

**ANALYSIS OF THE FEASIBILITY OF USING QUALITY FUNCTION
DEPLOYMENT IN THE DEVELOPMENT OF A TOTAL QUALITY
HEALTHCARE MODEL**

Thesis submitted for the degree of

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by

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ABSTRACT

Analysis of the Feasibility of using Quality Function Deployment for the Development of a Total Quality Healthcare Model

Lim Puay Cheng

Singapore hospitals are attempting to adopt a Total Quality Management (TQM) philosophy and a customer orientation strategy to meet customer's demand for higher quality. An earlier study by Yap on Quality Assurance in Singapore hospitals failed to adequately establish the contributions of Quality Assurance in improving customers' satisfaction. Against this background, the central thrust of this exploratory research project involves the identification of:

- * the need for a common definition of quality within a hospital.
- * the principles of TQM and a critique of orthodox TQM implementation models of the Gurus and TQM writers.
- * TQM tools and the applicability of Quality Function Deployment in the development of a total quality model.

Information was obtained on the research areas through:

- * extensive review of Quality Management literature.
- * questionnaire surveys investigating the management quality practices in Singapore hospitals, patients and doctors/staff expectations and perceptions of hospital service quality, and the critical success factors for the implementation of the total quality model.
- * structured interviews and focus group sessions investigating the specific management quality activities and service elements adopted by 3 Singapore hospitals.
- * case studies to demonstrate the wide applicability of QFD as an organisational tool in healthcare.

The adoption of this Action Research methodology identified that service quality in Singapore hospitals is generally below patients' expectations. These gaps arose from the failure in understanding the voice of the customer, which is itself symptomatic of the need for a holistic TQM model.

In the final analysis, this research project, as a major contribution to knowledge in the quality management field, provides the first empirically developed total quality healthcare model using the QFD tool. This represents the first holistic QFD-led total quality model validated by the experiences of 30 focus group members and 2 top level executives of Singapore hospitals. In addition, a framework involving infrastructure and measurement management to implement the proposed model is offered.

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I am indebted to the CEOs of the three hospitals for allowing me the opportunity to form a focus group and to conduct my research at their hospitals. I would like to gratefully acknowledge the contributions of the 30 focus group members. All these individuals contributed many hours of interview and brainstorming sessions which extensively aided my understanding on how Singapore hospitals operate, in particular, the specific quality management activities and service elements adopted by their hospitals. Their participation on a non-compensatory basis made the value of the endless discussions and constant feedback immeasurable. It also paved the way for a smooth data gathering process.

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ANALYSIS OF THE FEASIBILITY OF USING QUALITY FUNCTION DEPLOYMENT IN THE DEVELOPMENT OF A TOTAL QUALITY HEALTH CARE MODEL

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THE SINGAPORE STUDY

1.1 Introduction

The environment in which hospitals operate in Singapore is changing and with it, Singaporeans see an inevitable evolution in the industry itself. These forces of changes are wide-ranging, unique and interdependent. The healthcare system is generally fragmented, with multiple facilities from both the public and the private sector providing healthcare in a somewhat competitive system, which is controlled by a mixture of government directives and market forces but with relatively little control. The shift in emphasis of healthcare policy from one of equity to efficiency is impacting the entire healthcare industry as will the push for Singapore to be a centre of medical excellence. The ageing of the Singapore population, coupled with rising affluence and greater consumer education, will change consumers' needs and bargaining power. At the same time, the increasing sophistication of medical technology will change the delivery of services even as it changes the way medicine is practised. Also, given the additional inpatient bed capacity when consumption of acute hospital inpatient services that has reached near maximum growth can be expected to decline, competition in the hospital industry is likely to be aggressive with survival of only the fittest.

These developments in the healthcare industry are not specific to Singapore alone. Many developed countries, like the United States, are facing similar challenges. Therefore, there exist numerous opportunities and challenges for healthcare organisations. In the face of uncertainties, hospitals have to be reprogrammed and renewed, repositioning themselves for the future. In many ways, the 21st century will be a trial by fire for hospitals in Singapore. The two options open are for them to be swept along by the tide of change or to steer their own course inspired by the scenario of the future they prefer. The option of remaining status quo does not exist. The current Singapore healthcare system, the forces affecting the hospital industry and guidelines for a nation-wide, government-led future development of the Singapore healthcare industry will be explored.

Furthermore, these changes in the healthcare industry have caused a major rethinking in the defining and operationalising concepts of quality. For example, the concept of 'conformance to specification' within permitted tolerance is replaced by the philosophy of continual improvement in the achievement of target values for critical parameters that represent customer requirements (Zairi and Youssef, 1995). This opinion supports comments by Bergman and Klefsjo (1994) that conformance to specification is too narrow and is a deceptive definition of quality.

As quality is multi-faceted, it can be defined from several perspectives including:

- * the ability to satisfy the needs and expectations of the customer (Bergman and Klefsjo, 1994).
- * the totality of features and characteristics of a product or service that bear on its ability to satisfy given needs (Evans and Lindsay, 1996).

These perspectives have the customer as its central thrust. This could be stated as:

"Quality is a customer determination, not an engineer's determination, not a marketing determination. It is based upon the customer's actual experience with the product or service, measured against his or her requirements - stated or unstated, conscious or merely sensed, technically operational or entirely subjective and always representing a moving target in a competitive market. The purpose of quality measurement is to determine and evaluate the degree or level to which the product or service meets the expectation of the customer" (Feigenbaum, 1983).

As health services are credence products that are typically intangible, unstorable and immediate in terms of specific characteristics, there is no generic definition of quality in healthcare. Hence, the quality expectations of customers, namely, patients, doctors/staff of Singapore hospitals will be explored in this research project.

However, it is not always sufficient to merely fulfil the expectations of customers. Customers' expectations sometimes have to be exceeded so that the customer can be delighted. A model of customer satisfaction developed by Kano (Kano, 1984) categorised quality dimensions into three groups: must-be (basic) needs, one-dimensional (expected) needs and exciting experiences. Kano's model is dynamic in that what excites a customer today becomes expected tomorrow. In other words, once introduced, an exciting feature soon becomes an expected need. Kano found that exciting needs, which are tied mostly to adding value to a product or a service, are invisible to both the customer and the provider. Furthermore, they change over time and evolve with new technology. In this research project, an exceptional Total Quality Management (TQM) tool, Quality Function Deployment (QFD) created by the Japanese will be used to address this ever changing needs of customers.

In Singapore, some hospitals have put in placed management quality practices such as ISO 9000 certification which can be used as a vehicle for TQM implementation, but these activities/processes generally remain reactive rather than proactive. Under the TQM approach, patients are viewed as active partners in the provision of healthcare. However, efforts in both provider and purchaser settings to implement this radical understanding of the new role and function of the patient has yet to come to fruition (Kogan et al, 1991). Understanding what 'quality' is in healthcare or the 'voice of the customer' is not an easy task and understanding how these customers' expectations or demanded quality elements are being met by existing management quality activities/processes present an even more difficult problem. The management quality practices in Singapore hospitals will be explored to find out:

- i. top management understanding of what is required in developing a TQM culture
- ii. whether there is continuous training for improvement of staff skills
- iii. whether there is consistency in services through proper documentation of TQM initiatives
- iv. the activities, processes, analytical skills, and tools adopted for decision-making and evaluation.

- v. whether reward schemes are in placed to recognise staff contributions towards improved productivity, teamwork and leadership.

To implement the principles of TQM in hospitals requires a shift in organisational culture. The existing attitudes of Singapore hospitals are “why change?” “Why the need to improve quality?” and “anyway our beds are always full” must be replaced by the attitude of “continuously striving to increase customer satisfaction (both internal and external) through quality performance”. From an organisational perspective, to achieve increased customer satisfaction must entail expanding the focus of quality improvement and managerial activities to include understanding the expectations of customers (defining quality), establishing measures of customer satisfaction (performance measurement to highlight discrepancies between customer expectations and existing management quality activities) and improving customer satisfaction through internal process improvement and service planning (process improvement or new process development). In the author’s opinion, TQM together with QFD provides such a mechanism for organisational transformation and renewal. Hence, a total quality healthcare model is essential to guide hospitals in their Total Quality Journey. In this research project, the feasibility of using the QFD tool in the development of a total quality healthcare model will be explored through 3 case studies.

With the growing number of academics, practitioners and experts taking up the issue on TQM implementation in healthcare (Kelman, 1976; Sandrick, 1986; Donabedian, 1988; Lanning, 1990 and Nwabueze et al, 1994) and with QFD concepts being the leading edge of TQM implementation among all industries in the world (Gaucher and Coffey, 1993), there are few implemented examples of QFD within the healthcare industry (Ehrlich and Kratochwill, 1994). This research project will attempt to provide a framework for TQM implementation in Singapore hospitals using the proposed total quality model.

1.2 Rationale

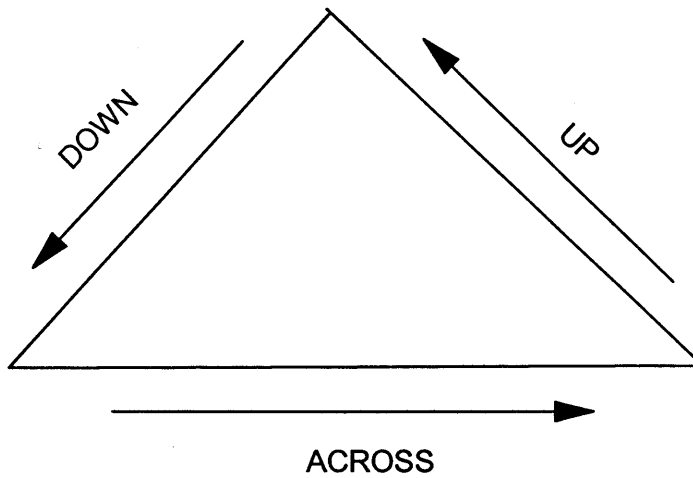
The TQM literature is inundated with articles extolling the virtues of TQM. There are many success stories of how organisations have used the TQM strategy to rescue their fledging business. Among them are Rank Xerox, Motorola and Miliken. On closer examination,

research (Eskildson, 1994 and The Economist, 1992) shows that about 70 percent of TQM initiatives failed in the USA (Clemmer and Sheehy, 1992) and a British Broadcasting Corporation (BBC) business report in 1993 noted that 10 out of 15 quality initiatives failed in Britain (BBC, 1993). Smith et al (1991) noted that most quality programmes fail after the initial 18-24 months honeymoon period is over due to partial implementation. Despite the attention given to TQM in the realworld organisations, relatively little academic research has addressed the topic on the specifics of applying the TQM theory to healthcare. For example, how does one begin? What are the difficulties managers face in understanding the voice of the customer? How can the organisation be structured to support these approaches? How customers' expectations are being met by existing quality management processes? How can the effectiveness of these efforts be evaluated? Nonetheless, few systematic studies have been carried out to address **what** and **how** the TQM tools can help implement TQM successfully in healthcare.

Given the lack of systematic research in this area and in attempting to account for the inevitable complexity and diversity of quality issues in healthcare, the author decided to embark on a Doctoral Research to review the use of several TQM tools such as flowcharts, benchmarking, Taguchi methods and QFD for total quality healthcare and finally to unravel how the tool, QFD, can be adapted to healthcare to help practising managers or whoever responsible for quality management to achieve continuous quality improvement. These TQM tools provide the strategies for successful TQM implementation by looking outside the organisation for expectations; targets and improvements; integrating many different quality improvement efforts and co-ordinating expectations and deployment. At the time of writing there are few implemented examples of these tools within the healthcare industry.

The Communication Framework of Hillman (1991) as shown in Figure 1.1 contributes towards this research project conceptual framework. As Hillman notes, the most crucial element to the successful implementation of TQM is 'effective' communication. To be effective, he argues, the communication framework must work well in three directions: down, across and up.

Figure 1.1: The Communication Framework



Source: Hillman, P. (1991), "TQM Magazine".

If communication is affected as the diagram illustrates, this would ensure that everyone in the organisation knows and understands:

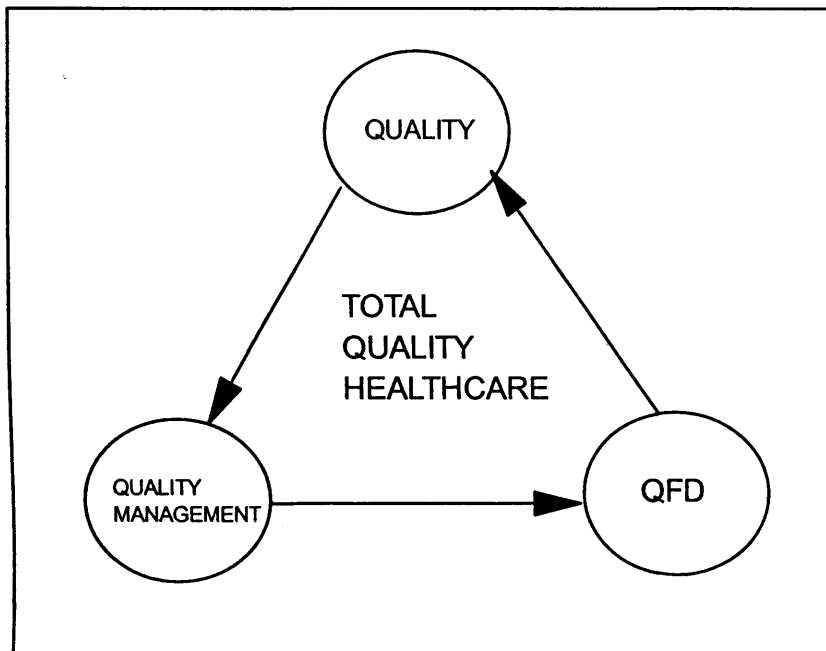
- * "Where the organisation wants to be" - mission
- * "What we need to do differently" - planned improvement
- * "What we have achieved" - feedback and success stories
- * "What still needs to be done" - next steps
- * "What are our customer requirements"

On this basis, it is possible to make an informed judgement as to whether the quality assurance activities adopted by Singapore hospitals are meeting customers' needs. However, it must be noted that it is impossible to determine the "voice of customer" without an in-depth study of what is 'quality' in healthcare. Hence the remit of this research project is the exploration of Singapore customers (patients and doctors/staff of hospitals) definition of quality healthcare.

The conceptual framework of this research project is presented in Figure 1.2. This conceptual framework is developed in subsequent chapters and is used as a window in three case studies.

Figure 1.2: The Conceptual Framework

SINGAPORE HEALTHCARE ENVIRONMENT



Source: Developed by the Author

This conceptual framework illustrates the importance of understanding the 3Q's to obtain total quality healthcare. To be effective, this framework must work cohesively and should provide the following information to Singapore hospitals:

- * What is **QUALITY** in healthcare? Quality has been defined as value, fitness for use, conformance to requirements in meeting and/or exceeding customers' expectations. A commonly held definition of quality by all employees is required because it provides the hospital with the ultimate 'focus' for total quality healthcare. An extensive literature review on quality has revealed that there is no generic definition of quality in healthcare. Hence, an empirical study using the SERVQUAL instrument was conducted to identify Singapore patients and doctors/staff expectations of quality.

- * What is **QUALITY MANAGEMENT**? In this conceptual framework the term Quality Management similarly refers to TQM. This research project examines the wide range of terminology associated with TQM. The relationship of TQM to Quality Assurance

efforts will be examined. The pitfalls of TQM in healthcare will be explored. The 'gurus' and 20 different researchers TQM implementation models will also be explored. An empirical study will be conducted to determine the management quality practices of Singapore hospitals.

- * What is *Quality Function Deployment (QFD)*? Since the application of the QFD tool is relatively new to the healthcare arena, three case studies will be used to demonstrate how QFD can be applied to healthcare in understanding the voice of the customer, in service planning and in performance measurement.

This research project will demonstrate that the QFD tool can be used in the development of a total quality healthcare model for TQM in hospitals. Additionally, an implementation framework for the total quality healthcare model involving 5 interrelated phases: Awareness, Knowledge, Breakthrough, Implementation and Integration will be proposed to guide Singapore hospitals in their TQM Journey. Inadequate awareness of how this total quality model should be implemented would lead to employees seeing TQM as the flavour of the month that would fizzle out with time. Also, the critical success factors for the implementation of the proposed model will be explored through an empirical study.

The author has embarked on this research project for the following reasons:

1. to examine the existing structure of the hospital industry in Singapore and to identify the significant forces of change.
2. to determine why customers of Singapore healthcare organisations are demanding higher quality healthcare.
3. why quality assurance and management practices in healthcare organisations fail to meet the expectations of customers.
4. to demonstrate that QFD can be applied to healthcare as a communication and planning tool for TQM implementation.

5. whilst the number of quality management programmes seem to increase in hospitals in Singapore, there are extremely few local studies on the healthcare industry. Much of what is available focuses on the economics and financing of healthcare (Toh and Low, 1991 and Phua, 1991), developing of marketing strategies for the American Hospital (Tham, 1991) and National University Hospital (Liak, 1990) but little research is available on the expectations and perceptions of customers on hospital service quality. There is one paper on Quality Assurance programmes adopted by Singapore hospitals (Yap, 1991) and another one on TQM practices of Singapore healthcare organisations (Tan, 1998). This can be explained by the fact that some writers have argued that quality is rather a vague phenomenon (Grant et al, 1994). Thus, it seems appropriate to develop a total quality model and an implementation framework for the proposed model to guide practising managers in their TQM journey. The purpose being to determine the existing management quality practices in Singapore hospitals, to highlight the unmet expectations of the customers, and the discrepancies in perception gap between customers and the providers of Singapore hospital services. The importance of this evaluation is to identify the need for process improvement and new process development.

The healthcare industry is chosen as the setting for the research project because:

1. the author has a working interest in quality provision in the healthcare sector in Singapore but lacks information on what the expectations and the needs of customers are.
2. despite the earlier study by Yap (1991) on the definition of 'Quality' in healthcare and the identification of Quality Assurance initiatives in Singapore hospitals, Yap's study has failed to fully address the customers' expectations of quality in healthcare. Instead the study focuses on the operational definition of healthcare quality based on the Systems View. It has also failed to consider the important aspects essential for successful implementation and maintenance of Quality Assurance programmes.

In addition, the National Health Expenditure in Singapore is currently 2.8% of Gross Domestic Product (GDP) (Singapore, MOH, 1997). By the year 2030, the ageing population may push

healthcare expenditure to 7% of GDP (Singapore, The Straits Times Press, 1996). Currently Government subsidies for healthcare amounted to 0.9% of GDP (Singapore, MOH, 1997). So it becomes important to study how the proposed total quality model can contribute to total quality healthcare at affordable cost for Singaporeans.

1.3 Scope of the Research Project

At the initial stages a number of research questions were raised with particular reference to the appropriate method that would elucidate a meaningful outcome. Techniques such as experiments and surveys were evaluated but were found inappropriate because experiments are particularly suited for focused studies which failed to take into account behavioural events, whilst surveys had the disadvantage of addressing issues pertaining to who, what, where, how much, etc (Yin, 1989).

Case studies have the advantage over the other two considered approaches because they are unique in its ability to deal with a full variety of evidence: documents, artefacts, interviews and observations, whereas surveys can try to deal with phenomenon and context whilst their ability to investigate the context is extremely limited (Yin, 1989). The survey designer, for instance, constantly struggles to limit the number of variables to be analysed, hence limiting the number of questions that can be asked (Robson, 1994), whilst an experiment has the disadvantage of divorcing the phenomenon from its context in order to focus on a few variables (Yin, 1989).

Yin (1989) notes, that case study:

"is an empirical inquiry that:

- * investigates a contemporary phenomenon within its real-life context; when
- * the boundaries between phenomenon and context are not clearly evident; and on which
- * multiple sources of evidence are used."

In this research project, the case studies present the reader with a holistic view of how the QFD tool can be adapted to the healthcare environment to help hospitals understand customers' expectations, in service planning and in the performance measurement of hospitals.

This research project represents an exploration to identify the 'what', 'how' and 'why' of TQM in Singapore hospitals. Although generally healthcare does not only include hospitals, the focus of this research project is hospital healthcare. The 'what' in this instance represents what the customers' expectations are. The 'how' represents the management quality practices in Singapore hospitals. The 'why' deals with the question, why the QFD tool is chosen against other competing or complementary tools?

To investigate the contemporary phenomenon of where Singapore hospital stands in relation to quality, it is essential to do an empirical study on the expectation of customers and the management quality practices in Singapore hospitals. As there are multiple tiers of customers in Singapore hospitals, such as the patients, the employers, the third-party payers, the doctors, the government or observers, the focus of this research project is on the expectations of patients and doctors/staff of Singapore hospitals. The objective being to find answers to the 'what', 'how' and 'why' questions and to assess the unmet expectations of customers to identify any changes or modifications required to the existing management quality practices.

To effectively conduct the investigation and substantiate the 'what', 'how' and 'why' questions, the author has decided that the best person to provide answers to these key questions would be the customers (internal and external) and the people responsible for process and quality improvement in hospitals.

To obtain answers to the 'what' of TQM from customers, this research project conducts questionnaire surveys on patients' and doctors/staff expectations and perceptions of Singapore hospital services using the popular service quality instrument, SERVQUAL. Due to the reluctance of Singapore hospitals to conduct the survey, the decision is to undertake the questionnaire survey at 4 general practitioners clinics and 2 specialists' clinics. These clinics in turn will distribute the questionnaires to patients who have received medical treatment in a hospital for the past 12 months, from October 1997 to October 1998.

Additionally, to obtain answers to the 'how' of TQM, this research project conducts questionnaire survey on the management quality practices in Singapore hospitals. This empirical study concentrates its investigations on whether top management understands what is required to develop a TQM culture and the management quality activities/processes adopted by Singapore hospitals. At the time when this empirical study is conducted, there are 20 hospitals in Singapore (Singapore, Department of Statistics, 1995). Nevertheless, due to time constraint, it is impossible to visit all the 20 hospitals to conduct interviews, hence, the decision taken is to undertake a postal questionnaire survey on all the 20 hospitals and a more in-depth study is conducted on 3 of the 20 hospitals.

In this research project, the decision to use a multi-method approach (triangulation) is influenced by the fact that some critics of the case study method have suggested that case study has the disadvantage of the data produced not being readily generalisable (Gummesson, 1991). Nevertheless, in this research project the use of multiple cases and questionnaire surveys would justify the validity and reliability of the data. Further, this research project is based on two perspectives: micro and macro.

At a micro level, the research project explores, in-depth and extensively, the management quality processes/activities and service elements adopted by 3 hospitals. Whilst at the macro level, through the use of questionnaires, it explores patients' and doctors'/staff's expectations and perceptions of hospital services, and the management quality practices in the 16 hospitals who have responded to the postal questionnaire survey. In the author's opinion, this multiple approach affords ample opportunity for generalisation from the discrete empirical data. Hence, both quantitative and qualitative data would be collected. However, the author does not have the luxury of choosing the hospitals to conduct the case studies and had to make-do with the three hospitals (restructured and private) who are willing to participate. Nevertheless, these three hospitals met the objectives suggested by Schatzman and Strauss (1993) in terms of suitability, feasibility and tactics. These hospitals do provide the best vantage point from which to explore the expectations of patients, the service elements and management quality activities/processes that are considered important by customers and the unmet customers expectations.

1.4 Aims and Objectives of this Research Project

The aims are:

- i. to provide a framework for understanding the evolution of the Singapore hospital industry. It sets out to identify the existing and potential forces of change for the industry and uses this as a basis to project how the hospital industry will evolve.
- ii. to provide guidelines for a nation-wide, government-led encouragement on the provision of total quality healthcare in Singapore.
- iii. to provide insights to healthcare providers on the definition of quality and whether a generic definition of quality exists in healthcare. Additionally, this research project aims to create an awareness of the importance of having a common definition of quality in the hospital.
- iv. a critical assessment of the characteristics and principles of TQM as posited by leading writers and practitioners. It seeks to delineate the TQM principles that should be adopted by hospitals.
- v. a critical assessment of the orthodox models of TQM to determine its suitability for application in Singapore hospitals.
- vi. to establish the feasibility of using the QFD tool in the development of a total quality healthcare model. Three case studies involving three hospitals will be used to explore the feasibility of the QFD tool in the development of the TQM model.
- vii. to provide a context specific implementation framework for the proposed total quality healthcare model to guide hospitals in their TQM journey.

1.5 Overview of the Thesis

This thesis is structured into eight distinct but interrelated chapters. Each is a "standalone" chapter which makes a discrete contribution to knowledge. The aim is to make certain that each chapter could constitute an academic publication. However, each of the chapters represents an essential element in the development of a total quality healthcare model.

The aim of the chapters is to first undertake an in-depth review of the literature relating to each element before testing the relevance of theory to practice. The author is of the opinion that TQM is a practical subject and, as such, theory should be grounded in empirical evidence. Thus, what will be found throughout the chapters, is an attempt to marry theory to practice but overall this research project represents a thorough analysis of the why and how the QFD tool can be used in the development of a total quality healthcare model for TQM, to take the hospital towards the future state, that is, the state of continuous quality improvement.

The chapters include:

Chapter Two: provides an account of the historical healthcare developments in Singapore. An extensive review of Singapore healthcare system is also included. A contribution is made to the field of healthcare in Singapore with the analysis of the hospital industry using Porter's five forces. The chapter concludes with guidelines for the future development of Singapore healthcare system with special emphasis made on the role of the Ministry of Health, the Ministry of Education and the Productivity and Standards Board (PSB).

Chapter Three: provides an assessment of the meaning of quality. A literature review is undertaken to establish whether a generic definition of quality exists. Furthermore, the inherent characteristics of healthcare services and how these characteristics would affect the evaluation of healthcare service quality are analysed. Some insights from past research(ers) into the expectations and perceptions of hospital services are offered. The chapter concludes by delineating through empirical studies, patients and

doctors/staff quality expectations and perceptions of Singapore hospital services. A contribution is made to the field of healthcare in Singapore where the internationally-used market research technique, SERVQUAL is used to measure service quality of Singapore hospitals.

Chapter Four: presents a rationale for implementing TQM in Singapore hospitals. The author addresses the frequently asked question, “Why do we have to change?” and “Why TQM?” An extensive literature review is undertaken to assess the definition of TQM and the principles of TQM are established. TQM is compared with Quality Assurance (QA) to contrast the characteristics of each. An approach to integrate TQM and QA is also presented. Furthermore, the pitfalls of TQM implementation in healthcare is provided. On this basis, the concept of TQM must be adapted to suit the uniqueness of the healthcare industry. A critical assessment of the implementation of TQM is offered through extensive literature review of orthodox TQM models. Arguments are posited to the effect that orthodox TQM models represent, in the main, piecemeal approaches to TQM. This leads to a reconceptualisation of an implementation framework for the proposed total quality healthcare model for TQM in healthcare. The chapter concludes with an empirical study identifying the management quality practices in Singapore hospitals.

Chapter Five: examines four quality tools selected by the author for the development of a total quality healthcare model. This leads to a reconceptualisation of using the QFD tool in the development of a total quality healthcare model. The chapter further demonstrates how the first phase and beyond of the QFD technique, the House of Quality, could serve as a vehicle for dialogue to strengthen vertical and horizontal communications. Some insights from past researchers on successful applications of QFD in manufacturing and service industries are offered. It highlights some of the QFD benefits and limitations. The chapter concludes with the

identification of the critical success factors and the obstacles to QFD implementation.

Chapter Six: contains the case studies. Detailed account is offered on the application of QFD with a goal towards understanding the 'voice of the customer', in service planning and in measuring the performance of hospitals surveyed. In addition, a cross-case analysis of the three cases is presented to demonstrate the applicability and importance of applying the QFD tool in hospitals. Considering the benefits and the superiority of the QFD tool, this chapter concludes with the development of a total quality healthcare model using QFD. The author further advocates the need for a context, specific implementation framework for the successful implementation of the proposed model for continuous improvement of Singapore hospital services.

Chapter Seven: provides an examination of the critical success factors for the implementation of the proposed total quality healthcare model through the use of a questionnaire survey based on Porter and Parker's critical success factors on TQM implementation and Ghobadian and Terry's critical success factors for QFD implementation. The analysis of the data confirmed that the researchers critical success factors have applicability but there are other critical success factors specific to Singapore hospitals where these prescriptions have failed to take into account. Thus, a contribution is made by extending Porter and Parker's and Ghobadian and Terry's critical success factors to include other essential critical success factors for the implementation of the proposed model in Singapore hospitals. A further contribution to knowledge is offered in the development of a framework for the implementation of the proposed total quality model for TQM in healthcare. Additionally, this framework is compared to the orthodox TQM implementation models.

Chapter Eight: is the conclusion of this research project. A summary of the research findings and the managerial implications involved is presented. The chapter wraps up the research project by restating the key benefits of using QFD in the development of a total quality healthcare model. Very often, it is the patients' perceptions of what makes a good hospital that mattered in hospital services, but understanding the expectations of patients is not an easy task. Furthermore, understanding how these patients' expectations are being met by existing management quality activities/process and service elements present an even more difficult problem. In view of these considerations, a total quality healthcare model is developed and a 5-phase implementation framework for the proposed model is offered to guide hospital management in its TQM endeavour. The limitations of this research project and suggestions for future research will also be discussed.

1.6 Background to the Research Project

A Critique of the Research Paper: Quality Assurance in Healthcare by Dr Jason Yap

As the main objective of this research project is to identify areas that have to be improved in order to improve customer satisfaction on hospital services, the research paper by Dr Jason Yap (1991), 'Quality Assurance in Healthcare' formed the main background of this research project. This is one of the two research papers on management quality activities in Singapore healthcare industry. This paper explored the place and nature of Quality Assurance in healthcare, arguing firstly that because it is dependent on Quality Consciousness in each healthcare worker, its implementation and operation must emphasise the human dimension, and secondly that the Quality Assurance movement is necessary, timely and can contribute immensely to the quality of healthcare in Singapore.

In specific, Yap's study analysed:

*** The operational definition of 'Quality' in healthcare**

It defines quality as a multifaceted attribute of healthcare comprising:

- desired levels of achievement
- particular characteristics of healthcare provision and receipt
- as collectively defined by the community (providers, patients, payers, politicians and public)
- at multiple levels and multiple elements throughout the healthcare system (structural, procedural, outcome and consequential aspects)

It identifies the chief inhibiting factors to better quality care which are:

- scarcity of resources
- inefficient use of resources which may be to some extent manageable

In brief, it proposes that the conceptualisation of quality in healthcare is based on the following premises:

- i. the systems view which includes all elements in the healthcare system in the definition of quality
- ii. the law of limiting factors focuses attention of those factors which inhibit the better quality healthcare
- iii. the World Health Organisation (WHO) definition of health provides a distant target to which to strive, and for which some systems element is the limiting factor
- iv. the Utilitarian approach to decision making reconciles an idealistic target to current limitations in a finite world

- v. the linking relationship between the above four aspects is the healthcare worker who must strive to remove limiting factors within his own system towards a distant target to benefit as many people as possible
- vi. the attitude of the healthcare workers must be one of Quality Consciousness

* **Concept of Quality Assurance in healthcare**

Quality assurance is the assessment of the quality of care provided and the consequent effort to improve deficiencies is thus found. It is the assurance, in effect the guarantee, from the service provider that all possible attention and actions have been taken to ensure that the desired and promised level of quality will be provided. Its activities include:

- the measurement of service quality at different points of the delivery process
- the determination of areas for improvement
- planned and controlled corrective action based on the results of the monitoring process
- the re-evaluation of the resultant care, thus "closing the loop" of the Quality Assurance Cycle.

* **Quality Assurance activities in practice, both in Singapore and in other countries**

Yap discusses Quality Assurance activities in Singapore at two levels: the Ministry of Health and the private sector hospitals. In the past, standing Quality Assurance Committees in Singapore government hospitals are of varying levels of activity. With the restructuring of hospitals, this practice has been enhanced and a wider variety of programmes has been introduced. However, the time spent on such programmes is limited and activities generally remain reactive, rather than proactive. Continuing

Medical Education programmes have to focus not only on the clinical disciplines but also on educating staff on the process of Quality Assurance and promoting quality consciousness among hospital personnel.

The self-initiated service quality manual set up by the private hospitals establishes benchmarks by which healthcare facilities should operate and serves as a yardstick of good healthcare. As the intent is service oriented, the only draw back of this particular measure is the lack of external input as the government and the public are not involved in the process.

Yap further discusses the quality assurance activities (what is being done and how it is being done) in three countries to which Singapore often looks for leadership in medical excellence: the United States of America, the United Kingdom and Australia.

*** Why Quality Assurance is necessary in Singapore and its implementation**

Quality Assurance has come to Singapore to stay because of:

- rapid advances in medical technology
- demonstrated poor quality of healthcare
- the rise of the consumer movement
- proliferation of service institutions
- rising costs of medical care
- increased government involvement

Yap has identified the five major phases of a Quality Assurance Programme:

- i. the institution's philosophy and objectives
- ii. formal and informal support structures for the programme
- iii. the establishment of systematic and consistent institutional documentation to support the programme

- iv. planned programmes in Quality Assurance or the setting up of individual assurance cycles throughout the institution
- v. evaluation and follow up in Quality Assurance

Yap has also identified the following pitfalls inhibiting the success of a Quality Assurance Programme:

- overenthusiasm and forced-down implementation
- a deficient legal infrastructure
- over-reliance on statistics, forgetting that all statistics involve a healthcare worker or a patient

Yap's study concludes with the proposal of fourteen principles for the nation-wide, government-led encouragement and guidance of the Quality Assurance Movement in hospitals. It has further emphasised that the human factor of Quality Consciousness in individual healthcare worker is the foundation of quality in healthcare, and the inculcation and maintenance of such an attitude is the only way to maximise the quality of healthcare.

1.7 Criticism

In the author's opinion, on reading the paper, Yap has failed to adequately establish the contributions of Quality Assurance in healthcare. The premise on which Yap's study is based lacks validity because a study that evaluates on the contributions and feasibility of implementing Quality Assurance in Singapore's healthcare industry should conduct empirical studies on:

- Customers (internal and external) definitions of 'quality' healthcare
- important aspects essential for successful implementation and maintenance of Quality Assurance Programmes by Quality Managers

Instead, Yap's study has chosen to concentrate on the operational definition of healthcare quality based on the Systems View (where quality is not so much an attribute of the actual

healthcare provided but of the process of healthcare delivery and self scrutiny) and the early implementation of Quality Assurance program, corresponding to the relative infancy of Quality Assurance in Singapore.

Yap's study has also stated that the incipient enforcement of the Private Hospitals and Medical Clinics Act makes the consideration of Quality Assurance timely and necessary. The intent of this legislation is to institute some system of licensing of healthcare establishments and to provide control to ensure that quality care is provided to patients. No attempt is made by Yap to establish whether quality assurance which emphasises professional quality rather than systemic quality and which encourages a blind adherence to professionally set standards without recourse to the needs and expectations of customers could contribute to total quality healthcare for Singaporeans. In addition, Yap's study also fails to make use of systematic or evaluative criteria to assess the current level of quality care provided by Singapore hospitals. Examples of the tools that could be used to assess an organisation's exact position to quality are the Balanced Scorecard, Crosby Quality Maturity Grid (CQMG), the European Foundation for Quality Management Assessment Model (EFQM), and QFD.

In addition, the paper bases its conclusion that Quality Assurance is heavily dependent on Quality Consciousness in the individual healthcare worker. Hence, the successful implementation and operation must therefore emphasise the human dimension. Admittedly, **PEOPLE** is an important resource in the provision of healthcare but the author feels that other factors should also be considered, for example, an understanding of the "voice of the customer", top management understanding of what is required to develop a TQM culture, information and innovation management and performance measurement.

In the final analysis, Yap's study recommends various government-led, institutional or committee-based guidelines to police quality. Pragmatically, it is difficult to assess these guidelines, nor is it possible to assess the need for these recommendations since there is no systematic evaluation of the current level of healthcare provided by Singapore hospitals. The only guideline given on how the Quality Assurance Programmes should be implemented is the Ten Step Model of the Joint Commission on Accreditation of Health Care Organisations (1990).

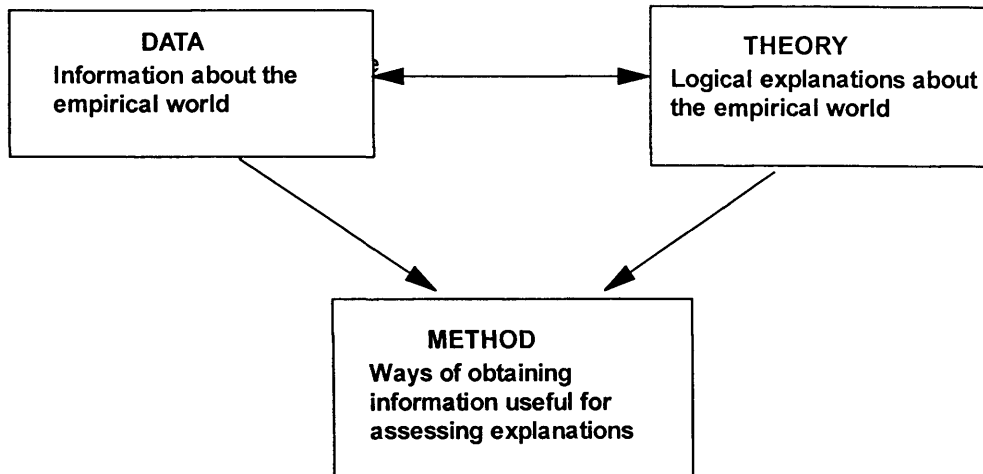
Due to different cultural background, can this model be applied in Singapore hospitals successfully? Furthermore, there is also no discussion on the management of change.

Hence, the lack of a systematic assessment of the contributions of Quality Assurance in healthcare in Singapore, as depicted in Yap's study, formed the decision to conduct empirical studies on patients and doctors/staff expectations and perceptions of hospital services in Singapore, current management practices in Singapore hospitals and critical success factors for the implementation of the total quality healthcare model. The findings from these empirical studies provide the elements to the three case studies on the use of the QFD tool in understanding patients expectations, in service planning, and in performance measurement.

