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Abstract

In a closely connected world, awareness from across the globe leads to constant increase in one’s expectations. This is more so true from a consumer mindset where expectations are always for superior service and value for money consistent experience. Patient expectations from healthcare service experiences are no different, thus leading to the transformation of traditional healthcare provider models into speciality healthcare units or hospitals. Information systems play a key role in ensuring strategic operational support to these cost intensive units. For long term success and sustainable investments, it is critical to measure the effectiveness of information system interventions in these speciality healthcare units. Since each patient has different healthcare needs, service models could vary; thus, the need of a mixed methods research framework to play a strong role in solving and understanding the inherent complexities for deriving maximum benefits from information system interventions.

Key Words


Introduction

In context of an information system intervention in a speciality healthcare unit, some of the critical success factors identified include (in alphabetical order) brand building, consumer mindset, data access controls, decision making support, health information networks, healthcare provider mindset, hospital resource planning and knowledge discovery databases (Gulati and Taneja, 2007). The success of an information system intervention can be determined by the improved performance of these factors or key organizational functions. This improved performance then supports the operational objectives of reducing average length of stay and increasing occupancy rates. Average Length of Stay (ALOS) refers to the average time a patient occupies the hospital bed (Economic Times, 2004). In other words, for a speciality healthcare unit, this metric is the average of number of days spent by its patients during the course of treatment. The second operational goal which goes hand-in-hand with the reduction of average length of stay is an increase in occupancy rates. Either of the two goals can precede one another as operational focus areas for speciality healthcare providers. The growing incidences of lifestyle diseases which need long term health management support and an aware patient or consumer has led the growth of demand for quality healthcare services. Corporate groups have been quick in tapping this opportunity by making large scale investments in speciality hospitals or healthcare units. The speciality healthcare units are expected to play a key role in future of Indian health sector with the vision of making quality healthcare affordable for all sections of the society.

Information system interventions are expected to continue playing a pivotal role in the operational success of these speciality healthcare units by helping them reduce average length of stay or increase occupancy rates. Since information system interventions and operational transformations are a cyclic process, it is important to measure the success from these interventions. With situational needs being different, mixed methods research based frameworks are best suited to the objective as they eliminate dependencies on a single approach and also effectively address the dynamic changes in the healthcare
sector. According to Creswell (2011), mixed methods research is an approach to inquiry that combines or associates both qualitative and quantitative forms. Mixed methods form of research is being increasingly used in the social sciences sector (Guthrie, 2010), thus, having potential to significantly contribute in healthcare research. In subsequent sections of this research paper, a mixed methods research framework is being elaborated upon.

The PERFORM Framework – Conceptual Perspective

The PERFORM framework has been conceptualized based on statistically reliable and validated research results obtained across 6 years of academic effort from 2005 to 2011 (Gulati and Taneja, 2013). External validity for this research project has been established through WHO websites and in person case study based research execution and corporate speciality healthcare units of New Delhi region. Triangulation of results from different qualitative methods like focus groups and interviews has been done to establish the internal validity. Reliability of the research outcomes has been established by calculating Cronbach’s alpha. The value of alpha ranges from 0.757 to 0.818 for the quantitative surveys design and executed as part of the research project. Table 1 indicates key components of the PERFORM Framework which are elaborated theoretically in this section. Evaluation aspect based on scores from each component of the framework will be summarized in the next section of the research paper.

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Table 1: Components of the PERFORM Framework

(a) Patient Expectations – With the increase in awareness on healthy living, today’s patients are more inclined towards preventing long term healthcare management. Like any other customers services marketing organization, they expect speciality healthcare providers to –

- Completely and quickly diagnose the health problems and suggest long term preventive action items along with the near term treatment plan.
- Maintain an appropriate communication channel which includes reminders around follow-up visits, vaccination schedules or medical investigations.
- Collaborate in long term well-being through events like informative seminars, check-up camps and discounted special offers on routine investigations.
- Commit for ensuring personal health data security for respecting individual privacy.
- Incorporate real time medical profiles which can be leveraged for e-consultation or second opinion reference as needed.

