Chapter 7
Discussion, Suggestions and Frontiers

This final chapter provides a retrospective view of the work in the dissertation and a summarizing discussion. A valid assertion is made as to how the objectives of the thesis are met by the work and the research questions formed are answered. A few practical suggestions derived from the contents are made. Finally, scope for further research is pointed out, three of the directions being presented as unfinished work. The potential areas include i) generalization of the models proposed in Chap. 4 & 6 to other fields, ii) development of a country-wide medical database as a ready reckon for physicians and hospital administration & iii) a technique for development of a unified terminology for healthcare system with the terms uniquely reflecting their meaning. Some relevant ideas in both contexts are elaborated along with a few other gaps for research contribution which is indicative of the prospects.

7.1 Introduction
In a dissertation spanning seven chapters and on an important topic like the service quality in healthcare, it is customary and useful to

a) Provide a summarizing discussion and
b) Indicate avenues for further work.

The first of these two aspects is attempted below by sifting through the material of the thesis. This provides a rear-mirror view of the contents in a nutshell. The aspect b) is dealt with later in the chapter.

7.2.1 Work Accomplished
After stating the need and scope for the present work, driven by the research gaps, the objectives are spelled out together with the methodology (data sources) and the layout for the chapters. The limitations of the work too are pointed out, mainly in the form of relatively narrow primary database. However, exhaustive reference to print media and internet more than salvage this limitation. A compact review of relevant literature

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(recently published work) is made around the standard concepts of service quality, TQM and TSQ frameworks and the pioneering model of Parasuraman and his associates, followed by the developments to rectify the limitations of this model (e.g. KQCAH model).

The thesis objectives were first translated into three research questions, answers for which have been attempted in the proceeding chapters in a reasonably comprehensive manner. These are believed to throw useful light and provide insight into the health sector scenario, leading to useful derived corollaries, some of which have key policy implications. The essential contributions of the thesis are in the central chapters: Chapters (4-6) and Annexure (II and III). The contents of Chapter 4 on concepts and theoretical aspects are eminently suited for quality evaluation of medical institutes and hospitals. The necessary inputs are to be obtained from direct observation, questioning or from the records. The outcome is in the form of numerical measure of the service quality. Chapter 4 (the core theoretical material), introduces concepts of positive and negative quality attributes and a demerit index for negative attributes using a weighting system.

Classification of demerits by their seriousness (e.g. Classes A, B, C and D) and by their source (e.g. nursing) is discussed. The stakeholders too are identified and an entrenched conflict of interests is pointed out. This makes quality evaluation a complex job. A handy and meaningful distinction is made between claimed (de jure) and delivered (de facto) service quality levels. Methods for assessment of these levels are outlined (e.g. Delphi method). A hybrid model, combining binary and rated variables, is developed and used as a basis for deriving a service quality score (SQS). The model is amenable for generalization to a macro-level. It can be adapted to a particular case, for example, a maternity hospital.

The material in Chapters (5-6) is essentially patient-centered. It surveys the perceived and expected quality levels as has been the experience of a large enough sample of patients/attendants/doctors/support staff. The inputs are obtained on a designed and pre-tested questionnaire with sixty-three questions (plus seven specific for

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Yeshasvini scheme), and the analysis throws light on the service scenario as obtaining today. Inputs are solicited from doctors, nursing and administrative staff on a limited scale using a designed questionnaire with the health sector status as the focus. Chapter 6 covers the status of the Yeshasvini scheme in Karnataka and summarizes three of the typical cases along with analysis of survey data. Also developed is a cube model for a coverage process, which is generalized to a cuboid model for more than three parameters.

The role of quality elevating tools such as योगासन, प्राणायाम, meditation, music, collective chanting and prayer is discussed. These are positive tools sans any adverse side-effects. They are an integral part of ancient Indian wisdom (e.g. Sage Patanjali’s Yoga sutras). Music and chanting have an added advantage. Even a bed-ridden person can benefit from these steps. There is abundant empirical evidence on the benefits of these tools, cost-wise too they are highly feasible, needing only investment of some time by the person/patient.

7.2.2 Contribution of Variables to Total Service Quality

We go by the average score assigned to the variables by the respondents in a Likert scale of one to five. We carefully examine the cases with average score of four and above. The discussion pertains to the entire respondent group. The scenario for the responses by the Yeshasvini group is similar. Our results, by and large, agree with the findings of similar earlier studies.