1.8 Background to the Research Project Methodology

Research is generally structured along three lines: courses in subject matter, in theory and in research methods. Some researchers foster the unfortunate idea that subject matter, theory and methods are either independent of one another or that they can be integrated only at the highest level of abstraction. However, theory, method and substance are inseparable. Miles (1979) has observed that each social scientist must be a theorist and a methodologist. However, it is the author's opinion that the pursuit of research information necessitates an integrated approach encompassing quantitative and qualitative data; as evidenced by this research project. Whilst it is true that theory and method can themselves be objects of study, it is also true that 'research' cannot proceed profitably unless it encompasses a fundamental theoretical and methodological framework. Furthermore, the relationships between data, theory and method are important as a continual process of interaction in research methodology as shown in Figure 1.3.

Figure 1.3: Relationships of Theory, Method and Substance



Source: Eckhardt and Ermann; Social Research Methods Perspective, Theory and Analysis (1977)

Nevertheless, there are various forms of research depending on the expertise of the researcher. For example, sociological research, which like all scientific enquiry is fundamentally promoted by simple human curiosity; that is, investigations of why people commit suicide (Eckhardt and Ermann, 1977). Some research aims only to describe in detail a situation or a set of circumstances. It aims to answer questions like 'how many?' and 'who?' and 'what is happening?' (Patton, 1990). Whilst other researches seek to explain a social phenomenon; it asks 'why?' and tries to find the answer to a problem. This may be a social problem or a sociological problem (Patton, 1990).

This research project which involves the feasibility of using the QFD tool in the development of a total quality healthcare model for TQM requires advancing with an open mind to explore findings, and allowing theory to be grounded in data. This is because hospitals are complex organisations with more complexities than might be discerned by an outsider. For example, anecdotal evidence suggests that the healthcare industry is not uniquely different from any other organisation or industry, and, thus, any model that has worked in the commercial or industrial sector is bound to work in hospitals. However, on closer examination, hospitals are indeed uniquely different on five major counts:

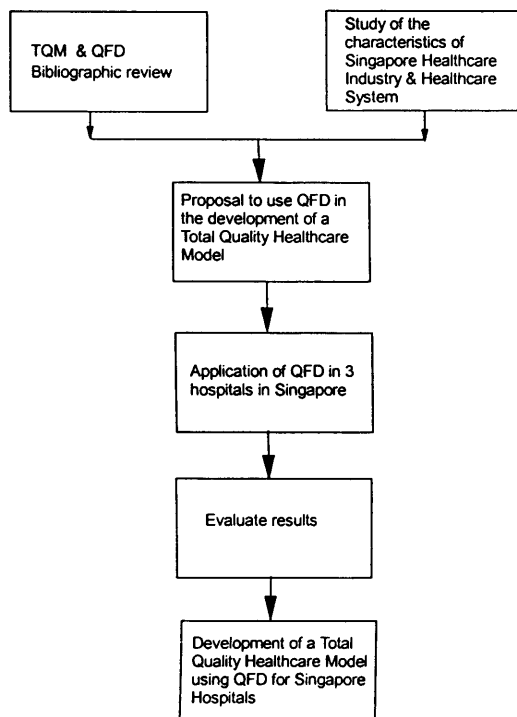
- i) its closer linkage to politics
- ii) its complex organisational structure
- iii) it is a credence product
- iv) its inherent characteristics: intangibility, heterogeneity, inseparability, perishability and labour intensive
- v) its objective is continually shifting, its environment is under siege from concurrent government changes

Hence, in the author's opinion, the approach which affords the research project the opportunity of presenting a rich account of the development of a total quality healthcare model for Singapore hospitals is Action Research (Susman, 1978 and Morgan, 1983). This is an integrated approach encompassing bibliographic review, questionnaire surveys and case studies.

This approach as depicted in Figure 1.4 involves the following steps:

- i. identify the state of art in the theme research - TQM and QFD bibliographic review
- ii. analyse the environment - the Singapore healthcare industry and system
- iii. establish the use of the QFD tool in the development of a total quality healthcare model
- iv. apply the QFD tool in 3 hospitals through case study
- v. evaluate results - cross case analysis
- vi. modify the QFD model developed by Hofmeister (1995) to suit the healthcare environment of Singapore

Figure 1.4 Research Methodology Structure



Source: Developed by the Author

Carrying out a research investigation on hospitals with only a strictly determined research design format, for example, questionnaire surveys would be inappropriate. What the researcher would find would be an aberration to the pre-structured design, thus jeopardising the reliability of the data. At the time this research project was embarked upon, there were only one study on Quality Assurance activities in Singapore hospitals (Yap, 1991) and the other study was on TQM initiatives adopted by Singapore healthcare organisations (Tan, 1998). Both of these studies were not based on any of the familiar strategies identified by Yin (1989): experiment, survey, archival, analysis, history or case study. They also failed to provide a format from which an informed judgement can be made regarding the definition of 'quality' in healthcare, quality assurance and the TQM activities adopted by Singapore healthcare organisations/hospitals, important aspects essential for successful implementation and maintenance of Quality Assurance/TQM programmes. Thus, the validity and reliability of these two studies are open to question (Gummesson, 1991). From the author's experience, CEOs, doctors/staff of hospitals are wary of completing questionnaires on their perception of hospital

services because this would portray them as being too negative of their organisation. Also they would not want to wash their dirty linen in public. In fact, CEOs would say that the Board of Directors would not approve of their completion of questionnaires relating to their perceptions of hospital services. Furthermore, staff must seek the approval of their superiors before completing questionnaires that ask questions about their perceptions of hospital services. Hence, for the purpose of this research project, the author undertakes to research into patients' and doctors'/staff's expectations and perceptions of hospitals services through questionnaire survey sent out to 4 general practitioners clinics and 2 specialists clinics. These clinics would in turn redistribute the questionnaires to patients who have received medical treatment in a hospital for the past 12 months, from October 1997 to October 1998. These clinics also served as collection centres for the completed survey questionnaire. In this way, the questionnaire survey would not be open to enforced managerial bias. Patients would be more willing to complete the questionnaire survey as they are no longer in the hospital, thus they would not be victimised if they indicated a poor or average overall rating on the services provided to them.

Furthermore, postal questionnaire surveys as the only research tool has the disadvantage of not being exhaustive. The researcher is always struggling to limit the number of questions to be asked (Robson, 1994). Against this background, the author included case studies in the Action Research methodology to give an accurate account of the expectations of patients, the critical management quality activities/processes and service elements and the service quality of Singapore hospitals. As Robson (1994) noted, case study 'allows the researcher to study real world situations as they unfold, non-manipulative, openness to whatever emerges, and lack of predetermined constraints on outcomes'. This will allow the reader to form his own judgements (Robson, 1994).

In addition, the use of case study affords the research project enormous flexibility in that the design process can be altered, changed or developed as the researcher becomes more acquainted with the phenomenon being investigated (Yin, 1989); whereas the experiment and survey techniques require that the design format be established at the beginning and then put into practice; with any deviation from the initial design being considered a disaster of such magnitude as to necessitate starting all over again (Robson, 1994).

1.9 Data Collection

A. Interviews

A commonly made distinction between types of interview is based on the degree to which the interview is structured (Robson, 1994). This highlights a dimension of difference, where at one extreme resides the fully structured interview with predetermined set questions asked and the responses recorded on a standardised schedule, through to semi-structured interview, where the interviewer has worked out a set of questions in advance, but is free to modify their order based upon his/her perception of what seems most appropriate in the context of the conversation (Robson, 1994). Powney and Watts (1994) prefer a different typology, making the basic distinction between respondent interviews and informant interviews. In respondent interviews, the interviewer remains in control throughout the whole process, whilst in informant interviews, the prime concern is for the interviewee's perceptions within a particular situation or context (Robson, 1994). Against this background, the semi-structured face-to-face interview format is chosen when the author conducts interviews with the CEOs/Quality Managers of the three hospitals. This face-to-face interview offers the possibility of modifying a line of enquiry, of following up interesting responses and of investigating underlying motives in a way that postal and other self-administered questionnaires preclude (Robson, 1994). The 'interview' is the main data collection strategy used in this research project to identify the service elements and management quality activities/processes adopted by the three hospitals. In addition, before the first set of interview was conducted, a set of 10 questions as depicted in Appendix A was worked out, but the author felt obliged to modify their order based upon her perception of what seemed most appropriate in the context of the conversation. The first set of interviews started in July 1997 at each of the three hospitals (Temasek, Raffles and Merlion Hospital). Each interview with each of the CEOs/Quality Manager lasted approximately one hour. The aim was to facilitate the open and forthright expressions of the 'what' service elements or management quality activities/processes adopted by the hospitals.

This 'open-ended' approach has enabled the CEOs/Quality Managers to talk frankly about their understanding of what is required to develop a TQM culture, the service elements and management quality activities/processes they consider important in healthcare delivery and are

adopted by their hospitals. Sometimes their frankness surprised the author, for example, 'why do we need TQM? Our beds are always full'. The author have also distanced herself from academia by telling them at the first interview that the discussion would be practically based and devoid of all academic jargons. This helped relax the respondents and they were able to "open up", giving, at times, detailed and confidential information concerning the service elements and management quality activities/processes adopted by their hospitals.

Throughout the interview, the author took notes which were immediately written-up and stored away in files which bore the names of the respective hospitals. The interview was scheduled for no more than an hour because of the widely held view in the literature that interviews should last no more than one hour (Robson, 1994).

The three hospitals were visited on two more occasions, November 1997 and June 1998. The aims were to monitor and to update the service elements and management quality activities/processes adopted by them for the case study. The major advantage of the use of 'interviews' as the primary data collection vehicle was that it afforded the author the opportunity to note all the underlying organisational changes in the three hospitals which other tools of data collection would have failed to gather. The environment in which hospitals operates is prone to continual changes because of its link to politics; only the interview method could provide the format to gain an accurate account of the processes adopted.

B. Questionnaires

Postal questionnaire was used to facilitate the coverage of management quality practices in the 20 Singapore hospitals. Subsequently, the author used another 2 questionnaires to measure expectations and perceptions of hospital services: one to measure the expectations and perceptions of patients and the other to measure the expectations and perceptions of doctors/staff of Singapore hospitals. A fourth questionnaire was used to identify the critical success factors for the implementation of the total quality healthcare model.

Questionnaire 1:

The first questionnaire in Appendix B dealt with the management quality practices in Singapore hospitals. This empirical survey seeks to determine top management understanding of what is required to develop a TQM culture, determine the activities, processes and tools adopted for decision-making and evaluation, determine whether there is proper documentation of its management quality programmes, determine whether there is continuous training to improve skills, determine whether reward system is in place to recognise the contributions of staff towards productivity, teamwork and leadership. Data was collected using the survey questionnaire instrument - Project Questionnaire. All variables of the descriptive model are captured using the 5-point semantic differential scale. The questionnaire is used for measuring the key factors (variables) and to ascertain the degree of application of management quality practice in Singapore hospitals. Sections A, B, C and D collect data on the key areas of application: Strategic Planning (SP), Quality Management (QM), Human Resource Management (HRM) and Information and Innovation Management (IIM). Full details of the Research Methodology are discussed in Chapter 4.

Questionnaire 2 and 3:

The second questionnaire in Appendix C was based on patients' expectations and perception of hospital services. The format of the questionnaire was based on the five SERVQUAL dimensions used by Parasuraman et al (1988) and the questionnaire developed by Youssef et al (1996) in investigating service quality in the National Health Service (NHS). The final questionnaire contained an 'EXPECTATIONS' section with 25 statements and a 'PERCEPTIONS' section consisting of a set of matching statements. In addition to these two sections, the questionnaire also added a question on 'importance of service dimension' and another question on 'overall rating of service quality'. A 5-point Likert scale ranging from 'least important' which score 1 to 'most important' which score 5 accompanied each statement for the 'EXPECTATIONS' and 'PERCEPTIONS' sections. The questionnaire instrument and full details of the Research Methodology are discussed in Chapter 3.

The third questionnaire in Appendix D was based on doctors/staff of Singapore hospital expectations and perceptions of hospital services. The format of this questionnaire was similar to that of Questionnaire 2.

Questionnaire 4:

The fourth questionnaire in Appendix E was designed and modelled upon the eight critical success factors for the successful implementation of TQM identified by Porter and Parker (1993) and the three critical success factors for the successful implementation of QFD identified by Ghobadian and Terry (1995). Thirty questionnaires were distributed to the thirty members of the three focus groups at the focus group meetings in December 1998. This questionnaire asked the focus group members to simply answer YES or NO to whether each of the eleven factors would be a critical success factor for the implementation of the proposed total quality healthcare model in Singapore hospitals. In addition, they were asked to add any other factor(s) which they considered 'critical' for the proposed model. Full details of the research methodology are discussed in Chapter 7.

The use of these four questionnaires in combination with the in-depth semi-structured interviews were mainly utilised for two reasons:

- i. to provide a wider coverage of all the hospitals since it was impossible due to time constraint to visit all the 20 hospitals.
- ii. to facilitate the notion that no research technique was without bias, although as Atkinson [Atkinson and Delamont, 1985) had noted, "Methods of research rely on different assumptions ... thus we should not assume, therefore that contrasting methods can be combined in a simple additive way'. However, the author is of the opinion that a triangulation method as used in this research project would be useful in validating the information and data provided.

C. Focus Group Sessions

With the consent and co-operation of the CEOs/Quality Managers of the 3 hospitals, a focus group was formed in each hospital with ten members. The author undertook 1 series of

allocated two hour brainstorming sessions with each focus group. The first brainstorming session was held on December 1997 to identify the service elements (Case Study 1 and 2) and management quality activities/processes (Case Study 3) that hospitals should adopt to meet the expectations of patients of Singapore hospitals. Another two focus group sessions lasting the allocated 3 hours per session were conducted in June 1998 and December 1998 to complete the correlation matrix and to develop the total quality healthcare model.

D. Documentary Sources

Documentary sources were mainly obtained from the MOH annual report, fact sheet from the National Training Board, hospital's monthly/quarterly newsletters etc. These documentary evidence were useful in confirming some of the information obtained at the semi-structured interviews.

1.10 Qualitative/Quantitative Argument

The author, in line with Bryman (1988a) argues that it would be methodologically naive to argue that quantitative research methods are more appropriate to business research than qualitative methods but that the distinctions between the two approaches are merely technical. Thus, there exist both qualitative and quantitative data which has to be dealt with in rather different ways and from a variety of approaches rather than from a quantitative or qualitative perspective (Bryman, 1988a).

There is no rule in research that says that only one method must be used in an investigation (Robson, 1983). Using more than one method in an investigation can have substantial advantages. One important benefit of multiple methods lies in the reduction of inappropriate certainty (Robson, 1985). Using a single method and finding a clear-cut result may delude investigators into believing that they have found the 'right' answer. Using other, additional methods, may point to differing answers which remove specious certainty (Robson, 1983).

Research employing both quantitative and qualitative data can be used to address different but complementary questions within a study - 'the complementary purposes model'. This focuses on the use of different methods for alternative tasks. It deals with what happens when initial exploratory work is done by means of unstructured interviews and subsequent, descriptive and

explanatory work employs a sample survey (Robson, 1994). For example, to explore the management quality practices adopted by hospitals, a pilot study is used to validate the relevance and applicability of the questionnaires in a natural setting and to test the survey instrument. Another example is, to explore the expectations and perceptions of patients, a focus group discussion involving 5 in-hospital patients, 5 out-patients, 5 observers, 5 CEOs/doctors of two hospitals were employed for their invaluable feedback on the relevance and applicability of the expectations and perceptions statements and to test the survey instrument.

The intention was to use the quantitative and the qualitative methods in a complementary fashion to enhance the 'interpretability' of the data collected. As Robson (1994) noted, 'researchers need not be prisoners of a particular model or technique when carrying out an enquiry.'

1.11 Overview of Field Work

The data collection period started in July 1997. The author's intention was to visit the three sites six times each over two years but the CEOs were not receptive to the idea. Hence, the author undertook three series of one hour interview per site. At each visit, the author found that new activities had been included due to changes in quality perspectives, government interventions which made this fieldwork an intriguing experience.

During the fieldwork, telephone calls were made with the CEOs/Quality Managers to double check on vague or confusing comments. The biggest indictment to come out of the fieldwork was that customers' expectations were never considered an important part of process improvement or new process development. The improvements to existing processes or new process developments were made to comply with MAAU requirements, or considered important as a strategic process by CEOs/Quality Managers, top management or doctors (that is, providers perspective of healthcare delivery) but never the expectations of customers (internal or external).

The interview schedule with the three CEOs/Quality Managers of the three hospitals are as shown in Table 1.1.

Table 1.1: Interview Schedule at Three Hospitals

Hospitals	Date of Visits	Data Collection Technique	Time
Temasek Hospital	Jul 1997	Semi-structured Interview	1 hr
	Nov 1997	Semi-structured Interview	1 hr
	Jun 1998	Semi-structured Interview	1 hr
Raffles Hospital	Jul 1997	Semi-structured Interview	1 hr
	Nov 1997	Semi-structured Interview	1 hr
	Jun 1998	Semi-structured Interview	1 hr
Merlion Hospital	Jul 1997	Semi-structured Interview	1 hr
	Nov 1997	Semi-structured Interview	1 hr
	Jun 1998	Semi-structured Interview	1 hr

- Postal Questionnaire 1:** Sent to all hospitals in Nov 1996
- Survey Questionnaire 2 and 3:** Distributed to 4 general practitioners clinics and 2 specialists clinics in Oct 1998
- Survey Questionnaire 4:** Distributed to the 30 focus group members of 3 hospitals in December 1998

Source: Compiled by the Author

1.12 Sampling

The central thrust of this research project was to focus on the feasibility and benefits of using the QFD tool in the development of a total quality healthcare model and how the implementation framework of the total quality healthcare model could contribute to continuous quality improvement and total quality in healthcare. The author started off by obtaining the list of hospitals in Singapore from the Ministry of Health Annual Report. There were altogether 20 hospitals in 1996, including government/government restructured and private hospitals. Armed with the list of 20 hospitals, the author spent a day collecting the telephone number of each of the 20 hospitals. The author contacted the receptionist of each hospital by telephone to obtain the name of the person(s) in charge of quality. On getting the names and appropriate titles, the author invited them to serve as collaborator in the research. Only 3 hospitals expressed their willingness to be interviewed. Thus, the decision was made to use the three hospitals for the case studies. However, the CEOs were informed that collaboration would be on absolute

confidentiality. Furthermore, the three hospitals met the objectives suggested by Schatzman and Strauss (1993):

- i. **suitability:** these hospitals have adopted on-going management quality initiatives or TQM programmes.
- ii. **feasibility:** these hospitals are accessible, allowing for discussion with the CEOs/Quality Manager. In addition, the respective CEOs/Quality Managers are receptive to the author throughout the entire period of fieldwork.
- iii. **tactics:** the CEOs/Quality Manager are evangelists of the quality movement. They strongly believe that TQM is the way forward in healthcare, thus enabling a common ground for discussion. This has aided the frank and in-depth answers they give to questions posed by the author.

Prior to this, the author had already determined:

- i. **Who:** which person would be interviewed?
- ii. **Where:** setting for data collection
- iii. **When:** at what time?
- iv. **What:** Which events, processes were to be explored?

The "who" in most organisations, be they in the private or public organisations, is the one person appointed to oversee, introduce and implement TQM or management quality practices organisation-wide. It becomes the responsibility of this person to identify the what, how and why of management quality practices or TQM within the organisation. Thus, a study into TQM in such an organisation demands that the person interviewed should be in a position to offer the research project a full insight into the hospital's management quality practices or TQM activities. He/She should also be the person designated as having the responsibility of implementing TQM.

In the author's opinion, continuous improvement and total quality in healthcare entails five essential characteristics:

- i. the model for total quality must be 'holistic'. The model should take into consideration the inherent characteristics of healthcare services.
- ii. the need for a context specific implementation framework for the total quality model, The implementation characteristics proposed by the researchers or the Gurus and the critical success factors identified in Questionnaire 4 must be incorporated into the implementation framework.
- iii. the CEO or the hospital needs to be aware of the 'pitfall' or the common mistakes of TQM and learn to avoid them, and improve upon them.
- iv. the need to understand the voice of the customers.
- v. there must be constant measurement of the service elements and management quality activities/processes adopted, recognise the unmet expectations of customers and the need for process improvement and new process development.

Thus, to systematically study how hospitals can achieve total quality through the proposed total quality healthcare model, it is imperative to carry out an in-depth analysis of the above five key components. This was the main failure of Yap's study. It failed to identify the expectations and perceptions of customers and critically evaluate the quality assurance activities from these key interrelated sequential parts of TQM.

The survey sample population for Questionnaire 2 and 3 were patients and doctors/staff of Singapore hospitals. For this questionnaire survey, the author contacted the CEOs/Quality Managers of the three hospitals for permission to conduct these Questionnaire survey. The CEOs/Quality Managers of these three hospitals were not receptive of the idea of conducting the survey in their hospitals due to the sensitivity of the information. The author discussed with several doctors carefully and exhaustively on the most suitable, convenient and bias free data collection method. The 'Convenience Sampling' method was finally used. This involves distributing the 300 questionnaires to 4 general practitioners clinics and 2 specialists clinics who

in turn redistributed these questionnaires to patients who have received medical treatment in a hospital for the past 12 months, from October 1997 to October 1998.

1.13 Hospitals

The three hospitals which represent the Case Studies will be called Temasek Hospital (Case 1), Raffles Hospital (Case 2) and Merlion Hospital (Case 3) respectively to preserve their anonymity. Also, as there are only 20 hospitals in Singapore, only a brief analysis of the background of the hospital would be given in Chapter 6 to preserve their anonymity.

1.14 Data Analysis

Qualitative data has been described as an 'attractive nuisance' (Miles, 1979). Its collection is often straightforward. It has a quality of 'undeniability' which lends verisimilitude to reports (Robson, 1994). There is no clear and accepted set of conventions for the analysis of qualitative data. The central requirement in qualitative analysis is clear thinking on the part of the analyst. As Fetherman (1989) notes, 'in the context of an ethnographic stance, the analysis is as much a test of the enquirer as it is a test of the data'. First and foremost analysis is a test of the ability to think, - to process information in a meaningful and useful manner (Robson, 1994). Bromley (1986) in his argument for the quasi-judicial approach for analysis of case studies, suggests that throughout the process, four important questions should be kept in mind:

- i. what is at issue?
- ii. what other relevant evidence might there be?
- iii. how else might one make sense of the data? and
- iv. how was the data obtained?

The quasi-judicial approach is concerned with evidence and argument. Miles and Huberman (1984), Lofland and Lofland (1984), Tesch (1990), Robson (1994) suggest basic rules for dealing with qualitative data which are as follows:

- i. Analysis of some form should start as soon as data is collected. Do not allow data to accumulate without preliminary analysis.

- ii Make sure tabs are kept on data collected (literally - get it indexed).
- iii Generate themes, categories, codes, etc along the way. Start by including rather than excluding; combine and modify along the way.
- iv. Dealing with the data should not be a routine or mechanical task; think and reflect! Use analytical notes (memos) to help to get the data to a conceptual level.
- v. Use some form of filing system to sort the data. Be prepared to re-sort. Play with the data.
- vi. There is not one 'right' way of analysing this kind of data - which places even more emphasis on the need to be systematic, organised and persevering.
- vii. Seeking to take apart the data in various ways and then trying to put them together again to form some consolidated picture. The main tool is comparison.

However, for all empirical studies, due to the sample size, the author is of the opinion that descriptive statistics are most appropriate for the analysis of the data. As Goulding (1987) has noted, 'the methods most useful in analysing information gained from investigations of a limited sample are those of descriptive statistics; whether the information arises from questionnaires which respondents themselves complete, or whether it arises from a structured interview or both, makes no difference to the way the data can be handled.' Descriptive statistical methods provide 'pictures' of the group under investigation; these 'pictures' may be in the form of Charts, Tables, Percentages or Averages (Goulding, 1987). In line with Goulding's argument, the analysis of the data gathered from the questionnaires would adhere to the use of descriptive statistics in which tables would be used for questionnaires 1 - 4 to show percentages and the patterns of responses. However, from each table, the prime aim would be to draw implications from the data. The analysis of the case study would be analysed in the context of Yin's 'explanation building' theory (Yin, 1989) because it fits this research best. In a multiple case study, as in the case of this research project, the aim of explanation building is to develop a general explanation that fits each of the individual cases, even though the cases vary in their

detail (Yin, 1989). The cases consist of an accurate account and rendition of the facts and conclusions are drawn based on the simple 'explanation' that appears most congruent with the facts (Yin, 1989). In this research project, an accurate rendition of the cases will be undertaken, a critical appraisal of the individual cases to judge the relevance of the QFD tool in understanding patients expectations, in service planning and in performance measurement will be offered, followed by the major goal of the research; a cross-case analysis to depict the elements of 'commonality' between the cases.

This will ensure the presentation of an in-depth and systematic study of the feasibility and benefits of using the QFD tool in the development of a total quality healthcare model for TQM. Furthermore, the complementary of both methods, qualitative and quantitative, will provide results from which deductions can then be made. This will ensure that the theoretical postulation to be offered in this research project is 'grounded' in data.

1.15 HOW THE QUESTIONNAIRES WOULD BE ANALYSED

QUESTIONNAIRE 1

A tabulation representing a brief summary of the management quality practices in the 16 Singapore hospitals who have replied to the survey. As Yin (1989) suggests '... there is no need for any simple case report but a brief summary of individual cases'. The aim of the tabulation is to support the 'explanation' that hospitals have adopted some form of management quality activities/processes. According to Tennor and DeToro (1990), a widely accepted TQM principle is to know the customers and to meet or exceed their expectations. Ultimately, TQM strives to create a corporate structure that is guided by business strategy and is driven by the expectations of the customers. From this perspective, hospitals will have to focus on integrating their various activities in different levels to meet and exceed customers' expectations and to achieve organisational excellence. For this research project, the author has identified four key elements of any management quality practice, essential for achieving the principle of TQM. These include:

- i. Strategic Planning
- ii. Quality Management

- iii. Human Resource Management
- iv. Information and Innovation Management

The 28 generic factors are broadly categorised to fit each of the above four elements. Thus Questionnaire 1 will be analysed from the 4 complementary perspectives which are essential and which must work in unison for total quality healthcare. Furthermore, a table with percentages will be provided to show the pattern of responses. The computation of the frequencies will be done using the Statistical Package for Social Science (SPSS). Thus, tables in Chapter 4 will show results by observation rate and row percentages. This is in contrast with the widely held view that qualitative research is incapable of statistical analysis.

QUESTIONNAIRES 2 AND 3

The analysis of questionnaires 2 to 3 would be based on the presentation of tables which shows the pattern of responses for patients' expectations and perceptions of hospital services (Q2), doctors/staff of hospitals expectations and perceptions of hospital services (Q3). Also, the table for each of Questionnaires 2 and 3 will show percentages scores. Nevertheless, the aim is to draw implications from the data in order to build theory.

QUESTIONNAIRE 4

Questionnaire 4 asked the respondents to answer Yes or No, to each of the 11 critical success factors. For example, question number 1 in the questionnaire reads:

'Necessary Management Behaviour: Clear leadership, commitment and vision is required from senior management'. In your opinion, is this a significant critical success factor?

YES

NO

Qualitative and quantitative research, as earlier noted, differs in that qualitative research is often developed when little information is available on a topic (Robson, 1993). The research plans to look for and describe attributes, themes and underlying dimensions of a particular unit in order to discover what distinguishes the characteristics or attributes of the unit. The quantitative

research aims to measure the magnitude, size or extent of the units (Robson, 1992). Although polar types of qualitative and quantitative research may be developed, this research project contains features of both.

Features of qualitative research include the case study method which is usually inductive and deductive. The methods for data collection, included questionnaire surveys, in-depth face-to-face semi-structured interviews, focus group sessions and documentary sources. Features of quantitative research include the use of postal questionnaires which are mainly deductive.

Lastly, the author will argue that in considering the choice of techniques for research, irrespective of whether the methodology chosen is quantitative or qualitative, three features are important:

- i. how well does the technique illuminate the view or experiences of the respondents?
- ii. representativeness: to which other groups in the population or the organisation do the information elicited relate?
- iii. resources: what expertise, people, time, cash, would be required by the technique?

1.16 Reliability and Validity

To ensure that the data collected is reliable and valid, on writing up of the three case studies, the author compares the data with the information found in reports and it is also sent to the respective CEOs/Quality Managers for their review and input, in order to ensure that the rendition of the cases are accurate from the information collected.

The reliability of the survey instruments was also assessed primarily by means of the Cronbach alpha reliability coefficient which measures the internal consistency reliability of the survey instruments.

The internal consistency reliability test is deemed to be acceptable for basic research when the reliability coefficient surpasses the 0.80 level (Nunnally, 1978).

The validity of an instrument refers to the extent to which the instrument measures what it is intended to measure. The instrument in relation to the purpose for which it is being used must be validated and not the instrument itself (Carmines and Zeller, 1981). The survey instruments are examined for content and construct validity.

1.17 External Validity

The findings from this research project were compared to:

- i. earlier studies which have previously evaluated customers expectations of services quality.
- ii. earlier studies which have previously evaluated customers perceptions of service quality.
- ii. earlier studies, although minimal, in the field which have evaluated the use of QFD in health services.

This was done in order to establish :

- i. consistency of results.
- ii. provision of new evidence.

In the final analysis, it would suffice to note that the theories, the development of the total quality model using QFD and the implementation framework of the total quality healthcare model encompassing 5-interrelated phases generated in this research project, in the words of Glaser and Strauss, 'was grounded in empirical data' (Glaser and Strauss, 1967).

2

THE SINGAPORE HEALTHCARE INDUSTRY

This chapter will develop a frame of reference from which this research project will proceed. Due to possibilities of market failure and the importance of curbing cost, the Singapore Government regulates the healthcare industry in strict accordance to the nation's health philosophies and policies. In this chapter, the author provides an account of the historical healthcare developments in Singapore. An extensive review of Singapore healthcare system is also included. A contribution is made to the field of healthcare in Singapore with the analysis of the hospital industry using Porter's five forces. The chapter concludes with guidelines for the future development of the Singapore healthcare system with special emphasis made on the role of the Ministry of Health (MOH), the Ministry of Education and the Productivity and Standards Board (PSB).

Areas to be examined are:

- 2.1 Historical Healthcare Developments in Singapore
- 2.2 Overview of Singapore Current Healthcare System
- 2.3 Singapore Hospital Industry Analysis
- 2.4 Guidelines for the Future Development of Singapore Healthcare System

2.1 Historical Healthcare Developments in Singapore

Western medical care was the preserve of the British military, government officials and European community. In June 1821, the first pauper hospital, Singapore General Hospital (SGH) was established in the cantonments. There were no government grants to fund the

hospital and public donations were the main source of funds. By the 1830s, it was clear that this only hospital together with the handful of Chinese medicinal shops were insufficient and incapable of tending to the rising number of chronic and terminally sick. Also, the government made no concerted effort to eradicate the rampant spread of diseases such as dysentery, malaria, smallpox and the then number one killer, tuberculosis. By 1839, things worsened. The large-scale arrival of Chinese immigrants due to political upheavals in China and the dumping of diseased Chinese labourers from the Dutch colonies severely strained the medical service. It was clear that more hospitals were needed, but the government still felt that it was up to the Chinese community to solve its own problems. In 1844, a group of far-sighted community leaders and Chinese businessmen who with their influence and financial support laid the foundation for a second hospital. In 1847, financial difficulties over operating costs prevented the second hospital from actually opening but due to the rising demand for medical services, the government was compelled to open the second hospital, Tan Tock Seng Hospital (TTSH) in 1849.

The two pioneering hospitals, SGH and TTSH, were made responsible for acute general medical care. Other hospitals which started sprouting were: the Maternity Hospital (later renamed the Kandang Kerbau Hospital) in 1888, the Middleton Hospital in 1907, specialising in the treatment of infectious disease and The Mental Hospital (later renamed the Woodbridge Hospital) in 1928.

Unfortunately, these years of progress were disrupted and to a large extent wiped out by the Second World War and the Japanese Occupation of Singapore from 1942 to 1945. There was a complete breakdown of medical services especially in the prevention of infectious disease and nutrition. After the war, the immediate task of the post-war British Military Administration was to put the hospitals in order and public healthcare services were then re-established. Under-nourishment had affected nearly the whole population and that led to a host of medical afflictions and complications.

The task of providing basic primary healthcare, including outpatient, maternal and childcare as well as school healthcare services were accorded top priority. Slowly, the rebuilding of the medical infrastructure went on. By 1950, outpatient services were made available to the rural

districts through 10 outpatient clinics spread over the island. Between 1952 and 1958, 13 new Maternal and Child Health Clinics were built and extensions were added to existing clinics. A new School of Nursing opened in 1956 at SGH along with the passing of the Nursing Ordinance to regulate the qualification and registration of nurses. The District Nursing Service was introduced in 1958 to provide nursing care to patients discharged from hospitals.

With self-government in 1959, Singapore took over from the colonial government the responsibility of providing healthcare for the country. Thomson Road Hospital (later renamed the Toa Payoh Hospital) was built in 1959 to ease the pressure of patients in the two overcrowded General Hospitals. Outpatient services were also expanded to include 19 dispensaries, eight City Council dispensaries and two travelling dispensaries. Open-heart surgery and heart implants were started along with a coronary care unit. The acquisition of a haemodialysis machine gave patients with kidney failure a new lease of life. In a cautious step to change the popular concept that medical care was free, a fee system was implemented for the first time in 1960. When the British Forces withdrew in the mid 1960s, Singapore took over the Alexandra Hospital, Changi Hospital and Sembawang Hospital (which closed down in 1983).

As Singapore entered the 1970s, healthcare services marched on to the new tune of specialisation. A high level committee on Medical Specialisation formed in 1970 recommended five areas of specialisation for priority development. They were: neurosurgery, cardiothoracic surgery, plastic and reconstructive surgery, paediatric surgery and nephology.

A National Health Plan for the next 20 years was introduced in 1982. Aimed at building a healthy, vigorous, active and physically fit population, the plan also provided for the introduction of Medisave and the upgrading of hospitals and polyclinics. Under the Medisave scheme, 6-8% of an employee income is set aside each month to be used to defray approved hospital expenses at government and private hospitals.

Singapore's first university hospital, the National University Hospital (NUH) was opened in 1985. Starting from late 1980s, the Government embarked on the mammoth task of restructuring the main public hospitals in a bid to boost the standards of service and to achieve

greater efficiency and cost effectiveness. The Health Corporation of Singapore (HCS) was thus incorporated in 1987 as a holding company for this purpose.

In the 1990s, with the shift of the majority of the population to new towns in Housing Board estates, MOH has been consolidating the existing 41 Outpatients Clinics and Maternal and Child Health Clinics into 16 polyclinics, each providing a comprehensive range of primary healthcare services. These include outpatient medical treatment, maternal and child healthcare, dental care, psychiatric care, health education, clinical laboratory services, pharmacy services and rehabilitation services for the elderly. To achieve more cost-effective utilisation of acute hospitals and to cater to patients, especially elderly who may have simple medical conditions or who may require a longer period of convalescence, community hospitals were planned. The first community hospital, the Ang Mo Kio Community Hospital was opened and restructured in 1993.

With the rising prevalence of chronic diseases like coronary heart disease, strokes, diabetes and cancer, MOH mounted several campaigns to educate Singaporeans to adopt a healthy lifestyle to reduce the risk of these lifestyle related diseases.

Due to the intensified development of healthcare facilities undertaken by the government in the last two decade, there had been tremendous improvements in the healthcare status of Singaporeans. To a large extent, this is due to the multitude of improvements in the healthcare delivery system, starting with the introduction of powerful antibiotics and free immunisation and maternal and child health programs in the 1950s and 1960s. Then there was the spurt of medical specialisation and sub-specialisation in the 1970s and 1980s, which raised the standard of medical services and the vigorous physical redevelopment program for the government hospitals and polyclinics in the 1980s and 1990s.

2.2 Overview of the Singapore Current Healthcare System

2.2.1 Background

Singapore is a small country with a total land area of 647.8 sq. km. The total population is about 3.8 million with a resident population of 3.1 million in 1997 (Singapore, Department of Statistics, 1997). Singapore has a relatively young population, with only 10% of the population above 60 years of age. However, the percentage of population over 60 years is projected to increase to 67% by the year 2030.

2.2.2 Health Status

The state of health in Singapore is good by international standards. The infant mortality rate has improved from 82.2 in 1950 to 3.6 per 1000 live-births in 1997 (Singapore, MOH, 1997). Average life expectancy rate has increased from 62 years in 1957 to 77.1 years in 1997 (Singapore, MOH, 1997). Rising standards of living, high standards of education, good housing, safe water supply and sanitation, a high level of medical services and the active promotion of preventive medicine have all helped to significantly boost the health of Singaporeans. The leading causes of morbidity and mortality are currently the major non-communicable diseases such as cancer, coronary heart diseases, strokes, diabetes, hypertension and injuries. Cancer and cardiovascular diseases together accounted for approximately 64% of the total causes of death (Singapore, MOH, 1997).

2.2.3 The State's Role in Healthcare

Traditionally, healthcare has been regarded as a social good. There is a greater tendency for a paternalistic government to shoulder the burden of looking after the health of its nation, as in the case of Singapore (Low and Toh, 1991). The healthcare industry in Singapore is not to be left as a free-market due to possibilities of market failure. Consumers of healthcare services are unlikely to have perfect information of their health conditions, choice of medical treatments and their alternatives, cost of medicines, etc. and thus not be able to choose the appropriate levels of care. Studies have shown that countries with more doctors, especially those with more

specialists tend to spend more on healthcare, leading to a supply-driven rather than need-driven situation (Singapore, MOH, 1993). Since healthcare impinges upon general welfare, there is a need for the government to intervene in healthcare provision with a certain degree of control over quality and price issues.

