IT-Enhanced Service Quality in the Healthcare Industry

Lee Pui-Mun

Nanyang Business School
Nanyang Technological University, Singapore
Email:apmlee@ntu.edu.sg

Abstract

Providing good service quality is of great strategic importance in the management of any service organizations. Besides ensuring excellent clinical care, hospitals should also focus on providing quality service to their patients and visitors. The findings from this study could provide useful information as to how hospitals could better manage their services and harness information technologies to enhance their services. Healthcare service in this research is defined as all medical support services, such as; nursing, food and beverage, ward service, counter service, and other ancillary services.

A questionnaire survey was conducted on about 400 customers who had previous experiences in one of the many hospitals of the healthcare system in Singapore. The method of survey was based on intercept interviews. Customer satisfaction levels were measured using a Consumer Satisfaction Index [CSI] model. The index model is based on a 10-factor construct. The research findings indicated that the CSI score for healthcare service quality in Singapore is 75.52 out of a possible 100. This shows that there is still a lot of room for improvement in the healthcare industry. Specifically, the healthcare industry as a whole seems to be weak in factors such as; Promptness, Attitude, Communication, Consistency, and Knowledge. An approach to apply IT in enhancing service quality in the healthcare industry is recommended. It is based on the principle of speed, mobility, and timely information sharing.

Keywords: Service Quality, Healthcare IT, Customer Satisfaction.

1. Introduction

The use of information technology (IT) in the healthcare industry is very much focused on recoding/retrieval of medical records, patient registration and payment transactions. Although these are critical aspects of healthcare service, there are other areas of healthcare service, such as nursing, customer support, food and beverage, laboratory services, etc. that are equally important as they affect the quality of service rendered to customer thus affecting customer satisfaction.

Service quality has four distinguished characteristics, namely; intangibility, inseparability, heterogeneity and perishability. These characteristics pose challenge to the application of IT in various aspects of healthcare service. Nevertheless, it is important to understand what are the important attributes of healthcare service that impact on customer satisfaction so that one would have a better idea on how IT could be applied to improve the provision of these service attributes.

2. The Healthcare Industry in Singapore

Healthcare services in Singapore are provided predominantly by the government, which accounts for about 80% of the total healthcare services. The remaining 20% of healthcare services is mostly provided by private for-profit firms, while a small proportion of it are given by a few charitable organizations.

In 2002, there are a total of 29 hospitals, in which 13 of them are public sector hospitals. Together, the 29 hospitals have 11,820 beds serving a population of about 4 million, in which 8,748 beds came from the 13 public hospitals, amounting to 74% of all hospitals beds in Singapore (http://app.moh.gov.sg/sta/sta0105.asp). The ratio of bed per 100,000 persons is about 300. The annual healthcare expenditure in Singapore in 2002 is about 3% of GDP or $4.8 billion (http://app.moh.gov.sg/you/you01.asp). There are 6,029 doctors and 18,034 nurses and midwives in the healthcare industry. Of these, 2,907 doctors and 9,690 nurses and midwives are in the public healthcare sector (http://app.moh.gov.sg/sta/sta0106.asp). The average length of stay in hospital is 5.6 days.

In the public healthcare sector, the 13 hospitals are grouped into 3 groups; the National Healthcare Group Hospitals (NHG), the Singapore Health Services Hospitals (SingHealth) and Extended Care Hospitals. NHG has 5 hospitals and 4 specialist centers as well as 9 polyclinics. SingHealth also has 4 hospitals and 4 specialist centers as well as 8 polyclinics. The polyclinics provide 80% of the primary care in the country. There are 4 smaller hospitals under the Extended Care Hospitals. In addition, 2 statutory boards called Health Sciences Authority and Health Promotion Board provides support services for the healthcare industry. The Health Sciences Authority provides regulatory services and evaluation support for healthcare products and equipment. The Health Promotion Board promotes healthy lifestyle, provides health information and preventive health services to the public (http://app.moh.gov.sg/our/our02.asp). The private healthcare sector consists of the remaining hospitals, which provide the remaining 20% of hospital care and about 1,900 private clinics that provide 80% of primary care.

