

Information Technology and Service Quality in Health Care: An Empirical Study of Private Hospital in India

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Abstract—The development of the information technology has made a significant impact on healthcare service quality in India. Today, besides providing excellent clinical care, hospitals should also focus on providing quality service to their patients. Information Technology plays a vital role in enhancing the service quality in hospitals. The findings from the present study could provide useful information as to how hospitals could better manage their services and harness information technologies to enhance their services. A questionnaire survey was conducted on 210 patients those availed health services from a private hospital in Hyderabad, India. Customer satisfaction levels were measured using a Consumer Satisfaction Index [CSI] model. The research findings indicated that the CSI score for service quality in selected hospital is 75.87 out of a possible 100. The results show that there is still a lot of space for improvement in the hospital. Specifically, the hospital as a whole seems to be weak in factors such as; Communication, Promptness and Availability. An approach to apply IT in enhancing service quality in the hospitals is recommended based on the principles of efficiency and effectiveness.

Index Terms—Hospital, information technology, patient satisfaction, service quality.

I. INTRODUCTION

Service quality has become increasingly significant to service organizations like hospitals and information technology has become more integral part of it. Application of information technology in healthcare has been gaining importance in India since few years due to the advancements in Information Technology. Information Technology has revolutionized the way of living. It has changed the economy, political structure, industries, financial markets and culture. Health care sector is also not far behind in opting for information technology as they have come to realize the importance of information required for timely decision making. Physicians need to make accurate and fast decisions every day with best utilization of resources available to them. With the help of existing IT technologies and developing new ones at the same time, accurate information is being made available to the decision makers so that treatment and service provided to patients will be faster, safer, affordable, and cost effective and resources employed for these services will be used efficiently.

In return this will support and improve quality of healthcare [1]. Therefore, there is an essential need for hospitals to manage IT to enhance service quality. The use

of information technology (IT) in the healthcare especially in Hospitals is very much focused on patient registration, recoding/retrieval of medical records and payment transactions. Although these are vital areas in hospital service, but there are other areas such as nursing, diagnosis, pharmacy, patient support and other support services that are equally important as they affect the quality of service rendered to patient thus affecting patient satisfaction.

II. THE HEALTHCARE SECTOR IN INDIA

Healthcare sector has a great potential in the present globalized world. It is one of the world's largest industries with total revenues of approximately US\$ 2.8 Trillion. Healthcare sector has been emerging as one of the largest service sector in India. Indian healthcare sector has estimated revenue of around \$ 30 billion constituting 5% of GDP and offering employment to around 4 million people [2]. According to Investment Commission of India, the sector has witnessed a phenomenal expansion in the last few years growing at over 12% per annum. The growth of healthcare sector can contribute to 6-7% of GDP and increase employment by at least 2.5 million by 2012 [2]. In globalised technology driven healthcare market, Indian hospital needs to be enhance the service quality by using information technology to meet the global competition as well as increasing patient's expectations.

III. HEALTH CARE-SERVICE QUALITY AND INFORMATION TECHNOLOGY

Service quality is a concept that has aroused considerable interest and debate in the research literature because of the difficulties in both defining and measuring it with no overall consensus emerging on either [3]. There are different definitions as to what is meant by service quality. One such definition describes service quality as the extent to which a service meets customers' needs or expectations [4] [5] [6] [7]. Another definition explains service quality as a focused evaluation which reflects the customer's perception of specific dimensions of service such as reliability, responsiveness, assurance, empathy and tangibles [8]. However, service quality refers to a number of inter-related factors including the way in which customers are treated by providers, the scope of services and contraceptives available to the customers, the quality of the information provided to the customers and quality of the service, the promotion of individual choice, the technical competence of providers and the accessibility and continuity of services.

Service organizations have followed the lead of manufacturers in making great strides work done with fewer employees mainly because of advances in technology. On

the other hand, little attention has been paid in academic and business literature to use information technology to improve customer service and long-run business effectiveness. To remain competitive in the market, service providers are increasingly offering IT-based service options to reduce costs and create value-added services for their customers. IT systems are expected to help service providers improve service quality, financial performance, customer satisfaction and productivity. [9]. IT can help to enhance service quality by increasing convenience, providing extra services and collecting service performance information for management use [10]. The potential benefits IT can provide, for the health care sector are competitive advantages through quality of information processing, process efficiencies, improved productivity and performance, superior quality of service, greater responsiveness to customer's needs and greater organizational flexibility [9].