The differences may be attributed to the fact that these studies have been conducted at different geographical locations and time points and using different questionnaires. The twenty-seven variables considered (Table 1.1) were examined for higher (four or more) response scores, which led to seven of them being identified as having higher effect. These are, looking at perceptions: Reliability, Responsiveness, Assurance, Empathy, Tangibles, Caring and Safety.

Reliability refers to capacity to carry out assured service consistently and accurately. The sub variables of higher importance in this unit are timely cure and problem-solving ability of the hospital staff. The results of similar study by other
Researchers are included in the last column of Annexure II.

**Responsiveness** stands for readiness to help patients and give quick service. This contains timely information about the treatment provided, willingness to help, timely service and readiness to respond to all patient queries.

**Assurance** is about the phenomenon of getting confident of a correct treatment and quick cure for the ailment. This is a mix of attitude, words of comfort and courtesy by the hospital staff. In particular, it included a feeling of getting cured after meeting the hospital staff, knowledge of the concerned to handle rightly and less burden on bills.

**Empathy** is the ability to place oneself in the position of the patient and appreciate all his physical psychological problems. The sub variables included providing special attention to patients, deal with patients with happiness and convenient transaction hours.

Next under focus are the **Tangible** variables. In fact, tangibility can be defined as that dimension emphasizing on physical environment where the service is provided. The internal service chain reduces the importance of tangibility, unless they influence patient care significantly. In our case, tangibility was identified through the sub variables - latest equipment, impressive hospital facilities, professional approach by the staff and familiarity with the correct use of the facilities (like PET scan).

Literally **caring** should find place in healthcare evaluations and its importance has been highlighted by the earlier research workers. We had a single question to test this aspect - whether staff has been providing family treatment to patient\family. In general, this may include communication, interaction between persons, friendliness and special caring. This had a average score of 4.37 out of a maximum of 5.

**Safety** is a factor often neglected though it deserves a high priority. Aspects like protection from fire, correct bio-medical disposal and airy wardrooms are the main determinants of this factor. This was checked through a single question of on this aspect, yielding an average score of 4.24. This factor does not come into play unless an emergency occurs, in which case it becomes critical. This is the reason for it being often overlooked, but with possible catastrophic consequences.

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7.3 Are the objectives met?

Four specific objectives and three research questions (RQ1 - RQ3) derived therefrom, were stated in chapter 1. The latter were linked to the relevant chapters in the dissertation. From the above summary of work accomplished, it may be noted that all the objectives have been met to a large extent and, thereby, the formulated research questions have been answered. In particular, RQ 1. a) concerns determinants of service quality, which are elaborated in Chapter 2. RQ 1. b) is regarding models of service quality. In this context, a wide range of quantitative indices are proposed together with the methods for their computation in Chapter 4. Further a couple of new models are also put forward. RQ 1. c), refers to fitting service quality into TSQ framework, which is attempted again in Chapter 4. The next chapter dwells on answering RQ 2 by providing adequate empirical evidence on healthcare quality in the country. The answer to RQ 3 on performance of Yeshasvini scheme in Karnataka forms the main contents of Chapter 6. Added to this, a cube/ cuboid model for coverage processes gives a theoretical flavor here to together with mathematical rigor. This testifies, as an audit note, to the one-to-one correspondence between the objectives and the contribution and a close match between the two.

7.4.1 Discussion

This dissertation presents quality aspects of healthcare, both its measurement and the Indian scenario, in a well-knit manner. The issues raised, well known in public debate, present a challenge to be taken up and tackled. The discussion on quality issues, anomalies in Addendum is only illustrative in nature and by no means exhaustive. Preparing a priority list and implementing the relevant steps in a phased manner is a prudent policy direction. The healthcare level is very important for all stakeholders including the Government as a social responsibility. This is often sidelined. A sound healthcare system directly affects the productivity of the people which in turn contributes to the GDP. A thorough blueprint for long-term implementation and its execution is a national priority. This plan should envisage the value of quality elevation tools (Annexure V) and the alternative systems of medicine like that based on the science of Ayurveda. Likewise, the issues in geriatric and palliative care, and the tricky issue of

