Chapter 1

The Background

This opening chapter provides a window to the thesis, touching upon the conventional statement of the problem, need and objectives, methodology used, data sources and the expected benefits. The important aspect of determining an adequate sample size is examined statistically to arrive at a working formula. A chapter layout is included to provide a menu card for the whole dissertation. The concern for health service quality and its continuous improvement run as a common denominator.

1.1 Introduction

People around the world are becoming increasingly aware of the need for healthcare quality. This is a recent phenomenon in the developing countries like India. The awareness has become strong enough to deserve serious evaluation of the quality level, which is country specific. Entitlement for a reasonable quality level at affordable cost is now considered almost a right of the people. Increasing medical tourism is a consequence of this aspect. In this scenario, the thesis makes an honest attempt with focus on the Indian case.

1.2.1 Need for the Study

There is an increased awareness about the service quality in health sector globally. It has been reported that the inequality in access to health service is even more than in economic status in the developing countries. The poor stand highly disadvantaged. Thus, it is a pressing need that service quality in health sector is properly evaluated using a reliable method. This should take into consideration all the stakeholders. The literature in this regard is sparse and scattered. The Indian case is less investigated. Hence, the need for this study.

1.2.2 The Research Gap

The application of TQM in the manufacturing sector has stabilized and has been well researched. Service quality in healthcare has been researched and discussed to some extent in the literature. However, the application of TQM in healthcare is still in its infancy in India. This study aims to fill the research gap by applying TQM principles to the healthcare sector in India.

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extent. There is a body of literature on TQM in service quality, in general, and in healthcare taking into consideration some of the recent works. Some isolated work on service quality along with TQM in sectors like banking is noted. For example, some empirical evidences from Malaysia on TQM practices, service quality and market orientation has been provided by Samat et al (2006). Likewise, the impact of TQM and Service Quality has been examined for the banking sector by Talib et al (2012).

A unified approach of fusing together service quality considerations with TQM principles in healthcare is not seen in the literature. Clearly, such an effort provides a holistic framework considering all the aspects (i.e. perspectives and expectations of all the stakeholders) and is, therefore, expected to result in a more effective measurement. This shows a gap in research efforts which has the potential of being valuable, if investigated. Such a consideration is the basic motivation for the work in the thesis. Developing a \( (\text{Service Quality} + \text{TQM}) = \text{Total Service Quality (TSQ)} \) framework in the context of healthcare is an important objective of the work. On the application side, the PPP model of Yeshasvini scheme of the Karnataka Government for healthcare is evaluated from the TSQ perspective, with the intention of making useful recommendations for enhancing the value and reach of the PPP program.

1.3.1 Statement of the Problem

Previous studies are done either from service providers’ perspective or from end users’ perspective. Evaluations are done from institutions to consider possibility of continuing financial support. There are, however, no studies done from a holistic perspective by integrating quality of service & total quality by management practices in an institutional setting. The present study aims to develop a theoretical framework from TSQ perspective and evaluate a Public-Private-Partnership (PPP) model from service provider & end user angles in the backdrop of Total Service Quality (TSQ). Peeping into issues and anomalies in the Indian health sector is kept as an auxiliary objective. Relevant empirical evidence, at aggregate level, is gathered and analyzed.

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1.3.2 Objectives
The specific objectives of the study are:
1) To assess the levels of service quality as perceived and expected by service providers and end users together with a ground level evaluation,
2) To develop an appropriate classification of determinants of service quality in health sector and indicators of the quality level, along with the necessary theoretical framework (TSQ),
3) To evaluate the quality aspects of Yeshasvini scheme for healthcare in Karnataka & 4) To draw policy conclusions based on the results of the study.

1.3.3 Research Questions
Keeping in view the stated objectives, research questions (RQs) are formulated as below and attempt to answer them in the following chapters.

RQ 1. a) What are the determinants of service quality in healthcare? (Chap. 2)
   b) How to quantitatively model service quality delivery in hospitals? (Chap. 4)
   c) How to fit healthcare service into TSQ framework? (Chap. 4)

RQ 2. What does the patient-centered empirical evidence on healthcare quality in India suggest? (Chap. 5)

RQ 3. How is the performance of Yeshasvini healthcare project as a PPP model in Karnataka? (Chap. 6)

1.3.4 Scope of the Work
The present study is theoretical in part, by synthesizing the service quality and TQM concepts in healthcare. It provides a Total Service Quality (TSQ) framework. On the application side, the quality aspects of a statewide healthcare scheme are evaluated. This refers to the Yeshasvini scheme, right from its inception in the year 2003 and covers geographically the entire Karnataka State. Input data are gathered from a sample of patients, family members, physicians and administrative staff of the network hospitals including those under the PPP model. This is augmented by some other field evidences, sources and discussions.
1.4.1 Methodology

After an extensive literature study and review, the theoretical aspects are investigated and quality indices are developed based on discussion with subject experts for fine-tuning the method(s). These methods have been tested before finalization. The data for chosen field studies were collected from secondary and primary sources.