This article provides research findings on customer perceptions of service quality in the public healthcare sector, as to how hospitals could better manage their services and harness information technologies to enhance their services.

3. Background

Service is a deed, a performance and an effort. The differentiation between a pure service and a product is seldom a clear distinction in many industries. In Figure 1, a broad categorization of various industries along a continuum of pure services (with zero exchange of tangible items) to pure goods (100% tangibility) is shown.

Research interest in service quality has been going on in earnest since the 1970s. Earlier research in the area of service quality was contributed mainly from the Scandinavian (U. and J. Lehtinen 1982, Gronroos, 1984). Gronroos (1988) argued that there are three dimensions of service quality – the technical quality of outcome, the functional quality of the service encounter and the corporate image. A service quality model was developed by Gronroos and tested on a sample of service business executives. The quality of service was based on 2 factors: expected service, and perceived service. The instrumental performance of a product is the technical side of the product. Consumers are not only concerned with what they receive as a result of the production process, but in the process itself.

Corporate image, or local image of an

office or another organizational unit, is of great importance to most service firms. Tests in the instrumental performance and expressive performance of products suggest that the first type of performance is necessary, but not sufficient condition for satisfaction. Functional quality, in fact, appears to be a very important facet of the perceived service, and the importance of image should be recognized. Lehtinen determined two approaches to the analysis of service quality and its dimensions. In the first approach, the three quality dimensions are used; physical quality, interactive quality and corporate quality. The other approach is to utilize two dimensions; process quality and output quality.

Most researchers recognized that service has inherent characteristics that make its performance difficult to evaluate. These characteristics are intangibility, inseparability, heterogeneity and perishability (Dotchin and Oakland, 1994a; Parasuraman et al., 1985; Sasser et al., 1978). As services are intangible, they cannot be subjected to precise specifications for uniform quality and measurement of performance. There is also an immediate effect of the service provided; the customer feels the impact of the service immediately when it is produced. The inseparability and heterogeneity of services mean that there is less managerial control over quality, since the services cannot be tested and assured before delivery and standardized during the delivery. Different service qualities are experienced when the customer visit different firms of the same industry. The final characteristic of perishability implies that service organizations need to retain excess capacity to meet the fluctuating demands of customers. The customer tends to be more involved in the production of the service than when they are in manufacturing.

Parasuraman et al. (1985) proposed a three-dimensional platform of service quality that included evaluative dimensions such as tangibles, reliability, responsiveness, assurance and empathy, whereby these are evaluated, follow by procedural dimensions where timing, flow logic, accommodation, anticipation, communication and feedback are of importance and lastly personal dimensions that include appearance, attitude, attentiveness, tact, guidance and gracious problem solving. They went on to formulate a survey instrument to assess the five service quality dimensions and the gaps that affect customer satisfaction . They called the instrument SERVQUAL.
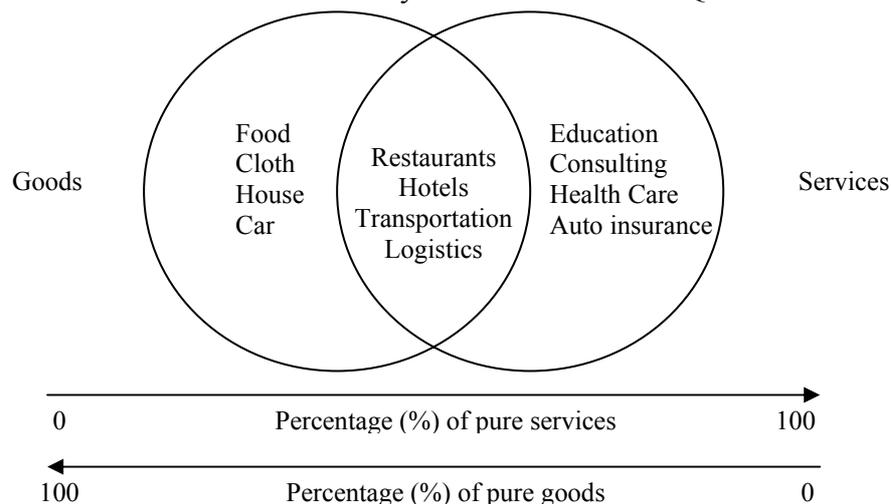