The introduction of information technology has made healthcare information management easy and secure. Information is collected, stored and managed from multiple channels and is distributed to multiple channels for further use. In healthcare medical information is received from hospitals, institutes, medical practitioners and patients. This information is then managed at a central database and made accessible for researchers and doctors. The major reason of introduction of knowledge management in healthcare is to improve the quality of diagnosis to patients, efficient and effective information management, help in undergoing medical research, and this quality will be provided by introducing information technology solutions.

To catch up with IT, healthcare organizations like hospitals need to incorporate clinical data repositories, electronic data interchange, internets, clinical pathways and wireless computers supported by investment in technologies that will enable this transformational change. It is argued that IT is increasingly being adopted by community and hospital based providers of health services, because IT is now available not only to improve the communication of patient data, but also to expedite communication of myriad other information across health care organization[11]. The realization by healthcare executives that IT is the linchpin for an organization's success resulted in a plethora of effort to ensure that the integration of IT with health care strategy would work successfully [12]. Information Technology department is the architect of the hospital strategic information plan and it must be the blueprint for organizing patient care, research, financial and administrative data [13].

In this context the present work intended to study the IT-Enhanced Service Quality in the Health Care with reference to a private hospital in India. The present study used the Customer Satisfaction Index (CSI).

Consumer Satisfaction Index (CSI) is a 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 [14]. The 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.

IV. OBJECTIVES

The aim of this study is to understand how hospitals could better manage their services and harness information technologies to enhance their services. The objectives of this study are to study the relationship between information technology and service quality, to measure the patient satisfaction levels using a Consumer Satisfaction Index [CSI] model and to develop a model for better IT- Enhanced Service Quality in hospital.

V. METHODOLOGY

The present study has adopted ten factors of service quality which were used by Lee Pui-Mun in his study [15]. These factors are as given in Table I:

TABLE I: LIST OF FACTORS USED IN CSI

| S.No | 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 of service |
| 7 | Safety when using service |
| 8 | Consistency of service provided |
| 9 | Trustworthiness of service |
| 10 | Equipment & Facilities |

Together, these above ten factors make up the Customer Satisfaction Index (CSI) model used in the research. All survey questions used in questionnaire are scale type questions, allowing respondents (patients) to respond on a 5-point Likert scale. The CSI construction is based on the following equation:

$$CSI = \{\sum (WtA * A + WtB * B + \dots WtN * N)\} / (N * 5) \quad (1)$$

where:

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

WtA, \dots, 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 210 respondents was drawn from a private hospital of Hyderabad, India. Male and female patients of different ages were consulted with structured questionnaire. These respondents only included those who have availed health services from the selected private hospital. The method of sampling was purposive sampling.

VI. RESULTS AND DISCUSSION

As shown in Table II, of the 210 respondents (patients) that were surveyed, 84 were male and 126 were female. 74 patients were between the age of 20 to 40, 96 were between the age of 40 to 60 and the rest were above 60 years. Collated responses to all the main factors listed in Table I

were statistically tested and found to be significant at 95%.

TABLE II: CHARACTERISTICS OF RESPONDENTS

| S.No | Characteristics | Sample |
|------|-----------------|------------|
| 1 | Type of Sample | Purposive |
| 2 | Gender | Male 84 |
| | | Female 126 |
| 3 | Age (Years) | 20-40 74 |
| 4 | | 40-60 96 |
| 5 | | > 60 40 |
| 6 | Total Sample | 210 |

In the survey, patients 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 experience of hospital service. Table III lists the Satisfaction ratings, the Importance ratings, followed by tabulation of relative weights and scores respectively.

$$\frac{37.937 \times 1.000}{10 \times 5} \times 100 = 75.87$$

From Table III and equation 1, CSI is 75.87 out of a maximum of 100 points.

TABLE III: COMPUTATION OF CUSTOMER SATISFACTION INDEX

| Factor | Satisfaction Ratings (Mean Value) [A] | Importance Ratings (Mean Value) [B] | Relative Importance weight C=(B/ΣB) | Relative Score D = A X C |
|-----------------|---------------------------------------|-------------------------------------|-------------------------------------|--------------------------|
| Reliability | 3.8604 | 4.5700 | 0.1037 | 4.003 |
| Knowledgeable | 3.7500 | 4.5300 | 0.1028 | 3.855 |
| Promptness | 3.9020 | 4.3505 | 0.0987 | 3.851 |
| Attitude | 3.6500 | 4.4250 | 0.1004 | 3.664 |
| Communication | 3.8522 | 4.2350 | 0.0961 | 3.701 |
| Availability | 3.7690 | 4.7025 | 0.1067 | 4.021 |
| Safety | 3.8420 | 4.5330 | 0.1029 | 3.953 |
| Trustworthiness | 3.8350 | 4.1405 | 0.0939 | 3.601 |
| Consistency | 3.9020 | 4.2435 | 0.0963 | 3.757 |
| Environment | 3.6040 | 4.3200 | 0.0980 | 3.531 |
| Total | 37.966 | 44.05 | 1.000 | 37.937 |