The focus group procedure was used as the method of collecting qualitative data about the Yeshasvini scheme, as the method suits determination of perceptions and attitudes (Krueger, 1994) of service providers. The participants were either providers or recent beneficiaries of healthcare. An advantage was that open-ended questions generate data in the participants’ own words. The two groups of participants gave valuable insights into what constitutes quality in healthcare. The patient group was drawn from a list of recent beneficiaries of the scheme and the patients in the other hospitals included in the study.

A field study was conducted in a charitable cancer treatment hospital at Valasad town in Gujarat State. A similar study was conducted covering a few hospitals in Bengaluru and Mangaluru cities.

A questionnaire to measure service quality was developed and tested using focus group inputs. Data from the beneficiaries on these questionnaires were used to validate the instrument (Addendum I). The data are examined from the view point of testing statistical hypotheses and inference is given briefly.

A couple of performance indices have been developed as follows:

a) A composite index for the healthcare services, considering all the relevant factors. Sub-indices are developed for direct medical services (e.g. diagnosis, medicine/surgery and treatment) and indirect operations (e.g. administration, security, nursing and follow-up).

b) A deficiency index to evaluate the shortcomings, after classifying them as major and minor, with a suitable weighting system for combining the two types.

This is motivated by the fact that sometimes it is simpler to assess a limitation, according to its seriousness, e.g. assess the delay factor (responsiveness) in access to
medical attention under the Yeshasvini scheme in the scale of 0 to 10 (ten being critically serious).

The research design is based on the juxtaposing of Input (Service Provider)-The Process-Output-Outcome (End-User) paradigm. At every stage, people are vital elements leading to appropriate outcomes. The people, institutions & the system are the target groups.

The paradigm of design is shown in Figure 1.1

![Figure 1.1: Basic Research Design](source)

A matrix of total quality v/s service quality is developed to identify quality variables to assess the gap between perceptions and expectations. The dimensions of cost, time & value creation as experienced by the target group are analyzed. The service quality dimensions such as tangibility, reliability, responsiveness, assurance & empathy are appropriately matched with key quality characteristics assessment for healthcare systems. While care, respect, timeliness are associated with responsiveness, safety & continuity are associated with assurance.

Likewise, patient satisfaction/happiness is associated with empathy. The reliability factors are availability & efficiency. In addition, tangibility is associated with efficacy, efficiency, effectiveness & clinical outcomes.

The criticality is linked with application or practices evolved by the organization in terms of design of the process, kaizen, robustness, inspection & check and such other basic principles in action in a clinical setting.

As such, the study operationally defines the elements linking with action at the setting as follows:

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1.4.2 Operational Definitions

1) **Service Provider**- That person or institution who/which provides appropriate service or product or both.

2) **Institution**- That setting formulated for defined actions to meet the requirements of the end user/customer/patient.

3) **Output**- The set or package of solutions offered by the system in well-articulated terms for the *end-user*, the *provider* and people involved in the process-support systems.

4) **Outcome**- The set of expected results/solutions realized by the end user.

The Total Service Quality (TSQ) is perceived as perfect match of perceptions and expectations of the *end-user* delivered by the system/organization(s).

*Population*:
Those units or elements associated with creation, action & delivery of solution to the (health) problem.

The elements are Doctors, Support Staff (Nurses, Medicine delivery, etc.,) people in back office and the patients (*end-user*).

The size is determined based on the Organization and package offered.

*Sample Design*

The selection of the sample of each of the elements in the population is attempted by two variables:

a) The finite number reflecting the size and

b) The characteristics of the elements.

1.4.3 Variables & Attributes

The variables and attributes finalized after a pretest and discussion with experts are as listed below. They are twenty-eight in number, some being crucial and the others having a supplementary role. There is a mix of service quality aspects and TQM considerations. These topics were in-built into the questionnaire for collecting data from respondents.
Reliability, Responsiveness, Assurance, Empathy, Tangibles, Caring,
Effectiveness, Appropriateness of the Location, Information, Efficiency, Meals, First
Impression, Staff Diversity, Safety, Timeliness, Availability, Authenticity, Control-
Courtesy, Formality, Friendliness, Personalization, Promptness, Adaptability,
Spontaneity, Coping, Involvement, Services Scape/Exterior Design & Other Tangibles.

