnaires, 35 were incomplete and therefore discarded; this left 532 questionnaires for analysis. About 44.5% of the patients were male and 55.5% were female. Also, approximately 32.1% of the patients were 31-40 years of age; 30.3% were 21–30 years of age; 16.4% were 41–50 years of age. Almost half of the patients were university graduates (32%); 27.4% were high school graduates (See Table 2).

Table 2. Demographics of sample (n=532)

Items	No	Percentage	
sex	male	237	44.5
	female	295	55.5
age	Younger than 20	29	5.50
	21-30	161	30.3
	31-40	171	32.1
	41-50	87	16.4
	51-60	65	12.2
	Older than 61	19	3.60
qualifications	below higher school	82	15.4
	high school	146	27.4
	college	76	14.3
	university	170	32.0
	above master's	58	10.9

3.3. Reliability and Validity Analysis

Cronbach's α for each dimension of medical services quality in service important and satisfaction ranged from 0.709 to 0.849 (see Table 3). Cronbach's α for each dimension were greater than 0.7 (Nunnally, 1978). This demonstrates that the scales of the formal questionnaire have considerable reliability. In terms of validity, the questionnaire had been designed on the basis of related studies, consultation with service-quality professionals and consultants, and discussion with customers. This demonstrates that the scales of the formal questionnaire have considerable reliability.

Table 3. Cronbach's α value of questionnaire

Dimensions	Importance survey	Satisfaction survey
Tangibility	0.813	0.708
Reliability	0.849	0.734
Responsiveness	0.811	0.737
Empathy	0.834	0.716
Assurance	0.754	0.709
Total	0.851	0.821

To verify reliability and construct validity of the formal questionnaire, factor analysis was conducted to verify the construct validity and Cronbach's α for each dimension was computed to verify the reliability. The factor analysis was based on the principal component analysis with varimax rotation, eigenvalue exceeding 1 and factor loadings exceeding 0.4. The test value of Kaiser–Meyer–Olkin (KMO) was 0.951(importance) and 0.897 (performance). The p-value of the Bartlett's sphericity test was almost zero (see Table 4). Consequently, the construct validity of the questionnaire was quite good (Nunnally, 1978).

Table 4. KMO and Bartlett test

Items	Importance	Satisfaction
KMO	0.951	0.897
Bartlett test	8347.478	5958.014
Significant test	0.000***	0.000***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3.4. PEM of Case Study

Through SPSS software, average values of importance and satisfaction are calculated and plotted into PEM, confirming the placement of each items. From Figure 3, five items were in the “maintain zone”: items 16, 22, 24, 28, and 32. Twenty items were in the “improvement zone”. Eight items were falling in the “priority improvement zone” respective items as follow: “hospital has modern medical equipment”, “medical staffs are passionate about helping patient solve problems”, “medical staff would not be too busy and neglect patients”, “prompt management of emergency patients by medical staff”, “medical staff can listen to patients needs”, “doctors can offer detailed explanations of patient status”, “doctors having good professional skills”, and “hospital will initiate follow-up of patient recovery”.

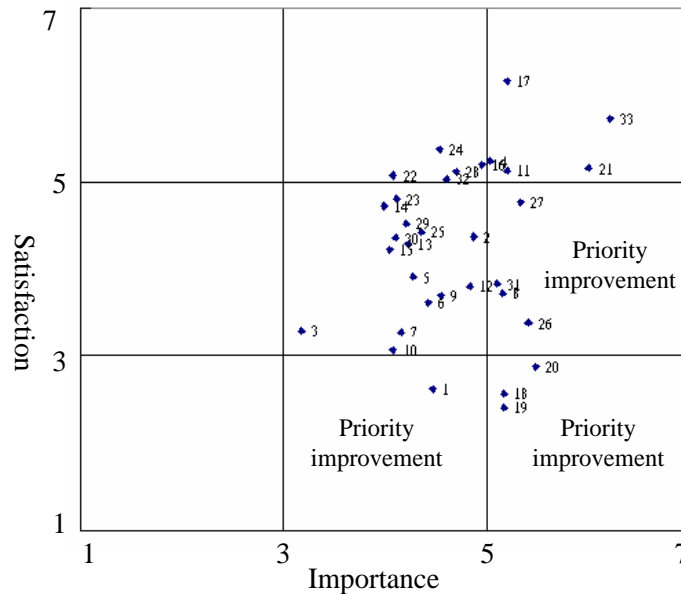


Figure3. Performance evaluation matrix of case study

4. CONCLUSIONS

The perimeters of medical service quality encompass a broad range of things, including working methods, operating procedures, machinery operation, and even medical management system. Since the implementation of nation health insurance in Taiwan, medical service quality has been gradually emphasized for the following causes: increase government expenses by medical cost, large inflation of healthcare costs, increased competition of medical service organizations, and a rise of customer consciousness. Management methods are need to improve medical service quality, the aims of which is to promote customer satisfaction; besides patient consent, opinions from experts, lowering management costs and elevated service quality and increased team work help to reach operation continuum.

To elevate medical service quality, just knowing patient opinions are not enough; the key is to increase the hospital’s ability to compete with other hospitals. Besides focusing on how to improve service quality, hospitals themselves need to survey their resource status and whether it is enough to promote efficient management methods and enrich management personnel. If hospital resources are adequate, modernized medical equipment must be purchased, professional and experienced medical staff employed, and professional medical management personnel trained. Hospitals must inspect all resources and personnel before considering the results of this study to efficiently distribute resources to items in most need of improvement. Service items with good performance should maintain status quo, and more resources can be devoted to items needing improvement. This method will no waste resources and ensures that usage of resources can be optimized.

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