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Noting the success of PPP models in healthcare in India, which is now on a limited scale in some of the States like Rajasthan and Karnataka, it is logical to recommend such models on a larger scale. This presents a win-win situation by allowing Government control over cost and quality together with private sector efficiency but without possible exploitation. This experiment will be handy for the economically poor in view of its cost effectiveness. The two field surveys carried out provide some insight into the healthcare scenario. One is concerned with Ayurvedic treatment for cancer by a charitable hospital near Valasad in Gujarat. The other one sheds light on the situation in Bengaluru and Mangaluru hospitals meting out allopathy treatment. Both the studies are patient (customer) centered. It is noted that inadequate health insurance cover, poor security, inaccessibility for rural folks and high costs are the pinpricks. The benefits of policy realignments have to percolate down to the last needy individual in an attempt to wipe out every tear from every eye. The medical service should be value creation and sustenance based and not excessively commercial. There is a need to address technology addiction in the present day younger generation and counseling for coming to terms with aging for the elderly counterparts. The super-specialty hospitals luxuriantly proliferate with an eye on cashing on patients' ignorance and helplessness.

7.4.2 Free Medicines for Disease Management: Mehasana Model

It is accepted by all that truly innovative interventions in disease management widen the outreach of the concerned programs, improve patient satisfaction and health outcomes, reduce patient costs and engage all stakeholders, especially the private sector. Yet, only a few such innovations appear, and when they do, they are often over-looked because current health programs are either too well-established or relatively inflexible. A case in point is a simple but transforming innovation being implemented in Mehsana, a small town in Gujarat. With a mix of rural and urban populations, this town is implementing India's first pilot program for universal free tuberculosis drugs-an idea that could transform Tuberculosis treatment and management in the country. If this succeeds,
the whole scenario of disease control can get changed fundamentally. TB continues to be one of the most serious health problems in the country. More than 750 Indians die each day due to this malaise. The annual economic loss due to this health hazard is estimated to be $23.7 billion. Extensive national programs have been carried out, campaigning through media has been done and other patient education packages have been initiated. In spite of all these, a large segment of patients still leans on the private sector hoping to get a better care. Unfortunately, this is not always true. There is rampant misuse of wrong/incomplete diagnosis, unsuitable treatment, which make the patients (and their kith and kin) fall into the poverty trap, which is difficult to break.

The Mehsana program offers no financial incentive to the doctor and offers only a small overhead charge to the pharmacists. However, in the end, the program provides a win-win situation for all: the chemist acts as a referral point, the patient gets the correct diagnosis and free medicine and the private doctor keeps his or her patient group. This innovation in Mehsana can possibly transform public-private partnerships and thereby the way the public health programs are run. An innovation of this nature, if scaled up nationally, could address several of the existing challenges.

7.4.3 A New Health Index for Indian States

The Indian NITI Ayog has recommended (Dec., 2016) a 'Performance on Health Outcomes' index that will allow rank ordering of the States based on their accomplishment in terms of measurable health indicators. This aims to quantify the yearly incremental improvement by the States, rather than on the past achievements. The indicators in the index have been pretested in two of the States. The index could be used to propel action in the respective states in order to improve health scenario and data collection and compilation mechanisms. The index will include pointers in the areas of health sector governance and some critical inputs and processes.

7.4.4 Lessons Learned

Taking a cue from and buoyed by the success of Mehasana Model outlined above and Yeshasvini Scheme of the Karnataka State, discussed in Chapter 6, strong suggestion
is made for wider application of the PPP model and scaling up in our country. This allows the Government control and orientation to social justice, at the same time giving the benefit of private sector efficiency sans its exploitation. A few further logical points and reasoning which have wider ramifications are discussed next.

Universal access to healthcare is of great importance and it is a priority in India. However, healthcare delivery in an efficient form has remained a mirage. It is stated that led to inadequate budgetary provision and lack of insurance cover has 3% of Indian population to serious indebtedness. This seriously calls for proactive and vigorous programs by the Government to ensure basic healthcare services at affordable cost to the common man, which needs revitalization of the healthcare delivery system. More medical centers, modern facilities including technology based tele-medicine are needed to cover the demand-supply gaps. This urgently calls for promotion of PPP models as a viable route. The detailed framework, both financial and legal, has to be meticulously developed, drawing upon the scattered experiments in Rajasthan, Gujarat and Karnataka States. The quality guidelines and working model too are to be spelled out carefully.

Smart business models are to be put in place, which allow reasonable profit margin to the private sector.