Healthcare services in Singapore is provided through 3 different Ministries, as well as by the private sector:

i. Ministry of Health (MOH)

MOH is responsible for providing preventative, curative and rehabilitative healthcare services in Singapore. MOH formulates national health policies, co-ordinates the development and planning of the private and public health sectors, as well as regulates health standards.

ii. Ministry of the Environment (ENV)

ENV is responsible for environmental health services such as sewerage, drainage and waste disposal systems, control of air and water pollution and of toxic chemicals and poisons, the control of outbreak of infectious diseases, vector or insect control and the safety of the food prepared and sold in Singapore.

iii. Ministry of Manpower (MOM)

MOM is responsible for the industrial and occupational health of the workers.

Until the end of 1998, MOH had pursued the mission:

"To build a healthy nation and to provide a comprehensive, modern and efficient healthcare service through the planning and development of public health sector to ensure a high standard of medical care for all Singaporeans."

The role of MOH is to provide preventive, curative and rehabilitative health services and to co-ordinate the planning and development of the public and private health sectors. These are administered through the hospitals, primary healthcare, dental, corporate and support services, and the administration divisions.

Five other professionals' boards are under the charge of the MOH, namely, the Singapore Medical Council, the Singapore Nursing Board, the Singapore Dental Board, the Pharmacy Board and the Laboratory Board (Singapore, MOH, 1997).

A Ministerial Committee was set up to review the state's role in providing healthcare. In view of rising healthcare costs, demand for health services and a maturing nation, there was been constant efforts to find ways to improve the healthcare system while containing the long-term increase in costs and subsidies.

The White Paper by MOH (Singapore, MOH, 1993), based on the Ministerial Committee's recommendations, outlines the Government's healthcare philosophy which are:

Nurturing a Healthy Nation

The Government has taken explicit measures to emphasise the importance of keeping a healthy lifestyle through preventive healthcare programmes and the promotion of healthy living. The population is encouraged through the public health education programme to adopt a healthy lifestyle and be responsible for his/her own health. The public is made aware of the adverse consequences of harmful habits like smoking, alcohol consumption, bad dietary intakes and sedentary lifestyles. The child immunisation programme, which is targeted against infectious diseases like tuberculosis, poliomyelitis, diphtheria, whooping cough, tetanus, measles, mumps and rubella and Hepatitis B, is offered at the government polyclinics. Health screenings programmes have been introduced for the early detection of common ailments like cancers, heart diseases, hypertension and diabetes mellitus. By preserving the health of the nation, there may be a reduced need for curative medical care in the long-run.

Keeping Medical Services Affordable

The Government ensures that good and affordable basic medical services are made available to all Singaporeans through the provision of heavily subsidised medical services at the government/restructured hospitals and government clinics. The basic medical package will reflect good, up-to-date medical practice, which is cost-effective and have proven value. It contains essential and cost-effective medical treatment, without which the patient's health and quality of life will be significantly compromised. Treatment will be delivered without frills by qualified doctors and specialists using appropriate facilities but it does not give the patient the right to choose his doctor/specialist. It includes drugs on a standard list, which is based on World Health Organisation recommendations and covers nearly all normal medical requirements. Some expensive investigations, drugs and procedures are subject to procedural restrictions as a safeguard against overuse, but are included if ordered by a consultant or senior doctor. It excludes non-essential or cosmetic services, experimental drugs and techniques whose effectiveness is not yet proven, and extravagant efforts to keep gravely ill patients alive using high technology equipment, regardless of their quality of life and prospects of recovery. If, however there are patients who wish to obtain more medical services, they are not prevented from doing so by paying for the extras or by seeking treatment from specialists or at private hospitals.

Intervention in the Healthcare Sector

Even though competition and market forces may impel hospitals and clinics to run efficiently, these alone will not suffice to hold costs down. The government has to intervene to structure and regulate the healthcare system to prevent over-supply of medical services and dampen demand. Specifically, MOH controls the number of beds and their distribution by class in each hospital, service standards, amount of subsidy, revenue, and introduction/development of specialist departments and new technology. Furthermore, MOH works closely with the ENV in the maintenance of environmental hygiene and control of communicable diseases. It also works with MOM in improving the industrial and occupational health of workers. MOH will continue with its policy to ensure that good, up-to-date and proven medical care that is cost-effective, remains available and accessible to all Singaporeans.

In addition, all private hospitals, medical clinics, clinical laboratories and nursing homes are required to maintain a good standard of medical services through licensing by the MOH.

2.2.4 Healthcare Delivery System

In Singapore, there is a dual system of healthcare delivery. The public system is run by the Government while the private system is provided by the private hospitals and general practitioners. The healthcare delivery system comprises primary healthcare provision at private medical practitioners' clinics and the government outpatient polyclinics and secondary and tertiary specialist care in the private and public hospitals.

80% of the primary healthcare services is provided by the private practitioners while the government polyclinics provide the remaining 20% to set the benchmark for the level of services. The aim is to keep fees for consultation and treatment at affordable levels, or as a safety net for the poor. For the more costly hospital care, it is the reverse situation with 80% of the hospital care being provided by the public sector and the remaining 20% by the private sector.

Patients are free to choose the providers within the dual healthcare delivery system and can walk in for a consultation at any private clinic or any government polyclinic. For emergency services, patients can go at any time to the 24-hour Accident & Emergency Departments located in the government hospitals. The Singapore Civil Defence Force runs an Emergency Ambulance Service to transport accident and trauma cases and medical emergencies to the acute general hospital.

Primary Healthcare Services

The primary healthcare services provide primary medical care for the family, health screening and preventive health programmes for school children, home nursing, day care and rehabilitation for the elderly and health education and promotion for the population.

The public sector comprises of 15 one-stop government polyclinics located throughout the country in the more populated areas. All polyclinics are family practice clinics, which provide personalised, continuing and comprehensive care to the patient and to members of his family. Each polyclinic provides outpatient medical care for acute and chronic illnesses, follow-up of patients discharged from hospitals, immunisation, maternal and child healthcare, health screening and education, patient counselling, investigative facilities such as laboratory and x-ray services and pharmacy services. Dental care and rehabilitation services for the elderly are also available in the polyclinics. These polyclinics also serve as training grounds for medical students, nurses and trainees in Family Medicine. Non-profitable public health programs are also launched by these clinics. Charges in polyclinics are subsidised, and charges from between SGD10.00 to SGD15.00 are well within the means of every Singaporean. Senior citizens (aged 65 years and above), children up to 18 years and all school children receive a further subsidy of 50% of these fees.

The private sector has about 900 private clinics run by about 1,200 medical practitioners. The private clinics are located at the door-step of the population in the city, housing estates and satellite towns. To serve the healthcare needs of the community, usually within their locality, GP clinics do function at night and on weekends. These private clinics do not have a list of patients, and patients routinely shop around for doctors when they need medical treatment. Also competition between these clinics helps to keep charges reasonable and patients pay the full cost of treatment which are normally around SGD20.00 - SGD25.00 per visit.

Primary healthcare services from both the private and public sectors are readily accessible to the community and fees for consultation and treatment are affordable. Medisave funds cannot be used to pay for these services. These services form the first line curative care for patients who suffer from conditions that do not need specialised expensive care. Thus, primary healthcare clinics act as "gatekeepers" to secondary care.

Hospital Services

Hospital services in Singapore are provided by secondary hospitals, which offer general and specialised inpatient and outpatient care in medical and surgical disciplines. Those patients who

are diagnosed to suffer from conditions not in the capability of being treated by primary healthcare providers are usually referred to secondary hospitals.

There are a total of about 11,030 hospital beds in the 20 hospitals, giving a hospital bed to population ratio of 3.5 beds per 1,000 population (Singapore, MOH, 1997). This bed ratio is quite close to that of Hongkong that is 3.8 beds per 1,000 population (Singapore, MOH, 1997). 80% of the beds are in the 8 public hospitals whose bed complements range from 160 beds to 3110 beds. On the other hand, the 12 private hospitals tend to be smaller, providing 25 to 500 beds each (Singapore, MOH, 1997). Private hospitals are likely to continue to grow rapidly as MOH is encouraging them to increase their share to 30% by the year 2010 as this will free public hospitals to focus its attention on providing quality basic services to the majority of Singaporeans (Singapore, MOH, 1993). To encourage the private sector to play a major role, MOH had limited the number of Class A beds in restructured hospitals and periodically the government has released land parcels for private hospital development. The Government's role as the dominant healthcare provider allows them to control the supply of the number of hospital beds, the introduction of high-tech/high-cost medicine, and the rate of cost increases in the public sector which sets the benchmark in terms of pricing for the private sectors.

The 8 public hospitals comprise of 5 acute general hospitals, 2 hospitals specialising in obstetricians and gynaecology and psychiatry and 1 community hospital. The general hospitals provide multi-disciplinary acute inpatient and specialist outpatient services and a 24-hour accident & emergency service. In addition, there are 3 speciality institutes for ophthalmology, dermatology and dentistry. The tertiary specialist care on cardiology, renal medicine, haematology, neurology, oncology, radiotherapy, plastic and reconstructive surgery, paediatric surgery, neurosurgery, cardiothoracic surgery and transplant surgery is centralised in two of the larger general hospitals, The Singapore General Hospital and the National University Hospital.

Within the public hospitals, patients have a choice of the different types of ward accommodation on their admission. 79% of the public hospitals' beds are heavily subsidised with the remaining 21% either being private (1-2 bedded) or semi-private (4-bedded) beds. Patients pay more when they request for higher level of physical amenities while the standard of medical care is the same for all types of accommodation. Generally, the more serious medical

conditions are attended to in the public hospitals, by the senior consultants or specialists regardless of the type of ward accommodation chosen by the patients. The average length of stay in the general hospitals is about 5.6 days. The hospital beds are well-utilised, with an average occupancy rate of about 83%.

Since 1985, the Government has restructured 6 of its acute hospitals and 3 speciality institutes to be run as private companies wholly-owned by the government. This is to enable the restructured hospitals to have the management autonomy and flexibility to respond more promptly to the needs of the patients. In the process, commercial accounting systems have been introduced to provide a more accurate picture of the operating costs and instilling greater financial discipline and accountability. The restructured hospitals are different from the other private hospitals in that they receive an annual government subvention or subsidy for the provision of subsidised medical services to the patients. They are expected to be managed like a not-for-profit organisation. The restructured hospitals are subject to broad policy guidelines by the Government through MOH.

The Government has also introduced low cost community hospitals for intermediate healthcare for the convalescent sick and aged who do not require the more expensive care of the acute general hospitals. Through the government/restructured public hospitals which make up a large part of the basic care provided, the government has been able to ensure that inpatient care is accessible and affordable to all, provide heavily subsidised basic services that are without frills, control the supply of beds and high-tech medical equipment, and set benchmark for fees, charges and professional standards.

On the other hand, the private hospitals have similar specialist disciplines and comparable facilities as the government/restructured hospitals including highly specialised facilities such as neurosurgery, open heart surgery, laparoscopic surgery, etc. If we look at the private hospitals, we see a mixture of profit-making and non-profit or charity hospitals. Most of the charity hospitals are the older hospitals. Today, philanthropy appears to be drying up and, increasingly, these hospitals have to try to be financially self-sustaining.

Healthcare Services for the Elderly

Healthcare services for the elderly are mostly run by voluntary welfare organisations (Vows). Government financial assistance is provided to these Vows. There are 4 community-based hospitals, 47 nursing homes, 17 day rehabilitation centres and 3 day care centres providing for the healthcare needs of the elderly in Singapore.

To address the concerns of increasing healthcare needs of the rapidly ageing population, the Inter-Ministerial Committee on Healthcare for the Elderly has been set up in 1997 to put in place policies and strategies for the adequate provision of healthcare for the elderly and to ensure that their long-term care is affordable to the individual, family, community and country.

Support Services

Support services to the hospital and primary healthcare programme include forensic pathology, pharmaceutical services and the blood transfusion service. Except for forensic pathology and blood transfusion service which are centralised by the MOH, the remaining services can be found in both the public and private sectors.

2.2.5 Healthcare Advancement

A number of advanced technology and procedures has been introduced over the last 3 years, for example, the extracorporeal shockwave lithotripter for the treatment of kidney stones, the percutaneous transluminal balloon and the laser angioplasty procedure for re-opening obstructed coronary arteries, the microwave method of treatment of benign enlargement of the prostate, keyhole surgery for lung cancer, the Leksell Gamma Knife for brain tumours and etc. Nine heart transplants and four liver transplants had also been carried out during the last 2 years (Singapore, MOH, 1995). The ability to perform such transplant is an indication of the high level of medical expertise and teamwork available.

2.2.6 Medical Audit and Accreditation

The current quality system in hospitals is largely informal and piecemeal or ad hoc. The Private Hospitals and Medical Clinics Act was passed by Parliament in 1980. This Act lays down definitions, interpretations and requirements for licensing (including physical provisions, services, requirements for specialised services, Quality Assurance Programme, Infection Control Programme, nursing requirements, medical recording) and penalties arising from non-compliance. This Act makes it compulsory for hospitals, clinical laboratories, medical clinics, maternity and nursing homes to comply with certain requirements and to be licensed by the Medical Audit and Accreditation Unit (MAAU) of the MOH before they are allowed to operate. MAAU monitors and ensures that good quality medical services are being maintained by hospitals, medical and specialists clinics in Singapore.

2.2.7 Healthcare Financing

As mentioned earlier, healthcare services in Singapore are provided by both the government and the private sector. The government regulates charges of the public sector healthcare services.

Singapore's healthcare financing philosophy is based on individual responsibility, coupled with Government subsidies to keep basic healthcare affordable. To avoid the pitfall of "free" medical services stimulating insatiable demand, patients are expected to pay part of the cost of the medical services that they use, and pay more when they demand higher levels of service in terms of comfort and ward amenities. This co-payment principle is applied even to the most heavily subsidised wards to avoid the pitfalls of medical services being perceived to be "free", either because they are fully subsidised or have been pre-paid through medical insurance, resulting in insatiable demand.

To help Singaporeans take responsibility for their own healthcare needs, the government introduced the Medisave Scheme in 1984. Medisave is a compulsory savings scheme to help Singaporeans save and pay for their hospitalisation expenses, especially after their retirement. Under the scheme, every employee sets aside 6-8% of his monthly income into a personal Medisave account from which he may withdraw to pay the hospitalisation expenses incurred by

himself or his family. As a savings scheme, Medisave provides incentive for members to save and avoid unnecessary use of medical services. If they stay healthy, the Medisave savings remain theirs. Unlike tax-based financing, Medisave does not place undue burden on a declining number of employed and the young to support an ageing population.

To supplement Medisave, a low-cost national catastrophic illness insurance schemes called MediShield/MediShield Plus were introduced in the 1990s. MediShield is designed to help members meet the medical expenses of major or prolonged illnesses that their Medisave balance would not be sufficient to cover. To avoid the problems associated with pre-paid insurance, MediShield operates on a system of deductibles and co-payment.

Despite Medisave and MediShield, there will always be the lower income group who will need special help from the Government. In April 1993, the government set up an endowment fund called the Medifund to help needy Singaporeans pay their medical bills. Medifund provides the safety net for those who are so poor that they cannot even afford the heavily subsidised charges at the public sector hospitals and clinics.

Together with Government subsidies, Medisave, MediShield and Medifund ensure that every Singaporean has access to good, basic medical care, irrespective of their socio-economic status.

2.2.8 Healthcare Manpower

Singapore today has about 4,900 doctors for its healthcare delivery system. This gives a doctor to population ratio of 1:760 (Singapore, MOH, 1997). Slightly more than 2,500 of the doctors (51%) are in the private sector (Singapore, MOH, 1997). About 42% of the doctors are trained specialists with postgraduate medical degrees and advanced speciality training. The nurse to population ratio is 1:250, with a total of about 14,705 nurses (Singapore, MOH, 1997). 50% of the nurses work in the public sector.

Healthcare Manpower Development

The continuing education for all healthcare professionals to upgrade the quality of healthcare was achieved through formal postgraduate training, both local and overseas and practical attachments at overseas centres of international recognition.

Nursing education and programmes for the professional development of nurses are targeted at all levels of nurses. Nurses were sent on three to four months attachments to renowned medical centres to keep abreast of current trends and developments in their respective clinical specialities. They were also sponsored for the conversion nursing degree course jointly organised by the Singapore Institute of Management and the University of Sydney.

2.2.9 Healthcare Utilisation

MOH has set up the Department of Continuing Care to co-ordinate the efforts of government agencies, private and voluntary organisations in the development of residential, day care and domiciliary services for the aged sick. An example is the 56 geriatric beds at TTSH. This will facilitate the discharge of aged sick from the acute hospitals and their smoother emplacement into nursing homes.

The total number of public sector hospital admissions have increased by 7.8% from 342,591 in 1993 to 369,456 in 1997 or about 1,012 admissions daily (Singapore, MOH, 1997). Hospital admission rate per 1,000 population has also increased from 80.3 to 119.1 (Singapore, MOH, 1997).

Attendance at the Government and Restructured Hospitals' Specialist Clinics has also increased by 61% from 1,455,985 in 1990 to 2,343,765 in 1997 or about 6,421 attendance daily (Singapore, MOH, 1997). At the A & E departments, the attendance increased by 2.5% from 533,571 in 1990 to 547,178 in 1997, or about 1,500 attendance daily (Singapore, MOH, 1997). This slight increase in attendance might be due to the educational publicity for non-emergency cases to make use of primary health services. Attendance at the Government primary healthcare

clinics has increased by 3.7% from 2,806,948 in 1990 to 2,910,366 in 1997 (Singapore, MOH, 1997).

2.2.10 Healthcare Expenditure

The National Health Expenditure (NHE) as a percentage of Gross Domestic Product (GDP) rose from 2.4% of GDP in 1983 to 2.8 of GDP in 1997 (Singapore, MOH, 1997). The NHE had increased from SGD881 million in 1983 to SGD4.0 billion in 1997 (Singapore, MOH, 1997) while Government subsidies on health services rose correspondingly from SGD405 million to SGD1,240 million or 0.9% of GDP (Singapore, MOH, 1997). Per capita healthcare spending had increased from SGD366 in 1983 to SGD1,080 or US\$675 in 1997 (Singapore, MOH, 1997) which was still very much lower when compared with other countries (in 1990) with a good stand of health viz. Japan at US\$1538, UK at US\$1039, Germany at US\$1511 and USA at US\$2763 (World, 1991).

2.2.11 Major Concerns and Future Challenges

Although Singapore has come a long way in improving its health status and standard of medical service, it still faces many concerns and challenges. These include (Singapore, MOH, 1997):

- i. The increasing cost of providing healthcare as a result of advances in medical knowledge and technology, leading to increased specialisation and sub-specialisation and greater use of medical technology.
- ii. The rising expectations and demand for better and more sophisticated health services by an increasingly well-informed and more affluent public.
- iii. The rapid ageing of the population where the proportion of those 60 years and above is estimated to increase from the present 10% to 27% by the year 2030. It is known that the aged will incur a higher healthcare expenditure.
- iv. The shortage of nurses and ancillary staff such as health therapists.

The above discussion on Singapore healthcare system has demonstrated that Singapore has a mixed system, which is good. People can choose what they want, there is reasonable control, there is government subsidy and compulsory savings which ensures that people are not deprived of the healthcare that they need. The present healthcare policy ensures that each generation insures for its own needs rather than paying for the health and social expenses of those in retirement or in need. In this way, today's young generation will be spared the burden of paying for the old in the future. If the Government simply appeases older people by giving them whatever healthcare they wanted free of charge, today's young people would suffer in future. There would be budget deficit and as a result they would be taxed heavily.

Any healthcare policy has to trade off among four competing goals: equitable access, freedom of choice for patients, affordability and freedom to organise production and to price. So far, no known healthcare system achieves all four goals simultaneously. A system can attain three of them with some compromise. Which three to aim for depends on the prevailing social, financial and political conditions. Singapore has compromised on the last goal: freedom to organise production and to price, and has thus chosen a middle way between a laissez-faire system and a government-regulated National Health Service.

Singapore is able to implement the present healthcare system successfully because of the following reasons:

- i. Cultural characteristics. Singapore is a country of immigrants in which the population has not come to expect or demand a state funded welfare system to meet all its needs. The population is also very young and the real test will only come when demographic trends change.
- ii. The economy has grown by around 8% a year since gaining independence, which provided full employment. This has enabled the government to require individuals to save to meet the costs of medical care and other needs. A downturn in the economy or a changed attitude to work would lead to more reliance on government funding.

A summary of Singapore present healthcare system together with a comparative study of healthcare system of selected countries are shown in Appendix F and Appendix G.

2.3 Singapore Hospital Industry Analysis

Industry analysis is useful in taking an organisation through a systematic study of the environment forces that affect and are affected by the organisation. It enables the organisation to be aware of its competitive position within the industry. In other words, it systematises the identification of opportunities and threats, the two external components of the venerable SWOT analysis framework that many organisations use in their formal strategic planning process.

Hospitals exist for the purpose of providing healthcare services as a general welfare for the nation. Focus is given to the quality of medical treatments and cost containment. As a social good, there used to be less emphasis on the quality of services that patients receive. Hospitals, private as well as public, were traditionally not accustomed to the concept of competition.

It has been recognised that Porter's (Porter, 1980) model from the positioning school is but one of the many available for the analysis of industry. Mintzberg (1990) proposes that there are ten distinct schools of thought, each with its own unique perspective. These range from the design and planning schools which view strategy formation as conceptual and formal processes respectively to the cultural and political schools which see strategy formation as ideological and power processes.

In choosing Porter's model for analysing the hospital industry in Singapore, the author felt that the analytical process of positioning school best facilitates the study of the hospital industry in Singapore. This is because in the positioning schools, strategies are generic, tangible positions in the market place. In addition, the market place is economic and competitive, and the strategy formation process is therefore one of the analytic selection based on calculation. The aim is to analyse formal data on the industry and the competition in order to select the optimal generic strategy.

It is noted that the positioning school has weaknesses, which may inhibit its effectiveness as a tool for analysis. Firstly, the focus is narrow and oriented to the economic and the quantifiable as opposed to the social or political. This can lead to a bias in the selection of strategies because cost leadership strategies can be supported by more hard data than quality differentiation. Secondly, the context of the positioning school is narrow and bias towards traditional big businesses. Thirdly, strategy tends to have a narrow focus with an emphasis on a generic position, not a unique perspective.

In adopting Porter's model, it is recognised that all models have weaknesses, since none can capture the diversity and complexity of the human condition. As such, effort is made to address the weaknesses as and when they arise. The five forces will be used to give a brief representation of the hospital industry in Singapore.

2.3.1 Degree of Rivalry

The intensity of rivalry in the hospital industry in Singapore has increased in the 1990s. This was due to a lack of industry growth, overcapacity, decreasing service (product) differences and switching costs, increased diversity of competitors with high strategic stakes and higher exit barriers. In addition, as the government moved from a policy of equity to efficiency, there emerged a greater desire and ability to meet customer expectations by public hospitals that would further exacerbate the intensity of rivalry in the hospital industry.

Industry Growth

Growth in the industry appears to be entering a "slow" or "negligible" phase. In-patient admissions, which grew from 265,828 in 1980 to 358,062 (Increase of 35%) in 1995 appears to be plateauing at 373,413 in 1996 and 369,456 in 1997 (Singapore, MOH, 1997). At the same time, there is a drop in the average length of stay over the same period from 5.5 days to 4.3 days (Singapore, MOH, 1997) and this is likely to be due to an increase in efficiency of treatment. Both these trends combine to produce a significant fall in patient days. All things remaining constant, revenue varies directly with patient days in a hospital and this decrease is expected to impact heavily on the industry.

Patient admissions and average length of stay can be expected to decline further given the increased efficiency of drugs and diagnosis and treatment of illnesses. This slowing of industry growth will turn competition into a market share game since hospitals can no longer improve their results by merely keeping up with the industry and instead have to contend with a less than optimal situation requiring financial and managerial resilience.

Overcapacity

The number of hospital beds had increased from 9,570 in 1980 to 11,030 in 1997 (an increase of 15%) (Singapore, MOH, 1997). This growth in bed capacity is set against a backdrop of declining patient days and a shift towards ambulatory care. Given that the hospital industry is characterised by the high fixed costs of labour, equipment and services which cannot be stored, the excess capacity will create strong pressures for hospitals to increase market share.

Competition Among Hospitals

Hospitals are now more cost conscious and service oriented. They are continuously pursuing excellence in the quality of their medical care and services to keep abreast with the competition for patients. Competitive pressures have to be dealt with. Private hospitals have the resources to attract "big name" doctors and develop medical specialities extensively. Even though receiving treatment under 'choiced' specialists often means larger bills, more people are willing to pay the price and are switching to private hospitals to enjoy more extravagant services.

There are two ways in which a hospital can differentiate its services (that is, product differentiation). One way is to differentiate through the medical services it provides. The other is to differentiate via its hotel/hospitality aspects. The former is unlikely to have an impact on patients who lack the technical expertise to be informed buyers and are mostly users of a hospital from their doctor's choice.

Differentiation through hospitality can be done along the physical dimension of hospital design and doctor/nurse or the interpersonal dimension of service. Differentiation via the physical environment will be increasingly difficult as all hospitals have already embarked or are

embarking on renovations and extensions. Also, the scope for differentiation through physical environment is limited because unlike hotels, decreasing marginal utility sets in much earlier for patients who are motivated by early discharge and the hospital whose key source of revenue is not bed charges but the ancillary charges from their operating theatre, pharmacy, radiology and laboratory departments.

Service differentiation via quality customer service will also be limited due to an increasing shortage of manpower. Given the limits to service differentiation, competition for patients is likely to be fierce unless new markets are created or entered into.

Exit Barriers

For private hospitals, exit barriers for all players are extremely high since their highly specialised assets are extremely costly and have low liquidation values. In recent years, legislation and licensing by the government has increased the capital investment necessary for running a hospital. This has the effect of increasing the cost of leaving the industry by existing players although it acts as an effective deterrent to entry, since by the same token, capital investment costs for new entrants are higher.

2.3.2 Barriers to Entry

The threat of new entrants into the hospital industry is minimal given the government strict consideration for approval of a new hospital and the increasingly high entry barriers.

Government Policies

Due to the impact on people's lives and market failure in the provision of healthcare, the hospital industry in Singapore is heavily regulated by the government. For both the private and public hospitals, government regulations cover the number of hospital licences, hospital beds, the degree of specialisation of doctors, the provision of specialist care and prices hospitals charge etc. to curb rising cost and inefficiencies (Phua, 1991). The licensing of hospitals places an added responsibility on hospitals to provide all patients with an estimate of the cost of their

hospitalisation before admission, restricts the use of technology that has not been previously approved by the MOH and set standards on the minimum quality of care and services that are to be provided to patients. The effect of licensing has been to raise the floor cost of operating a hospital. In an effort to prevent a supply-driven situation, the government's constant intervention in the industry makes it difficult for new start-outs unless they are according to the needs of the nation.

Capital Requirement

The capital requirements necessary to enter the industry will grow as a significant barrier to entry due to three factors. Firstly, the cost of medical technology and equipment has increased tremendously over the years. Secondly, the leaps in technological advancement shortens considerably the economic lifespan of a piece of equipment at a time when the industry is facing decreasing growth rates. Thirdly, the purchase of equipment has become increasingly used as a means to attract and retain doctors and their patients to utilise the hospital. Higgins (1991) refers to this as the "medical arms race", that is, hospitals adding expensive services and technology in order to be viewed as more modern and prestigious than their rivals and argues that increased competition does not slow it down. It should also be noted that this form of capital involvement increases costs without a necessary increase in revenue or profits.

The government had spent about SGD400 million constructing the New Changi Hospital and close to SGD600 millions building the new Tan Tock Seng Hospital. The cost of building hospitals has increased tremendously over the years. Thus, the heavy capital requirement poses a major barrier to new entrants.

Brand Identity

Although there is limited service differentiation within the industry, brand identity is a formidable barrier to entry because the purchase of inpatient hospital care hinges heavily on a reputation that a hospital has built through its years of existence and its relationship with doctors. Unlike outpatient primary healthcare where the consumer perceives less of a need to explore the seller's credibility before making a first purchase; and trauma situations which

makes proximity of location crucial, admission into hospital is usually the result of careful consideration based on the hospital's reputation and the recommendations of doctors and friends. As such, this consumer behaviour serves as a barrier to entry.

2.3.3 Threat of Substitutes

Substitutes limit the potential returns of an industry by placing a ceiling on the prices hospitals can profitably charge. The more attractive price performance alternative offered by substitutes, the firmer the lid on industry profits (Porter, 1980).

Technology Advancement

Major medical breakthroughs in the last five years have led to the proliferation of new methods in surgery and diagnostics. Exploratory surgeries have been brought to an end as powerful diagnostic tools become available. Non-invasive technologies are taking the stage in surgical procedures. In the next five to ten years, many of the medical procedures carried out today may be phased out. Outpatient treatment or day surgery may substitute inpatient treatment as medical technology advances. In the long run, these forces will result in fewer inpatient days and lower the demand for hospital beds.

Demographic and Epidemiological Changes

These two factors of demographic and epidemiological changes will underscore the shift from acute care, which is the current business of hospitals, to chronic and ambulatory care. Nursing services and personal care for the terminally and chronically ill will be developed and extended in the coming years. The basic appeal of such services is that patients can spend their days at home with their families, supported by nursing and therapy care from a medical base. Provision is made for short trips by the patient to the hospital for short stays for inpatient care or during a respite for the person at home caring for the patient.

These changes in age and disease patterns in Singapore would bring about an inevitable propensity to substitute by buyers and will adversely threaten the existing structure of the hospital industry.

Changing Paradigm of Medicine

Coile (1986) had supported the above point by discussing the forces that may shape the hospital industry in the future. Some of those discussed, like the setting up of integrated health plans, conglomeration of health corporations, injection of corporate practice and the rise of the new consumer have already taken shape ten years after his writing.

He proposes that hospitals must begin to re-orientate their planning toward the emerging paradigms of health because individuals and community values are shifting towards health enhancement. He also predicted that there would be a shift in healthcare dollars from inpatient to outpatient treatment, public to private practice and curative to preventive medicine.

Signals of the change are evident in Singapore today, with the development of a fitness movement as well as explicit emphasis by the government on personal responsibility for health. Such a move to promote wellness serves as 'preventive' measures in place of curative care. Along with the heightening health consciousness of people, there may be a reduced need for inpatient services in the long run.

2.3.4 Bargaining Power of Suppliers

There are many suppliers to the hospital industry in Singapore and they range from pharmaceutical companies to suppliers of fresh vegetables. Although they play a key role in the industry, most of these suppliers generally operate in a perfectly competitive market and do not exert significant bargaining power over the industry; nor does the industry have significant bargaining power over them. The suppliers that do exert bargaining power over the industry are those who render professional services, namely, doctors and nurses.

Switching Costs of Suppliers

With the increase in the number of beds in the industry and the resulting competition for doctors and their patients, the bargaining power of doctors will increase. This is especially so because the switching costs of doctors are very much lower than that of a hospital. For instance, referral made to another hospital is likely to incur only additional travelling time and some adjustments

to environment, equipment and staff for doctors. For hospitals, however, loss of doctor referrals means coping with heavy fixed overheads of staff and equipment. The low switching cost of doctors will accentuate their bargaining power as overcapacity in the acute inpatient hospital industry comes about and gains momentum.

Shortage of Staff

A shortage of manpower is a common problem in hospitals, since there is almost no substitute for these personnel. The demand for nursing staff increases with the addition of hospital beds. Yet the industry is not producing enough personnel trained in the nursing profession. Many hospitals are hiring foreign nurses which may pose a problem due to language and cultural barriers. Many medical professionals choose to be employed at hospitals or be engaged in practices where rewards are reported to be higher. In order to attract and retain staff, hospitals are under tremendous pressure to offer a more competitive compensation package, which pose a strain on financial resources.

Doctors' Referrals

Doctors usually determine the choice of a patient's hospital and in turn the survival of hospitals themselves. They also control the consumer's healthcare purchase decisions, consequently, they exercise a great deal of influence on a hospital's demand for equipment, drugs, general supplies and the number and types of support personnel. If the doctors do not like the location, equipment or even the management of the hospital, they may cease to refer patients to a particular hospital (Chong, 1994). This becomes the basis from which they pose an impact on a hospital's cost and differentiation.

The output of a hospital is patient care and the inputs are services and goods supplied by departments within the hospital that have a functional orientation. Prior to centralisation of healthcare in hospitals, doctors decide on the needs of patients and also serve as managers of inputs. The present level of specialisation precludes this organisation because the functional inputs are too capital-intensive and specialised for the doctor to manage in his or her office. Doctors' needs for certain services within the hospital must be supplied by the hospital

management, who, unlike the doctor, operates under cost and regulatory constraints imposed by a board of directors, MOH, financial institutions, skills availability and a host of other factors.

A large portion of patients is being referred to hospitals either by in-house practitioners or affiliated doctors. To attract the doctors to refer patients to them, hospitals have to offer the latest, best and most extensive medical facilities, equipment, support staff and prestige. Also, if the doctors do not like the location, equipment or even the management of the hospital, they may cease to refer patients to a particular hospital (Chong, 1994). Thus, hospitals also need to establish close working relationships with doctors, which may involve providing training and continuing education and keeping them updated about developments in the hospitals.

2.3.5 Bargaining Power of Buyers

Porter notes that buyers compete with the industry by forcing down prices, bargaining power for higher quality or more services and playing competitors against each other. Their actions have effects on the industry profitability, the impact of which depends on the buyers' bargaining power. In Singapore's hospital industry, significant factors such as an increase in bargaining leverage and price sensitivity are increasing the bargaining power of buyers and these are likely to erode industry profits.

Lower Buyer Switching Costs Relative to Firms Switching Costs

Greater public education through the advertising efforts of MOH on television and in printed forms reduce consumers' ignorance and consumers would exercise their option to switch between hospitals. However, the switching costs of hospitals will increase as they have to cope with the overheads of excess capacity whilst making investments in new service lines that are desired by customers. This is especially in the case of day and minimally invasive surgeries which reduce inpatient length of stay without always necessitating an increased intensity of treatment, thereby decreasing revenue and profits.

Better Buyer Information

The higher education level of consumers of healthcare means patients are increasingly more knowledgeable and better informed. They are aware of their rights as well as the range of services available in hospitals. These form higher expectations of healthcare providers. The healthcare seeking behaviour of patients is unlike normal goods in the sense that we expect price in-elasticity. Also, people are earning higher income now and are willing to spend on their well-being, therefore price is not the central issue in competition. How much a hospital can meet the patients' expectations and offer services beyond satisfaction level becomes a focal competitive issue.

Greater buyer information via the MOH's public education programme and licensing requirements will see an increase in the bargaining power of buyers. Currently, unknown, though, is the difficulty patients encounter in obtaining relevant information for comparative pricing of hospital services. The multitude of separate hospital rates for specific services and items makes the task of comparing prices complex. Moreover, a patient cannot determine what services will be required prior to admission and is therefore unable to ask for the appropriate rates for comparison.

The MOH has tried to circumvent this problem by the introduction of legislation to ensure that all patients receive an estimation of their hospitalisation and treatment charges on or before admission, but the impact of this is yet to be seen.

Greater Availability of Substitutes

The hospital of the future will have fewer inpatients who will be more acutely ill and many more outpatients. Breathtaking technological advances represent the main reason behind the surge in outpatients. The most important technological breakthrough is laparoscopic surgery which reduces the need to cut the body, allowing patients to recuperate and be discharged much faster.

Advances in anaesthesiology have also contributed significantly to outpatient boom as patients wake more rapidly with fewer side effects, facilitating early discharge. New modalities such as home foetal monitoring also contribute to the reduced need for hospitalisation. Imaging advances are also increasingly dramatic, reducing the need for exploratory surgery.

Service Differentiation

Service differentiation will be greatly reduced both in reality and as perceived by patients. This is due to hospitals attempting to match and outdo each other in a bid to attract patients. At the same time, efforts by the MOH in clinical auditing, professional credential and public education will reduce service differentiation due to consumer ignorance.

Brand Identity

Brand identity, being subject to the same forces of change as service differentiation, will also decrease, increasing buyers' bargaining power.

In summary, the hospital industry in Singapore is a rather controlled one where hospitals have to adhere strictly to government's policies and directives. The government will approve of a new hospital set-up under the strictest consideration of the nation's need. Hospitals face the common problem of shortage of staff which makes attracting manpower into this profession a challenge. To ensure constant flow of patients to be referred to them, hospitals not only have to improve their services, they also have to form close working relationships with outside doctors and physicians to attract them in making them the "choice" hospitals. Today's patients are more educated, affluent and demanding. Hospitals cannot relax their efforts to seek continuous improvement in their services. This is especially so in the face of competition. The shifting paradigm of medicine that is taking place now may result in changes in healthcare demand in the future. Hence, hospitals have to brace themselves up for possible structural changes in the healthcare/hospital industry and modify their products and services accordingly.

2.4 Guidelines for the Future Development of Singapore Healthcare System

The hospital industry is experiencing significant changes in its five forces of competition. Given that these five forces provide the structural underpinning of the industry, the changes must initiate a change of strategy by all hospitals in the industry that intend to survive and profit from the changes. Strategies for success are potentially countless, limited only by the creativity and resources of players in the industry.

Having analysed the healthcare industry of Singapore using Porter's five forces and in view of the challenges and competition facing the industry such as escalating healthcare costs, rising patient expectations and increasing technological complexity, the author suggests the following guidelines as depicted in Table 2.1 for a nation-wide, government-led encouragement on the provision of quality care. The author suggests guidelines for an organisation-wide re-engineering of major processes in Chapters 4 to 7.