Figure 1: Distinction between Services and Goods

Perceived service quality, unlike tangible product quality, varies across customers. Having good service quality is a source of competitive advantage while poor service quality can become a cost burden to the organization and also alienates customers. In the healthcare industry, service providers offer similar ranges of services, but often with varying levels of service quality and professionalism. [Youssef et al, 1996] One cannot improve unless one can measure one's current state of performance. Measuring customer satisfaction is a good indicator of the performance of service quality in an organization. Eklof and Westlund [1998] defined a Consumer Satisfaction Index (CSI) as "system to model, measure, estimate and analyze the interaction between customer preferences, perceived quality and reactions on the one hand, and the performance of the company on the other." Thus a possible advantage of using a CSI is that it can form a component in the forward-looking Management Information Systems as an assessment tool. It can possibly offer information on priority areas to improve upon, and serve as a benchmarking against competitors using a common index.

Fornell [1992] studied CSI movement in Sweden. In 1989, a CSI measurement for its national competitiveness was launched, using annual data obtained and compiled in most of its economic sectors. It was an attempt "to link quality, satisfaction and performance" [Eklof and Westlund, 1998]. Based on the results from the Swedish CSI, a strong positive relationship has been demonstrated between the year-by-year change in CSI and change in organization's profitability. For the group of companies with a positive change in CSI between two successive years, an average increase in profits of 10% is recorded, while for the group of companies with decreased CSI, their profits decreased on average by 14%. [Anderson et al., 1994]

The SERVPERF [Service Performance] model (Bolton, 1991) uses a performance index rather than one of confirmation/ disconfirmation and aims to overcome the primary weakness of some other models that depend largely on the view of expectations and gaps that may be susceptible to the fact that a consumer's present attitude is dependent on their residual attitude from a previous experience with the firm.

In the area of healthcare, customer satisfaction measurement have been carried out by many researchers. Ware et al [1976] identified five measurement areas; access to care, availability of resources, finance, humaneness and quality of care. Rubin [1990] confirmed the earlier findings of Ware et al, and also further providing a list of dimensions use in evaluating their healthcare quality; admission, doctors' care, nursing, daily care, ancillary staff, discharge, billing and overall quality."

4. Research Approach

In this research, ten factors of service quality were selected because of their use in prior research. The list of main factors is as given in Table 1:

Table 1: List of factors used in CSI.

	Main Factors
1	Reliability of service
2	Knowledge of service staff
3	Promptness of service staff
4	Communication skill of service staff
5	Attitude of service staff
6	Availability/accessibility of service
7	Safety when using service
8	Consistency of service provided
9	Trustworthiness of service
10	Equipment & Facilities

Together, these 10 factors make up the Customer Satisfaction Index (CSI) model used in the research. All survey questions

used in construction are scale type questions, allowing respondents to respond on a 5-point Likert scale. The CSI construction is based on the equation given as follows:

$$CSI = \{\Sigma \ (Wt_A * A + Wt_B * B + \ldots Wt_N * N)\}/(N*5) \ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ (1)$$

where:

A, B... N are the mean satisfaction ratings to survey questions on the main factors.

$Wt_{A\sim N}$ are relative importance weights given by customers to each of the main factors.

N is the number of main factors.