Table 1.1: Total Service Quality Dimensions

<table>
<thead>
<tr>
<th>RATER/ KQCAH/ JCAHO Dimensions (Set A)</th>
<th>TQM Dimensions (Set B)</th>
<th>TSQ Dimensions (Set C)</th>
</tr>
</thead>
</table>

Source: Author

Sets A and B are mutually exclusive in the sense that they have no elements (characteristics) in common. However, C contains some elements from A & some from B.
Conceptual Relations

Since the aim is to assess the TSQ in Healthcare Sector, the relationships among people, units, organizations, operational aspects leading input to the final outcomes have been formulated. These perceived relationships are converted into mathematical formats in order to enable us to test the floated hypotheses/sub hypotheses.

1.4.4 Instrument Development

All the instruments: a. Check list b. Schedule c. Questionnaire and d. Interview schedules are developed for assessment of TSQ. The foundation of the instruments is the pioneering work by Parasuraman and his associates in the area. Since TQM is involved in the comprehensive assessment, the foundations of TQM with fourteen principles are confounded with service quality dimensions.

There are three parts in the instrument: Part I- Demographic items (eleven), Part II- Topics proper (sixty-three) and Part III -Yeshasvini scheme specific (seven).

(Addendum I)

The Selection of Unit

There are several schemes/projects associated with both in the public and private sectors. These could be either supported by the Central Government or by the State Government. Ten established hospitals were selected from the cities of Bengaluru and Mangaluru and one from Gujarat State. This represents a good cross section of institutions meting out Allopathic/ Ayurvedic (Chapter 5) treatments and hospitals from the public and private sectors.

The study concentrates on a health package scheme evolved by the Government of Karnataka (Chapter 6) which is unique in the sense of participation by people (target group), private hospitals & the State Government. The role of the latter is in overall coordination and in funding through the target group of cooperatives. The scheme is named YESHASVINI.
Secondary Data Sources

These consist of:

1) Records from hospitals and discussion with doctors,
2) Reports of Department of Health and Family Welfare, Govt. of Karnataka; the findings of the National Sample Survey and National Family Health Survey &
3) The Internet.

Primary Data

Personal interviews were held with healthcare providers and beneficiaries (patients and their family members) to evaluate service quality. The draft questionnaire was pre-tested to word-craft the same, so that the questions conveyed the intended meaning to the respondents without ambiguities, before being used for final data collection.

1.5 The Size of the Sample (n)

In any field study, determining the adequate size of the sample is a key step of the design. This needs an idea of the margin of error d (difference between the true and estimated values of the parameter). When several parameters are involved, the decision is based on the important characteristics. While estimating proportions (or percentages), a good rule (Cochran’s sample size formula, Chap. 4) is to use:

\[ n = \left(t^2 P Q / d^2\right) / \left[1 + (1/N) \left((t^2 P Q / d^2) - 1\right)\right] \]  

where \( t \) is the abscissa of the normal distribution curve that cuts off an area \( \alpha \) (e.g. 0.05) at the tails, and \( P \) is the population proportion to be estimated and \( Q = (1 - P) \).

For practical use, an advance estimate \( \hat{p} \) of \( P \) is substituted in the formula. If \( N \) (the population size) is large, a good approximation is to use

\[ n_0 = \left(t^2 \hat{p} q / d^2\right); q = (1-\hat{p}) \]  

For a typical choice of \( d = 0.05 \) (or 5 %), \( \hat{p} = 0.20 \), \( q = (1-\hat{p}) = 0.80 \) and \( t = 2 \) (the 95 % cut off point under normal curve), to get

\[ n_0 = 4 \times 0.020 \times 0.80 / (0.05^2) \]
\[ = 256 \]
This goes up to \( n_0 = 336 \) for the advance estimate as \( p = 0.30 \). The maximum \( n \) under this exercise occurs when \( p=q=0.5 \) and this works out to be \( n_{max} = 400 \). Thus, a sample of size 250 to 400 was considered as adequate with 400 being a safe bet.

In the field study this is the rule, while fixing the sample size. Sample size determination for estimating continuous characteristic needs some more inputs. In general, the standard error of estimate decreases as \( \sqrt{n} \) increases.

An interesting theoretical point deserves mention here. The precision of estimation depends primarily on the actual size of \( n \) and not that much on the relative size \( n/N \). In other words, the role of \( N \), after a certain threshold level, \( N_0 \), virtually disappears in the determination of precision.