TABLE 2.1: GUIDELINES FOR THE FUTURE DEVELOPMENT OF SINGAPORE HEALTHCARE SYSTEM

- | |
|--|
| • A national co-ordinating organisation to oversee quality improvement |
| • Healthcare manpower development |
| • A national assessment system to assess performance |
| • An organisation responsible for setting up the national assessment system |
| • A resource centre on best practices |
| • New methods to fund research and teaching |
| • Government to provide funding for industrial and academic collaborations |
| • Intensify efforts to reduce market imperfection and increase buyer information |

Source: Developed by the Author

Guideline 1: A national co-ordinating organisation to oversee quality improvement in healthcare.

The current quality system of hospitals is largely informal and piecemeal or ad hoc. Some hospitals have put in place quality management programmes such as ISO 9000 certification. Doctors have to provide, and be seen to provide, the best possible level of healthcare at the

lowest possible cost, and to uphold the long tradition of moral integrity, technical excellence and consistent professionalism of the healers' craft.

There should be a guiding organisation to motivate and co-ordinate the hospitals for TQM implementation. Those already convinced of the need must be co-ordinated and brought together into a common direction. Otherwise, multiple hospitals will set off in an equal number of directions and there will then be a lack of coherence and much wastage of resources. Those as yet unaware or unwilling must be won over by reasoned argument and clear demonstration of the importance of quality management.

Which organisation should take on such a responsibility? The MAAU is the accrediting and licensing agency for MOH since 1 January 1994. In theory, it would be ideal for them to monitor and assess a hospital's performance, being entrusted with the power to regulate the standard of healthcare in Singapore.

In practice, the MAAU is less suited to this implementation role as it is an enforcing unit. One obeys the person who holds the cudgel, but is unlikely to be convinced of his cause. As the prime mover of quality management is the healthcare worker, external coercion is far less likely to work than internal motivation. For the successful implementation of such a massive programme which is so dependent on the recipient's co-operation, TQM must be seen to be originating from the healthcare personnel, not from a central policing organisation. Therefore relevant hospitals and healthcare workers should be invited to participate in the implementation and MAAU should only act as the co-ordinating organisation.

Guideline 2: Healthcare manpower development.

Healthcare workers play a very important part in the delivery of total quality healthcare. MOH should not only place emphasis on the continuing medical education programmes for doctors and nurses but should also conduct continuing education programmes for para-medical staff, such as clinic assistants, radiographers, etc to enable them to upgrade their skills for continuous quality improvement.

MOH should organise continuing education programmes or seminars on current trends and developments in quality and innovation management for managers and administrators of healthcare organisations. This would ensure a continued availability of trained and experienced managers for the healthcare industry.

Guideline 3: A national assessment system to assess the performance of hospitals.

Singapore should have a National Assessment System to assess the performance of hospitals. Where necessary, healthcare standards from organisations around the world should be consulted.

Hospitals should be assessed on the degree of their application of healthcare management in relation to strategic planning, quality management, human resource management and financial management with special emphasis on customer satisfaction and total quality commitment.

Guideline 4: An organisation responsible for the setting up of a national assessment system.

Singapore should follow the example of United States, Australia and New Zealand. They make use of coalitions of healthcare and other relevant organisations involving healthcare personnel, the government and the consumers. A Council should be formed with representation from:

- a) the government - MAAU and Productivity and Standard Board (PSB).
- b) individual private hospitals or a group representative from the Singapore Private Hospitals Administrators' Group.
- c) restructured and non-restructured government hospitals.
- d) professional groups like the Singapore Medical Association for the doctors and relevant groups for the nurses, physiotherapists etc.
- e) academic bodies like the National University of Singapore Faculties of Medicine and Dentistry, etc.
- f) private consumer groups like the Consumer Association of Singapore

Such an advisory committee would be given more prominence as it represents the professional, political and public interests. The overseeing organisation will only adopt a facilitator role. The standards set will then acquire credibility and respectability.

The overseeing organisation should be the PSB because the MAAU is the enforcing and licensing unit and is not suited for the role of facilitator. PSB should initially co-ordinate the Council and provide administrative support and subsequently act as the external and independent auditor. In this aspect, PSB will not be imposing regulations upon the professionals and the hospitals, but would be enforcing standards that they have set for themselves. Thus, the Council acts as the advisory committee on matters of standards and protocol.

Guideline 5: A resource centre on best practices.

A Resource Centre similar to that set up by the King's Fund in UK should be funded by the Government and set up by the PSB. PSB should supply information about best hospital practices and industry benchmark and assist them with improvement programmes. Certain aggregated indicators of current and past performance should also be available to allow hospitals to compare themselves with the "industry standard".

Guideline 6: New methods of funding research and teaching.

All hospitals are conscious of costing which is to be expected. Chief Executive Officer (CEO) of hospitals is always concern about the bottom-line. As a result, service becomes of primary importance and only a minority is committed to research because research does not bring in the money. If a doctor spends his time teaching or in research, he is taking time away from seeing patients. To do well in the long term, research, teaching and service, all three must go together. Thus the government should think of new methods of funding research and teaching, encourage quality improvement research and development, grant tax exemptions and give incentives to hospitals who are committed to research and teaching, quality improvement research and development.

Guideline 7: Funding for industrial and academic collaborations.

Through industrial and academic interaction, hospitals and university experts could share a global view to gain mutual benefits. On the academic side, the researchers could make use of the field data to develop, test and adapt a new theory. They can address the context of a problem, rather than focus on the content of their theories. For hospitals, this collaboration would transfer knowledge from University experts to staff. Staff could acquire multiple skills, theoretical knowledge and perspectives to communicate with their customers and suppliers. The academics and the hospitals would treasure the value of each other and become more pro-active in participating in collaboration project.

Guidelines 8: Reduce market imperfection and increase buyer information.

Currently patients have difficulty obtaining relevant information for comparative pricing of hospital services. Although MOH has tried to circumvent this problem with the introduction of legislation to ensure that all patients receive an estimation of their hospitalisation and treatment charges on or before admission, the multitude of separate hospital rates for specific services and items makes the task of comparing prices complex. Moreover, a patient cannot determine what services will be required prior to admission and is therefore unable to ask for the appropriate rates for comparison.

MOH should try to circumvent this problem with the publication of "Schedule of Fees". This "Schedule of Fees" should indicate the estimated cost of hospitalisation and treatment by hospitals and by procedure.

In conclusion, Singapore has some advantages which could facilitate the future development of its healthcare system. A small and compact country, it has an economy and standard of living that rivals some developed countries. The population is relatively well educated and amenable to well implemented, well marketed government policies. There is an efficient communication system, a good healthcare infrastructure and well-developed hospitals. The strategic advantage

of these factors should be maximised. The MediNet system of information collection should also be harnessed.

Overenthusiasm and forced top-down implementation which can provoke resistance should be overcome with legislation rather than from a spontaneously coherent healthcare community. Healthcare workers should contribute their best and hospitals should firmly subscribe to the "never settle for less" mindset. They should re-engineer their major process organisation-wide for quantum leap in quality improvement.

3

QUALITY

In this chapter, the author provides an assessment of the meaning of quality. A literature review is undertaken to establish whether a generic definition of quality in healthcare exists. Furthermore, the inherent characteristics of healthcare services and how these characteristics would affect the evaluation of healthcare service quality are analysed. Some insights from past researchers on patient's expectations and perceptions of hospital service quality are also reviewed. The chapter concludes by delineating through empirical studies, patients and doctors/staff quality expectations and perceptions of Singapore hospitals services. A contribution is made to the field of healthcare in Singapore where the internationally used market research technique is used to measure the service quality of Singapore hospitals.

Areas to be examined include:

- 3.1 Definitions of Quality
- 3.2 Definitions of Quality in Healthcare
- 3.3 Inherent Characteristics of Healthcare Services
- 3.4 SERVQUAL: The Instrument for Measuring Service Quality
- 3.5 Service Quality Studies in Hospitals
- 3.6 Expectations and Perceptions of Singapore Hospital Services - Methodology
- 3.7 Patients' Expectations and Perceptions of Singapore Hospital Services - Findings
- 3.8 Doctors/Staff Expectations and Perceptions of Singapore Hospital Services - Findings
- 3.9 Analysis of Variance on Patients and Doctors/Staff Expectations and Perceptions of Singapore Hospital Services

3.1 Definitions of Quality

Quality requires that a product or service, of any grade, meets specifications. Failure to do so automatically excludes any claim to Quality. Quality, however, has another dimension which is to do with the perception of "the customer", that is, a recipient, beneficiary or founder. When delivered, the product or service must fulfil the expectations of the customer in terms of their total experience of it.

In its broad form, quality means any action or differing form of activity directed towards providing consumers with products (goods and services) of appropriate quality (Evans and Lindsay, 1993). Quality which are the needs and wants of the customer (or more precisely the stakeholders) should be the driving force for achieving world competitiveness.

Dotchin and Oakland (1992) state that 'scholars face many problems when defining quality as an economic as opposed to a transcendent concept'. These difficulties apply equally to goods and services. Edwards (1968) defines quality as being "the ability of a commodity or service to satisfy human wants". This suggests that for many products, customer judgements are made over their useful life, based on reliability, durability, price and ease of maintenance (Dotchin and Oakland, 1992).

Similarly, Shewart (1931) draw attention to the particular difficulty of knowing and measuring what consumers will consider to be acceptable quality in the future. The implication being that customer needs is not static. Townsend and Gebhart (1986) separate 'quality of perception', as seen subjectively by the customer, from 'quality of fact' or performance to the standard which has been set. They have stated that both perspectives need to be acknowledged and recognised. For Juran (1988), quality is 'fitness for purpose'. Quality, he notes, is judged by the user, not by the manufacturer or merchants and it has four key elements:

- * an understanding of what the customer values sufficiently to pay for in preference to all other competitive offerings
- * the development of a precise specification to build the product or service
- * the ability to deliver the product or service within the specification 100% of the time

- * the ability to improve the specification or reduce the cost to the customer faster than the competition does

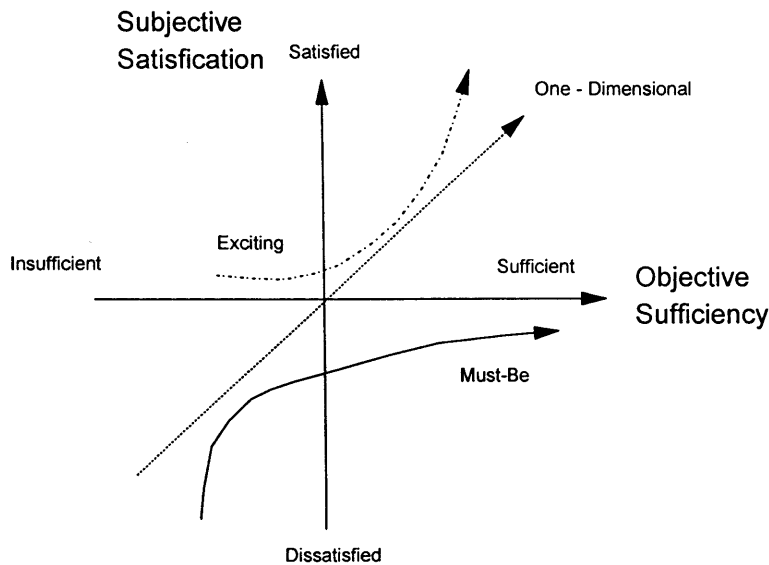
A different, but equally important definition, is given by Crosby (1979), who defined quality as conformance to requirement not elegance, whilst Garvin (1988) argues that quality can be seen from five approaches:

- i. transcendent or innate excellence
- ii. product-based or the amount of a desirable attribute which is present
- iii. user-based in the context of fitness for use
- iv. manufacturing-based on conformance to specification
- v. value-based or satisfaction relative to price

Garvin is of the view that these meanings can co-exist within an organisation. He goes on to suggest that it may become necessary to give quality different meanings in different industries, and also probably change the approach taken towards quality from user-based to product-based, as products move through market research to design; and then from product-based to manufacturing-based, as they go from design into manufacture (Garvin, 1988). However, the user-based definition is more appropriate in a service organisation because it denotes that those services that meet customer preferences and expectations are the central thrust of high quality (Garvin, 1988). In addition, the author is of the opinion, that the management of the relationship with the customer is also crucial. This is consistent with the view of Kogan et al (1991) who argues that 'given that the client is both a consumer and a producer, the management of the company-client interface becomes extremely important and a delicate task for any service organisation'.

However, it is not always sufficient merely to fulfil the expectations of customers. Customer expectations sometimes have to be exceeded so that the customer can be delighted. Kano (1984) developed a model of customer satisfaction. He categorised quality dimension into three groups as depicted in Figure 3.1.

Figure 3.1: The Kano Model of Customer Satisfaction



Source: Kano, N. Seraku, N., Takahashi, F. and Tsuji, S. (1984), "Attractive Quality and Must Be Quality". Quality, Vol. 14, No. 2, pp. 39 - 48.

According to Kano, customers almost unconsciously expect must-be (basic) needs to be present in a bought product or service. These needs are so obvious or taken for granted that customers usually would not describe them even if asked. If dissatisfied with respect to these needs, they will likely become most unhappy. Further along the expectation scale are one-dimensional needs (expected needs) which customers are aware of and want to have satisfied. At the extreme are exciting experiences which refer to features that may not be present in a product and the provider has to find out. Their absence of exciting product feature may not result in customer dissatisfaction; their presence, however, would excite customers. However, the framework for understanding these diverse customer needs were not provided.

Collard (1989) notes that "quality is about attitudes, culture and commitment within an organisation; it applies in all organisations, be it manufacturing, service or the public sector". He further states, "in organisations of every kind, quality can be regarded as a means to an end - customer satisfaction in all aspects of the product or service". Quality, he contends, should be all-pervasive, covering not only the design, performance and reliability of a product or service but the constant improvement of what is on offer (Collard, 1989). An alternative definition of

quality is offered by the British Standard, BS 4778, which defines quality as the totality of features and characteristics of a product or service that bear on its ability to satisfy a given need. On the basis of this definition, it is possible to evaluate quality firstly on the criteria of "fitness of purpose" and secondly on the ability to satisfy a given need, which may include availability, maintainability, reliability and design (Dotchin and Oakland, 1992).

Tom Peters (Peters and Austin, 1985) prefers a different typology and suggests, "perception is all there is". Quality is not a technique, it is about care, people, passion, consistency, eyeball contact and gut reaction. He suggests that quality comes from people who care and are committed; quality comes from the belief that anything can be made better, that beauty is universally achievable; in the collection of garbage, in services, in the raising of chicken, in the design of a retail store, etc. He argues that quality involves living the message of the possibility of perfection and infinite improvement, living it day in day out, decade by decade (Peters and Austin, 1985). He further contends that, quality is a function of commitment - from all hands on the loading dock, at the receptionist desk, in the design space, without that commitment only human beings can give, you will not get top quality. Thus quality is primarily a function of human commitment exemplifying passion and pride (Peters and Austin, 1985).

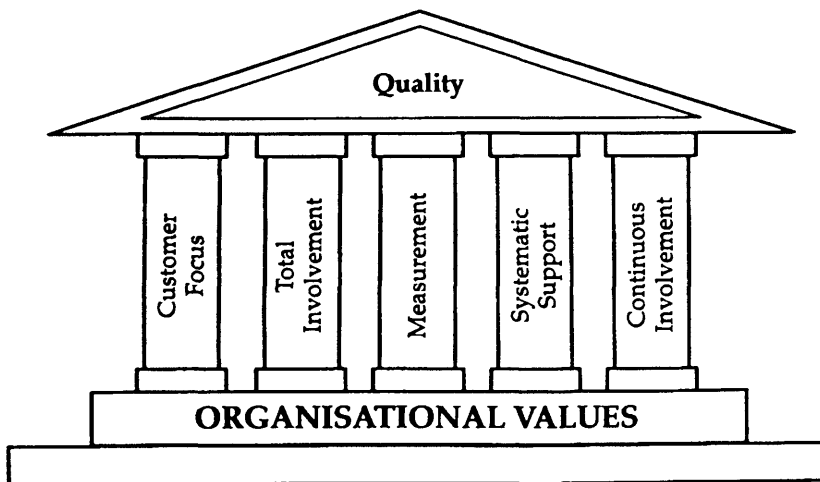
The Organisation Development Institute (ODI), UK (1991) has identified two elements in the definition of quality:

- i. **Alignment**, which is '**doing right things**'.
- ii. **Execution**, which is '**doing things right**'. To do things right means, by implication, identifying customers needs, converting those needs into agreed requirements, then aligning work process to be capable of meeting those requirements. In order to do things right, an organisation must execute its work processes in a way that meets those requirements. Quality, the ODI states, has several other dimensions: including the relationship with the customer, the integrity with which products and services are supported, the timeliness of delivery and the cost to the customer for acquiring the product or service. ODI suggests five pillars of Quality (ODI, 1991) that are:

- * Customer Focus
- * Total Involvement
- * Measurement
- * Systematic Support
- * Continuous Improvement

To support quality, these pillars must be built on a foundation of organisational values that employees can believe in as shown in Figure 3.2:

Figure 3.2: The Five Pillars of Quality



Source: ODI Publication, (1989)

However, Black (1993) notes that most TQM writers have failed to provide an adequate definition of quality that can be easily related to the philosophy of TQM. He suggests that the differing definitions of quality only link with aspects of TQM and not with its totality. For example, Deming (1986) defines quality as control of variation, while Juran (1988) sees quality from internal customer perspectives, whilst for Crosby (1979), quality is meeting requirements. None of these definitions address the management of quality that encompasses the optimisation of processes that occur both within the organisation and beyond. According to Black (1993), the meaning of quality should be as relevant to a typing process as it is to manufacturing, order processing, or the performance of a service. In addition, the author is of the opinion that, not only have the definitions of quality omitted its management aspect but, that whatever definition an organisation adopts, it should reflect the organisational system as a whole. Thus, quality

should be seen more as meeting both the needs emanating from the internal and external environments of the firm; in particular the external environment, because it is the external customers who pay the bills which keeps the organisation profitable.

From the marketing perspective, Parasuraman et al (1985) has derived a purified set of five quality dimensions that they argue are important to consumers of service businesses:

- a. Tangibles - physical facilities, equipment and appearance of personnel.
- b. Reliability - ability to perform the promised service dependably and accurately.
- c. Responsiveness - willingness to help customers and provide prompt service.
- d. Assurance - knowledge and courtesy of employees and their ability to convey trust and confidence.
- e. Empathy - caring, individualised attention the firm provides to its customers.

These dimensions the author contends, a quality company, particularly a service organisation like hospital, should exhibit.

Similarly Peters (1985) holds the view that quality is what the customer says he needs, not what the producer/processor indicates is satisfactory. Peter's definition of quality is consistent with the view of Feigenbaum, the man who first coined the words Total Quality Control. Feigenbaum (1983) states: "Quality is a customer determination, not an engineer's determination, not a marketing determination or a general management determination, it is based upon the customer's actual experience with the product or service measured against his or her requirements - stated or unstated, conscious or merely sensed". Thus, product and service quality can be defined as "the total composite product and service characteristics of marketing, engineering, manufacture and maintenance through which the product and service in use will meet the expectations of the customer" (Feigenbaum, 1983).

For Lesley and Munro Faure (1992), quality is defined by the customer. They suggest that an organisation needs to first of all agree on what the customer wants (the customer requirements) then produce exactly what is wanted within the agreed time frame at minimum cost. This view of quality is probably the best way of assuring customer loyalty, the best defence against foreign

competition and the only way to secure continuous growth and profits in difficult market conditions. In continuing with the notion of the superordinate customer, Morris (1992) notes that quality is possibly one of the most commonly misunderstood words in manufacturing. She defines quality as "the degree of fitness for purpose or function" indicating that quality is a measure of the satisfaction of customer needs. Thus, the quality of a motor car or a garment or medical care is the extent to which it meets the requirements of the customer. She contends that before any discussion on quality can take place, it is necessary to be clear about the purpose of the product or service - "the needs of the customer". Whether the customer is internal or external, meeting his/her satisfaction is of prime importance (Morris, 1992).

This is consistent with Gronroos' work, where it is stated that a consumer's experience of a service influences his post-consumption evaluation of the service quality which he has experienced, that is, the perceived quality of the service. Hence, the quality of a service is dependent on two variables: expected service and perceived service (Gronroos, 1983). Consequently, for an organisation to claim to be delivering quality, it should make sure that the services or products provided meets or exceeds the customers' expectations. From the foregoing discussion it is possible to discern four differing types of definition of quality:

- i. **Production based definition** - Quality under this banner is seen as a precise and measurable variable and that differences in quality reflect differences in quantity of some product attributes.
- ii. **User based definition** - Quality is determined by what a customer wants and what he or she is willing to pay for. Individuals have different wants and needs and, hence, different quality standards. This is exemplified by the "fitness-for-use" definition.
- iii. **Manufacturing based definition** - Quality is an outcome of engineering and manufacturing practice, or conformance to specifications. Specifications are targets and tolerances determined by designers of products and services (Evans and Lindsay, 1993).
- iv. **Value based definition** - Quality is defined in terms of costs and prices, a quality product is one that provides performance at an acceptable price rather than a name

brand, since it provides the same performance at a lower cost. For example, although the mini automobile was introduced with great hype by the Rover group, it failed to corner the small car market because the quality of conformance to customer expectation was not good despite its low production cost (Evans and Lindsay, 1993). Thus, for a product to be called a quality product, it should provide quality in finite terms and be of value to the customer.

As an illustration of how the four different views of quality can apply to a single product, the author will consider the services provided by a hospital. The value based definition of quality is characterised by an image of excellence as perceived by the competency of the medical staff, the availability of treatment for rare or complicated disorders and the availability of advanced medical technology (Evans and Lindsay, 1993), whilst the auditing of hospital efficiency, the measurement of treatment consistency and resource utilisation are viewed along the product based dimension. However, the patients (external customers') perception of care is focused on the user-based definition. Thus, increasing the pressure on hospitals to provide services to meet these expectations. As the demand for a flawless service increases, the medical staff and ancillary services (internal customers) must turn their attention to quality improvement rather than concentrating on providing a professionally focused service. Therefore, it could be argued that the user-based definition in the context of 'fitness-for-use' has received the greatest attention in recent times because of the on-going restructuring of hospitals (Singapore, MOH, 1993).

However, in whatever form an organisation decides to define quality, one 'fact' cannot be compromised, and that is, an organisation needs a clear and consistent understanding of what quality means and how to deliver it (Clemmer and Sheehy, 1993). This is because if an organisation cannot consistently define quality, that organisation must look to the customers they serve. The customers' perceptions of the value they are receiving must become the common yardstick from which to discern a company-wide definition of quality (Clemmer and Sheehy, 1993). Motivated by the practical and theoretical implications of this issue, the author undertakes an extensive literature review to establish whether a generic definition of quality in healthcare exists.

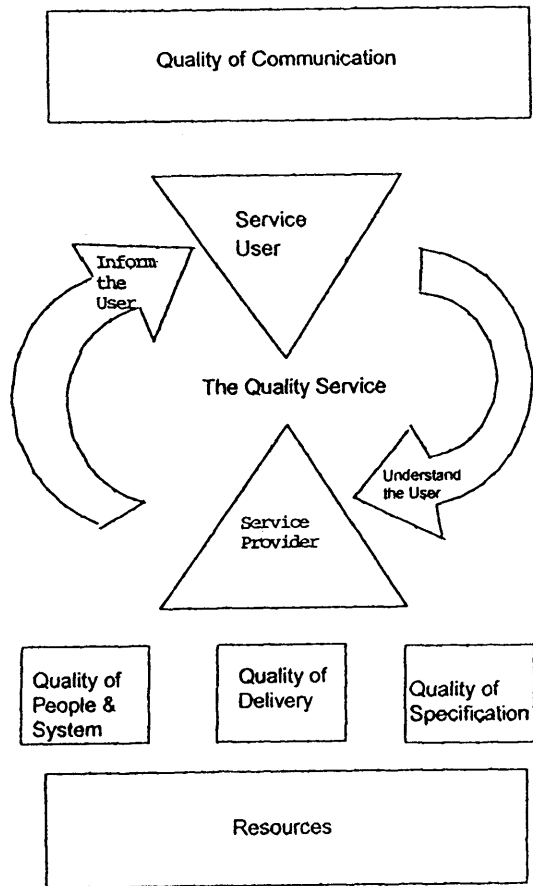
3.2 Definitions of Quality in Healthcare

Patients are now set to take their rightful place at the forefront of healthcare provision. Gone are the days of the quiet and compliant patient who dare not speak, much less challenge the healthcare providers. Today's better informed patients can and are willing to make judgements and to discriminate about quality care.

For any kind of quality definition, whether or not aiming for zero defect, the question is, the quality of what? Quality can only be judged in relation to explicit objectives and targets. The Audit Commission, UK (1993) has identified four areas of quality as shown in Figure 3.3 that it argues contribute to a quality service:

- i. Quality of Communication: communication with, listen to and understand users.
- ii. Quality of Specification: users' needs converted into clear standards for service delivery.
- iii. Quality of Delivery: are the standards actually delivered, and is remedial action taken when failure occurs.
- iv. Quality of People and Systems: are staff motivated, trained, well managed and supported by good management, processes and systems.

Figure 3.3: The Quality Map is made up of Four Key Elements of Quality: Communication, Specification, Delivery and People



Source: Audit Commission Occasional Papers, (1993), “Measuring and Appraising Quality in Public Service”. March.

The Audit Commission (1993) has further argued that a quality service should have a foundation of adequate resources, be user effective and without waste to deliver the service. It suggests that applying the definitions and processes of quality used in the private sector to the public sector can be dangerous. In the private sector, satisfying stated or implied needs will lead to increased sales and profits. This is not necessarily true in the public sector. In the public service, increased quality leading to increased demand may lead to increased expenditure against limited budgets. This problem does not invalidate the need to consider users' needs in service delivery, rather it emphasises the importance of informing users about what can be done, understanding users' expectation and incorporating this understanding into policies and targets (The Audit Commission, 1993). Hence, high quality service involves adherence to customer's

expectations, not a compromise between what the customer wants and what the organisation is comfortable in providing (The Audit Commission, 1993).

Traditionally within the healthcare system, the definition of 'quality of care' is the prerogative of the clinical staff; occasionally with some ideas adapted from hospital administrators. However, if the notion of quality improvement and continuous quality improvement is to make any sense in healthcare, the definition of 'care' must reflect the representative view of other participants involved in the provision of the service (Wilson, 1987). Donabedian (1980) identifies the difference between art and the science of medicine; he is of the view that in order to observe the difference, it is necessary to have an in-depth knowledge about clinical issues. In line with Donabedian's argument, it may be inferred that the consultant is in the best possible position to perform the evaluation of the consultant/patient encounter because he or she possesses the clinical expertise. However, Ferreira (1993) argues that "we should base the evaluation of quality of care from different and differing sources, that is, customers, service users, patients, providers of care (clinical/non-clinical staff), hospital administrators, government". He advocates the integration of these various view points in order to avoid a conflict of interest. Hence, "quality of care becomes that kind of care which is expected to maximise an inclusive measure of patient welfare, after one has taken account of the balance of expected gains and losses that attend the process of care in all its parts" (Donabedian, 1980).

Consistent with this definition, healthcare organisations' quality programmes generally have three major foci: assessing or measuring performance, determining whether performance conforms to standards and improving performance when standards are not met (Ferreira, 1993). However, this traditional approach to quality has several limitations. To begin with, the classical definition of quality of care seems too narrow to meet the needs of modern healthcare providers. For example, Donabedian's formulation emphasises quite appropriately the extent to which healthcare providers improve the physical and psychological health of individual patients. Nevertheless, the needs of customers should always be paramount (Zemke and Schaaf, 1989). This is because the health service is increasingly called on to meet the needs of other individuals and groups such as patients' families, referring GPs, the general public, etc. Furthermore, it is difficult to ascertain the difference in the definition of quality of care from its operationalisation. There seems to be a congruence between researchers in this field, namely, that to agree on a

universal definition of 'quality of care', it is important to enumerate the element which belong to it (Ferreira, 1993). In the literature, two elements can be identified:

- i. **The technical aspect of care** - "Curing", which relates to how clinical issues in general are applied in a particular personal situation, taking into account currently available medical knowledge and technology (Vuori, 1982). The technical aspect of the quality of care implies judgements about the competence of providers (effectiveness of cure, thoroughness and clinical outcomes).
- ii. **The interpersonal aspect of care** - This represents the humane aspects of care and the socio-psychological relationships between the patient and the care providers. This involves explanations of illness and treatment, the availability of information, courtesy and the warmth received; that is the way care providers interact personally with patients.

Both technical and interpersonal aspects are considered part of science and part of art, though it is not always possible to distinguish between these two aspects of care (Ferreira, 1993). However, there is sufficient evidence that the caring process, that is, the interpersonal aspect, is usually appreciated by patients and considered as one of the most important aspects they take into account when they evaluate the quality of medical care (Ware et al, 1983). Ware et al (1983) describe three features used by patients to evaluate the quality of care:

- i. accessibility
- ii. availability
- iii. continuity of care

Accessibility and convenience are factors involved in the receipt of care, such as time spent to get a first appointment, waiting time, transportation, or the possibility of receiving care at home. Part of accessibility of care includes easy access to emergency care, that is, calling out doctors, and ambulances. The other aspect of care is the availability of care resources which involves the number of staff (doctors, nurses and paramedics) and also the completeness of hospital facilities (Ware and Synder, 1975). The continuity of care (seeing the same nurse, doctor or consultant) is another dimension important to patients. However, 'being treated as an individual'

is by a considerable margin more important to patient satisfaction than 'getting better' and having timely, adequate information about their condition is more desirable than the newness of facilities or the flexibility of hospital rules (Donabedian, 1980).

Berwick (1989) defines quality in healthcare as that quality of care that has the capability to meet the needs of those who depend on the care. In other industries he contends, this means 'meeting the needs of the customer' but the word 'customer' he opines offends some people in healthcare. In healthcare, quality can be defined by listing the results and attributes of the healthcare system that are wanted by people who depend on that system; such as restoring function, relieving pain, prolong useful life, answering questions and respecting dignity. The American Medical Association (AMA) definition of quality is 'care which consistently contributes to improvement of, or maintenance of, the quality and/or duration of life' (Steffen, 1988). Whilst for U.S. Joint Commission on Accreditation of Healthcare Organisations (Steffen, 1988), quality is 'the degree of adherence to generally recognised contemporary standards of good practice and the achievement of anticipated outcomes for a particular service, procedure, diagnosis or clinical problem. Similarly, Brooks (1992) defines quality as continually meeting people's defined healthcare requirements. The key word in the definition is 'defined', which describes the process of negotiation and agreement which must take place between the provider and customer to achieve a deliverable level of service. Yet, the concept of quality has two basic elements, focusing respectively on the product and the relationship of user and product (Brooks, 1992). By focusing on the service, quality is seen as the degree to which a particular service conforms to its specifications. This is a view of quality that is based upon identifiable faults which can be discovered by inspection. Thus, services which have faults can be identified and remedied. However, a more dynamic view of quality emphasises the extent to which the service is fit for the purpose for which it is intended (Walsh, 1991). Something might conform perfectly to its specification without being of any use for the circumstances in which it is used (Walsh, 1991). Thus, hospitals should look outward as the key determinant of success, changes from the control of internal service systems to the relationship with the customer. For Calman (1992) quality "is a concept which describes in both quantitative and qualitative terms the level of care or services provided". Quality he states has two components. The first is **quantitative and measurable**, the second is **qualitative, and although assessable**, is associated with value judgements. Quality is a relative not an absolute concept. He suggests

that in describing the quality of a service, it must always be compared with something else, either a similar activity or the same activity measured at another time. This also implies measuring consistency over time. Therefore, the quality of medical care (Calman, 1992) may be seen to comprise of:

- i. knowledge - technical skill and competence
- ii. professional standards - ethical issues
- iii. attitudes and behaviour, including communication skills
- iv. managerial functions, including the ability to work within resources
- v. teaching, audit and research

However, in the author's opinion, Calman has not pointed out how all these elements are connected and aggregated to constitute quality medical care. Thus, the integration of the elements within a holistic framework of quality of care would be difficult.

Reinhardt (1986) views quality from a micro and macro context. At a micro level, quality is that element of service rendered to the individual patient, whereas at the macro level, the term quality embraces the ethical quality of the healthcare system as a whole; that is, the percentage of the population enjoying unfettered, dignified access to a minimally adequate level of service. Whilst for Brook and Lohr (1988), quality is that "component of the difference between efficacy and effectiveness that can be attributed to care providers, taking account of the environment in which they work". The author disagrees, because today's patients want to be more actively involved in the decision-making process concerning their care and treatment. The era of the patient as the ultimate customer has arrived. Healthcare consumers can easily discriminate between quality of care and the quality of caring they receive; between the way they are treated medically and treated personally. As patients, they feel competent to evaluate the quality of the care they receive and justified in making treatment choices on that basis. Moreover, it is imperative that healthcare organisations, particularly hospitals, concentrate on improving the interpersonal aspect of care; that is, the way patients are treated and the interpersonal relationships between staff and patients.

Koch (1991) notes that healthcare quality means continually meeting customer (purchaser/patient) requirements. He identified six components for a quality service as shown in Figure 3.4, however a seventh essential component is omitted, namely the assessment of patient's goals and values. For the author, the real kudos for providing quality healthcare is the way the patient is treated as a person; which entails meeting his/her expectations. The author in Chapter 6 illustrates through three case studies how hospitals can understand and meet customers' expectations.

Figure 3.4: Six Components of Quality in Public Services



Source: Hugh Koch - Quality Healthcare and TQM (1991)

The Department of Health (DOH), UK (Koch, 1991) suggested that quality should involve:

- i. Appropriate treatment and care
- ii. Achievement of optimal clinical outcome
- iii. All clinically recognised procedures to minimise complications and other preventable events
- iv. Attitudes which treat patients with dignity as individuals
- v. An environment conducive to patient safety, reassurance and contentment
- vi. Speed of response and minimal inconvenience

vii. Involvement of patients in their own care

These initiatives, the 'key to quality of care', are intended to ensure the 'understanding of the patients expectations, the identification of who the customers are and their views of the technical care and non-clinical service they receive'. However, the DOH has failed to reveal the interrelatedness of these elements. Yet it is important to demonstrate how the elements combine to constitute a concise representation of quality of care, that is, the quality of care required to turn hospitals into places where patients will be treated as people and not as case files and through-puts.

Quality healthcare requires some common understanding of the term quality; comparisons of health facilities in terms of good quality demand agreement on the concept and its measurement (Haran et al, 1993). Whilst quality of healthcare has been an issue since Florence Nightingale, a major problem remains in deciding whether quality should be based on patients' values or those of the service providers (McCusker, 1978). Conflict over standards may arise between the service providers and the patients. Overall satisfaction with treatment is the way in which patients may determine the quality of care. However, health practitioners determine quality in terms of accuracy of diagnosis and efficiency of treatment even when patient satisfaction is low (Clark and Forbes, 1979). This conforms to the ethos of the traditional medical quality assurance paradigm which represents a static approach to quality. However, quality must be based on the needs of the customer not the values of the provider, no more no less (Zemke and Schaaf, 1989).

In Singapore, the practice of appraising quality of care has focused mainly on the providers side; that is, the professionals' perspective rather than patients' satisfaction. However, it is the patients satisfaction approach which helps to ensure that the services provided are responsive to the views and needs of the community (Cibulskis and Haran, 1991). Donabedian and Maxwell have done a good deal of operational and academic research in the area of healthcare quality assurance since they draw a distinction between the patient perspective and that of the provider of care (Haran et al, 1993). In Donabedian's model, quality of care is evaluated in terms of the structure of health facilities, the process of care and the outcome of care. He states that what is actually done in giving and receiving care, including both practitioners and patients

contributions, changes in the health status of patients as well as improvements in their understanding and their satisfaction, are all essential elements of quality healthcare (Haran et al, 1993). It could be argued from Donabedian's perspective, that to define quality of care, emphasis should focus on the 'structure-process-outcome' relationship between the provider and the patient, whilst the six dimensions of Maxwell's methodology illustrate the differing concerns of patients and providers (Maxwell, 1984). Furthermore, Brue (1990) has provided a framework for evaluating quality that is heavily weighted towards the patient's perspective. In this framework, customer's expectations are viewed as desires or wants of consumers, that is, what they feel a service provider 'should offer' rather than 'would offer'. In addition, consumers' expectations or wants are influenced by past experience of the service, that is, their expectations of the service against the perception of the service received. Although a profession consisting of doctors, consultants and nurses will tend to stress that a patient should be given 'not what he wants but what he needs', it is important to get the balance right, the balance between professional excellence and customer satisfaction. However, in the author's opinion, in a hospital setting, good co-ordination is an essential element in the service encountered between the provider of service and the patient. Furthermore in respect to Donabedian, he has failed to contextualise 'how' hospitals can focus on treating patients as real people and not as 'haemorrhoids' in ward 5 nor as the cancer patient in ward 7. Thus, it is important for hospitals to have a broad definition of quality as patients have differing needs and expectations of the quality of medical care.

The Management Executive of the National Health Service (NHSME) in its publication, "The Quality Journey - A Guide to TQM in the NHS" (1993), defines quality as:

- i.. "Meeting customer requirements. Under this definition, it is the customer of a product or service who defines the quality of what is delivered. The customer knows what he or she wants and only the customer can decide whether or not it is up to scratch".
- ii. "Meeting people's healthcare requirements. These requirements will be negotiated and agreed with the user - the patient".