A survey sample of 400 respondents was drawn from all around Singapore. Male and female adults of different ages were surveyed. Respondents should have either received medical treatment at a Singapore healthcare institution or accompanied or visited someone receiving medical treatment. The method of survey was intercept interview.

5. Research Results

Of the 400 respondents that were surveyed, 197 were male and 203 were female. 36.5% were below the age of 30, 42.3% were between the age of 31~50, and the rest were above 50. Collated responses to all the main factors listed in Table 1 were statistically tested and found to be significant at 95%.

In the survey, respondents were asked to rate the importance to them of each of the main factors and then followed by giving satisfaction ratings to each of the ten main factors based on their own past experience of healthcare service. Table 2 lists the Satisfaction ratings, the Importance ratings, followed by tabulation of relative weights and scores respectively. From Table 2 and equation 1, CSI is 75.52 out of a maximum of 100 points.

Table 2: Computation of CSI

Factor	Satisfaction Ratings (Mean Value) [A]	Importance Ratings (Mean Value) [B]	Relative Importance weight [C=(B/ΣB)	Relative Score [D = A*C]
Reliability	3.7200	4.5275	0.1048	3.898
Knowledgeable	3.7408	4.3950	0.1017	3.804
Promptness	3.8333	4.3350	0.1004	3.848
Attitude	3.7869	4.2450	0.983	3.722
Communication	3.6004	4.2000	0.972	3.500
Accessibility	3.8525	4.3525	0.1008	3.883
Safety	3.9104	4.4175	0.1023	4.000
Trustworthiness	3.6132	4.4125	0.1022	3.693
Consistency	3.7579	4.1725	0.966	3.630
Environment	3.9515	4.1375	0.958	3.786
Total	37.767	43.195	1.000	37.764

In terms of percentage, Table 3 provides a breakdown of the average responses to the 10 factors. From Table 3, it can be seen that critical areas where improvement could be first targeted are Promptness, Attitude, Communication, Consistency, and Knowledge. These factors are where less than 60% of the survey respondents are satisfied.

Table 3: Computation of CSI

	% Highly Agree or Agree	% Neutral	% Highly Disagree or Disagree
Reliability	67	28.3	4.8
Knowledge	59.6	35.5	5.0
Availability	63.0	32.3	4.8
Safety	71.8	24.3	4.1
Trust	67.6	29.8	2.8
Promptness	43.1	39.5	17.6
Attitude	52.5	36.3	11.3
Communication	54.6	38.0	7.6
Consistency	56.3	38.3	5.6
Environment	72.3	23.3	4.5

6. Discussion and Conclusion

This research study provided a benchmark on customer satisfaction towards the healthcare industry in Singapore. Using a CSI index, the study has produced an index of 75.52 out of a possible 100. This shows that there is still a lot of room for improvement in the healthcare industry. Specifically, the healthcare industry as a whole seems to be weak in factors such as; Promptness, Attitude, Communication, Consistency, and Knowledge.

Areas that impact on promptness include waiting times for appointment bookings, registrations, consultations, and medicine dispensing. Areas that impact on Attitude include politeness, sensitivity, and empathy. Areas that impact on Communication include adequacy of signage, language, and understanding of instructions. Area that impact on Consistency is in ability to provide consistent level of service in repeated visits for customers. For Knowledge, areas of impact include healthcare staff ability to answer queries and identify medications.