Patient expectations represent the consumer mindset in need of superior healthcare service. The list above is by no means a comprehensive one around the growing patient expectations. It is merely an indicative one which does confirm that meeting such expectations is much easier and efficient through information system interventions and interplay of other identified critical success factors. This is affirmed by the research result where hospital resource planning, healthcare provider mindset and consumer mindset have emerged as the top three critical success factors of information system interventions.

Patient Expectations or shortfall in them can be measured by using the statistically proven SERVQUAL model (Babakus and Mangold, 1992). The tool measures the patient expectations and their real time experience based perception of the healthcare unit across five broad dimensions of
Tangibles, Reliability, Responsiveness, Assurance and Empathy. Evaluation using this tool is done through the following steps:

- Patient responds to questionnaire themed around expectations from the healthcare service provider. Responses are recorded for 15 questions on a Likert Scale (Kumar, 2005) of 1 to 5.
- After availing the services, patient feedback is solicited across another similar 15 questions and similar scale. The key difference is that here the response is based on the perception of healthcare services received.
- Difference is calculated across each pair of questions.
- Difference score across each question is averaged with other questions of the same category to conclude the score at a category level. E.g. Responsiveness.
- Average score of difference across all 5 categories is recorded.

Outcomes from this phase provide the quantitative strength of the research framework.

(b) Research – In context of the research phases, a factor like Knowledge Discovery Databases (KDD) was always referred to in terms of its contributions to reducing average length of stay or increasing occupancy rates. However, as these databases grow in terms of no. of years of data processing, they would become an invaluable source of trend based health management data. Multiple such datasets then form the basis of medical research for doctors to come up with new treatment approaches or even suggest a new combination of salts within a health drug. Knowledge discovery databases or warehouses are also playing an important role in domains like clinical trials, biotechnology and genome analysis. Thus, without much additional or specific investment, information system interventions support research and development on an on-going basis. This component of the framework renders qualitative support which is based on past success stories and full of actionable insights for the healthcare to work upon.

(c) Financial Management – Speciality healthcare units are high on investment need both as start-ups and consistently over the periods of existence. Once the venture capital has been fully leveraged, providers need strong cash flows to maintain the modern infrastructure and plan for new investments. Information system intervention based real time financial modules help exchange of money between diverse stakeholders including healthcare providers, patients, insurance providers and third party administrators who support processing of claims. Indian healthcare sector has still a long way to traverse in terms of availability of end to end financial management and assistance modules for patients throughout the country. Diversified corporate groups like Apollo Hospitals have ventured into health insurance business to become a one stop shop for all current and prospective consumers. Fortis group of hospitals have also made their presence felt through the financial services brand ‘Religare’. As the Government of India and regulatory bodies like IRDA continue to open up the general insurance sector, information systems will continue to play a key role in bringing all the diverse stakeholders on a single operational platform. It has also been ascertained that providers who lay emphasis on having a robust financial exchange network take strong lead against growing competition in the industry (Cordina and Singhal, 2008).

(d) Optimized Resources – Based on the research results, it has been ascertained that Hospital Resource Planning (HRP) is the most critical factor for contributing towards both the operational goals of reducing average length of stay and increasing occupancy rates. Information system interventions support the optimization of all kinds of resources of a speciality healthcare unit. These include –

- Doctors and support nursing staff on duty,
- Ambulances on stand-by for emergency requirements within the city or for attending patients arriving at domestic or international airports,
- Accurate supply and demand chain quantities of medicines and vaccines at the in-house medicine store, and
- Need of new medical equipment for investigation or treatment purposes.
Reducing average length of stay and maintaining high occupancy rates have multiple benefits for the speciality healthcare providers such as –

- Patient satisfaction and trust,
- Balanced investment capital needs since the occupancy rates at the speciality healthcare unit can be increased without adding new beds,
- Compliance to global quality standards, and
- Increase in overall profitability of the healthcare providers (related to high occupancy).

(e) Medical Tourism – The modern speciality healthcare units in the country are increasingly becoming popular amongst foreign patients. These patients are able to receive quality healthcare treatment at costs which are several times lower than their native countries. From a provider perspective also, this is a win-win situation as these patients are source of foreign currency cash flows which help in meeting the on-going investment capital requirements of the speciality healthcare unit. Information system interventions ensure an online communication medium with the international prospect consumers for complete arrangements including planning the treatment, travel and visa arrangements, stay at the speciality for treatment and then post discharge consultations through tele-medicine.