These two definitions by NHSME are congruent with the work of Dotchin and Oakland (1992), who have noted that the most widely used definition of quality today are:

- i.. “Fitness for use”
- ii. “Meeting customer requirements”

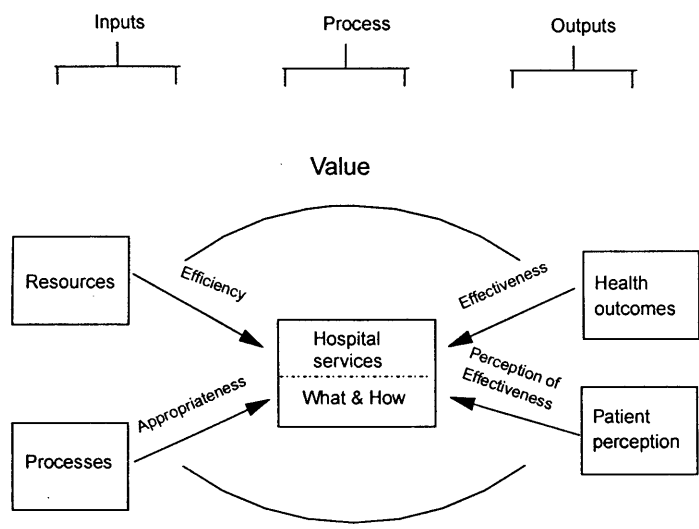
However, from the literature, a third definition can be discerned, the traditional view of quality. This represents quality of care as defined by healthcare professionals. But this definition fails to take into account economic factors, such as the tax payer and the importance of accountability and patients' expectations (Laffel and Blumenthal, 1989). Laffel and Blumenthal (1989) note that the traditional approach to quality healthcare implicitly assumes that some rate of poor outcomes is acceptable and that little information can be obtained from the analysis of cases in which prevailing standards are met. Furthermore, the traditional approach tends to focus on physician performance and to under-emphasise the contributions of non-physicians and organisational processes generally (Laffel and Blumenthal, 1989). Nonetheless, quality improvement in modern healthcare will require complex, simultaneous changes involving employees and professionals in many departments to bring about a change in the status quo. Thus, to achieve quality healthcare, three distinct factors will play a role in the patient's judgement (Zemke and Schaaf, 1989):

- i. the patient's standard or nominal expectation
- ii. what the patient has experienced in the past that has detracted from the quality of care
- iii. what the patient has experienced in the past that has enhanced the patient-medics relationship

Each of these three factors tends to be a discrete item in the patient's mind and, by listening to the patient, hospitals can compile a valuable map of what constitutes quality 'care' from the patient's perspective. However, some researchers infer that, as healthcare professionals are the 'experts', they should be the ones whose voices are listened to most closely (Ferreira, 1993).

Nonetheless, it should also be noted that professional judgement is not always correct. In recent times, there have been cases of wrong clinical diagnosis in hospitals. This is consistent with Nelson et al's definition of quality of care based on the fact that one of the primary functions of healthcare is to ensure patient's welfare (Nelson et al, 1974). This perspective requires that important decisions about medical benefits and risks be shared with the patients and that practitioners be considered as working on behalf of the patients. Thus, the patient should no longer be considered as the 'disappointed observer of care' or as 'the final victim of poor health', but as the focus for quality care (Berwick, 1989). Both of these perspectives belong to a wider model of providing healthcare; the 'systems model' - patient is the one who receives an output of a process which is itself any set of actions that transform an input from a supplier into an output evaluated and used by the consumer (Ferreira, 1993). The benefit of this output being always judged by the consumer and never by the persons involved in the process (Ferreira, 1993). In healthcare, the concept of 'the consumer' includes not only the patients, but also the consultants, the nurses and paramedics, who interact with the patients in reducing their pain or improving their health status. Every service provided within a hospital setting can be seen as a string of processes involving relations between suppliers and consumers of care (Ferreira, 1993) as shown in Figure 3.5.

Figure 3.5: A Systems View of the Health Service



Source: The New Healthcare Market by P. Boland (1988) Cited in Lanning (1990)

However, as identified by the author, there are different definitions of quality in hospitals. In one particular hospital visited by the author, there were four different values of quality:

1. To the medical staff, 'quality is about "curing", effectiveness of medical care, thoroughness and clinical outcomes'.
2. To the receptionists, 'quality is about how we attend to patients queries'.
3. To the Chief Executive, 'quality is low cost'.
4. To the Quality Manager, 'quality is about meeting what the patient actually needs'.

In another hospital, the employees have defined quality as 'meeting the requirements of the Medical Audit and Accreditation Unit'. This means providing information to patients on charges, adopting quality assurance programme, infection control programmes, ensuring that emergency drugs/equipment are ready for use anytime, recording the time of consultation on the patients medical records and proper documentation of drugs dispensed. These activities are mainly technical and do not relate to the interpersonal aspect of medical care.

In the third hospital, an employee have defined quality as 'auditing'. This means 'checking to see whether employees do the job well'. Another employee in this particular hospital enquired, "When is this quality thing going to finish? Why do we have to be quality conscious?" What was evident in this hospital was that whilst TQM was in full swing, most employees felt that this "quality thing" was unnecessary, after all "we do our job well, our beds are always full". This confirms the fact that in a professional setting, once an employee feels he or she is carrying out a job within the confines of professional requirements he is providing a quality service, it does not matter whether the patient is satisfied.

The above findings are congruent with the study by Kogan et al (1991), who noted a "lack of common definition of quality due to the diverse professional groupings". Thus, the lack of consensus among employees of a hospital as to what quality means result in the failure of a organisation-wide definition of quality in Singapore hospitals. A commonly held definition by all employees is a good starting point because it provides the organisation with the ultimate 'focus' for total quality healthcare For example, Juran's definition of quality, 'Fitness for Use', as an organisation-wide definition informs the workforce explicitly that the services we provide

should be 'fit for purpose' of our customers. This provides the opportunity for every employee to adopt the new philosophy. Hence, one of the objectives of this study is to conduct an empirical study on the customers of healthcare quality in the context of Singapore hospitals.

3.3 Inherent Characteristics of Healthcare Services

In the above sections, the author has provided an assessment of the definitions of quality and has established that there is no generic definition of quality. This section provides literature on the inherent characteristics of healthcare services and how these characteristics would affect consumers evaluation of healthcare service quality.

According to Zahorik, Rust and Keimingham (1994), service (in general) may be broken down into any of the four main components. The author provides an example for each of the components in relation to healthcare services:

- i. physical product - whatever the organisation transfers to the customer that can be touched; it is tangible and physically real, for example, medications dispensed to patients.
- ii. service product - part of the service that can be planned and designed but is not physical and tangible, for example, laboratory investigation services.
- iii. service environment - physical backdrop that surrounds the service, for example, the cleanliness of the wards.
- iv. service delivery - how the service is actually provided, for example, responsiveness of doctors and staff.

Sasser, Olsen and Wycoff (1978), Gronroos (1984) and Lehtinen and Lehtinen (1992) were amongst the earliest writers on the concept of service quality (in general). Their writings suggested the underlying themes which made important pointers in researches on healthcare service quality:

- * Healthcare service quality perceptions result from a comparison of consumer expectations with actual service performance.
- * Quality evaluations are not made solely on the outcome of a service; they also involve evaluations of the process of service delivery.
- * Healthcare service quality is more difficult for the consumer to evaluate than goods quality. This is especially evident in healthcare or hospital services where few consumers/patients possess medical skills to evaluate whether the services are necessary or are performed properly. Because of this, patients are likely to rely on their experiences when evaluating service quality (Parasuraman et al, 1985).

Some research work has also been done to identify differences between development of products and of services. However, the characteristics that separate healthcare services from traditional manufactured products are:

i. Intangibility

Intangibility means that services often lack tangible attributes. Hence, customers cannot test or compare before purchase. Also in hospitals, service is the combination of intangible and tangible attributes and this combination is inseparable. For example, Temasek hospital services encompass well-equipped operating theatres; this is not separable from the mannerism of the service staff and doctors. Consequently, it is difficult for customers to identify their expectations succinctly and for managers to deliver features that connote high quality to customers. Also, customer satisfaction in hospitals is difficult to measure because it depends on personal experiences, preferences and moods. Thus, the paradox arising from the intangible form of services undoubtedly presents a major obstacle towards the possible standardisation of the delivery process and meeting customer's expectation (Oliva, 1996).

ii. Heterogeneity

Heterogeneity is present due to the difficulty in maintaining a consistent delivery performance level, the presence of customers in the delivery process and a wide customer base. Most of the

services provided by hospitals are labour intensive and customers come into direct or indirect contact with the staff. It is difficult to control the staff/customer interaction directly and this interaction heavily influences the perceived level of quality.

iii. Inseparability

Inseparability means that the creation and consumption of a service occurs almost concurrently (Kotler, 1991). Also, the service offering cannot be separated from the service delivery process. Consequently, there is no opportunity for inspection and rectification. The customer would see all the mistakes and there is little recourse for remedy except for expensive service recovery. This makes the TQM dictum of "right the first time" even more important. Hence, the inseparableness of the producer and his services also tends to localise service marketing and thus offer the consumer limited choice of alternatives (Bessom and Jackson, 1975).

iv. Perishability

Following from the fact of inseparability, health service production is typically fixed in time and space. This means that if health service capacity is not sold on a particular day, the potential revenue they represent is lost and cannot be recovered. Hospitals thus face the problem of matching available demand to perishable supply.

v. Healthcare Services are Labour Intensive

The labour intensity and unavoidable proximity between the employees and customers make the managing of service quality very complex. This is aggravated by the fact that no two people are the same. People vary in their performance day to day or even hour to hour (Zeithaml, 1996), often dependent on their moods and feelings. As healthcare services are performances produced by people, it is also unlikely that two services will be performed in identical ways. This is problematic, as the employees producing the service are perceived as part of the service by the customer. Hence, the ability to create a "personal touch" in the environment becomes a critical determinant of healthcare service quality. As such, the managing of healthcare services requires the managing of the human's complex thoughts and motivation, resulting in inconsistency of healthcare service quality.

vi. Healthcare Services are "Credence" Purchases

This means that healthcare services must be consumed before assessment is possible. Also, customers of healthcare services typically do not have enough knowledge, training or expertise to make a logical, rational, supraliminal service quality evaluation. They have to rely on peripheral cues such as the personal attention they receive from the service provider. Customer satisfaction is therefore dependent on the human interaction of service delivery.

These inherent characteristics of healthcare services present a challenge to hospital administrators and CEOs because the evaluation of healthcare services has to be based on perceived quality rather than objective quality. Perceived quality involves the subjective response of people and is therefore highly relativistic (Parasuraman et al, 1988). Consumers also perceive higher risks for services than physical goods. Since healthcare service is the core product of hospitals or healthcare organisations, the failure to provide quality services may cost customers more than that of goods-producing companies (Webster, 1989).

3.4 SERVQUAL: The Instrument for Measuring Service Quality

Due to the inherent characteristics of healthcare and hospital services and the non-existence of a generic definition of quality, consumers (e.g. patients) cannot measure quality of the service in the same way as they measure tangible goods. This lack of an objective measure often results in consumers using key cues and indicators to determine the quality of services they experienced (Oliva, 1996). Quality in healthcare is therefore no longer measured by the outcome of services. Rather, the service delivery process and interactions between the service provider and the consumers becomes an experience and its measure should be a multi-dimensional construct in order to capture all its aspects.

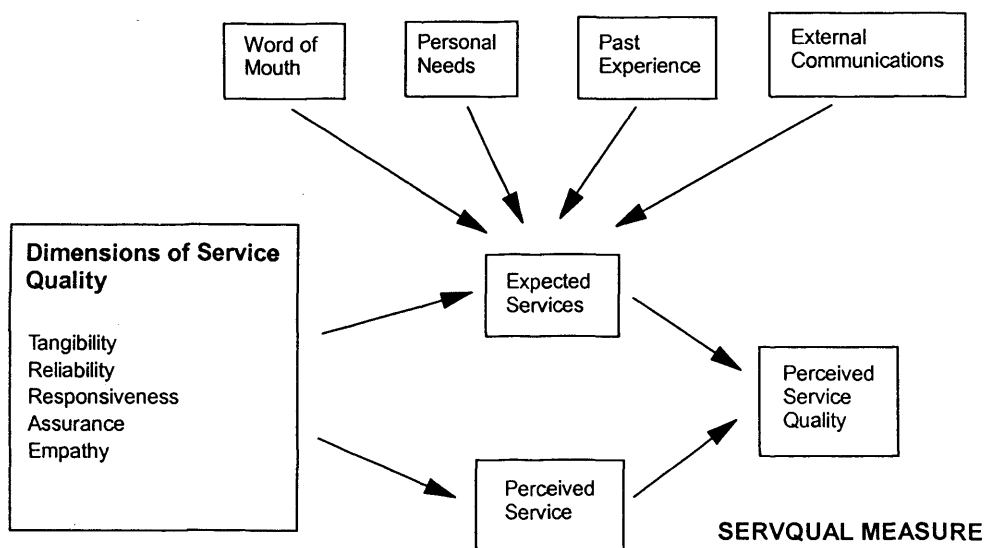
A key dimension of healthcare service quality construct is the customer's satisfaction since a service that has quality must satisfy its customers. In this context, satisfaction is commonly viewed as a function of expectations and perceptions (Zeithaml, 1996).

".... Satisfaction occurs when an outcome meets or exceeds the consumer's expectation. Likewise, dissatisfaction occurs when a negative discrepancy exists between the consumer's anticipated outcome and actual outcome."

Since patients are the sole judges of healthcare service quality, they assess service by comparing the service they received (perception) with the service they desire (expectation) (Parasuraman et al, 1988). This definition of healthcare service quality towards a subjective customer's expectations (Gronroos, 1984 and Maister, 1984) arises from a lack of tangible matrices to evaluate healthcare services. However, with the patient's expectation evolving and changing over time, healthcare service quality becomes a moving target. Hospitals need to put in place a dynamic process to adjust its service specifications in its attempt to match the customer's changing needs (Aranda et al, 1993).

Parasuraman et al (1988) developed the SERVQUAL model as an instrument to measure the level of service quality from the perspective of the consumer as depicted in Figure 3.6. SERVQUAL uses a multiple item scale to assess the level of expectations and perceptions of the customer with regard to the various aspects of service quality.

Figure 3.6: The SERVQUAL Model



Source: Parasuraman, Zeithaml and Berry (1988)

The instrument consists of a questionnaire with two sections. The first section is used to measure consumer expectations while the second section is used to measure consumer perceptions. Each section contains 22 statements with a one to one statement correspondence between sections. The section on expectations is used to ascertain the general expectations of the consumer concerning a service while the perceptions section contains a matching set of questions to measure the consumer's assessment of a specific company within the service category. In addition to these two sections, the questionnaire also asks for an overall rating of the service quality and the relative importance of the five dimensions of service quality: Tangibles, Reliability, Responsiveness, Assurance and Empathy.

3.4.1 Computation of the SERVQUAL Score

Simple statistical methods namely the mean and standard deviations are used to compute the SERVQUAL score.

Step 1:

The first step in the assessment of service quality is the calculation of the SERVQUAL score of the 22 pairs of expectation/perception statements for each respondent. The formula for SERVQUAL score is as follows:

$$\text{SERVQUAL Score (SQ)} = \text{Perception Score} - \text{Expectation Score}$$

Step 2:

The second step in the computation of the SQ is to total up the scores obtained in the first step for each of the service dimension and then dividing by the number of statements in the particular dimension. For example, the SQ for the "Reliability" dimension would be obtained by adding the SQ for the 5 statements measuring reliability and then dividing by 5.

Step 3:

Next for each dimension, the SQ are added for all the respondents and then divided by the number of respondents. This would give an overall SQ for the service dimension.

Step 4:

Finally to obtain the unweighted overall SQ, the five SQ obtained for each of the five dimensions are added up together and divided by five.

Step 5:

To obtain the weighted overall SQ, the results obtained in step 2 are multiplied by the corresponding weights assigned to the dimensions. This would give us a weighted score for each respondent. Next proceed with steps 3 and 4 through 4 to obtain the overall weighted SQ.

3.5 Service Quality Studies in Hospitals

There is a plethora of consumer expectation, perception and satisfaction literature in healthcare and hospital settings. Elliotte, Hall and Stiles (1992) investigated the expectation aspect of service quality along these dimensions: i) interpersonal, ii) amenities, iii) capabilities and iv) accessibility to determine what the importance of various hospital characteristics were. Results from their study showed that competency and behaviour of physicians were the most important characteristics in the minds of patients.

In a paper by O'Connor and Schewchuk (1990) on service quality expectations in hospitals, the SERVQUAL instrument was used to determine the service quality gaps to help service providers choose their service improvement strategies. They found that service quality could be enhanced either by lowering expectations or increasing perceptions. This could be accomplished by marketers' communication, word-of-mouth communication or other media and public relations efforts.

In another paper by John (1992), which also used the SERVQUAL model, he confirmed the hypothesis that patient expectations, which served as standard or reference points against which service performance was judged, were based primarily on previous expectations. Confirmation of expectations for a hospital was the result of comparing the perceptions of current performance of the hospital with the expectations. Depending on the confirmation or disconfirmation of expectations, patients were either satisfied or dissatisfied.

Youssef, Nel and Bovaird (1996) similarly used the SERVQUAL model to conduct a survey on patients' assessments of service quality in the NHS. Results of their research showed that:

- i. The use of SERVQUAL methodology is most suitable to identify patients' expectations.
- ii. Reliability was considered the most important dimension, Empathy was second, followed closely by Responsiveness.
- ii. Service quality in NHS hospitals was well below expectations. NHS hospitals failed to meet expectations of patients in all dimensions, except for tangibles which exceeded patients expectations. Reliability was perceived to be the worst feature and it was apparent that failure in the reliability dimension had a detrimental effect on perception of the overall quality.

Chui (1996) conducted a survey on patients, staff and the general public, which explored the similarities and differences in expectations and perceptions of quality of a government hospital in Singapore. Results of his research showed that there was no difference in the views of the various groups on what was important or not important to good quality in hospital services. However, there were differing views about what was important in assessing overall quality, meeting expectations, satisfaction and loyalty behaviour.

Butler, Oswald and Turner (1996) in their survey to determine the dimensions of perceived hospital quality from both users and observers of hospital services found that hospital quality composed of two major dimensions: human performance and facilities. These results supported their contention that service quality indicators in a hospital environment, while related, cannot be determined adequately using existing service quality measures, such as SERVQUAL. Furthermore, this study showed that there were differences in perceptions of quality between users and observers of hospital services and that gender and age adequately predicted one component of perceived hospital quality. Finally, this study demonstrated how t-testing against a neutral value can show managers which specific items are perceived to be positively or negatively valenced. This is effective in helping hospital management pinpoint specific areas not being well received by observers and users.

3.6 Expectations and Perceptions of Hospital Services in Singapore - Methodology

As discussed earlier, hospital service quality is an elusive and distinctive construct. Often mistaken for imprecise descriptions like "goodness or luxury, or shininess or weight" (Crosby, 1979), quality and its requirements are not easily articulated by consumers (Takeuchi and Quelch, 1983). Explication and measurement of quality are also problems for researchers (Monroe and Krishnan, 1996), who often bypass definitions and use un-dimensional self-report measures to capture the concepts (Jacoby and Olsen, 1985; McConnell, 1968 and Shapiro, 1972). In order to investigate the patients' and doctors/staff expectations and perceptions of hospital service quality, surveys were conducted by the author with the aid of the SERVQUAL instrument.

Tucker and McCann (1986) recommended that in order to identify potentially important attributes of services, conducting exploratory research was necessary. As such, two exploratory surveys were conducted with the following key objectives:

- * to examine patients' expectations of hospitals' services in the Singapore context
- * to examine doctors/staff expectations of hospitals' services in the Singapore context
- * to assess patients' perception of hospitals' services in the Singapore context
- * to assess doctors/staff perception of hospitals' services in the Singapore context
- * to identify gaps in hospitals' service quality in the Singapore context

3.6.1 Questionnaire Design

When designing the pilot questionnaire, the 22 items in the SERVQUAL questionnaire developed by Parasuraman et al (1985) were referred to. Some modifications and adaptations had to be made to selective questions to make them more relevant to hospital services. The 22 items questionnaire developed by Youssef et al (1996) in their evaluation of healthcare quality in NHS hospitals were also referred to. The pilot questionnaires which consisted of 22 questions in 5 dimensions: Tangibility, Reliability, Responsiveness, Assurance and Empathy, were given to 5 in-house patients, 5 out-patients, 5 observers, 5 CEOs/doctors of two hospitals for their invaluable feedback. Based on the feedback received from the pilot survey, the final

questionnaire rephrased ambiguous questions and an additional dimension, 'Accessibility and Affordability' was included. The final questionnaire contained an 'EXPECTATIONS' section with 25 statements and a 'PERCEPTIONS' section consisting of a set of matching statements. In addition to these 2 sections, the questionnaire also added a question on 'overall rating of service quality'. The statements in both the Expectations and Perceptions sections were grouped into six dimensions, each with its range of pertinent statements which are as follows:

1. Tangibility (Statements 1 - 5)
2. Reliability (Statements 6 - 10)
3. Responsiveness (Statements 11 - 14)
4. Assurance (Statements 15 - 18)
5. Empathy (Statements 19 - 22)
6. Accessibility & Affordability (Statements 23 - 25)

It was felt that a 5-point Likert scale was sufficient as most people would not be able to articulate sharp differences in their attitudes between ratings of a higher order scale. The patients' expectations and perceptions questionnaire is enclosed in Appendix C and the doctors/staff expectations and perceptions questionnaire is enclosed in Appendix D.

3.6.2 Data Collection

It is very often impossible to examine a population of interest during a market research project due to the constraint of resources, time and reluctance of the hospital to participate in the survey. As such for the purpose of both the studies, patients and doctors/staff expectations and perceptions of hospital service quality, the "Convenience Sampling" method was used to gather the data as accessibility and co-operation were the major considerations. For the patients survey, a total of 300 survey questionnaires were sent out in October 1998 to 4 general practitioners clinics (200 questionnaires) and 2 specialists clinics (100 questionnaires), who in turn redistributed the questionnaires to patients who have received medical treatment in a hospital in the past 12 months, from October 1997 to October 1998. These clinics also served as collection centres for the completed survey questionnaires. As managers and CEOs of Singapore hospitals are reluctant to conduct the survey at their hospitals, it is hope that this

technique would be able to achieve a "snowballing" effect and provide a representative sample for the research. For the doctors/staff survey, a total of 200 questionnaires were sent in October 1998 to the Quality Managers of 5 hospitals in Singapore for redistribution to their doctors/staff.

3.6.3 Data Processing

The data collected were input into a database and analysed with the statistical software, SPSS.

3.6.4 Reliability Tests

A composite score for each section of the questionnaire was obtained by summing the scores of individual statements. Reliability tests were run to determine how strongly the attributes were related to each other and to the composite score.

The internal consistency reliability test is deemed to be acceptable for basic research when the reliability coefficient exceeded Nunnally's reliability criterion of 0.70 level. For every dimension in both sections (Expectations and Perceptions) of the patients' survey, the Cronbach alpha ranged from 0.71 to 0.81. The doctors/staff survey had a Cronbach alpha ranged from 0.71 to 0.91 in both sections.

3.6.5 Data Analysis

To satisfy the objectives of the survey listed earlier, statistical analyses were performed to find the mean expectation and perception (each dimension and individual statements) ratings for both the groups. The analysis would be based on the presentation of a table which shows the pattern of responses for patients' expectations and perceptions of hospital services. The table will also show percentage scores. Nevertheless, the aim is to draw implications from the data in order to build theory.

Analysis of variance test (MANOVA) was performed to determine whether there were any significant differences in expectations and perceptions between patients and doctors/staff of hospitals. A significance level of 0.05 was used as the test statistics.

3.7 Patients Expectations and Perceptions of Hospital Services in Singapore - Findings

One of the main objectives of the survey was to determine expectations of hospitals' services in the eyes of the patients. The expectations of patients along with the hospitals performance as perceived by patients are analysed. The author also computed the service quality gap for each statement and dimension, which is a good indicator of any service deficiency. Significant findings from the analysis of variance tests are also presented.

3.7.1 Quantitative Findings:

The number of questionnaires distributed to patients of general practitioners and specialists clinics were 300. As the number of valid responses received were 252, the response rate was 84%.

Table 3.1: Mean Level of Patients' Expectation and Satisfaction and Service Quality Gaps by Dimensions and 25 Service Statements

Statements	Expectation	Perception	Service Gaps
Tangibility	4.16	3.75	-0.41
1. Up-to-date and well-maintained facilities and equipment	4.38	3.87	-0.51
2. Clean and comfortable environment with good directional signs	4.21	3.89	-0.32
3. Doctors/staff should be neat and professional in appearance	4.13	3.96	-0.17
4. Informative brochures about services	3.70	3.39	-0.31
5. Privacy during treatment	4.40	3.65	-0.75
Reliability	4.28	3.54	-0.74
6. Services should be provided at appointed time	4.20	3.30	-0.90
7. Services should be carried out right the first time	4.31	3.65	-0.66
8. Doctors/staff should be professional and competent	4.56	3.71	-0.85
9. Error free and fast retrieval of documents	4.25	3.57	-0.68
10. Consistency of charges	4.10	3.47	-0.63
Responsiveness	4.41	3.47	-0.94
11. Patients should be given prompt services	4.29	3.41	-0.88
12. Responsive doctors/staff	4.51	3.62	-0.89
13. Attitude of doctors/staff should instil confidence in patients	4.48	3.72	-0.76
14. Waiting time of not more than 1 hour	4.35	3.12	-1.23
Assurance	4.47	3.71	-0.76
15. Friendly and courteous doctors/staff	4.26	3.72	-0.54
16. Doctors should possess a wide spectrum of knowledge	4.49	3.88	-0.61
17. Patients should be treated with dignity and respect	4.55	3.60	-0.95
18. Explain thoroughly medical condition to patients	4.58	3.62	-0.96
Empathy	4.15	3.51	-0.64
19. Obtain feedback from patients	4.02	3.38	-0.64
20. 24-hour service availability	3.71	3.52	-0.19
21. Doctors/staff should have patient's best interest at heart	4.47	3.57	0.90
22. Doctors/staff should understand the specific needs of patients	4.41	3.56	-0.85
Accessibility & Affordability	3.83	3.31	-0.52
23. There should be adequate parking facilities	3.36	3.21	-0.15
24. The location should be easily accessible	3.94	3.46	-0.48
25. Affordable charges for services rendered	4.19	3.25	-0.94

Table 3.2: The Five Highest Expectations

<i>Highest Expectation Statements</i>	<i>Mean Expectation</i>
Explain thoroughly medical condition to patients	4.58
Doctors/staff should be professional and competent	4.56
Patients should be treated with dignity and respect	4.55
Responsive doctors/staff	4.51
Doctors should possess a wide spectrum of knowledge	4.49

Table 3.3: The Five Lowest Expectations

<i>Lowest Expectation Statements</i>	<i>Mean Expectation</i>
There should adequate parking facilities	3.36
Informative brochures about services	3.70
24-hour service availability	3.71
The location should be easily accessible	3.94
Obtain feedback from patients	4.02

Table 3.4: The Five Highest Perceptions

<i>Highest Perception Statements</i>	<i>Mean Perception</i>
Doctors/staff are professional and neat in appearance	3.96
Clean and comfortable environment with good directional signs	3.89
Doctors possess a wide spectrum of knowledge	3.88
Up-to-date and well-maintained medical facilities and equipment	3.87
Doctors/staff attitude instilled confidence in patients	3.72

Table 3.5: The Five Lowest Perceptions

<i>Lowest Perception Statements</i>	<i>Mean Perception</i>
Waiting time of not more than 1 hour	3.12
Adequate parking facilities	3.21
Affordable charges for services rendered	3.25
Services provided at appointed time	3.30
Obtaining feedback and keeping patients informed	3.38

Table 3.6: The Five Largest Service Gaps (SQ)

<i>Largest Service Gaps</i>	<i>Mean Differences</i>
Waiting time of not more than 1 hour	1.23
Explain thoroughly medical conditions to patients	0.96
Patients should be treated with dignity and respect	0.95
Affordable charges for services rendered	0.94
Services should be provided at appointed time	0.90

Table 3.7: The Five Smallest Service Gaps (SQ)

<i>Smallest Service Gaps</i>	<i>Mean Differences</i>
There should be adequate parking facilities	0.15
Doctors/staff should be neat and professional in appearance	0.17
24-hour service availability	0.19
Informative brochures about services	0.31
Clean and comfortable environment with good directional signs	0.32

Table 3.8: Analysis of the relative importance of SERVQUAL dimensions

For this analysis, the author took into consideration only the five dimensions of the SERVQUAL analysis for comparative study done by Parasuraman et al.

Statements	Dimensions	%	Mean(%) PZB findings
1. Clean and comfortable environment with good directional signs and up-to-date and well-maintained equipment	Tangibility	16.1	11
2. The ability of the hospital doctors and staff to provide services at appointed time and accurately	Reliability	20.0	32
3. The willingness of the hospital doctors and staff to provide prompt service and be responsive to patients needs	Responsiveness	22.5	23
4. The knowledge and courtesy of the hospital doctors and staff and their ability to convey trust and confidence	Assurance	24.1	19
5. The caring, individualised attention the hospital doctors and staff provides its patients	Empathy	17.3	17

Table 3.9: The unweighted mean SQ

<i>Dimensions</i>	<i>Mean unweighted score</i>
Tangibility	-0.413
Reliability	-0.743
Responsiveness	-0.939
Assurance	-0.762
Empathy	-0.643
Accessibility & affordability	-0.524
SQ (unweighted)	-0.670

This table shows the following features;

- * The lowest unweighted score -0.939 is in the Responsiveness dimension.
- * The highest unweighted score -0.413 is in the Tangibility dimension.
- * The overall unweighted SQ is -0.670.

Table 3.10: The weighted mean SQ

Dimensions	Mean weighted score
Tangibility (T)	-0.591
Reliability (RL)	-0.734
Responsiveness (RS)	-0.823
Assurance (AS)	-0.883
Empathy (E)	-0.632
Accessibility & Affordability (AA)	-0.359
SQ (weighted)	-0.670

This table shows the following features;

- * *The lowest weighted score -0.883 is in the assurance dimension.*
- * *The highest weighted score -0.359 is in the accessibility and affordability dimension.*
- * *The overall weighted SQ is -0.670.*

Table 3.11: Analysis of the overall quality rating of the services provided by Singapore Hospitals

Rating	No. of Patients (%)	T	RL	RS	AS	E	AA	SQ
Very Poor	4 (1.6%)	-1.90	-2.20	-3.00	-2.88	-2.75	-0.33	-2.18
Poor	18 (7.1%)	-1.65	-1.82	-2.33	-2.63	-2.08	-2.50	-2.17
Fair	78 (31.0%)	-0.80	-1.31	-1.64	-1.28	-1.17	-1.01	-1.20
Good	122 (48.4%)	-0.12	-0.42	-0.48	-0.31	-0.16	-0.13	-0.27
Very Good	30 (11.9%)	+0.35	+0.27	+0.29	0.00	-0.07	+0.38	+0.20

This table shows the following important features:

- * The worst mean SQ is -2.18
- * The worst score (-3.00) is in the Responsiveness dimension

3.7.2 Qualitative Findings

On a broader outlook, it would be useful to assess the expectations of patients by examining the mean ratings for service attributes in their respective dimensions. Mean ratings for each sections on the questionnaire from the whole sampling population are computed as shown in Table 3.1. The highest expectations/perceptions are listed and the highest service quality gaps

identified. The polarities between expectations and perceptions of quality are analysed in Tables 3.2 to 3.11.

The highest expectations - Table 3.2 indicates:

Three of the highest expectations (E18, E17 and E16) are in the Assurance dimension, the second highest expectation is statement E8 in the Reliability dimension and one of the highest expectation is statement E12 in the Responsiveness dimension.

The patients' choices clearly show that Assurance and Responsiveness are the two most critical dimension of hospital services. The results when considered collectively imply an important message from patients to hospital managers: "Be responsive, be friendly, be courteous, treat patients with dignity and respect and most of all, explain to patients their medical condition thoroughly".

The highest perceptions - Table 3.4 indicates:

Three of the highest perceptions (statements P3, P2, P1) are in the Tangibility dimension, the third highest perception statement is P16 in the Assurance dimension and the fifth highest perception statement is P13 in the Responsiveness dimension.

These patients' responses clearly show that hospitals' doctors and staff were perceived to be neat and professional in appearance, promoted confidence in patients because they possess a wide spectrum of knowledge and their attitudes instilled confidence in patients. Also, Singapore hospitals were perceived to have up-to date and well-maintained medical facilities and equipment, clean and comfortable environment with good directional signs which nearly matched up to their expectations.

The lowest expectations - Table 3.3 indicates:

Two of the lowest expectations statements E19 and E20 are in the Empathy dimension, two of lowest expectations statements E23 and E24 are in the Accessibility and Affordability dimension and one of the lowest expectations statement E4 is in the Tangibility dimension.

The lowest perceptions - Table 3.5 indicates:

The least of the lowest five perceptions is statement P19 in the Empathy dimension, and the lowest perception is statement P14 in the Responsiveness dimension. However, two other lowest expectations statements, P23 and P25 are in the Accessibility and Affordability dimension and another is statement P6 in the Reliability dimension.

The largest five service quality gaps "SQ" - Table 3.6 indicates:

Two of the largest differences between expectations/perceptions, SQ18 and SQ17, are in the Assurance dimension. The largest difference between expectations/perceptions is SQ14. Patients were unhappy with the long waiting time of more than 1 hour for services. Their desired waiting time is between 15 - 30 minutes. The other of the top five largest differences between expectations and perceptions is SQ6 in the Reliability dimension. Another largest differences between expectations/perceptions is SQ25 in the Accessibility and Affordability dimension.

The smallest five service quality gaps "SQ" - Table 3.7 indicates:

Three of the smallest differences between expectations and perceptions are SQ3 and SQ2 in the Tangibility dimension. The smallest difference between expectations and perceptions is SQ23 in the Accessibility and Affordability dimension. The other one of the smallest differences between expectations and perceptions is SQ20 in the Empathy dimension.

Relative importance of service quality features as evaluated by patients

One of the most valuable elements of the SERVQUAL analysis is the ability to determine the relative importance of the five dimensions in influencing patients' overall quality perceptions as shown in Table 3.8:

- i. A striking result is that the highest (24.1%) in the Assurance dimension is the most relative importance of the SERVQUAL scores. This is higher than PZB findings (Parasuraman et al, 1985) of 19% for other service organisations (retail banking, credit card, securities brokerages and product repair and maintenance). Responsiveness is the second most important dimension closely followed by Reliability.

- ii. The lowest (16.1%) in the Tangibility dimension is the least relative important of the SERVQUAL scores. This is higher than the PZB findings of 11% for other service organisations.

For comparison, the PZB findings for services industries show that:

- * Reliability is the most important of the five dimensions in any service organisation whereas this study shows that Assurance is the most important. This distinguishes hospital services from other service organisations which they have studied. One of the reasons for this is likely to be that, with many other service industries, there is very little human or personal contact with those delivering the service (e.g. Barclaycard or insurance companies). For hospital services, there is almost always a significant amount of personal involvement between patients when doctors/staff administer the treatment. Another reason for this is likely to be that sick patients would expect to be informed of their medical condition and be treated with dignity and respect. Also, they would expect their doctors/staff to be friendly and courteous and to possess a wide spectrum of knowledge. Thus, patients place a high value on Assurance.
- * Tangibility is the least important of the five dimensions in any service organisation, as it is in this study.
- * Responsiveness, Assurance and Empathy were scored second, third and fourth respectively, whereas this study shows that Responsiveness scored second, Reliability is third and Empathy fourth.

Performance along the SERVQUAL dimensions

How well Singapore hospitals perform along the SERVQUAL dimensions as perceived by patients is shown in Tables 3.9 and 3.10. Table 3.9 shows that the most important dimension of service, ASSURANCE, has the second most negative unweighted SQ. The second most important dimension, RESPONSIVENESS has the most negative unweighted SQ. It can be seen that all five dimensions have negative SQ, thus implying that not one dimension exceeded

patients' expectations. Table 3.10 shows the weighted SQ and the dimensions that have the highest negative SQ are: Assurance and Responsiveness.

The negative SQ (both unweighted and weighted) across the board clearly show that there is room for service quality improvement in Singapore hospitals. What is significant is that the weighted SQ for the Assurance and Tangibility dimensions are more negative than the unweighted scores. This indicates that Singapore hospitals are performing most poorly on the Assurance aspect of hospital services that are most critical to patients. Since the findings revealed that patients placed a high rating on the Assurance dimension, hospitals should shift their resources to this critical facets of service.

By examining these various gap scores, Singapore hospitals can assess overall quality of service as perceived by patients and also identify the key dimensions on which to focus quality improvement efforts.

Analysis of the overall quality rating of the services provided by Singapore hospitals

Table 3.11 shows the following important results:

- * 30 patients (11.9%) rated the service quality very good (SQ 0.20)
- * 122 patients (48.4%) rated the service quality good (SQ -0.27)
- * 78 patients (31.0%) rated the service quality fair (SQ -1.20)
- * 18 patients (7.1%) rated the service quality poor (SQ -2.16)
- * 4 patients (1.6%) rated the service quality very poor (SQ -2.17)
- * The least favourable score (-3.00) is in the Assurance dimension, of those who rated the overall quality of services very poor (1.6%).
- * The most favourable score (+0.38) is in the Accessibility and Affordability dimension of those who rated the overall quality of the services very good (11.9%).

Table 3.11 shows that service quality is generally below patients' expectations. Only two group of patients who rated the service good and very good were the SQ more favourable than the average weighted SQ of -0.670. The other three groups, representing 40% of the total number of patients, reported that services were below expectations.