Although Information Technologies and the use of computers in healthcare might not be able to improve on all the areas of impact mentioned in the previous paragraph, they can definitely help to strengthen most of the deficiencies been detected in this study. A generalization model on IT-enhanced service quality in healthcare has been proposed in Figure 2.
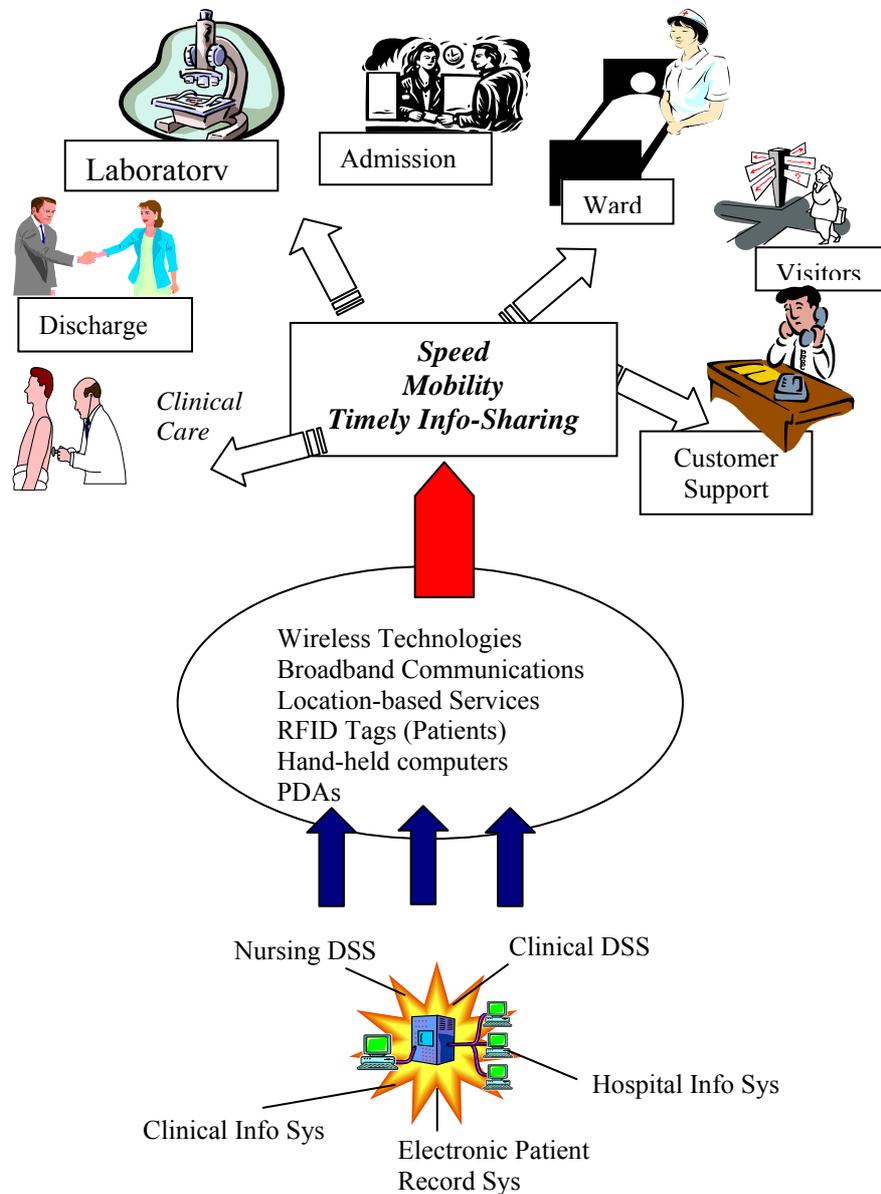

Figure 2: IT-Enhanced Service Quality in Healthcare

In this model, the proposed approach to apply IT in enhancing service quality in the healthcare industry is based on the principle of speed, mobility, and timely information sharing. If this principle could be successfully achieved, the level of service quality with regard to Promptness, Communication, Consistency, and Knowledge would definitely be enhanced. The approach calls for a core system of IT

components to be interlinked using a common World-Wide Web based platform. In order to facilitate the dissemination of timely information and decisions from this core system to all parties involved, the use of wireless technologies, broadband communications, location-based services, Radio Frequency Identification (RFID) tags for patients and critical documents, Personal Digital Assistants (PDA), and hand-held computers must be properly deployed organization-wide.

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