Insurance is an area where PPP models have worked. For instance, the Yeshasvini Cooperative Farmer’s Healthcare Scheme in Karnataka involving Narayana Hrudayalaya provides a convincing example. This covers over 800 surgical procedures to farmers and their family members. This is one of the largest self-funded healthcare insurance schemes in the country. Neighboring Andhra Pradesh has the Arogya Raksha Scheme in collaboration with New India Assurance Company and with private clinics. This focuses on BPL families.

The new Companies Act of 2013 mandates corporate to spend not less than 2% of their profits on Social Responsibility activities. The Government should utilize this provision to partner with private sector, leading to significant improvement in healthcare delivery in India via a PPP model. This is a win-win situation for both Government and

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the private sector.

7.5.1 Streamlining Healthcare Data

Healthcare data in India suffer from lack of quality, periodicity and coverage. Serious discrepancies between information collected by different agencies are too common. In this context, a few viable suggestions have been proposed at different forums which include the following:

**Data Gaps**
- Lack of data at district and local levels.
- Highly irregular intervals between data collection efforts. (e.g. Fourth round of National Family Health Surveys (NFHS) was after a gap of nine years)
- Data remain incomplete with unfinished surveys, particularly at local levels.
- Lack of data quality, propelled by absence of an independent quality audit body and that the collected data must pass through several layers before evaluation and analysis.
- Lack of healthcare data from the private sector.

**Way Forward**
- Standardizing the several definitions across various studies/ surveys.
- Ensuring periodical collection of dis-aggregated data, avoiding duplication of forms/ formats.
- Placing positive value on data by decision makers and other stakeholders.
- Capacity building of staff by providing them with necessary skills.

7.5.2 Some Other Suggestions

The Government should encourage novel techniques in medical science and certainly not curb it. The health sector fabric has several weak/ missing threads. India today hosts the world's largest number of people prone to poor health. A lot is to be accomplished in designing medical devices and instruments, which will assist doctors in quick and correct diagnosis. The rising cost of healthcare is a big concern. But innovation should not be sidelined because of it. Price limits on medical devices can in fact prove

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counterproductive. One should work towards a network of well-equipped easily accessible and affordable healthcare services, particularly for the people in the lowest rung of the society.

Keeping in mind the quality in healthcare service and the protective/preventive measures towards ensuring satisfactory health levels, the following suggestions are made for active consideration by competent authorities. In this effort, cooperation/partnership may be sought from private players like non-governmental organizations and private hospitals:

1) Improving the level of awareness of people about health hazards from addictive habits like smoking (active/passive or e-cigarettes), use of other tobacco products and alcoholism. Educatve programs like street plays, electronic/print media or signboards may be used for this effect,
2) Removing the misconceptions about diseases like HIV/AIDS, again through educative programs. These may be made part of school curricula at different levels,
3) Propagating the need for blood and organ donations,
4) Making the public realize the importance of hygiene and cleanliness, balanced diet, intake of adequate quantity of water and physical exercise daily,
5) Highlighting the benefits of quality elevation techniques like yoga and listening to music,
6) Establishing Authorities with requisite powers to regulate price of drugs and quality, evaluate the service quality of hospitals and control the cost burden on patients,
7) Introducing adequate schemes for health insurance coverage for all sections of the society, both in rural and urban areas, making the seniors an integral part of the same, introducing legal framework for issues like euthanasia and e-pharma. Justice is best served when the most vulnerable in society are benefitted,
8) Dealing firmly with sale of tobacco products and display of adequate warning signs on the cover of such products,
9) Improving the healthcare accessibility in rural/semi-urban areas and for hill-tribes,
10) Taking steps to make people aware of the existing Central/State programs regarding health,
11) Enhancing the budgetary provisions to implement the above suggestions. Also use the corporate social responsibility dimension to achieve this goal.

No progress can be achieved by being continuously in a denial-mode. The existence of notorious nexus in the health sector, entrenched interests and hidden agenda must be recognized and eliminated. Mere legislation of strict laws will not solve the problem. It is like trying to eradicate TB by legislating that no person shall show symptoms of TB, like cough and sputum! What are needed are strict laws which are to be equally & strictly implemented. These should be extensively and intensively applied within an organization, leaving no pockets of exception.