Implications of the SERVQUAL results

These results clearly establish that the Assurance dimension constitutes the most serious problem facing Singapore hospitals. Patients' expectations of service providers are highest in relation to Assurance, yet these score have been consistently the lowest in this study. Why has this discrepancy occurred? It is possible that perceptions of Assurance and Responsiveness are not matched by the perceptions of hospital doctors and staff or by their ability to satisfy agreed standards. Hence, a survey is conducted to evaluate the expectations and perceptions of doctors/staff of hospitals. Assurance, from the standpoint of the patient depends on a number of different features. Taking them in sequence, the most important are:

- i. doctors should thoroughly explain medical conditions to patients
- ii. doctors/staff should treat patients with dignity and respect
- iii. doctors should possess a wide spectrum of knowledge
- iv. doctors/staff should be friendly and courteous

This study shows that the expectations of Singapore patients are different from those of the NHS. Singapore patients placed high ratings on the Assurance and Responsiveness dimensions whilst patients of NHS placed high ratings on the Reliability and Empathy dimensions. Both Singapore patients and patients of NHS perceived hospital services to be below expectations. In general, hospitals have failed to meet their needs which they consider critical.

3.8 Hospitals Doctors/Staff Expectations and Perceptions of Hospital Services in Singapore - Findings

The number of questionnaires distributed to doctors/staff of 5 hospitals were 200. As the number of valid responses received were 98, the response rate was 49%. This low response rate could be due to the lack of time to complete the questionnaire caused by heavy workload, their reluctance to highlight the service quality gaps in their hospital or the reluctance of the Quality Manager to hand out the questionnaires to doctors/staff. The expectations and perceptions of the doctors/staff on the service quality of the hospital would reflect the ineffectiveness of management quality programmes.

As discussed earlier, a two-way multivariate analysis (MANOVA) would be conducted to determine whether there are any differences between patients' expectations and perceptions of hospital services to those of doctors'/staff's, that is, differences between the findings of Table 3.1 and Table 3.12.

Table 3.12: Mean Level of Expectation and Satisfaction of Doctors/Staff and Service Quality Gaps by Dimensions and 25 Service Statements

Statements	Expectation	Perception	Service Gaps
Tangibility	4.12	3.84	-0.28
1. Up-to-date and well-maintained facilities and equipment	4.43	4.00	-0.43
2. Clean and comfortable environment with good directional signs	4.18	3.98	-0.20
3. Doctors/staff should be neat and professional in appearance	4.16	3.85	-0.31
4. Informative brochures about services	3.61	3.66	+0.05
5. Privacy during treatment	4.20	3.69	-0.51
Reliability	4.19	3.39	-0.80
6. Services should be provided at appointed time	3.98	3.14	-0.84
7. Services should be carried out right the first time	4.22	3.36	-0.86
8. Doctors/staff should be professional and competent	4.63	3.59	-1.04
9. Error free and fast retrieval of documents	4.00	3.47	-0.53
10. Consistency of charges	4.12	3.39	-0.73
Responsiveness	4.36	3.26	-1.10
11. Patients should be given prompt services	4.35	3.21	-1.14
12. Responsive doctors/staff	4.43	3.41	-1.02
13. Attitude of doctors/staff should instil confidence in patients	4.59	3.47	-1.12
14. Waiting time of not more than 1 hour	4.06	2.94	-1.12
Assurance	4.42	3.54	-0.88
15. Friendly and courteous doctors/staff	4.12	3.50	-0.62
16. Doctors should possess a wide spectrum of knowledge	4.61	3.71	-0.90
17. Patients should be treated with dignity and respect	4.39	3.50	-0.89
18. Explain thoroughly medical condition to patients	4.55	3.46	-1.09
Empathy	4.13	3.33	-0.80
19. Obtain feedback from patients	3.92	3.16	-0.76
20. 24-hour service availability	3.69	3.58	-0.11
21. Doctors/staff should have patient's best interest at heart	4.51	3.36	-1.15
22. Doctors/staff should understand the specific needs of patients	4.41	3.20	-1.21
Accessibility & Affordability	3.85	3.29	-0.56
23. There should be adequate parking facilities	3.49	3.20	-0.29
24. The location should be easily accessible	3.96	3.47	-0.49
25. Affordable charges for services rendered	4.10	3.19	-0.91

Table 3.13: The Five Highest Expectations

<i>Highest Expectation Statements</i>	<i>Mean Expectation</i>
Doctors/staff should be professional and competent	4.63
Doctors should possess a wide spectrum of knowledge	4.61
Attitude of doctors/staff should instil confidence in patients	4.59
Explain thoroughly medical condition to patients	4.55
Doctors/staff should have patient's best interest at heart	4.51

Table 3.14: The Five Lowest Expectations

<i>Lowest Expectation Statements</i>	<i>Mean Expectation</i>
There should be adequate parking facilities	3.49
Informative brochures about services	3.61
24-hour service availability	3.69
Obtain feedback from patients	3.92
The location should be easily accessible	3.96

Table 3.15: The Five Highest Perceptions

<i>Highest Perception Statements</i>	<i>Mean Perception</i>
Up-to-date and well-maintained facilities and equipment	4.00
Clean and comfortable environment with good directional signs	3.98
Doctors/staff should be neat and professional in appearance	3.85
Doctors should possess a wide spectrum of knowledge	3.71
Privacy during treatment	3.69

Table 3.16: The Five Lowest Perceptions

<i>Lowest Perception Statements</i>	<i>Mean Perception</i>
Waiting time of not more than 1 hour	2.94
Services provided at appointed time	3.14
Obtain feedback and keep patients informed	3.16
Affordable charges for services rendered	3.19
Doctors/staff understand the specific needs of patients	3.20

Table 3.17: The Five Largest Service Gaps (SQ)

<i>Largest Service Gaps</i>	<i>Mean Differences</i>
Doctors/staff should have patient's best interest at heart	1.15
Patients should be given prompt services	1.14
Attitude of doctors/staff should instil confidence in patients	1.12
Waiting time of not more than 1 hour	1.12
Explain thoroughly medical condition to patients	1.09

Table 3.18: The Five Smallest Service Gaps (SQ)

<i>Smallest Service Gaps</i>	<i>Mean Differences</i>
Informative brochures about services	<0.05>
Clean and comfortable environment with good directional signs	0.20
There should be adequate parking facilities	0.29
Doctors/staff should be neat and professional in appearance	0.31
Up-to-date and well-maintained facilities and equipment	0.43

Table 3.19: Analysis of the relative importance of SERVQUAL dimensions

Statements	Dimensions	%	Mean(%) PZB findings
1. Clean and comfortable environment with good directional signs and up-to-date and well-maintained equipment	Tangibility	18.0	11
2. The ability of the hospital doctors and staff to provide services at appointed time and accurately	Reliability	19.2	32
3. The willingness of the hospital doctors and staff to provide prompt service and be responsive to patients needs	Responsiveness	22.0	23
4. The knowledge and courtesy of the hospital doctors and staff and their ability to convey trust and confidence	Assurance	23.8	19
5. The caring, individualised attention the hospital doctors and staff provides its patients	Empathy	16.9	17

Table 3.20: The unweighted mean SQ

<i>Dimensions</i>	<i>Mean unweighted score</i>
Tangibility	-0.282
Reliability	-0.802
Responsiveness	-1.099
Assurance	-0.875
Empathy	-0.806
Accessibility & affordability	-0.562
SQ (unweighted)	-0.738

This table shows the following features;

- * *The lowest unweighted score, -1.099 is in the Responsiveness dimension.*
- * *The highest unweighted score, -0.282 is in the Tangibility dimension.*
- * *The overall unweighted SQ is -0.738.*

Table 3.21: The weighted mean SQ

Dimensions	Mean weighted score
Tangibility (T)	-0.722
Reliability (RL)	-0.774
Responsiveness (RS)	-0.884
Assurance (AS)	-0.958
Empathy (E)	-0.682
Accessibility & Affordability (AA)	-0.405
SQ (weighted)	-0.738

This table shows the following features;

- * *The lowest weighted score -0.958 is in the Assurance dimension.*
- * *The highest weighted score -0.405 is in the Accessibility and Affordability dimension.*
- * *The overall weighted SQ is -0.738.*

Table 3.22: Analysis of the overall quality rating by doctors/staff of the services provided by Singapore Hospitals

Rating	No. of Patients (%)	T	RL	RS	A	E	AA	SQ
Very Poor	0 (0%)							
Poor	3 (3.1%)	-1.13	-1.80	-3.25	-3.26	-2.33	-2.11	-2.31
Fair	46 (46.9%)	-0.46	-1.23	-1.50	-1.22	-1.22	-0.69	-1.05
Good	46 (46.9%)	-0.08	-0.38	-0.65	-0.48	-0.41	-0.43	-0.40
Very Good	3 (3.1%)	+0.07	+0.27	+0.25	+0.58	+0.92	+1.00	+0.51

This table shows the following important features:

- * *The worst mean SQ is -2.31*
- * *The worst score (-3.26) is in the Assurance dimension*

Qualitative Findings

Table 3.12 examines the expectations and perceptions of doctors/staff of Singapore hospitals. The polarities between expectations and perceptions of quality are analysed in Tables 3.13 to 3.22.

The highest expectations - Table 3.13 indicates:

Two of the five highest expectations (E16, E18) are in the Assurance dimension. The highest of the five expectations is statement E8 in the Reliability dimension. The third of the five highest expectations is statement E17 in the Assurance dimension. The lowest of the five highest expectations is statement E21 in the Empathy dimension.

These doctors/staff expectations clearly show that Assurance and Responsiveness are the most critical dimensions of the service. These expectations are similar to that of patients.

The highest perceptions - Table 3.15 indicates:

Four of the five highest perceptions (statements P1, P2, P3, P5) are in the Tangibility dimension and the fourth of the five highest perceptions is P16 in the Assurance dimension.

Four of these five highest perceptions of doctors/staff are similar to those of patients. Patients have indicated P13 (Attitude of doctors/staff instilled confidence in patients) in their five highest perceptions whilst doctors/staff have indicated "privacy during treatment" as one of their five highest perceptions.

The lowest expectations - Table 3.14 indicates:

Two of the five lowest expectations statements E19 and E20 are in the Empathy dimension and the other two of the five lowest expectations statements E23 and E24 are in the Accessibility and Affordability dimension. The lowest of the five expectations is statement E23 which concerns adequate parking facilities. This view is also shared by patients who have rated this statement as their lowest expectation. The second of the lowest five expectations statement E4 is in the Tangibility dimension. This view is also shared by patients.

The lowest perceptions - Table 3.16 indicates:

Two of the five lowest perceptions statements P19 and P22 are in the Empathy dimension, the lowest of the five lowest perception statement P14 is in the Responsiveness dimension, the second lowest of the five lowest perception statement P6 is in the Reliability dimension and one

of the five lowest perception statement is P25 in the Accessibility and Affordability dimension. Similarly, these perceptions are shared by patients.

The largest service quality gaps "SQ" - Table 3.17 indicates:

Two of the largest differences between expectations/perceptions, SQ20 and SQ22, are in the Empathy dimension. These findings are not revealed in the patients study. Three of the largest differences between expectations/perceptions, SQ11, SQ13 and SQ14 in the Responsiveness dimension. The only similarity with the patients' study is the waiting time (SQ14) statement.

The five smallest service quality gaps "SQ" - Table 3.18 indicates:

Four of the five smallest differences between expectations and perceptions, SQ4, SQ2, SQ3 and SQ1 are in the tangibility dimension and the second of the five smallest difference between expectations and perceptions is SQ23 in the Accessibility and Affordability dimensions. Similar findings are revealed in the patients' study.

Relative importance of service quality features as evaluated by doctors/staff

- i. The highest (23.8%) in the Assurance dimension is the most relative importance of SERVQUAL scores as shown in Table 3.19. Responsiveness is the second most important dimension closely followed by Reliability. This finding is similar to the evaluation made by patients.
- ii. The lowest (17.0%) in the Empathy dimension is the least relative importance of SERVQUAL scores. This finding differs from patients' evaluation of the relative importance of service quality. Patients have evaluated the Tangibility dimension as the least important service quality feature and this finding is similar to the study conducted by Parasuraman et al.

Performance along the SERVQUAL dimensions

How well Singapore hospitals perform along the SERVQUAL dimensions according to the doctors/staff are shown in Tables 3.20 and 3.21. Table 3.20 shows that the most important dimension of service, ASSURANCE, has the second most negative unweighted SQ. The second most important dimension, RESPONSIVENESS has the most unweighted negative SQ. It is

seen that all five dimensions have negative unweighted SQ, which imply that none has exceeded doctors/staff expectations. Table 3.21 shows the weighted SQ, the dimensions that have the most negative weighted SQ are: Assurance and Responsiveness. This indicates that Singapore hospitals are performing most poorly on the Assurance and Responsiveness aspects of service that are most critical to patients. These findings are similar to the study on patients evaluation of hospital services.

Analysis of the overall quality rating by doctors/staff of the services provided by Singapore hospitals

Table 3.22 shows the following important results:

- * 3 doctors/staff (3.1%) rated the service quality very good (SQ 0.51)
 - * 46 doctors/staff (46.9%) rated the service quality good (SQ -0.40)
 - * 3 doctors/staff (3.1%) rated the service quality poor (SQ -2.31)
 - * 46 doctors/staff (46.9%) rated the service quality fair (SQ -1.05)
 - * 0 doctors/staff (0%) rated the service quality very poor
-
- The least favourable score (-3.26) is in the Assurance dimension of those who rated the overall quality of service poor (3.1%).
 - The most favourable score (+1.00) is in the Accessibility and Affordability dimension of those who rated the overall quality of the service very good (3.1%).

Table 3.22 shows that the service quality is generally below doctors/staff expectations. Only for the group of doctors/staff who rated the service good and very good was the SQ more favourable than the average weighted SQ of -0.738. The other two groups, representing 50% of the total number of doctors/staff, reported that service were below expectations.

3.9 Analysis of Variance on Hospital Service Quality of Patients and Doctors/Staff of Singapore Hospitals

The above findings have revealed that patients and doctors/staff of hospitals shared the same five lowest expectations. They also shared the same four highest expectations. Patients have indicated that statement E17 (Patients should be treated with dignity and respect) as one of the five highest expectations but this is not so for doctors/staff. On the other hand, doctors/staff

have indicated that statement, E13 (Attitude of doctors/staff should instil confidence in patients) as one of the five highest expectations but this is not so for patients.

The author assumes that since patients and doctors/staff of hospital services are exposed to the same perceptual set, therefore, no difference would exist between the two groups in the expectations and perceptions of hospital service quality. A two-way multivariate analysis of variance (MANOVA) procedures are used to test for any differences in expectations and perceptions between the two groups to justify the author's assumption.

Table 3.23: Expectations of Patients and Doctors/Staff - Analysis of Variance (MANOVA)

Variables	F Ratio	F Probability
Tangibility		
Up-to-date & well-maintained facilities and equipment	0.3582	0.5499
Clean & comfortable environment with good directional signs	0.1299	0.7187
Doctors/staff should be neat and professional in appearance	0.0902	0.7641
Informative brochures about services	0.5837	0.4454
Privacy during treatment	4.9514	0.0267
Reliability		
Services should be provided at appointed time	4.9393	0.0269
Services should be carried out right the first time	0.7558	0.3852
Doctor/staff should be professional and competent	0.7306	0.3933
Error free & fast retrieval of documents	5.4898	0.0197
Consistency of charges	0.0841	0.7720
Responsiveness		
Patients should be given prompt services	0.5068	0.4770
Responsive doctor/staff	1.0523	0.3057
Attitude of doctors/staff should instil confidence in patients	1.8425	0.1755
Waiting time of not more than 1 hour	8.6692	0.0035
Assurance		
Friendly and courteous staff/doctors	2.4970	0.1150
Doctors should possess a wide spectrum of knowledge	2.4250	0.1203
Patients should be treated with dignity & respect	4.4288	0.0361
Explain thoroughly medical condition to patients	0.1393	0.7092
Empathy		
Obtain feedback from patients	1.1484	0.2846
24-hour service availability	0.0124	0.9116
Doctors/staff should have patient's best interest at heart	0.2584	0.6116
Doctors/staff should understand the specific needs of patients	0.0030	0.9564
Accessibility & Affordability		
There should be adequate parking facilities	1.3240	0.2507
The location should be easily accessible	0.0260	0.8720
Affordable charges for services rendered	1.0011	0.3178

The **Expectations** results (Table 3.23) revealed no significant difference between the two groups on the Empathy and Accessibility and Affordability dimensions. However, a significant difference was found on the following statements:

- i. Privacy during treatment (Tangibility)
- ii. Services should be provided at appointed time (Reliability)
- iii. Error free and fast retrieval of documents (Reliability)
- iv. Waiting time of not more than 1 hour (Responsiveness)
- v. Patients should be treated with dignity and respect (Assurance)

Table 3.24: Perceptions of Patients and Doctors/Staff - Analysis of Variance (MANOVA)

Variables	F Ratio	F Probability
Tangibility		
Up-to-date & well-maintained facilities and equipment	0.5789	0.4489
Clean & comfortable environment with good directional signs	0.2758	0.6008
Doctors/staff are neat and professional in appearance	0.6222	0.4325
Informative brochures about services	2.8034	0.0978
Privacy during treatment	0.0423	0.8375
Reliability		
Services provided at appointed time	0.4578	0.5005
Services carried out right the first time	2.8075	0.0975
Professionalism and competence displayed by doctors/staff	0.4588	0.5000
Error free & fast retrieval of documents	0.4975	0.4826
Consistency of charges	0.1570	0.6929
Responsiveness		
Prompt services	0.9301	0.3376
Responsiveness displayed by doctors/staff	1.4092	0.2385
Doctors/staff attitude instilled confidence in patients	1.9822	0.1629
Waiting time of not more than 1 hour	0.4824	0.4892
Assurance		
Friendly and courteous staff/doctors	1.3646	0.2461
Doctors possess a wide spectrum of knowledge	1.1849	0.2795
Patients treated with dignity & respect	0.3615	0.5493
Thoroughly of explanation of medical condition	0.4622	0.4985
Empathy		
Obtaining feedback & keeping patients informed	1.1526	0.2861
24-hour service availability	0.3109	0.5786
Doctors/staff have patient's best interest at heart	1.3751	0.2442
Doctors/staff understand your specific needs	3.5373	0.0635
Accessibility & Affordability		
Adequate parking facilities	0.0307	0.8612
Location of premises is easily accessible	0.0019	0.9652
Affordable charges for services rendered	0.1277	0.7217

The **Perceptions** results (Table 3.24) revealed no significant difference between the two groups on the Responsiveness, Assurance and Accessibility and Affordability dimensions. However, a significant difference was found on the following statements:

- i. Informative brochures about services (Tangibility)
- ii. Services carried out right the first time (Reliability)
- iii. Doctors/staff understand your specific needs (Empathy)

In conclusion, the author has demonstrated how the SERVQUAL instrument could help hospitals identify the service characteristics that are considered important by patients and doctors/staff of hospitals. Both patients and doctors/staff expectations clearly show that Assurance and Responsiveness are the most critical dimensions of hospital services. Similarly, both patients and doctors/staff have perceived service quality to be poor in these two dimensions. Generally, Singapore hospitals' service quality is below patients and doctors/staff expectations.

Based on these findings, Singapore hospitals should ask themselves: "What business are we in?" Are we prepared to continue offering such inadequate services to our customers?" The answer should be: "We will strive to meet and exceed customer expectations and to have continuous quality improvement".. How could hospitals meet this challenge? Although there is no agreement as to how they can meet this challenge, some authors argue that the application of TQM may offer a partial solution (Anderson, 1992; Geber, 1992; Lawrence and Early, 1992 and Bergman, 1994). Motivated by the practical and theoretical implications of meeting and exceeding customers' expectations, the author's specific objective of this research project is to develop a model and present an implementation framework that offers guidelines for Singapore hospitals as they attempt to become more quality and customer oriented.

4 QUALITY MANAGEMENT

This chapter presents a rationale for implementing TQM in Singapore hospitals. The author addresses the frequently asked question, “Why do we have to change?” and “Why TQM?” An extensive literature review is undertaken to assess the definitions and to establish the principal elements of TQM. TQM is compared with Quality Assurance (QA) to contrast the characteristics of each. An approach to integrate TQM and QA is also presented. Furthermore, the pitfalls of TQM implementation in healthcare is provided. On this basis, the concept of TQM must be adapted to suit the uniqueness of the healthcare industry. A critical assessment of the implementation of TQM is offered through extensive literature review of orthodox TQM implementation models. Arguments are posited to the effect that orthodox TQM models represent, in the main, piecemeal approaches to TQM. This leads to a reconceptualisation of a framework for TQM implementation in healthcare. The chapter concludes with an empirical study on Singapore hospitals’ management system. This provides information for subsequent work in this research project.

Areas to be examined include:

- 4.1 Why Implement TQM?
- 4.2 TQM Definitions
- 4.3 Integrating TQM and Quality Assurance
- 4.4 Pitfalls of TQM in Healthcare
- 4.5 TQM Implementation Models
- 4.6 Research on Empirical Studies on TQM Practices in Singapore
- 4.7 Empirical Study on Management Quality Practices in Singapore Hospitals

4.1 Why Implement TQM?

Yap's (1991) study as discussed by the author in Chapter 1 has identified the quality assurance activities adopted by Singapore hospitals. Since Singapore hospitals have a quality assurance program, why do they need quality improvement? Why do these hospitals have to change? Why implement TQM? In Chapter 2, the major concerns and challenges facing the healthcare industry in Singapore have been highlighted. These include rising healthcare costs, rising expectations of Singaporeans, rapid ageing of the population and the shortage of nurses and ancillary staff. There is thus an urgent need to improve the value of healthcare services by improving quality and cost effectiveness. What is 'value'? According to Shortell (1990), value embodies the concept of cost, productivity and quality. Adding value requires hospitals to change the nature of both their internal and external relationships. It requires a rethinking of what it means to be a hospital in the healthcare environment in the 21st century.

The customers of healthcare in Singapore: patients and their families, business and industry, insurance companies and the government are expecting and demanding better quality. As there is no universally accepted definition of 'quality', especially in healthcare, the concept of quality has different meaning to different people, although the main theme is similar. Moreover, in many instances non-provider customers are not competent to judge what constitutes quality in healthcare relative to the technical and scientific aspects of care. Also, most quality measures are not customer-focused, they are quality measures indicative of process failure, for example, the measurement of mortality, morbidity, hospital-acquired infection rates.

The author believes that hospitals that can provide high-quality services and meet customer expectations at a reasonable price will compete very effectively in the 21st century. The problem is that learning how to elicit customer expectations is not an easy task for an industry that has always assumed it knows what its customers' need. While it is clear to all healthcare managers that the financial incentives have changed and the "golden days" of medicine are over, answers about how to respond to the crisis are few and far between.

According to Gaucher and Coffey (1993), there are three distinctly different approaches to improve quality as depicted in Table 4.1.

Table 4.1: Approaches to Improve Quality

Approach	Impact
Inspection	<ul style="list-style-type: none">• Identifies and removes unacceptable services, products or information• Almost always creates rework, delays and additional cost
Prevention	<ul style="list-style-type: none">• Improves processes causing poor quality• Reduces rework, waste, delays and costs
Planning and design	<ul style="list-style-type: none">• Plans processes and designs to meet and exceed customers' expectations• Reduces unnecessary activities, reduces costs and increases revenues

Source: Gaucher and Coffey (1993), "Total Quality in Healthcare: From Theory to Practice".

The first method of measurement of quality by inspection tries to identify and remove unacceptable services, products or information or find the persons who made the mistake and punish them. This type of quality approach is retrospective and involves rework. For example, most hospitals review surgical infection rates. A better approach would be to determine what measures can be applied to prevent surgical infections. Hospitals must improve quality by prevention, improving the systems that are causing poor quality. This will eliminate rework and reduce costs while simultaneously enhancing quality. By utilising the voice of the customer in the planning and design of systems and services, the organisation will have the best chance to affect both quality and price.

Hence, quality management should encompass planning and design, improvement and control as means to enhance organisational renewal. It is the author's belief that TQM offers a methodology of organisational renewal that can win back the confidence of the customers and achieve a higher level of customer satisfaction. Thus, healthcare organisations, especially Singapore hospitals should attempt to adopt TQM and a customer orientation strategy to meet the challenges of improving patient care, market share and achieve a higher level of customer satisfaction. In the next section, the author provides an extensive literature review on the definitions of TQM and delineates the principal elements of TQM.

4.2 TQM Definitions

One of the difficulties in the discussion of TQM is the apparent lack of consensus as to what it means (Wilkinson et al, 1992). There seems to be confusion as to what different commentators mean when they discuss TQM, although certain buzzwords are common in the literature, for example, 'Zero defects', 'Right first time', 'Plan-Do-Check-Act' and 'Fitness for use' (Wilkinson et al, 1992). However, the British Quality Association (BQA) has put forward three alternative definitions of TQM (Wilkinson et al, 1992). The first focuses on the 'soft' qualitative characteristics; customer orientation, culture of excellence, removal of performance barriers, teamwork, training, employee participation and competitive edge. From this perspective, TQM is seen as consistent with open management styles, delegated responsibility and the empowerment of staff. The second definition places emphasis on the production aspects, such as systematic measurement and control of work, setting standards of performance, using statistical procedures to assess quality; this is the 'hard' production/operations management view. The third definition is a mixture of 'hard' and 'soft', comprising three features: an obsession with quality, the need for a scientific approach and the view that all employees are part of one team. However, these definitions are rather arbitrary and it is unlikely that the practising manager would have much time for the 'soft' side of TQM given their emphasis on tool, measurement and bottom-line performance.

Within such a context there are clear implications for the workforce in the message that "quality is everyone's business". Firms are urged to move away from supervisory approaches to quality control towards a situation where employees themselves take responsibility (Wilkinson et al, 1992). Therefore, the soft side of TQM puts emphasis on the management of human resources in the organisation (Wilkinson et al, 1992). Nonetheless, at the initial stages of TQM (one to two years), quality should be the responsibility and ownership of top management. This would ensure its understanding of TQM and thus, win its commitment and leadership to the process as a precursor to the involvement of first level operatives.

For Crosby (1979) quality has no qualifiers. He defines quality management as a systematic way of guaranteeing that organised activities happen the way they are planned. It is a management discipline concerned with preventing problems from occurring by creating the

attitudes and controls that make prevention possible. TQM advocates zero defects in the products and services produced by an organisation. It is about driving quality into all aspects of a company's operation and perhaps, even more importantly, it is about doing things 'right first time'; an approach which adds nothing to the cost of a company's product or services. The author questions Crosby's idea of zero defects, arguing whether it is possible to achieve zero defects when human and environmental factors are involved. Furthermore, Haigh and Morris (1993) have also identified three complementary views of TQM:

- TOTAL - Organisation-wide process involving everyone from post room to the boardroom.
- QUALITY - Establishing quality goals for each and every element in the process of product or service delivery so as to meet customer needs and expectations first time and on every subsequent occasion.
- MANAGEMENT - Not just commitment of senior management to quality goals but senior management's active involvement in pursuit of them.

They go further to suggest that TQM is a process which embraces the conscious striving for zero defects in all aspects of an organisation's activities or management with workforce co-operating in the processes, developing, producing and marketing quality goods and services which satisfy customers' needs and expectations first time and every subsequent time (Haigh and Morris, 1993).

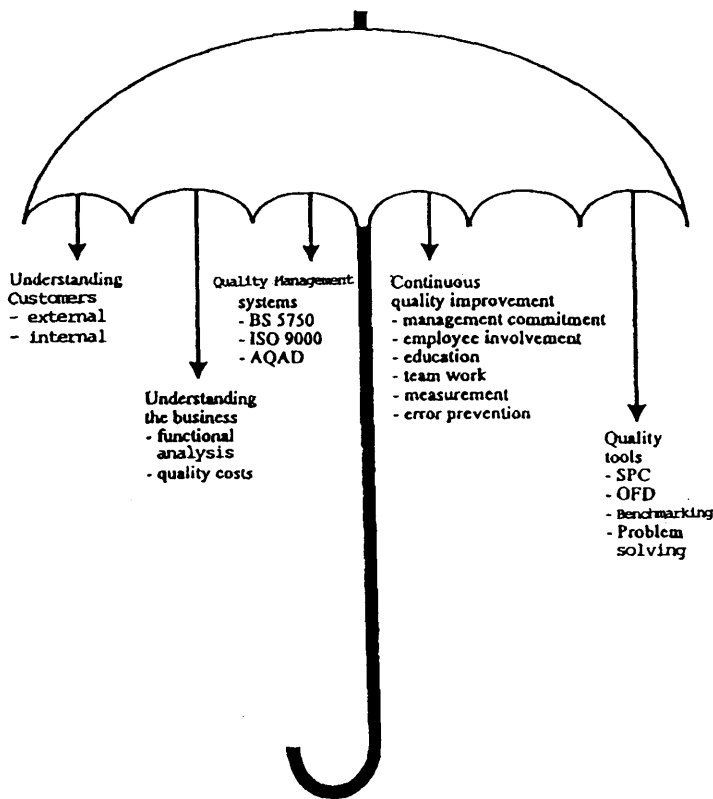
Lesley and Malcolm Munro-Faure (1992) define TQM as 'a proven, systematic approach to the planning and management of activities'. They have stated that the objective of TQM is to satisfy customer requirements as efficiently and profitably as possible. In a total quality environment, all employees must strive to:

- i. *do the right things* - only the activities that satisfy the requirements of customers should be encouraged, all other activities are to be analysed or discontinued if they are considered unnecessary.

- ii. *do things right* - all organisational activities should be performed correctly to ensure that output meets customer requirements.
- iii. *do things right first time, everytime* - if this is possible, then money should not be wasted on checking and scrapping output or correcting errors.

They go further to suggest that TQM can be successfully applied to any type of organisation provided it integrates certain components as shown in Figure 4.1.

Figure 4.1: Components of TQM In Meeting Customer Requirements At Minimum Cost



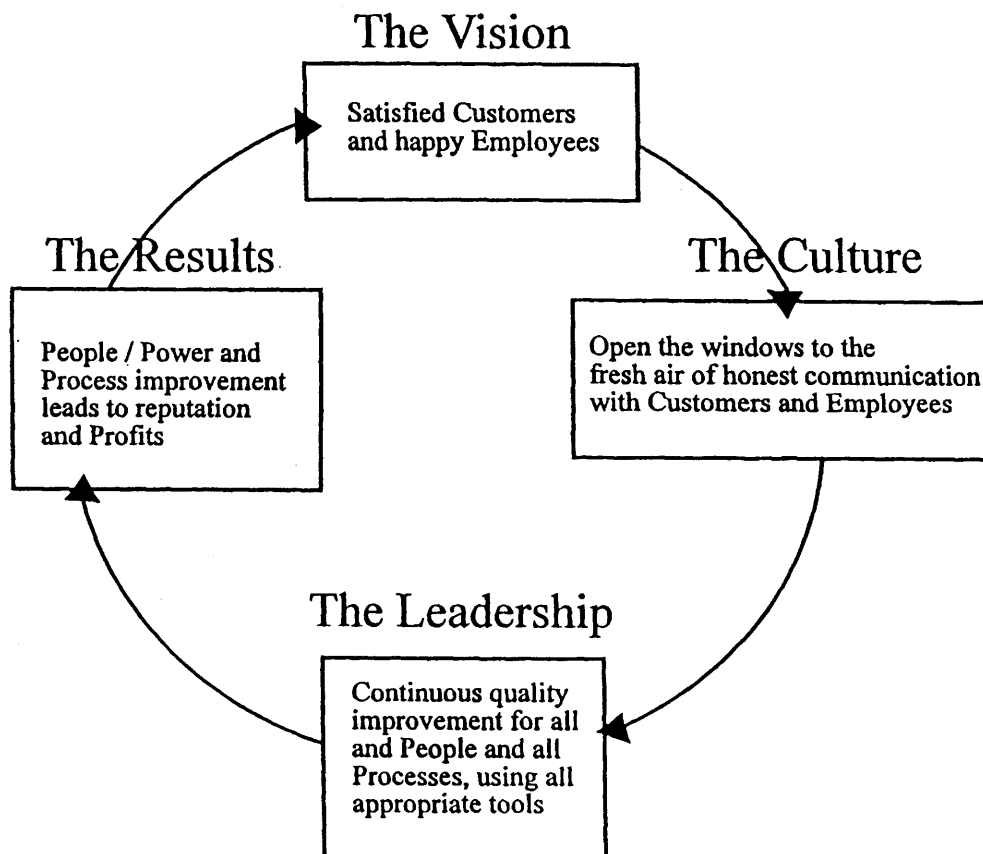
Source: Lesley & M.M. Faure (1992), "Implementing TQM".

The author agrees with the components of TQM as advocated by Lesley and Malcolm Munro-Faure but would suggest that any model of TQM should establish clear, customer-oriented performance standards and the meticulous measurement of performance against those standards. A commitment to TQM without a commitment to standards and measurement would be a

dedication to lip service, not customer service. Only with customer-focused standards and customer-based satisfaction measurements is it possible to create and maintain a quality focused organisation.

Hagan (1994) notes that the underlying theme of most discussions on TQM is two fold as shown in Figure 4.2: the need for sufficient cultural changes in industry to support the concept of continuous quality improvement, and the need to carry this concept beyond traditional quality assurance applications into work processes, ultimately including management.

Figure 4.2: A Closed-Loop Notion of Two Underlying Themes of TQM



Source: Hagan, J. (1993), "Management of Quality".

Hagan (1994) further notes that TQM's basic strategy is 'to integrate primary management techniques, existing improvement efforts and technical tools into a disciplined approach, focusing on how to improve the way work gets done'. This directly addresses customer

satisfaction, the elimination of chronic waste, and the reduction of excess variability in performance. TQM involves the management of four basic pillars of business:

- i. Customer - management must become customer-driven, for both the external and the internal customer. This means anticipating and meeting or exceeding the customers' needs and desires.
- ii. Quality - with quality being defined by the customer, it must become the number one priority of the enterprise, taking precedence over all other considerations, specifically over cost and schedule.
- iii. Continuous process involvement - lasting improvement can only be obtained by focusing on the process.
- iv. People - this is the important part of any process. They should be treated more as a resource rather than as a capital.

However, the author agrees with the Organisation Development Institute, UK (1991) that there are five rather than four basic pillars of TQM. These are:

- i. Customer focus
- ii. Total involvement
- iii. Measurement
- iv. Systematic support
- v. Continuous involvement

The argument being that these five principal elements must work in unison for a quality transformation to take place.

Bergman (1992), in his definition of TQM, takes a three dimensional perspective. Firstly, he defines 'Total' to mean that it is not only external customers that count. To achieve high external quality, it is necessary also to satisfy internal customers. Every process in the company has customers. All of these have to be satisfied in order to be able to do a good job. Secondly, he notes that TQM is about leadership and employee participation. It involves cultural change towards an organisation, which is strongly customer focused and is strongly committed to

continuous improvement in all its processes. The central part of today's quality he ascribes to is customer's orientation. Thirdly, he proceeds to state that the quality strategy of an organisation has to be revered by everyone in the organisation. Everyone is responsible for a process. Everyone should make improvements based on facts interpreted in the light of process knowledge. Everyone has to be involved. He further advocates the importance of top management commitment in achieving TQM. Top management has to create respect for quality and the quality strategy of the organisation. To Bergman's list the author will add the need for demonstrated and committed leadership from top management, particularly the Chief Executive Officer (CEO), who must be seen to be overtly involved in the TQM programme.

The Department of Health (DOH), UK (1993) defines TQM as:

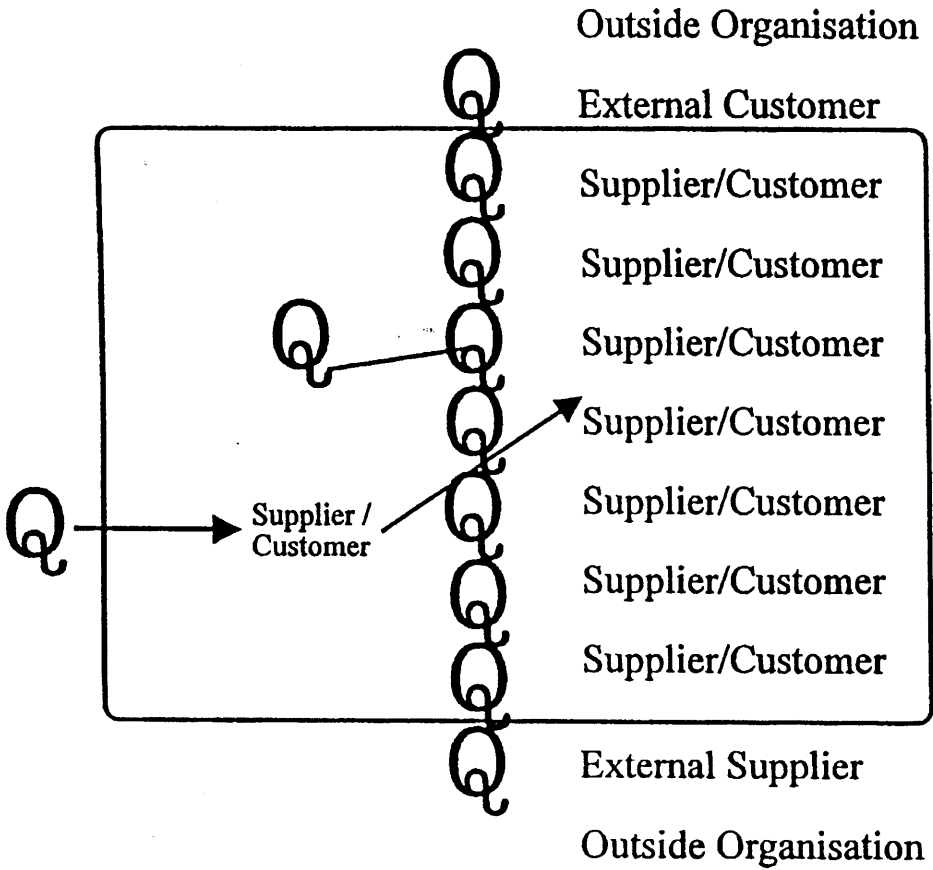
"A corporate management approach which recognises that customer needs and business goals are inseparable". Whilst, the NHS Management Executive (NHSME) defined TQM as a strategy to get an organisation working to its maximum effectiveness and efficiency, this could be achieved by challenging traditional ways of working and encouraging organisations to adopt innovative practices. In a mature TQM environment, they perceive:

- * everything is driven by customer needs
- * a highly trained and motivated workforce continually seeking better ways of working
- * change is based on measured fact and monitored in a continuous cycle of improvement
- * errors are relentlessly traced and eliminated
- * a hands-on management drives the search for quality

These elements emphasise the need for organisations to focus on the needs of customers and to adopt an organisation-wide management strategy. Oakland (1989) develops this further by suggesting that the concept of TQM is basically very simple. Each part of an organisation has customers, whether within or without, and the need to identify what the customer requirements are and then get about meeting them forms the core of a total quality approach. This definition encourages organisations to see customers not only as those people who receive the end product but also that each service and department also has customers, the internal customer (Schofield, 1991). Applied to Singapore hospitals, the internal customers would be consultants, ward sisters, theatre managers, suppliers, finance departments, etc. At the various points along the

customer-supplier chain as depicted in Figure 4.3, there must be a genuine desire to understand the needs of customers and to negotiate the extent to which these needs can be met; this also takes into account the extent to which staff are considered as the customers of managers (Schofield, 1991).