The PERFORM Framework – Evaluation Perspective

The PERFORM framework discussed above validates that information system interventions enable the accomplishment of long term speciality healthcare provider goals and objectives. Further, with the inherent mixed methods construct, insights generated for healthcare provider leadership are relevant, actionable and most importantly measurable on an on-going basis. As mentioned earlier, the research outcomes in the field of speciality healthcare are very situational and specific. For this reason, the analysis based on the PERFORM framework is kept more on the qualitative side rather than quantitative. Outlined here is an evaluation / research plan based on this framework.

**Step 1:** Leveraging SERVQUAL, calculate average difference scores (perception vis-à-vis expectations) for all 5 sub-dimensions of Tangibles, Reliability, Responsiveness, Assurance and Empathy. These dimensions can these be sorted from best to worst performing to provide clear focus areas with reference to patience expectations.

Figure 1 below indicates the relationship of the three most critical factors in context of the information system interventions.
The action items from these 5 sub-components are expected to drive the need of patient or consumer focused health data and technologies (Herzlinger, 2007). These in turn have led to the conceptualization of patient centric health information systems (Gulati and Taneja, 2013).

Step 2: The **Research** phase of the framework relates to the outcome from the Knowledge Discovery Databases (KDD) factor. Knowledge Discovery Databases (KDD) are thus well defined databases which –

- have superlative data mining capabilities to identify the most relevant data,
- assist the healthcare organization in discovery of new knowledge,
- leverage EDI protocols for consistent information management, and,
- ensure application of business intelligence / online analytical processing to support real time decision making process. These decisions are again stored in the databases for future references.

Thus, this phase of the framework provides qualitative experiential insights around operational decision making, administrative challenges and their resolutions with patients of similar healthcare problems and successful treatment plans which contributed to the optimum average length of stay of patients in need of healthcare service.

Step 3: The state of **financial management** is measured based on multiple progressive aspects of involved stakeholders. Inferences can be drawn from –

- Revenue share coming in through the network of corporate plans, insurance providers, etc.
- Increase in number of preferred partners for cashless insurance claim settlement.
- Corporate affiliations offering preferred rates to users, thus ensuring sustainable cash flows.

While financial management is all about business numbers, PERFORM framework intends to provide focus areas of action to the healthcare provider leadership when they compare performance on some of the key dimensions with competition.

Step 4: As discussed, **optimized resources** allude to healthcare provider performance with respect to continuous average length of patient stay and occupancy rates. Both these operational goals are very dependent and interlinked. In context of a previous assessment, outcomes from this phase of the framework are categorized as following –

- High Optimization – Similar or reduced average length of stay metric with improving or 100% occupancy rates.
- Average Optimization – Increase in average length of stay metric or decline in occupancy rates.
- Low Optimization – Increase in average length of stay metric and decline in occupancy rates.

**Step 5: Medical Tourism**, as a concept needs no introduction, especially if the healthcare provider unit is based in India to derive maximum cost benefits for multinational patients. A simple metric related to this in the PERFORM framework is the % revenue share for healthcare provider from patients who are not Indian nationals. Efforts to improve or maintaining this at high levels also lead to provide healthcare services at low cost to the weaker sections of Indian economy.

**Future Directions**

Any new research or evaluation framework is subject to improvement / enhancement with increased usage in the industry, PERFORM, being no different. Some of the future directions for the PERFORM framework should include –

- Increase in quantitative assessment while maintaining the significance of qualitative insights.
- Assessment of the framework components in consistent sequence across diverse speciality healthcare units.
A few critical success factors can be identified for information system interventions at clinics focused on preventive care, thus leading to a framework at clinic or smaller set-up level.

Robust designs of information system based applications can be developed which support financial support and inclusion of all sections of the society. The framework can then be expanded to measure the success of these robust systems.

Performance indicators in context of medical tourism or treatment plans of international patients can be developed to continue attracting them towards India as the preferred healthcare destination. These should then be added to the fifth component of the framework for evaluation.

References