Persistent and chronic malnutrition among children has resulted large scale stunting and wasting (low weight and height for the age) micro-nutrient deficiencies in India. This is pointed out again in the Global Nutrition Report 2016. This calls for a national nutrition mission to be driven in a fast mode. Several recent Government programs like Swach Bharath, Beti Bachao and Beti Padao are nutrition sensitive steps. These may be revamped to be made more focused and penetrating. Hollow clichés will not do.

Idea of Trust Index

The desire for healthcare is not negotiable and the choice of a provider can never be compromised. The concept of a quality index for medical institutions may be generalized to lead to a creation of a single trust index and devising the weightage for each driver of trust. These institutions can then be rated (ranked) against criteria that lend them substantial credibility. The variance in quality and trust level makes the choice of a provider difficult. The trust index may be evaluated based on responses from all the stakeholders including customers (patients and guardians).

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Development of a medical database and building of root and rule based medical terminology are outlined as unfinished work. Together with this some other research gaps as well as suggestions for a forward movement are made.

7.6.1 New Directions for Work

The available potential calls for further work, which evolves with passage of time. The work is challenging: but the knowledge fund grows for the benefit of the mankind. An attempt is to be made to create a template for future and extend the frontiers of scientific knowledge. Two specific directions and a bunch of loose ends are outlined below:

7.6.2 Generalization of Methods and Models as Further Work (Chap. 4 & 6)

Chapter 4 elaborated on new angles of looking at the quality scenario and novel ways of quality evaluation, with reference to the health sector. This includes:

1) bifurcation of attributes as being positive or negative,
2) distinction between de jure (claimed) and de facto (delivered) quality levels,
3) classification of demerits by seriousness and construction of a demerit index, and
4) compiling of a Quality score based on both binary (yes/no type) and rated attributes.

These ideas are quite generic and apply equally to a host of other areas. For instance: manufacturing, banking, transport (roadways, railways, waterways and airlines), insurance, telecommunications and tourism. As a sequel, one may identify the relevant parameters for each sector, devise suitable weighting systems, and develop reliable methods of data gathering, particularly for fixing the de facto levels, listing of demerits and their categorization. The weights (100, 50, 10, 1) were used as illustration. Other weight systems based on optimization principle maybe designed. Each sector with its own peculiarities and angularness, offers enough scope for useful research. Aggregation methods for collating responses by a group may be developed and fine tuned. This

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includes the problem of missing observations (non-response). These are in the realm of multivariate data analysis. Some other unforeseen questions are likely to prop up as research progresses and as specific to the chosen field.

The cube/ cuboid model dwelt upon in Chap. 6 holds potential for application in the different areas mentioned above. The work includes the study of geometrical properties of the model along with the provision for retardation (negative growth) in a few directions. Empirical evidence may be gathered and analyzed to judge the suitability/ adequacy of the said model. Policies to apportion a fixed total budget to different heads may be derived, assuming apt cost models like the square root function, which has an inbuilt dampening property.

We strongly believe all this offers a green pasture for thinking minds, inviting for exploration.

7.6.3 A National Medical Database: Unfinished Work

The US hospitals and Doctors must use specific disease codes, w.e.f Oct. 01, 2015, which cover everything from parrot bites to getting sucked into a jet engine. In this list, there are 70,000 ways to get sick, hurt or mortally injured and the US has made it official. These codes have been made mandatory to bill government programs and private insurers in the country's healthcare system. The codes cover a vast gamut of possibilities and are exhaustive as well as extensive. The list has, however, some absurd excuses such as Z. 63.1 'Problems in relationship with in laws' or V 91.07 XA ' Burn due to water skis on fire'. These codes will assist in handling different types of health conditions from headaches to heart related problems.

It is the right time that a similar system is developed in India. The concept of a Registry for notifiable diseases like cancer does exist in the country. But its implementation has been sparse, sporadic and has often hit roadblocks due to lack of coordination among agencies like the Government and hospital. The idea of a National Database supersedes the concept of a Registry, elevates it to the national level and brings the scattered efforts under a common umbrella. This countrywide effort can be easily
implemented due to the facilities for *automation* and computer *networking*. A medical database at national level puts the patient’s entire medical history literally at the fingertips of the Doctor- readily available and precisely revealed. This circumvents the *lack of memory* or want of records problems of the patient/attendant.