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

TABLE IV: COMPUTATION OF CSI

| Factor | % Highly Agree or Agree | % Neutral | % Highly Disagree or Disagree |
|-----------------|-------------------------|-----------|-------------------------------|
| Reliability | 74 | 23 | 3 |
| Knowledgeable | 65 | 30 | 5 |
| Promptness | 47.5 | 35.5 | 17 |
| Attitude | 68.5 | 26.5 | 5 |
| Communication | 46.8 | 39.0 | 14.2 |
| Availability | 56 | 38.5 | 5.5 |
| Safety | 72.5 | 25.5 | 2 |
| Trustworthiness | 68 | 18 | 14 |
| Consistency | 64 | 26.5 | 9.5 |
| Environment | 67.5 | 28.5 | 4 |

VII. CONCLUSION

The present study provided a customer satisfaction in a private hospital of India. Using a CSI index, the study has produced an index of 75.87 out of a possible 100. This shows that there is still a lot of space for improvement in the hospital. Specifically, the hospital as a whole seems to be weak in factors such as; Communication, Promptness and Availability. Areas that impact on Communication include adequacy of signage, language, and understanding of instructions. Areas that impact on promptness include waiting times for appointment bookings, registrations, consultations, and medicine dispensing. For Availability areas of impact include doctors, nurse and specialty service.

Although Information Technologies and the use of computers in hospital may not be able to improve on all the areas of impact mentioned in the study, but they can mostly help to strengthen these deficiencies in a hospital. A generalization model on IT-enhanced service quality in hospital has been proposed in the following Figure 1. The conceptual model is partially based on the IT-Enhanced Service Quality in Healthcare of Lee Pui-Mun [15].

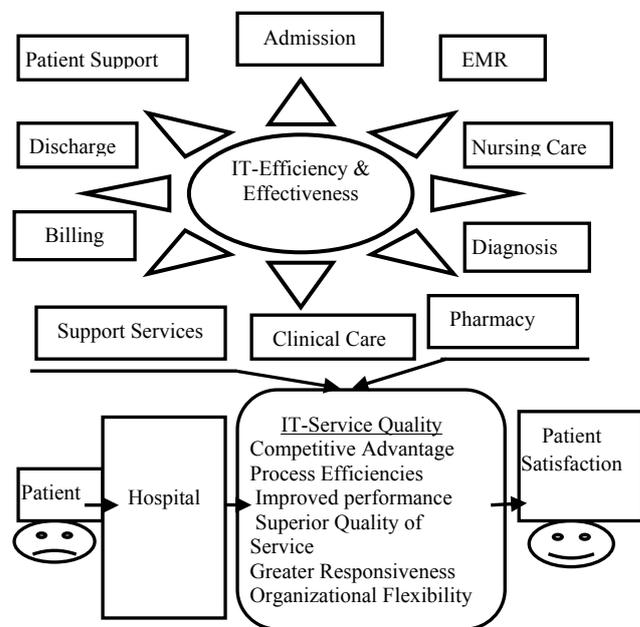


Fig. 1. IT-Enhanced service quality in hospital.

In this model, the proposed approach to apply IT in enhancing service quality in hospital is based on the principles of efficiency and effectiveness. If this principle could be successfully achieved, the level of service quality with regard to Communication, Promptness and Availability would be enhanced in the hospital.

As figure 1 shows, when a patient visits a hospital to avail the health services, the hospital could be achieved the patient satisfaction with the help of IT-enhanced service quality model. 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 stakeholders involved, the use of wireless technologies, broadband communications, Radio Frequency Identification (RFID) tags and hand-held device must be properly

deployed organization-wide.

Demand for quality in healthcare is becoming more and more imperative and is increasing immensely with the growing healthcare needs. Information technology can play a vital role in mobilizing the hospital to provide better quality services and it will enhance the service quality of a hospital that has dared to think outside of the box. The possibilities are infinite as the hospitals design their workplace of the future. It is the responsibility of the top management and then all stakeholders in healthcare to integrate and implement the information technology in hospitals to change the overburdened manual process in to a technological foundation. Information technology will support the physician, the nurse and the multidisciplinary team at the point of care to provide the better service quality in order to achieve the patient satisfaction.

ACKNOWLEDGMENT

The author would like to thank his teachers, Dr. G.V.R.K Acharyulu & Prof. B. Raja Shekhar, School of Management Studies, University of Hyderabad, Hyderabad, India for their encouragement, support and inspiration.

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