Figure 4.3: The Quality Chain



Source: Oakland, J. (1989), "TQM: The Route to Improving Performance", Heineman

Kanji (1990) notes that the modern concept of quality is defined as conformance to requirements and requirements are defined as the task to be accomplished in meeting customers' needs. In general, he notes that TQM is defined as follows:

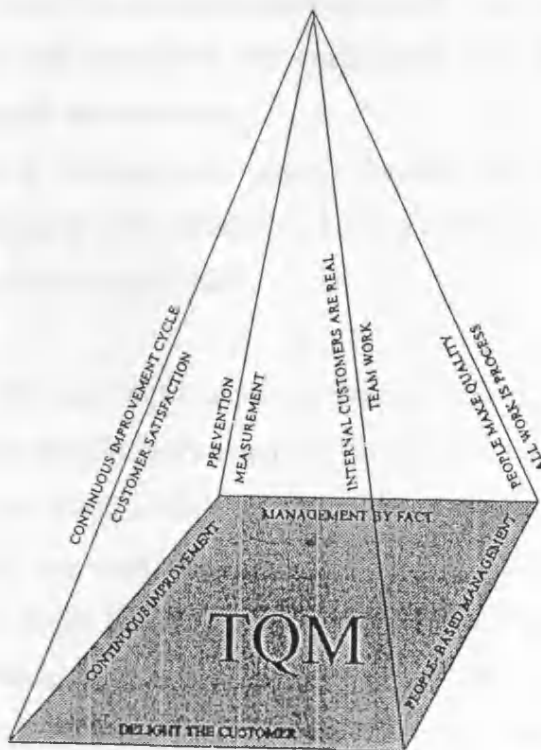
- Quality - Is to satisfy customer's requirements continually.
- Total Quality - Is to achieve quality at low cost.
- TQM - Is achieving total quality by harnessing everyone's daily commitment.

Kanji (1990) also suggests that TQM is about continuous performance improvement of individuals, of groups and of organisations. What differentiates TQM from other management processes, he notes, is the emphasis on continuous improvement. TQM, he argues, is not a quick fix; but is about changing the way things are done - forever. In order to improve performance, Kanji suggests that organisations need to know 'what to do' and 'how to do it', 'have the right tools to do it', 'be able to measure performances' and 'to receive feedback on current levels of achievement'. TQM provides this by adhering to a set of general principles. These are discerned as:

- i. delight the customer
- ii. management by fact
- iii. people-based management
- iv. continuous improvement

Furthermore, Kanji advocates a four-sided pyramid principles together with core concepts which he argues need to be present in a TQM environment as shown in Figure 4.4.

Figure 4.4: Pyramid Principles of TQM



Source: Kanji and Asher (1993), "TQM Process: A Systematic Approach", Cartax Publishing.

However, a number of studies (Boje and Winsor, 1993 and Mallinger, 1993) seem to challenge the pro-TQM stance taken by Kanji. They argue that TQM has historical roots in Taylorism and Fordism in ways, which lead to dysfunctional results. Thus, in practice TQM is an extension of the deregulation mentality into the workplace. Get rid of non-management-imposed restrictions, government agency restrictions, union work rules, removal of employee rights and institute the idea of letting management manage, without any recourse to improving the employees' welfare (Steingard and Fitzgibons, 1993). Therefore, TQM is not about changing the ways things get done but a repackaged Taylorist agenda that would exist as a conspiracy to de-humanise the worker using self pretentious principles such as teamworking, empowerment and motivation (Steingard and Fitzgibons, 1993).

MacDonald and Piggot (1990), quoting Ishikawa, state that "quality management is a revolutionary management philosophy characterised by the following strategic goals":

- * seek quality before profits
- * develop employees' infinite potential through education, delegation and positive support
- * build a long-term consumer orientation, both outside and inside the organisation
- * communicate throughout the organisation with facts and statistical data and use management as motivation
- * develop a company-wide system focusing all employees on the quality related implications of every decision and action at all stages of development of the product or service, from design to sales

Cuylenberg (1990) sees TQM as part of the corporate culture; "TQM must be accepted as a natural way of working by every employee. In such a culture every employee cannot help but be involved, this would involve an awareness of the hundreds of business processes which combine to make any company work". Similarly, to Shirley (1992) TQM is a cultural based approach. She notes that for TQM to succeed, management must operate an open and participative management style. Management must communicate with employees and, more importantly, must trust and respect them. All too often, managers treat members of the workforce as if they are incapable of anything except exercising a limited range of mechanical

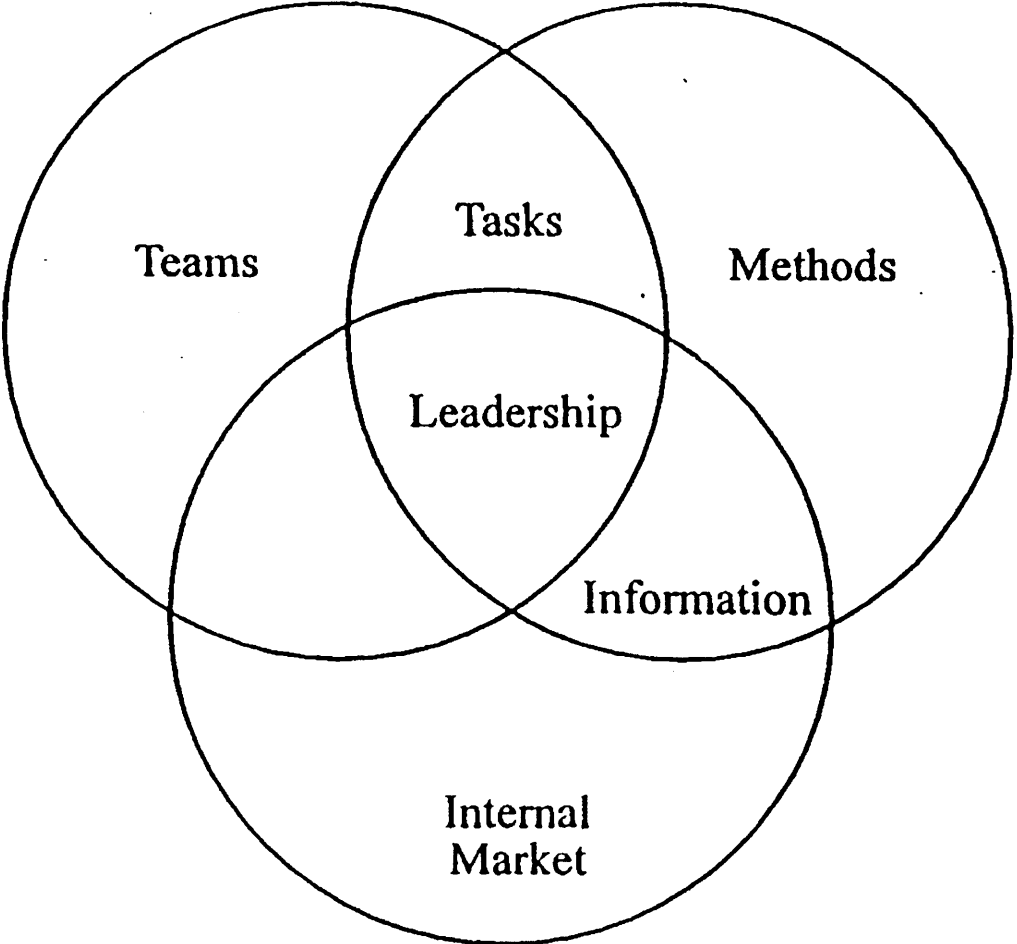
skills. Thus, in this kind of environment, to ensure that cultural change takes place, there must be a fundamental review of the following:

- * approach to quality determination and improvement
- * scope of the quality programme
- * philosophy of quality assurance
- * standards of work
- * review mechanism

Shirley (1992) argues that an adherence to these key elements will ensure a change from retrospective quality control to the 'right first time philosophy'.

However, Dumaine (1990) argues that for culture change to happen, it must come from the bottom, and the CEO must guide it. Organisations have to start with the premise that people at all levels want to contribute to make the business a success. This means that the CEO must live the new culture and become the walking embodiment of it (Dumaine, 1990). He must also spot and celebrate managers and employees who exemplify the values he wants to inculcate (Wilkinson and Witcher, 1991). This would ensure that quality becomes a way of life that permeates every part and all aspects of organisational activities. The essence of TQM lies in its ability to bring together under a single integrated approach, that is, four areas of organisational life of equal importance (Wilkinson and Witcher, 1991) as shown in Figure 4.5.

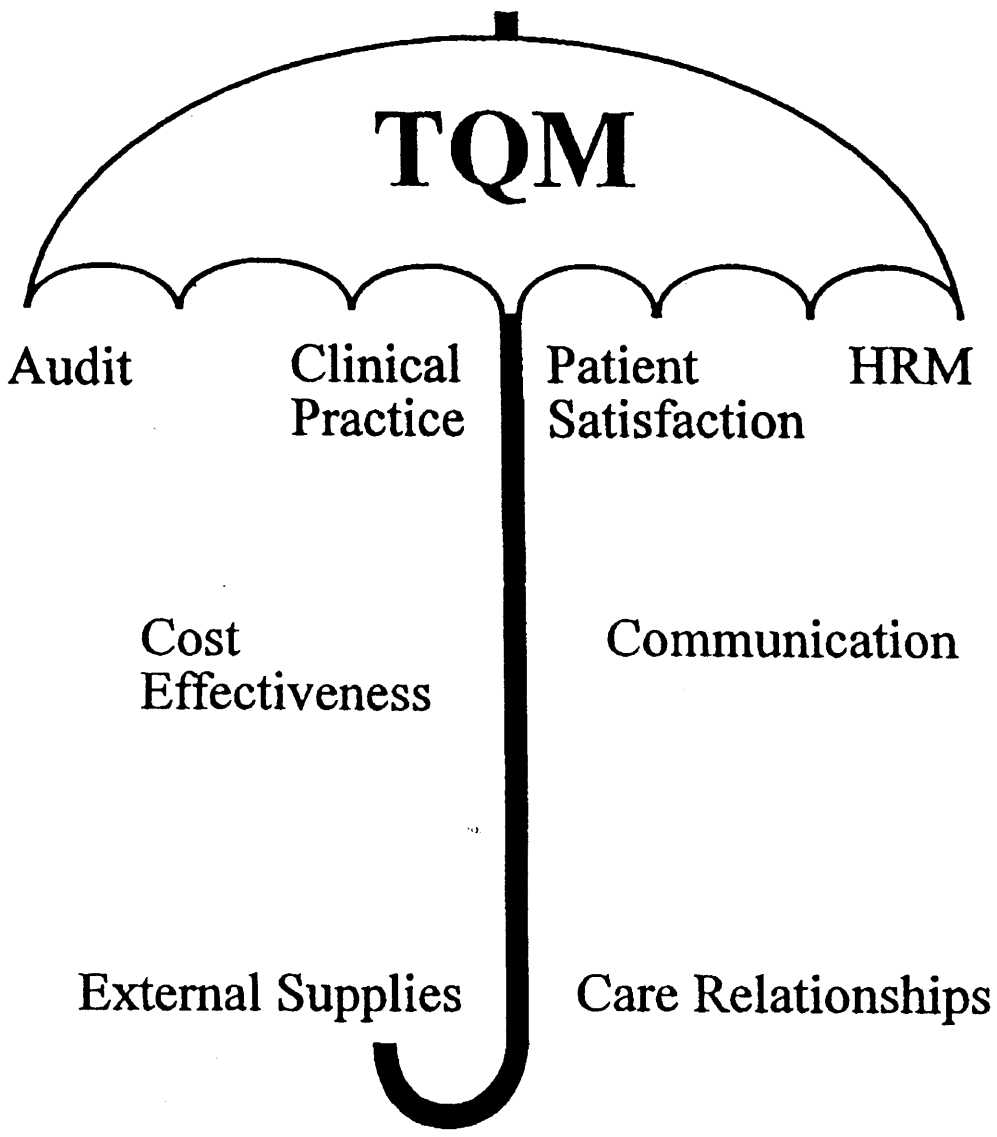
Figure 4.5: Single Integrated Approach of TQM



Source: Adrian Wilkinson and Barry Witcher (1991), "Management Decision", pp. 46 - 51

For Woollas (1993), TQM is the 'strategic approach to developing the best service possible'. It needs the full medical practice's commitment to getting things right. She suggests TQM as the umbrella for all the activities of the medical practice as shown in Figure 4.6:

Figure 4.6: TQM is the Umbrella for All Activities



Source: Tricia Woolas (1993), "Total Quality Management within the Practice Seminar", Brochure (2), Second Edition.

Woolas (1993) states the principles of TQM as being:

- * TQM needs to be driven from the top by doctors and practice managers together
- * TQM is not a short term expedient, it goes on forever, through continuous improvement and does not end with a certificate on the wall
- * TQM involves everyone in the practice and everyone needs to take personal responsibility for quality

The TQM drive, she contends, must be tailored to meet the specific needs of each department. However, Woollas' principles of TQM fails to integrate the fact that organisations are not mere apparati. Thus, they should not only manage what is done for the customer, but the way they do it is also fundamental; the totality of the input -> process -> outcome relationship is the basis for TQM.

For Koch (1991), TQM is an attempt to develop a positive culture that encourages all staff to produce quality improvements in their own particular services and involves:

- * standard setting
- * monitoring and review
- * quality information production
- * customer feedback strategies and action
- * training for quality
- * communication
- * resource management and integration of quality criteria into contracts

Ross (1994) defines TQM as a system approach that considers every interaction between the various elements of the organisation, and where the overall effectiveness of the system is higher than the sum of the individual outputs from the subsystems. The system, as defined here, is the inter-related set of quality policies, processes, technology and personnel needed to achieve quality transformation. However, Ross forgets that TQM involves a primary focus on the requirements of the customer whether internal or external to the organisation.

John Hradesky (1995) defines TQM as a philosophy, a set of tools, and a process whose output yields customer satisfaction and continuous improvement. Everyone in the company can and must practise it. It espouses a "win-win" attitude, differentiates cost versus price and provides added value.

Oakland and Leslie (1994) wrote that TQM is a comprehensive approach to improving competitiveness, effectiveness and flexibility through planning, organising and understanding each activity and involving each individual at each level.

In the International Standard (ISO 8402: 1994 (E/F/R), TQM is defined as the management approach of an organisation, centred on quality, based on the participation of all of its members and aiming at long-term successes through customer satisfaction, and benefits to all members of the organisation and to society. It further explains that the expression "all its members" designates personnel in all departments and at all levels of the organisational structure. It noted that the strong and persistent leadership of top management and the education and training of all members of the organisation are essential for the success of this approach.

The various definitions highlight various characteristics claimed for TQM: that it **makes quality a central management concern, requires all to participate, anticipates future needs and expectations, sees customer satisfaction as the route to success, benefits employees and enriches society**. These definitions include the 'soft' and the 'hard' aspects of TQM; the 'soft' elements relate to the team building and the personnel development aspects of TQM, whilst the 'hard' elements relate to the techniques applicable to quality improvement.

Having identified a large number of TQM perspectives by different researchers and quality gurus, the author provides a summary as shown in Table 4.2 the differences between the traditional method of management and TQM.

Whilst TQM can be variously defined according to which guru or researcher one follows, there is a measure of agreement as to what constitutes the essential principles of TQM. In the author's opinion, the following definition sums up the various definitions of TQM:

TQM is the integration of a customer-focused, continuous improvement philosophy, analytical skills, people skills and a structure and organisation, within an internal and external culture affected by leadership (Gaucher and Coffey, 1993).

Table 4.2: Differences between Traditional Method of Management and TQM

TRADITIONAL MANAGEMENT	TQM
Government, industry and education at cross-purposes.	Government, industry and education co-operatively working towards common objectives.
Management vs. suppliers, employees customers in a win-lose scenario.	Suppliers, management, and customers and society in a win-win scenario.
Profit through downstream results.	Profit through process improvement.
Tradeoffs between quality, cost and time.	Simultaneously improve all three.
Work on results.	Long-term focus on how results are achieved.
Highest priority placed on short-term profits.	Short and long-term objectives are balanced.
Bureaucracy with a narrow span of control.	Minimal hierarchy with a much broader span of control.
Top-down communication of objectives.	Two-way communication of objectives and means to achieve them.
Delegating authority and responsibility.	Empowerment and individual management of functions by all. TQM focuses more on the delegation of authority with the expectation of individual accountability throughout the organisation.
To "manage" is to "control".	TQM principles call for the management of systems and processes and leadership of people, replacing control of people.
Organisations have evolved to an adversarial "us/them" relationship between labour and management.	TQM leadership views co-operative relationships with "management mentors" supporting the efforts of "employee/associates."
People are expendable and considered a liability.	People are valued assets, which are the keys to achieving growth, sales and profits.
Education is a series of discreet events.	Education is a continuous process.
Heroes, problem solvers and fire fighters.	Achieve extraordinary results through ordinary people.
Primarily focused on doing.	Taking time to Plan, Check and Act along with Do.
Maintaining the status quo.	Continuous improvement of the organisation, its products and services is the norm.
All values between specification are equally good.	Continuously reduce limits variation around the target.
Concerned with short-term financial loss to company - scrap and re-work.	Addresses long-term loss to society once product is shipped.
Decisions made by top management.	Using a balanced approach to obtain the best decisions. Employing the different strengths of people to improve decision-making capability of the organisation.

Source: Prepared by the Author

Based on the above definition of TQM, the author establishes the principles of TQM. These are:

The Theme: TQM must be grounded in a continuous improvement philosophy. It is geared to the continuous improvement of quality in a hospital. However, the literature is devoid of suggestions as to how to sustain this never-ending journey. The author is of the view that for TQM to actually constitute a never-ending process, it must deliver on performance. Therefore, TQM must be result-oriented in order for employees/management to believe it actually delivers a transformational strategy.

The Focus: TQM is customer-focused. It is based on customer expectations and on meeting customer needs. However, in healthcare, the identification of the customer is a relatively new concept. The patient is not traditionally viewed as the ultimate 'external' customer. The idea of the patient and the existence of other external customers such as the government, employers, third party payers has only been acknowledged recently. In addition, in an environment characterised by professional dominance, the identification of the customer and the anticipation of their needs is rather alien (Claus, 1991).

The Control: TQM requires analytical knowledge and skills and an organisation's long-term commitment. The use of analytical tools and techniques to evaluate and improve processes and in business decision making are very important to a TQM process. Engineers, business managers, quality control staff and others have used measurement, graphs of data, controls charts and other quantitative techniques for years. However, these skills have not been widely used by healthcare managers to improve organisational performance.

The Approach: TQM requires a structure and organisation which must be tailored to the unique internal and external culture and environment. A supportive structure and organisation should be established to ensure the success of a wide range of quality improvement efforts ranging from formal Quality Improvement Teams through daily quality improvement efforts of every employee. If quality improvement is to become an organisational focus, it must be management driven and be tailored to the unique internal and external culture and environment of the hospital. Applied to the hospital setting, with its dual line of authority, this means that both administrators and the consultants will have to take the lead and move beyond 'advanced

lip-service' in applying the principles and tools to their work setting (Claus, 1991). However, this is easier said than done.

The Scale: TQM involves interpersonal or people skills. As work is accomplished by people, the involvement of everyone in the organisation and the empowerment of staff are critical to success in a highly competitive healthcare environment. Better ideas are generated and changes implemented faster if staff closest to the process are involved in the analysis and decision-making process. However, in healthcare, empowerment of staff remains an illusion. Many senior managers are still not prepared for an empowered subordinate.

The Scope: TQM's focal point is leadership and collaborative teamwork. Overtime, leadership drives the process and creates the pressure for cultural change within the organisation, which can significantly influence the external culture. Nevertheless, the TQM literature remains vague on how to achieve leadership and collaborative teamwork, particularly in a healthcare setting, where consultants see themselves as better trained and more qualified than the rest of the staff.

In conclusion, the uniqueness and power of TQM is in the integration and balance of the above principles, not in the use of individual principle. The key to organisational goal achievement is PEOPLE, especially in a labour-intensive healthcare environment. Inattention to people and cultural change are the most common reasons for the excessively long periods or failure in implementing TQM in healthcare. It is important to recognise that very few healthcare professionals have a combination of analytical and people skills today. Training programs with skill-building opportunities are essential to help healthcare professionals and practising managers to develop and combine these skills. In the next section, the author describes the relationship of TQM to quality assurance efforts and presents an approach to integrate TQM and quality assurance activities.

4.3 Integrating TQM and Quality Assurance (QA)

As mentioned earlier, Yap's study has identified in general the QA activities adopted for internal quality control by Singapore hospitals. Since every hospital's QA program is different, it is impossible to compare TQM with an individual hospital QA program. However, in this

section, the author discusses the similarities and differences between QA and TQM before looking at how the two approaches could be integrated.

The key characteristics of a QA approach compared to TQM are illustrated in Table 4.3. There are several differences, but the three key factors are:

- The focus on everyone as customers and suppliers in a process.
- The emphasis on improving the processes for everyone rather than identifying only the problems and unacceptable few.
- Continuous improvement rather than static standards for quality indicators.

Although Yap (1991) sees the QA activities adopted by Singapore hospitals as valuable functions, however, a number of QA functions can be improved by using a TQM approach.

These are:

- * *Broader definition of quality* - For most QA programs, quality is defined in terms of clinical outcomes or services that directly affect clinical outcomes. This definition ignores many other characteristics of care which are important to patients, their families, the referring physicians, staff, payers and other customers. TQM has a much broader definition; quality is meeting valid customer requirements, for **all** customers. Thus, for TQM, quality encompasses all clinical and non-clinical services, products and information. Indicators are based on the expectations of patients, families, physicians, payers and other customers, in addition to traditional professionally defined quality indicators.

Table 4.3: Comparison between QA and TQM

<i>Characteristic</i>	<i>Quality Assurance</i>	<i>Total Quality Management</i>
Purpose	<ul style="list-style-type: none"> Improve quality of patient care for patients 	<ul style="list-style-type: none"> Improve quality of all services and products for patients and other customers
Scope	<ul style="list-style-type: none"> Clinical processes and outcomes Actions directed toward people studied Mandated by Accreditation Unit and others 	<ul style="list-style-type: none"> All systems and processes - clinical and non-clinical Actions directed toward process improvement Optional, but in order to meet JCAHO performance measurement, some aspects of TQM needed
Leadership	<ul style="list-style-type: none"> Physician and clinical leaders: chief of clinical staff, QA committee 	<ul style="list-style-type: none"> All clinical and non-clinical leaders
Aims	<ul style="list-style-type: none"> Problem solving Identify individuals whose outcomes are outside specified thresholds - implies special causes 	<ul style="list-style-type: none"> Continuous improvement, even if no "problem" identified Addresses both special and common causes - most attention toward common causes
Focus	<ul style="list-style-type: none"> Peer review vertically focused by department or clinical process - each department does its own QA Unacceptable few - education or elimination of those who do not meet standards Inspection Outcome-oriented 	<ul style="list-style-type: none"> Horizontally focused to improve all processes and people that affect outcomes Improve performance of everyone, not just the unacceptable few Prevention and design to improve the processes - then inspection to monitor process Process- and outcome-oriented
Customers and Requirements	<ul style="list-style-type: none"> Customers are professionals and review organisations Measures and standards established by healthcare professionals only 	<ul style="list-style-type: none"> Customers are patients, professionals, review organisations, and others - everyone No long-term fixed standards - continuously improving standards established by customers and professionals
Methods	<ul style="list-style-type: none"> Chart audits Nominal group technique Hypothesis testing Indicator monitoring 	<ul style="list-style-type: none"> Indicator monitoring and data use Brainstorming Nominal group technique Force field analysis Coaching/mentoring Flowcharting Checklist Histogram/Pareto chart Cause-effect, fishbone diagram Run/control chart Stratification Quality function deployment Hoshin planning
People Involved	<ul style="list-style-type: none"> QA program and appointed committees Actions decided by committees appointed for specific periods Limited involvement 	<ul style="list-style-type: none"> Everyone involved with process Actions decided by team of people familiar with process - no time period specified Total institutional involvement
Outcomes	<ul style="list-style-type: none"> Include measurement and monitoring May improve performance of the few individuals addressed Creates defensive posturing 	<ul style="list-style-type: none"> Include measurement and monitoring Improves performance of everyone involved in process Focus on process improvement - reduces threat to individuals, promotes team spirit, and can break down turf lines Includes QA efforts
Continuing Activities	<ul style="list-style-type: none"> Monitor for deviations from thresholds/standards Follow up when there are special cause deviations 	<ul style="list-style-type: none"> Monitor processes for deviations (QA) and continually improve standards (QI) Follow up when there are special or common cause deviations

Source: Coffey, R.J. (1991), "Comparing TQM and Traditional QA: Considerations for Health Care Organisations". *Competitive Times*, No. 2, Methuen, Mass: GOAL/QPC, pp. 9 - 10.

- * *Extension beyond clinical performance* - The performance of a physician, nurse or other clinician is heavily influenced by supportive and administrative processes as well as the clinician's personal decisions. For example, a physician orders a laboratory test and the results are delayed or incomplete. This may lead to delayed clinical decisions and treatment. It may also require rework. The physician may be forced to order the same laboratory test on a stat basis. Delays can lead to an undesirable clinical outcome and excess use of services, for which the physician is criticised during the QA process. TQM extends consideration to the whole process, not just clinical performance.

- * *Application of TQM methods to improve QA* - The QA process that exists to identify problems with individual or system performance does not have any particular methods to improve performance. TQM has several group-process and analytical methods that can be used to direct attention to the most important quality improvement issues, to focus on data rather than opinions, to ask the correct questions, and to reduce defensive posturing.

- * *Evolution of positive approach and standards based on process capabilities rather than opinions* - QA standards are normally based on data from other organisations or on opinions relating to acceptable performance held by members of the respective QA committees. QA standards are seldom based on the capabilities of the current process. This leads to two situations. The first is that the standards are set too narrowly, and virtually everyone easily meets the standard. Alternatively, the standards may be set too widely, and the QA committee spends a lot of time investigating individual performances that simply reflect that the overall system is incapable of meeting the standards. By using control chart that is a TQM method, the control limits are based on the measured outcomes, or capabilities of the current process. This allows managers, teams, or the QA committee to ask the appropriate questions about whether the process measurements are due to a special/assignable cause, in which case the reason for that outcome is investigated individually. If, on the other hand, the measurements are within the control limits, attention is focused on how to improve the processes so that everyone's performance can be improved. There is no investigation of individuals or possible special causes in this situation. However, the focus of the investigation is to

find better processes and develop plans to improve processes, not to identify individuals who do not meet those goals.

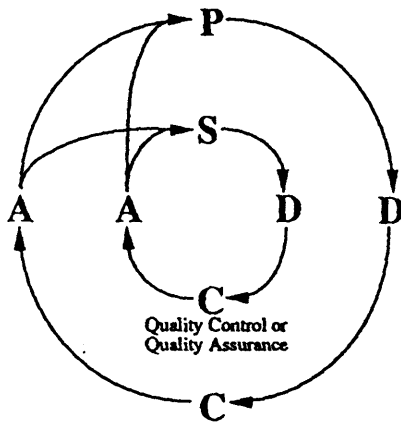
- * *Dynamic quality improvement* - Hospitals with established QA standards usually use the same standards for multiple years. TQM, on the other hand, stresses continual improvement. Quality levels are expected to improve each year.
- * *Prevention and design rather than inspection* - QA is based on inspection as the primary approach to identify problems for resolution. TQM, on the other hand, is primarily based on prevention and design of new or improved systems to prevent quality problems. This type of approach can help QA process move away from inspection as a primary means to achieve quality.

Having discussed the differences between QA and TQM and QA areas that could be improved with TQM, the author moves on to discuss an approach to integrate QA and TQM.

Transition from QA to a fully implemented TQM process will take time and can be accomplished by using different approaches. Each organisation must develop an approach consistent with its current situation, plan and resources. However, to facilitate the integration of QA and TQM, the following actions should be looked into:

- * Communicate relationship of QA and TQM. One useful approach is to use the P-D-C-A and the S-D-C-A cycles illustrated in Figure 4.7. The outer cycle is the Plan-Do-Check-Act, or P-D-C-A, quality improvement process. This approach is used when a process is being studied for improvement. The inner cycle is the Standardise-Do-Check-Act, or S-D-C-A, cycle. Once a process is improved it should be standardised to minimise the variation among different people performing the process. The quality assurance process then continues to monitor for compliance with the established standards. If special causes are identified, the QA committee may investigate and resolve the issues. If on the other hand, a systematic quality gap is identified, a Quality Improvement Team may be established. The situation jumps back and forth between the P-D-C-A cycle for improvement and the S-D-C-A cycle for quality assurance or control.

Figure 4.7: QA Relationship to P-D-C-A and S-D-C-A Cycles



Source: King, B. (1989b), “Hoshin Planning: The Developmental Approach”. Methuen, Mass: GOAL/QPC, pp. 1 - 18.

*

Develop and communicate plans for integration. This involves:

- consolidate leadership of QA, TQM and operations. One of the most important changes is to make sure the leadership of QA, TQM, and daily operations have a common direction and are co-ordinated. All three should report to the same leadership body. If the three report to different leaders, it will be very difficult to maintain an integrated plan, direction and priorities.
- include QA management and staff in the development, education and implementation of TQM. There would be much less resistance if QA staff are informed and involved. The QA leaders and staff should be included in all TQM education programs.
- cross-educate QA and TQM leaders and staff. Educate all QA staff in the use of quality improvement methods. It is particularly important to train QA leaders and staff as TQM team leaders and facilitators. Similarly, it is important to educate TQM leaders and staff about the QA processes, data sources, and their staff capabilities.
- provide diversified opportunities for TQM training. Given the restricted time availability of clinical staff, involving them in TQM training may require providing diversified training opportunities.
- select TQM pilot project from QA process. An effective approach for integrating QA and TQM is to use the QA process to select one of the pilot TQM projects.

One of the early quality improvement projects will then yield an improvement visible to QA leaders and staff.

- use QA organisation and resources rather than duplicate them. As physicians and other clinical staff have very limited time available, the QA organisation and resources should be used to identify important quality improvement projects. Some of the clinical and QA staff should also serve on some of the quality improvement projects.
- integrate the indicators used for QA and TQM. By integrating the indicators, the relationship of QA and TQM will be more evident to everyone.

In conclusion, when moving ahead to implement TQM, it is important to continue meeting the requirements of the Medical Audit and Accreditation Unit and other review agencies. In the next section, the author examines the pitfalls of TQM in healthcare.

4.4 Pitfalls of TQM in Healthcare

A number of factors has been identified as being unique to the healthcare industry. According to Claus (1991), these are:

- * The relatively long learning curve leading to the acceptance of TQM.
- * The search for the perfect plan.
- * The advanced lip service paid to TQM.
- * The fragmented effort as a result of a lack of vision.
- * The general resistance to change.
- * The opportunity cost involved.
- * Short-term orientation.

Hence, QA has been the dominant thinking in healthcare rather than TQM (Claus, 1991). QA activities have been described by Berwick as being limited to inspection rather than improvement, focused on what has been done, outcomes, rather than how things should be done, concerned with meeting requirements rather than with expectations, focused on monitoring and surveillance instead of on quality improvement (Claus, 1991).

A obstacle to the successful implementation of TQM identified by Claus (1991), is the professional dominance by consultants in teamwork, coupled with the emphasis on the personal responsibility of the consultant. This could severely impede the true collaborative efforts of teams. There is also the issue of professional resistance from many professional groups that are represented in healthcare. This is because of their affiliation to their professional bodies. In the Singapore healthcare industry, very little support for the TQM process has yet to come from the major Colleges and Associations representing Consultants, Doctors, Nurses, Pharmacists and other Therapists in guiding their members with regard to their contribution and involvement in the TQM process. Furthermore, the precarious budgetary situation facing many hospitals is not conducive to monopolising the resources necessary to implement a continuous improvement process. This coupled with the long-term nature of TQM, can create an attitude of procrastination amongst decision-makers.

Godfrey, Berwick and Roessner (1992) reports a common set of bottlenecks that decelerate progression to mature quality management. These are:

- * insufficient facilitation - either too few facilitators or too little progress in facilitative management to support quality improvement methods.
- * insufficient Board involvement and education.
- * rapid turnover in medical staff.
- * restructuring.
- * excessive word crafting of both mission statements and TQM policy documents.
- * executive turnover is a potentially lethal factor on healthcare quality. When a change of CEO, for example is imminent, few managers have the confidence to carry on TQM. until the name and agenda of a new executive are known.
- * key processes in healthcare organisations are complicated, often inter-departmental.
- * limited commitment to the TQM agenda by the CEO.

Similarly, Merry (1990) contends that systemic deficiencies, in the form of poor information transfer between support services and patient and the lack of co-ordination between the various diagnostic and therapeutic services inhibits TQM. He further suggests that the relative isolation of consultants and virtually all clinical staff, heretofore characteristic of healthcare quality is

antimetical to TQM. Therefore, consultants may well prove to be the 'killer-lymphocytes' opposing the quality process in healthcare organisation.

The author agrees with Merry that consultants may well be the stumbling block to the successful introduction and maintenance of TQM in healthcare. Although these issues are yet unsolved, the author suggests that healthcare organisations should deal directly with the practitioners. To start off, it is very necessary to begin with steps that do not pose direct threats towards the individual practitioner. There should be regular meetings to define processes and outcomes that constitute high quality care and provide a non-threatening forum that raises quality consciousness. The meeting should provide a forum for discussing general information such as successful working clinical models in healthcare, link examples of improvements in processes with enhancements in patient care quality, discuss patients' expectations and perceptions of service quality, etc. There must be no special onus or imputation of wrong outcomes associated with the meetings. Lastly, the most important step is to change the practitioners' behaviour and to gain their involvement in the decision-making process. This includes the ability to gather and discuss problems openly, share information and findings and to drive out fear, fix the process and not fix the blame.

In Chapter 7, the implementation framework of the proposed total quality healthcare model emphasises the need to gain practitioners' support and involvement in decision making and in the creation of a TQM culture.

Reeves and Bednar (1993) report that the greatest barrier to TQM in healthcare is 'territorialism' which produces dysfunctional consequences for both individuals and organisation. They have identified a number of other barriers that impede the adoption of TQM which are:

- * Lack of consistent support from executive
- * Fear/resistance to change
- * Failure to implement solutions in a timely manner
- * Inadequate planning for TQM
- * Ineffective communication

- * Faulty group process
- * Sabotage/lack of commitment from both middle/top management
- * Politics/turf battles
- * Turnover/changes in key personnel

Similarly, in Singapore hospitals, territorialism has led to battles between functional areas over resources thus, creating a functional dependence culture that undermines the spirit of team-work that TQM seeks to promote.

Shortell (1993) states that the major barriers to the integration of TQM into healthcare are:

- * the ability to overcome the hospital paradigm.
- * the failure to understand the new core business of healthcare.
- * the inability to convince the 'cashcow' to accept a systems strategy.
- * the inability of Board members to understand the new healthcare environment and their responsibilities.
- * ambiguous roles and responsibility throughout the system.
- * the inability to 'manage' managed care.
- * the lack of strategic alignment of the quality initiative into corporate planning.

However, one of the key principles of TQM which many quality practitioners have struggled with in Singapore hospitals, is the continuous improvement of work processes (THE THEME). This is because managers and staff, clinicians included, have consistently failed to see their work as processes and this has adversely impacted on their ability to meet patients' expectations.

Furthermore, the deliberate approach by some healthcare organisations to change the behaviour of their employees rather than the system, represents a misconception of what is required to affect TQM. Many managers forfeit the obvious, that it is the system, and not the people, which is responsible for 85% of all quality problems (Deming, 1986). Unless there is a quality system, there can be no quality outcome (Deming, 1986). If behaviours are to change, the system must change in spite of every counter effort. One reason for this failure is the failure of leadership. If

TQM were to be properly implemented, the implementer(s) should ensure it focuses on improving the quality of the system so that organisational behaviours would be improved and effective quality outcomes would be achieved (Wakefield and Wakefield, 1993).

Additionally, in most healthcare organisations, the traditional employee evaluation and reward systems, which emphasise individual technical competence rather than the overall quality of team performance and productivity, have created a cadre of tunnel-visioned front-line supervisors, middle managers and, in some cases, senior executives who are concerned only about the activities of subordinates under their immediate control, with little interest in, or influence over, broader organisation-wide quality and productivity. Furthermore, department managers and first-line supervisors frequently have well-developed technical skills but lack training in, and understanding of, basic management supervisory and problem solving skills. This has led to the situation where the incorporation of quality management methods is frequently viewed by clinical staff as incompatible with the highly individualised nature of patients needs, hospital services, delivery mechanisms (Wakefield and Wakefield, 1993).