The database should include critical information on patient's blood group, allergies etc. to avoid serious medical errors. These are not uncommon now and could (should) be avoided. Developing a database can be accomplished in a phased manner and can be facilitated via the internet links. In the first phase, one may document the individual’s medical history on major diseases like TB, cancer, cardiac problems and diabetes on a regional basis. Later this could be extended to the national level and to cover the entire medical history of the individuals. Similar scaling up to cover more diseases and incidence of multiple ailments for a patient may be implemented. A *deletion rule* should be built-in to update the base after the demise of the patient/individual. A suitable numerical ID may identify the individual in a precise manner.

The Central Government plans to have a centralized medical history of patients via a platform called National e-Health Authority (NeHA). This step is a much needed one for allowing access to accurate health history of the patient to have a better treatment plan. A suggested format for the individual patients to be fed into the database is in Annexure III.

As an initial step, the Karnataka Government intends (Jan., 2017) to digitize the details of patient and the ailment by linking it to the *Aadhar* number, starting with fifteen chosen hospitals in the State. The software developed has been named 'smart ilaaj clinic' and will allow easy access to patient's medical details in a digital form, with adequate data security.

**Database of Medicinal Plants**

In a parallel move, the Karnataka Government intends to build a database of local medicinal plants and indigenous knowledge. The Geographical Information System (GIS) will be harnessed for this purpose. This knowledge will be integrated with modern
sciences. This will allow the best and effective practices to be shared by the medical personnel.

7.6.4 A Novel Approach for Terminology Development: Unfinished Work

Bhat et al (2015 a, b) have, in their basic work, suggested a new root and rule based approach for this purpose. This opens new areas for work including the healthcare sector.

It has been remarked that most mistakes in the medical field occur due to lack of precise description and absence of a doctor friendly system. The newly developed system should be eminently suitable for automation, which is the order of the day. The traditional approach has been to define each word as a standard but in a laborious non-machine friendly style which is often ambiguous. For example, cancer versus its treatment. The relation among different terms involved may be vague and unclear. Consider the phrase ‘They are killing snakes’ may mean

1) A group of people is beating snakes to kill them, or
2) A group of people is as malicious as snakes.

In such cases, machines cannot map uniquely the words to their meanings. Such uniqueness may be achieved through combining the roots (धातु-Dhaatu) to form a phrase rather than a sentence or a paragraph to explain (form) a concept. There should be a clear rule to combine the roots. Three examples are police_woman, cancer_chemotherapy and malaria_quinin. These respectively stand for a lady police officer, chemotherapy as a treatment of cancer and quinin as a drug for malaria. Here the classifier (police, cancer, malaria) is followed by the word (classified), thus the term is embedded into the terminology. This makes it semantic as well as knowledge rich. In this fundamental approach, the terminology evolves itself systematically and logically, leading to a robust and computer friendly set up. To give an example of a ‘wrong’ terminology in current use, one may cite the case of ‘orphan medicine’, which actually refers to treatment for rare diseases! (with incidence, less than one per lakh population). Here the medicine is not orphan, as the usage first suggests.
While developing machine friendly terminology, one may avoid *plurals* and *gender references*. Always treat a word as plural only, for the sake of *parsimony*. One may have a convention that the minimum number of nouns used (*Dhaatu*) is *three* and the maximum is *five*, to keep the number of permutations to be manageable; after five one may give a break point.

It is worthwhile to note that in the Sanskrit language there are about 2000 *root words* which are used to develop the entire rich vocabulary. For instance, the word *yoga* is derived from the root *yuj* (to unite); *krishna* from *krish* (to attract). *Yoga* is a process of yoking together all the powers of body, mind and soul to God, the All-perfect. New words are created as per the situation requirement. One may study the Sanskrit word system and adapt it to other languages including the English language. The structure of the classical Greek and Latin languages may be examined from this standpoint. This provides a vast, potential area of linguistic research effort, as applicable to the healthcare sector: a totally new direction, which promises immense practical utility.

Bhat (2018) has adapted the root and rule-based natural language processing approach to information indexing and searching. This includes domain dependent preprocessing rules, for example, to filter out extraneous content. This method has potential implications for the medical data base development mentioned above.

*Use of Images*

To cite an example from religious set up, the idol (*प्रतिमा*-Pratima) of Ganesha suggests the *attributes* involved- Elephant head, sharp eyes, large ears, liking for sugarcane etc. The same self-suggestive logic (rule) can be used to standardize the medical terminology. These may be modified or adopted according to the situation.