For instance, a sample of 400 units from a population of 8000 units is practically as good as \( n = 400 \), when \( N \) is just 4000. This phenomenon has a favorable practical significance. Namely, \( n \) need not be raised proportionately when larger populations are encountered. This advantageous rule holds both for estimating proportions and measured characteristics. The above aspect is leverage in favor of sampling method as compared to complete enumeration of population under study.

The working steps of the design are shown sequentially in the following figure.

\[ 
\begin{array}{c}
\text{Research Objectives} \rightarrow \text{Methodology} \rightarrow \text{Sample Design} \rightarrow \text{Instrument Development} \\
\text{Sample Size Determination} \rightarrow \text{Questionnaire Design & Pre-Test} \rightarrow \text{Data Collection} \rightarrow \text{Data Analysis & Inference}
\end{array} 
\]

Source: Author

Figure 1.2: Implementation Steps of the Design

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1.6 Thesis Layout

After this opening introductory chapter, the subsequent Chapters elaborate on different aspects as follows:

**Chapter 2: Determinants of Service Quality in Healthcare**

This dwells upon the concepts of service quality in healthcare, providing relevant definitions, their evolution and measurement aspects, and provides a common platform for ensuing chapters.

**Chapter 3: Review of Relevant Literature**

An up to date review of relevant literature is provided here, touching upon both the theoretical framework and a few country specific cases. This provides a state of the art assessment and report on the situation.

**Chapter 4: The Thought Process-A Theoretical Outline**

The study makes a few theoretical contributions both in terms of concepts and methods. A demerit index, hybrid model and a multivariate version are proposed and discussed. Illustrations are provided. This forms the core chapter of the work.

**Chapter 5: Empirical Studies on Quality Evaluation**

Two field studies conducted by the candidate and their results are reported here. The questionnaire is discussed and the data analysis is provided. The derived inputs provide good insight into the inter-relations among the concerned variables and their significance.

**Chapter 6: Yeshasvini Scheme in Karnataka State: A PPP Model**

A popular Public Private Partnership (PPP) model in healthcare is discussed here. Such models are projected as a method to provide quality healthcare at affordable cost. A geometric model for the expansion of the Yeshasvini scheme is proposed and analyzed mathematically. Also, a cuboid model for coverage processes is prepared.

**Chapter 7: Discussion, Suggestions and Frontiers**

The contents of the thesis are swiftly summarized to provide a retrospective view.

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A discussion is added as fallout. This final chapter puts forward a few recommendations as derived corollaries of the work, which can be implemented. Three potential areas (directions) and a few open ends (unfinished work) for further work are outlined. This includes generalization of the models proposed to other fields, a National database development and a *new* method for developing standardized medical terminology.

The next figure shows the thrust of each of the chapters in the form of a flow chart to fix the direction of the discussion at a glance.

![Sequential Layout of Chapters (1-7)](image)

*Source: Author*

**Figure 1.3: Sequential Layout of Chapters (1-7)**

### 1.7.1 Contribution of the Study

The thesis makes a *five-fold* contribution on a modest scale to health sector service quality domain as follows:

1) Theoretical contribution in the form of a few novel ideas and quality measurement methods (classification and measurement indices/growth models) in the TSQ framework.

2) Some empirical evidence on healthcare service quality in Indian context together with discussion of policy issues and anomalies.

3) Examining a PPP model for providing satisfactory healthcare at affordable cost with the potential for countrywide expansion.

4) An effective summary of the work together with clear outlining of three potential open areas for further work.

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5) A brief review of relevant literature precedes the above contributions.

1.7.2 Benefits from the Work

The following benefits are expected to accrue from the results of the present study.

1) Paving the way for assessment of healthcare quality from TSQ perspective and advancements therefrom.
2) Identifying policy issues and anomalies in Indian health sector, leading to necessary policy modifications to achieve greater efficiency and penetration.
3) Mathematical modeling of standard coverage processes.
4) Suggesting open avenues for further useful research work in the health sector related aspects.

1.7.3 Limitations of the Research

These primarily concern the following:

1) The empirical evidence is only on a moderate scale due to the limited sample sizes. However, the reliability of the data personally collected by the candidate compensates, at least in part, this limitation.
2) Only two major medicine systems are covered. The alternative systems like Yunani and Homeopathy have not been included.
3) The geographical coverage for empirical evidence is not wide spread and limited to three cities, one in Gujarat and two in Karnataka.

Moving on, the work presented in this dissertation attempts to enrich the knowledge regarding healthcare quality, anchored around hospitals, patients and doctor-patient relation. Several health sector issues are under the lens. The inputs in this chapter provide the necessary platform for the ensuing discussions.