At the next higher level, the *words* may be replaced by *images* to make them language independent (Hindi, Chinese, Japanese etc.). Then one may have a *directory* for the basic words, which may be decided based on frequency of usage and number of *intersections* with other domains. If the frequency structure changes over time, one may develop a dynamic rule to update the basic directory by suitable *deletions* and *additions*.

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One may create a new *dialect* and if it gets high frequency of usage it may be *promoted* as a *language* after a period, based on a *computer mechanism*, where low frequency of usage automatically leads to deletion of the *dialect*. To cite a historical parallel, many religious sects were created in India (e.g. सान्ख्या-sankhyas, अघोरी-aghories), but many of them got deleted due to lack of followers (low usage frequency). The standardization of the terminology should take place such that it is *scale-able, computer friendly, semantic* and at the same time *reducible* (dropping of rarely used words).

*Flexibility is the Key*

The directory, mentioned above, should be self-evolving and capable of surviving the passage of time. The American Constitution, which is very short, provides a good example. Through its vagueness and flexibility, it is old but ever new (पुराण अपि नव - *Puraa api nava*). This allows evolution during time, without change in the basic frame.

Vagueness allows many potential uses, which may come and go, depending on the need; root words have this flexibility; of course, they must be *simple* and *short.*

Healthcare is a delicate issue and it deserves a compact, non-ambiguous directory, which is doctor-friendly and preferably language independent, being at the same time amenable for computerization.

*Another Application*

In a hierarchical classification involving several levels (e.g. Hospital, Department, Dean, Doctor and Patient), which has a *tree like structure*, search for the lower level elements (e.g. patient) can be quickly completed by mentioning it at the top of the tree. This application in ontology has great advantage for rapidly identifying the targeted element by re-clustering via automated methods. The tree can be inverted (manipulated) quickly and, in turn, this leads to several cross-tables. This serves as a mode of *data consistency check.*

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7.7 Some Other Cognate Research Gaps (to be covered)

In the light of the material presented in the dissertation, identified below are a few other research gaps:

1) To rank order the quality characteristics mentioned in Chapters 2 and 3, after suitable grouping for their importance from a) Patient's angle and b) Hospital's angle. *Factor Analysis* may be used on suitably collected large enough data set, to extract the *key factors*,

2) Testing for association between preference for service quality factors and income/education levels of patients. A chi-square based test is apt,

3) Developing novel data based methods to assess *de facto* quality levels mentioned in Chapter 4. With entrenched interests, the necessary data are tough to gather. Application of *randomized response technique* (RRT) is strongly suggested for data collection,

4) Clustering the several quality factors using underlying similarities, into three or four homogeneous clusters for parsimony of analysis. Standard *clustering techniques* may be employed for this purpose,

5) Gathering empirical evidence on healthcare quality from other Indian states,

6) Case studies of other prominent PPP models in healthcare in the country,

7) The accessibility/proximity issues of healthcare for rural/hill areas, along with its service quality. A survey of households with this as the focus will be handy,

8) A critical comparison between economic disparity and in healthcare access, with emphasis on rural/urban and male/female differentials in order to identify bias, if any,

9) The extent of health insurance coverage, particularly for the seniors and participation by private players in this regard,

10) A focused study on quality of (i) child and maternal care and (ii) nursing service including crunch of adequate manpower (due to flight abroad) and training,

11) To evaluate the status of medical tourism in the country and suggest measures to improve the same,

12) An investigative study of unethical practices in healthcare delivery system and

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suggesting measures for their control. Use of RRT is apt for data collection,

13) To examine the gamut of food safety regulations and their implementation lapses and
14) To evaluate the existing bio-medical waste disposal systems including the washing of
hospital linen and the associated safety measures.

7.8 In Retrospect

This chapter is a link between the past, present and future on health sector quality
aspects. It gives a synoptic view of the contribution of the thesis to the theoretical and
application aspects of medical service system and delivery, keeping quality healthcare for
the people at the center stage. It is earnestly believed that the effort in the dissertation
drives through some new distance forward regarding health sector quality issues along
with clear directions for furthering the research journey.

The dissertation tries to contribute some new theoretical concepts for measuring
health sector service quality. Then it traverses through the present high and low points in
the Indian public health scenario, the latter far outnumbering the former. A few
suggestions are derived to tackle the low points. In brief, this work makes a small but
positive contribution to the ever-growing fund of human knowledge as relevant to the
health sector.