Finally another reason for the failure of TQM in healthcare is the issue of vertical hierarchy. In healthcare, due to the provider-purchaser split, more multiple levels of managerial hierarchy have developed; for example, first line supervisors, department managers, directors of directorates, service managers, CEO, non-executive directors, chairman, etc. As these managers focus on a portion of the hierarchy, a more “vertical” rather than “horizontal” approach to issues has developed. In consequence, healthcare organisations are further removed from meeting the needs of its main customer - the ‘patient’.

Having identified the pitfalls of TQM in healthcare, the author in the next section reviews extensively the TQM implementation models of the Gurus and 20 different TQM researchers to identify the need to develop a total quality healthcare model and to propose an implementation framework for the proposed model to suit the uniqueness of the healthcare industry.

4.5 TQM Implementation Models

The TQM literature seems inundated with a variety of approaches/models to the implementation of TQM which have been shaped over the past decades by a variety of Gurus and researchers. These models are usually presented as 'steps' to quality or 'phases' of quality improvement (Claus, 1991). In this section, the author examines the implementation models of 3 Gurus - Deming, Juran and Crosby and 20 different researchers namely, Claus, Hillman, Fried, Haigh and Morris, Roy, Melum and Sinioris, Batalden et al, McLaughlin and Kaluzny, Collard, Beer and Walton, Latif, Littman, Ovretveit, Lesley and Malcolm Munroe-Faure, Holt, Scholtes and Hacquebord, Spector and Beer, Wilkinson and Witcher, Godfrey et al, and Oakland to assess their suitability within the context of Singapore hospitals.

4.5.1 The 'Gurus' on TQM Implementation

TQM represents the eternal search for continuous quality improvement in the product or service that is offered to both internal and external customers. Its characteristics are to be found in the work of Deming (1986), Juran (1988) and Crosby (1979) and are often summarised as being the presence of a formulative customer focus, employee empowerment and the installation of leadership. The fundamental message of these three quality Gurus is essentially the same, although they might use different dialects (Oakland, 1990). The salient characteristics of their work are depicted in Table 4.4.

Table 4.4: The Quality Gurus Compared

	Crosby	Deming	Juran
Definition of quality	Conformance to requirements	A predictable degree of uniformity and dependability at low cost and suited to the market	Fitness of use
Degree of senior management responsibility	Responsible for quality	Responsible for 94% of quality problems	Less than 20% of quality problems are due to workers
Performance standard/motivation	Zero defects	Quality has many 'scales'; use statistics to measure performance in all areas; critical of zero defects	Avoid campaigns to 'do perfect work'
General approach	Prevention, not inspection	Reduce variability by continuous improvements; cease mass inspection	General management approach to quality, especially 'human' elements
Structure	14 steps to quality improvement	14 points for management	10 steps to quality improvement
Statistical process control (SPC)	Rejects statistically acceptable levels of quality	Statistical methods of quality control must be used	Recommends SPC but warns that it can lead to 'tool-driven' approach
Improvement basis	A 'process', not a programme; improvement goals	Continuous to reduce variation; eliminate goals without methods	Project-by-project team approach; set goals
Teamwork	Quality improvement teams; quality councils	Employee participation in decision making; break down barriers between departments	Teams and quality circle approach
Costs of quality	Cost of non conformance; quality is free	No optimum, continuous improvement	Quality is not free, there is an optimum
Purchasing and goods received	State requirements; supplier is extension of business; most faults due to purchasers themselves	Inspection too late; allows defects to enter system through AQLs; statistical evidence and control charts required	Problems are complex; carry out formal surveys
Vendor rating	Yes and buyers; quality audits useless	No, critical of most systems	Yes, but help supplier improve
Single sourcing of supply		Yes	No, can neglect to sharpen competitive edge

Source: **Oakland, J. (1989)**

In essence the message is: attack the system for the delivery of products and services and do not attack the employee; strip down the work process whether it be in the manufacture of a product or the delivery of a service; identify your customer and delineate customer needs; find and eliminate the problems which prevent the continual satisfaction of customer needs; eliminate waste; instil pride in performance and teamwork; create an atmosphere of innovation and continuous quality improvement. The Gurus claim that a process that exhibits such features will lead to increased corporate competitiveness and profit by increasing customer demand. In practice, such a scenario is naive. Quality is not a detached and generally recognised standard of excellence, but something which is agreed between the actors in the supplier-processor-customer chain in order to ensure that external customers are always offered what they are able and willing to pay (Wilkinson and Witcher, 1991).

When the ideas of these three gurus on the theme of enhanced quality are amalgamated, coupled with a range of implementation techniques and then customised to suit the stated needs of a particular organisational culture of hospitals, the result is a multiplicity of hybrids which have the appearance of a quality quagmire (Oberle, 1990); very easy to enter, very difficult to move through with any confidence and almost impossible to emerge from with a sense of direction intact. It has been noted that "Crosby's 14 steps" were over-long and is a complicated process designed to achieve relatively simple ends (Kogan, Henkel and Spink, 1991). This is in relation to the number of steps and the 'tedious' process of specifying suppliers and customers in the internal customer chain. Furthermore, a fair number of people in hospitals do not understand the concepts of zero-defects (Joss, Kogan and Henkel, 1994). For example, what is the practising manager to make of the exhortation to achieve "zero defects" whilst being encouraged at the same time to "avoid campaigns to do perfect work?" (Haigh and Morris, 1995).

The consequence is 'cafeteria management', a style of management marked by the tendency of practising managers to take into account only those aspects of quality management that appeal to them. The totality is forsaken in pursuit of the parts which are seen to have the most immediate relevance and return; the word 'total' is removed with only 'quality management' remaining. This selectivity inevitably results in the partial implementation of TQM. Perhaps such an outcome is not unexpected as most practising managers and the Gurus themselves share a professional, operationally oriented, managerial background in which broader organisational

issues, such as the impact upon decision making of the intra-organisational political dimension were largely ignored (Wilkinson and Witcher, 1991). The Gurus implicitly view management as a technical resource with management strategies including TQM, being viewed as a rational and linear progression (Wilkinson and Witcher, 1991). However, other writers perceive management as an inherently political process and organisations as social constructs in which groups compete for influence and power in order to determine the allocation of finite corporate resources. The absence of such contextual factors in the work of the quality Gurus serves as a limitation upon the successful implementation of TQM, particularly in health service, for as Sinclair (1993) notes, the lack of attention directed to the 'people issues' within organisations ensures a reduction in rational prescription. The apparent absence of a realistic approach to organisational politics and, in particular, to the politics of organisational change, means that the Gurus have produced idealised concepts and prescriptions which are poorly suited to the demands and constraints of modern businesses (Sinclair, 1993).

In conclusion, the notion that TQM is holistic as implied by the word 'total' is vital. Yet evidence exists which suggests that the quality Gurus have not adequately contextualised their ideas. They have provided prescriptions as a guide to the practising manager seeking to launch his/her organisation along the road to continuous quality improvement without providing the manager with an adequately integrated framework within which the principles of TQM can be operationalised, sustained and brought to fruition. Considering this, in the next section, the author examines the TQM implementation models of 20 different researchers to determine the need to develop a total quality healthcare model for TQM in Singapore hospitals.

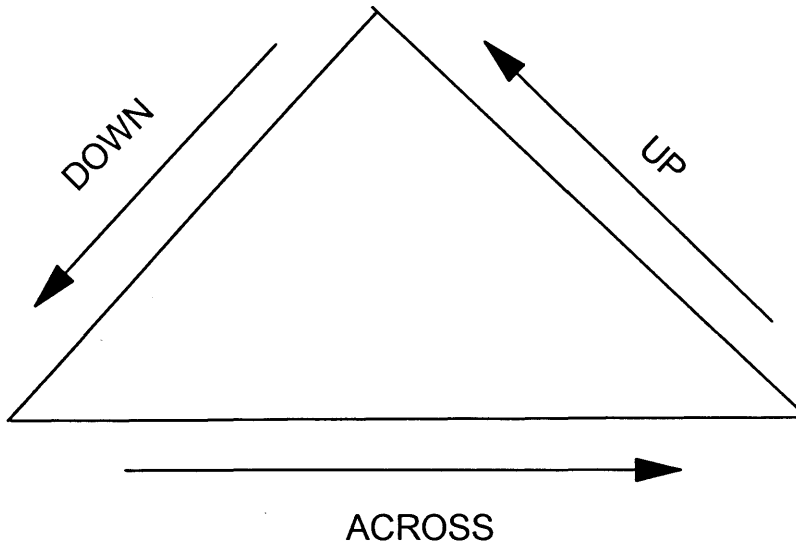
4.5.2 TQM Implementation Models By 20 Different Researchers

Claus (1991) argues that what organisations should keep in mind when implementing TQM is that TQM is itself a model for organisational change, requiring that a number of necessary conditions to be present for change to occur. He further argues that if a hospital's continuous improvement process is to be reflected in the attitude and behaviour of its employees, the hospital environment will need to acquire the attributes of a learning organisation. According to Claus, the 'Change' step model of TQM in healthcare involves:

- * Organising for change
- * Preparing the environment
- * Empowering employees
- * Focusing the environment
- * Engaging the environment

The continuous improvement strategy of any hospital needs to be carefully developed, implemented and time-phased in a manner that can be effectively managed for short-and long-term results (Claus, 1991). However, an organisation needs to be aware of existing barriers and obstacles that can jeopardise the implementation of the quality improvement process. As Hillman (1991) notes, the most crucial element to the successful implementation of TQM is 'effective' communication. To be effective, he argues, the communication framework must work well in three directions as shown in Figure 4.8:

Figure 4.8: Communication Framework



Source: Hillman, P (1991) TQM Magazine, Oct.

If communication were affected as the diagram illustrates, this would ensure that everyone in the organisation knows and understands:

- "Where the organisation wants to be" - mission
- "What we need to do differently" - planned improvement

- "What we have achieved" - feedback and success stories
- "What still needs to be done" - next steps
- "What are our customer requirements"

It is important that organisations, in communicating the need for change, should use a non-threatening and motivating language (Hillman, 1991). Whatever is being communicated must be reinforced by action because people are more influenced by what they experience rather than by what they see or hear (Hillman, 1991).

Fried (1992) suggests that for TQM to succeed in healthcare, quality management efforts must have an agreed meaning of quality. However, a commonly held definition of quality has been elusive in healthcare (Kogan, Henkel and Spink, 1991). A central problem for TQM in healthcare is whether the system should provide patients/customers with what they want or with what they need? It is believed by many that patients fare better if their care is co-ordinated by one provider with whom they have a long term relationship (Zemke and Schaef, 1989). Thus, Fried argues that to succeed, the language of TQM might need modification; words like 'customer' create problems for healthcare professionals. Thus, substituting 'Total Patient Care' for "meeting customer requirements" is a small but significant change (Fried, 1992). However, Claus (1991) notes that no perfect TQM design can be plugged into a hospital and at the same time meet all of the organisation's structures. However, some basic steps can be discerned:

- Phase 1: Executive Education (Commitment)
- Phase 2: Middle Management/Supervisory Education and Action
- Phase 3: All Employee Education and Action

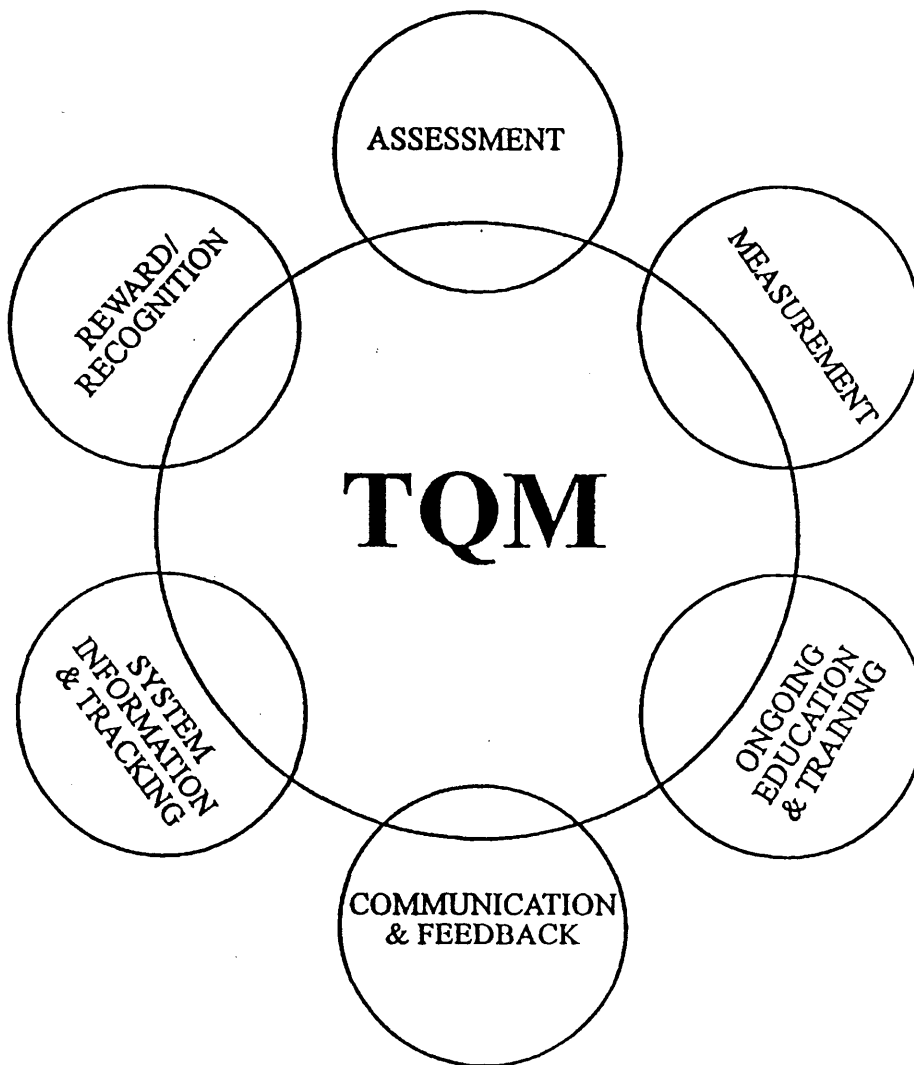
In order to be successful, a continuous improvement process has to be management driven, driven through a number of key elements as shown in Figure 4.9.

Although there is no perfect implementation model, the author believes that for TQM to succeed, a sustaining and supportive infrastructure is required. This will ensure that TQM programmes are adequately managed. What Claus fails to contextualise in his prescription is

the 'requirements' at the initial stages prior to the introduction of a TQM initiative. Some activities are essential for the sustainability of the programme:

- i. strengths and weaknesses of the firm
- ii. values and beliefs which have to be realigned to meet the principle of TQM

Figure 4.9: Key Elements for TQM Implementation



Source: Claus, L.M. (1991) "TQM: A Healthcare Application". *Total Quality Management*, Vol. 2, No. 2.

According to Haigh and Morris (1991), measurement of quality is another important ingredient for the success of TQM. 'What cannot be measured, cannot be managed' argued Haigh and

Morris. Similarly, Roy (1991) suggests that for 'quality' to succeed in healthcare settings, quality standards will need to be identified throughout directorates and units and that the associated standards should be monitored and evaluated continuously. This will lead to an improvement in the efficiency and effectiveness of services provided. Additionally, the nature of the hospital as a service provider, and the limited human/financial resources available, make it imperative that an incremental approach to the implementation of TQM should be adopted; initially to ensure success, thereby offering quick-investment-for-effect and reinforcement of the quality message. This will ensure that hospitals build on an early return to motivate people. Nevertheless, it has been identified that the nature of healthcare organisations works against implementing TQM (Fried, 1995). There is a hierarchical structure with conventional reporting relationships and the workforce is multi-disciplinary; thus, it cannot be managed like most employees within the commercial sector. Moreover, physicians make decisions that dominate every aspect of a hospital's activity, hence, any impetus for change should always come from clinicians. Similarly, Melum and Sinioris (1992) contend that if TQM is to be successful in a hospital setting, physicians must play a central role. But they note that achieving substantial consultant involvement in TQM is one of the most difficult and paradoxical challenges facing healthcare executives. Traditional management paradigms ask physicians to support a strategy to ensure the survival of an organisation. However, the primary definition of such physicians is to their profession. Healthcare organisations can maximise their chances of successfully appealing to physicians by ensuring that their strategy meets at least four criteria:

- i. Management commitment to TQM and action.
- ii. Identification of a 'Champion' amongst the consultant hierarchy.
- iii. Effective differentiation of TQM and QA.
- iv. Development of improvement projects that address physicians to-priority problems.

Furthermore, hospitals should address the three roles physicians play: consumer, processor and supplier; emphasising improvement in clinical outcomes and a reduction in patient waiting time.

Melum and Sinioris further suggest three implementation strategies that are imperative in building consultant support for TQM:

- i. We are in this together - make physicians full partners in the organisation's TQM efforts from the beginning
- ii. Prove it first: prove the validity of TQM to physicians through demonstration projects before asking them to participate
- iii. Help physicians help themselves - implement TQM in the physicians' office; clinical areas

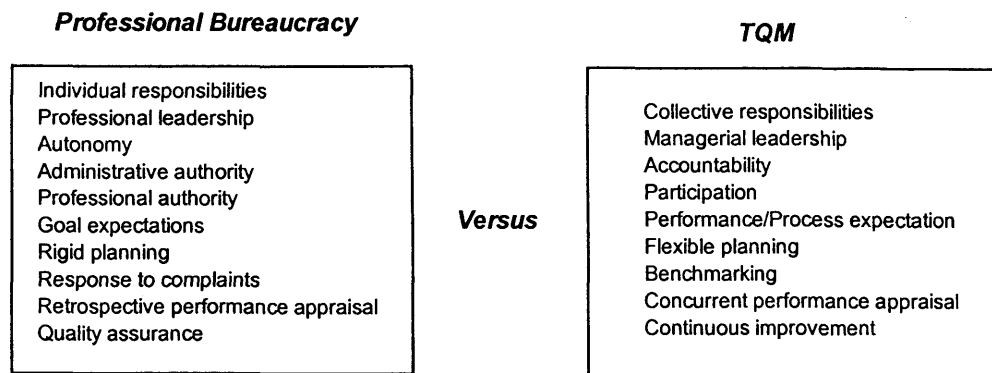
These strategies are consistent with the view of Fried (1991), who notes that 'attempting to impose changes' (TQM) in medical practice from the administrative side without clinical support is a recipe for disaster'.

Batalden et al (1989) view of a totality approach to quality outlined what the healthcare leadership must learn in order to implement TQM successfully:

- * Management must learn the meaning of quality, including an understanding of the importance of the customer
- * Top management must sponsor and encourage the continuous improvement of quality, including the wise use of teams that can work effectively to improve systems and other processes
- * Management must understand the use of statistical thinking

However in healthcare, clinicians view quality as a process of evaluating and regulating themselves, to gain and protect their professional domains and autonomy but TQM does not respect existing professional standards, it is continually demanding new ones. The reality is that for TQM to work in healthcare, both the models of TQM and professional bureaucracy as shown in Table 4.5 must be accommodated (McLaughlin and Kaluzny, 1990).

Table 4.5: TQM and Professional Bureaucracy



Source: McLaughlin and Kaluzny, 1992

McLaughlin and Kaluzny (1990) suggest 11 actions that they believe must be undertaken for management to function well in a TQM environment:

- i. Redefine the role of the professional
- ii. Redefine the corporate culture
- iii. Redefine the role of management
- iv. Empower the staff to analyse and solve problems
- v. Change organisational objectives
- vi. Develop mentoring capacity
- vii. Drive the benchmarking process from the top
- viii. Modify the reward system
- ix. Go outside the health industry for model
- x. Set realistic time expectations
- xi. Make the TQM programme a model for continuous improvement

However, McLaughlin and Kaluzny's 11 actions represent a lot of theory without backup by tools. There is a big difference between suggesting actions necessary for TQM and showing someone 'how to do it?' It is important that organisations learn to purpose-build in the implementation of TQM rather than doggedly follow prescriptive packages.

According to Collard (1989) a successful TQM programme should be based on the following principles:

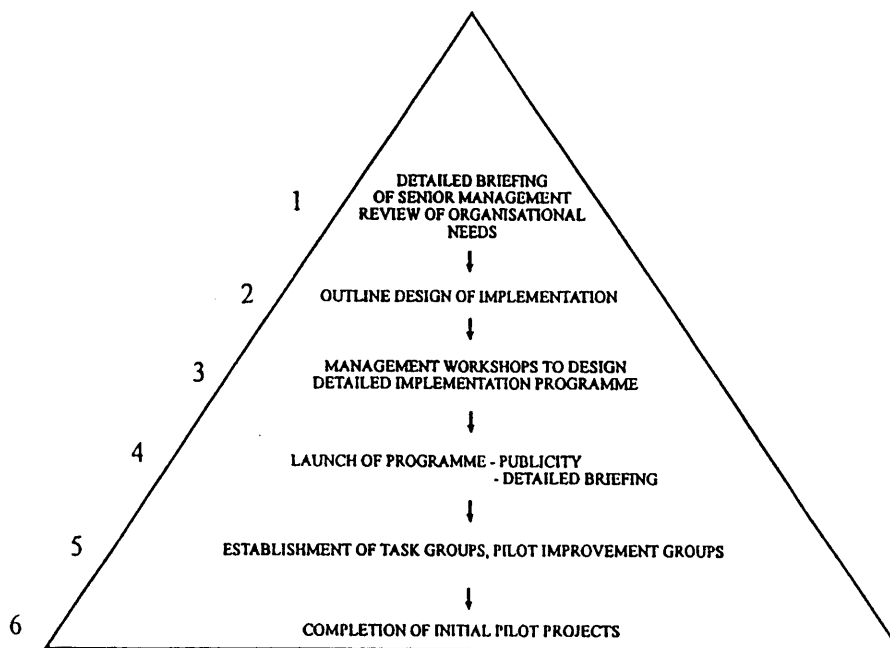
- * Top management commitment
- * Attitude change
- * Continuous improvement
- * Strengthened supervision
- * Extensive training
- * Recognition of performance

Collard further suggests that the implementation process involves the establishment of:

"A steering committee led by senior management and the quality manager, the facilitator and key functional heads. Its role is to set priorities and allocate resources and ensure that projects meet their objectives. An interdisciplinary task force should be set-up by management aimed at solving specific problems. Furthermore, improvement groups/quality circles should be set-up within the same work area, composed of operational or front line staff".

Collard notes that this group should be voluntary and allowed to choose its own improvement projects. Collard further suggests what he calls a typical TQM implementation plan as shown in Figure 4.10.

Figure 4.10: A Typical Implementation Plan



Source: Collard (1989) "Total Quality Success Through People". IPM Publication

However, the model put forward by Collard respectively seems inappropriate for the implementation of TQM in hospitals because they fail to build into it the flexibility required for the integration of other numerous initiatives such as listening to the voice of the customers and linking the voice of the customer for process improvement. Additionally Collard model is based on the incremental continuous improvement approach that has been established as being inappropriate for the healthcare setting. There are, however a number of divergent views among commentators about the best approach to TQM implementation. Beer and Walton (1993) argue that 'change' is not brought about by following a grand master plan but by continually adjusting direction and goals. The greatest obstacle to revitalisation, they contend, is the idea that it comes through company-wide change programmes. This assertion is consistent with the problems faced by Singapore hospitals due to the constant intervention of the MOH. In practice, healthcare practising managers are bound to develop strategies to TQM based upon their existing working norms, practices, ethics and subjective understanding. As a result, a very diverse set of practices seem to be emerging within the rather 'empty shell' of the TQM processes. From empirical evidence, it is the author contention that what exists in Singapore hospitals is the professionals' approach to quality. The reason being that hospitals is still a professionally dominated organisation. The professional staff are yet to imbibe the holistic view of quality. Until such a time when there will be a change in the stratified culture, the professionally oriented quality initiative will dominate. Moreover, the customer has no real choice, irrespective of whether or not a patient's needs are met, the patient has no reasonable alternative source of provision.

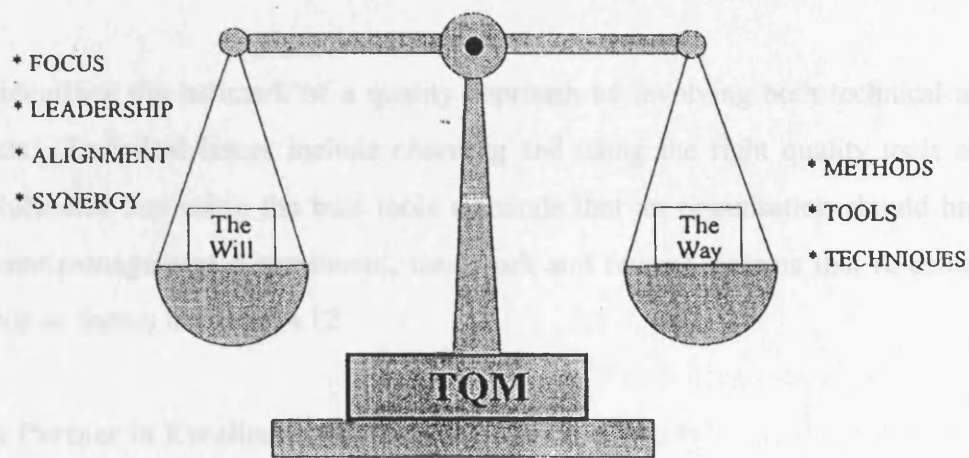
According to Beer, Russel and Spector (1990), TQM is about culture change encompassing six steps:

- i. Mobilise commitment to change through joint diagnosis of business problems
- ii. Develop a shared vision of how to organise and manage for competitiveness
- iii. Foster consensus for the new vision, competence to enact it and cohesion to move it along
- iv. Spread revitalisation to all departments without pushing it from the top
- v. Institute formal policies, systems and structures

vi. Monitor and adjust strategies in response to problems

However, Beer et al failed to establish 'why' TQM is about culture change, nor did they suggest in what context the six steps that they have identified are to be implemented. Nonetheless, the sustainable transformation of an organisation to a TQM culture requires a balance between organisational systems, skills and techniques (the way) with the fundamental attitudes and values of employees (the will) as shown in Figure 4.11 (Latif, 1994).

Figure 4.11: TQM Culture



Source: Latif, S. (1994) 'Organisation Values - The Foundation Stone of TQM Quality Management'. Proceedings of the Tenth International Conference of the Israel Society for Quality. November 14th - 17th.

Without the development of the will, the ongoing success of TQM requires a large amount of attention, effort and energy to work against the fundamental status-quo in an organisation that dictates that 'things should be done the way they have always been done'. This will can only be generated if TQM (Latif, 1994):

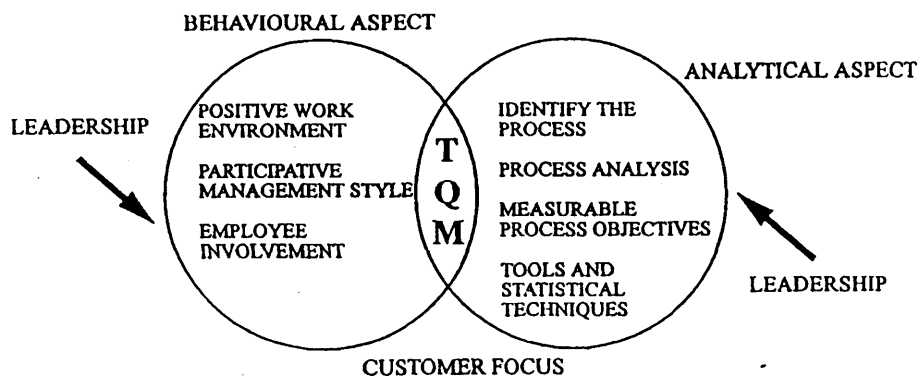
- * is adopted as a strategic focus for the organisation.
- * is supported by committed and a fundamentally aware leadership.
- * is accompanied by a plan to ensure that the behaviours encouraged are aligned with those required.
- * generates synergy as a result of the alignment of the TQM concepts and philosophies with the organisation's systems and policies.

The 'why' aspect of the model can be taught. However in hospitals, 'THE WILL' for "TQM" is yet to be fully developed due to a number of ongoing and conflicting quality initiatives and concurrent government restructuring. Thus, for TQM to succeed, a 'total' re-orientation of employee beliefs and values is required. This is consistent with the views of Thomas Watson Snr., the founder of IBM, who noted:

"Any great corporation, one that has lasted over the years, will find that it owes its resiliency not to its form of organisation or administration skills, but to the power of values and beliefs and the appeal these values and beliefs have on its people" (Latif, 1994).

Littman (1992) identifies the hallmark of a quality approach as involving both technical and behavioral aspects. Technical issues include choosing and using the right quality tools and methods. He elucidates that using the best tools demands that an organisation should have systems that ensure management commitment, teamwork and reward systems that re-enforce appropriate actions as shown in Figure 4.12.

Figure 4.12: A Partner in Excellence



Source: Littman (1992)

Littman suggests that both behavioral and analytical aspects are needed for TQM to work. However, Ovretveit (1990) observed that it is the process quality element of health services which has been largely ignored in quality improvement programmes. Ovretveit contends that poor process quality can produce a downward spiral, where more and more is spent making up

for mistakes and getting round inefficient and ineffective practices. Thus, process quality should be central to most organisations' quality improvement programmes.

According to Lesley and Malcolm Munroe-Faure (1994), the components that help to produce a successful TQM environment are:

- i. Understanding customers - external and internal.
- ii. Understanding the business - functional analysis and quality costs.
- iii. Quality management systems - ISO 9000 Standards, Malcolm Baldrige National Quality Award Criteria.
- iv. Continuous quality improvement - management commitment, employee involvement, education, teamwork, measurement and error prevention.
- v. Quality tools - Statistical Process Control (SPC), Quality Function Deployment (QFD), benchmarking, problem solving.

Holt (1993) suggests six key stages in the implementation of TQM. These stages need not be followed sequentially, but all have to be set-up as continuous processes to achieve and maintain a TQM approach. The six key stages are:

- i. Awareness and assessment: identifying customers on a departmental basis. Identify gaps in meeting customer needs with all staff having a basic understanding of the meaning of TQM
- ii. Organising for quality: identifying a TQM strategy, formation of a formal structure, timetable and targets within which objectives have to be accomplished
- iii. Education and training: creating a shared vision and equipping staff with the necessary tools
- iv. Establishing the continuing process to monitor and evaluate activities and generating the appropriate actions
- v. Involvement: mainly on the part of management and filtering down to the shopfloor
- vi. Continuous improvement - continuous customer satisfaction is the objective

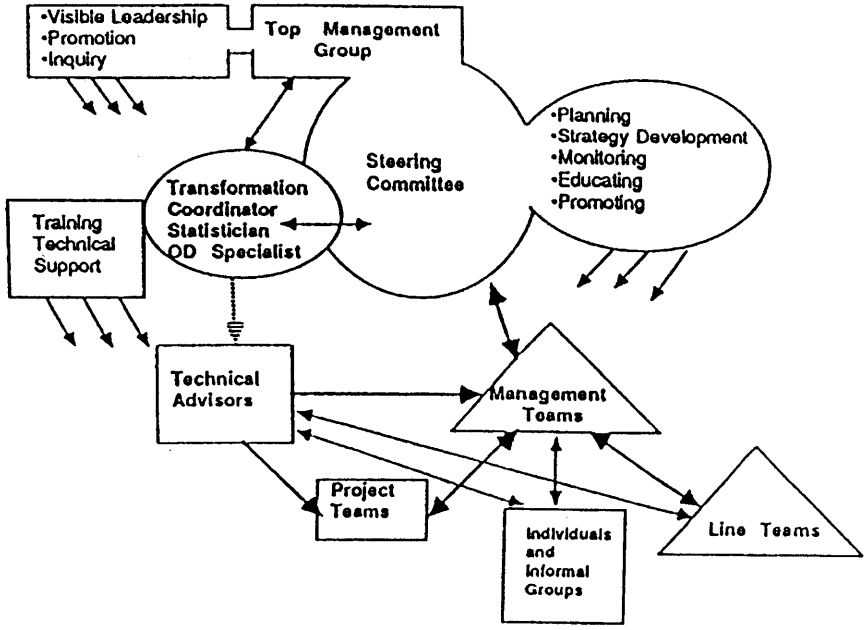
However, Lesley and Malcolm and Holt failed to contextualise their ideas by providing a coherent format the 'what', the 'how' and the inter-relationship of the elements in their respective step-by-step approaches. It is one thing to have a prescriptive format of TQM, but the practising manager is faced with the dilemma of 'how' to actually implement the process, particularly the issue of winning the commitment and involvement of the shopfloor, culture change and the sustainability of the TQM programme. Because of these deficiencies, these models lack the essential characteristics of a model and an implementation framework for TQM. The author believes that the proposed total quality model developed using the QFD tool is an integrated approach to TQM implementation in Singapore hospitals. How QFD can support this role will be discussed in Chapters 5 and 6.

Scholtes and Hacquebord (1987) offer 11 basic guidelines for quality:

- i. Quality begins with delighting the customers
- ii. The quality organisation must learn how to listen to customers and help customers identify and articulate their needs
- iii. The quality organisation leads customers into the future
- iv. Flawless, customer-pleasing products and services result from well-planned systems and processes that function flawlessly
- v. In a quality organisation, the vision, values, systems and processes must be consistent and complementary to each other
- vi. Everyone in the quality organisation ... managers, supervisors and operators must work in concert in order for all systems to work in a consistent co-ordinated complementary manner; a spirit of teamwork must pervade the organisation
- vii. Teamwork in a quality organisation must be based on a commitment to customers and to constant improvement
- viii. In a quality organisation, everyone must know his or her job
- ix. Use data and a scientific approach to plan, work, and solve problems
- x. Develop a working partnership with suppliers
- xi. The culture supports and nourishes the improvement efforts of every group and individual in the company.

Scholtes and Hacquebord acknowledge the fact that transforming an organisation full of people is hard work and requires a carefully considered approach as shown in Figure 4.13.

Figure 4.13: The Practice Approach to Quality



Source: Scholtes and Hacquebord (1987)

Scholtes and Hacquebord (1987) suggest five strategies to start a TQM transformation:

- i. Top managers learn to become leaders, exemplars and teachers of quality
- ii. Managers establish a series of improvement projects
- iii. Top managers engage in quality transformational planning starting with a two year blue print for preparation, start-up and early expansion
- iv. Managers establish processes for the internal co-ordination, oversight and technical training and assistance needed to support all quality improvement efforts
- v. Managers undertake specific efforts to change the organisation's culture to one that is more supportive of total quality

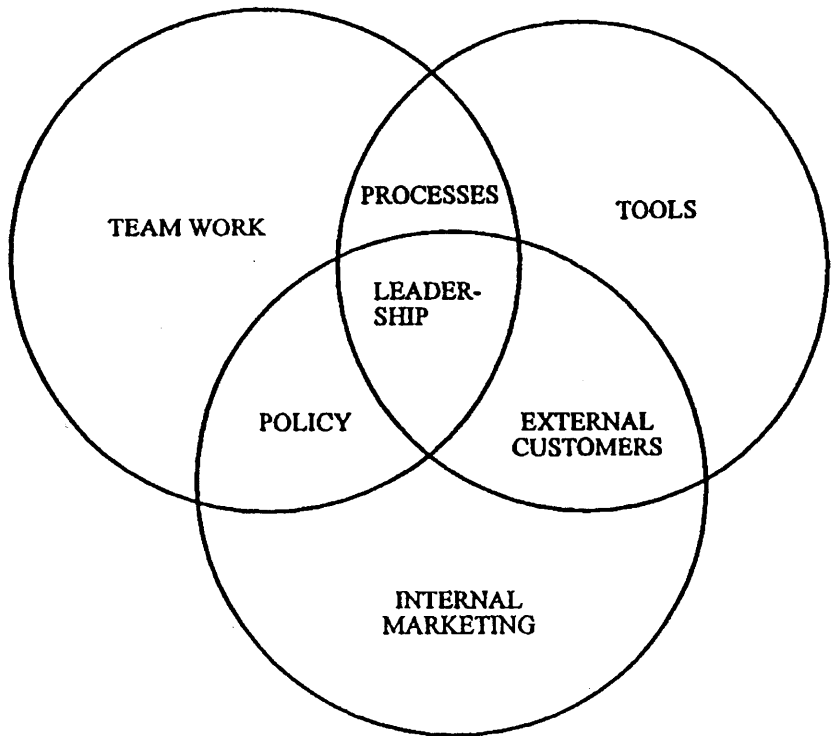
In addition to these strategies, Scholtes and Hacquebord offer further suggestions in the form of six changes that they argue must be carried out by the person responsible for the TQM process. These are:

- i. Recognise the informal organisation
- ii. Seek the active support of a critical mass
- iii. Allow people to deal with the need for change and the planning of change
- iv. Organisation change should be a mixture of gradualism and surprise
- v. All efforts should be 'anchored', no isolationism
- vi. Change should be profound, comprehensive and widespread

However, Scholtes and Hacquebord fail to show the relationships or the interconnectedness between their 11 basic guidelines, five strategies and the six changes. Their model is confusing and will not be useful in the implementation of TQM; but it does have a place in creating awareness for TQM.

For Wilkinson and Witcher (1993) there are four critical things that must come together for TQM to succeed: leadership, teamwork, TQM tools and internal marketing together with processes, policy and external customers as shown in Figure 4.14, but they did not suggest the use of any specific tool. These elements must be fused together for the attainment of an effective implementation framework. If, for any reason, the implementers of TQM emphasise only the need for operational management and tools at the expense of human resource management and teamwork, then TQM will be at best partially implemented.

Figure 4.14: The Parts of TQM



Source: Wilkinson and Witcher (1993)

In order for TQM to succeed, an organisation must unhook itself from its traditional hierarchical and functional moorings and then re-attach itself to horizontal and cross-functional processes (Spector and Beer, 1994) whilst integrating six sequential steps:

- i. Trigger change by combining external competitive pressure with a clearly defined direction from the organisation's leadership
- ii. Develop, on the part of the top management team, an agreement on, and commitment to, the belief that quality improvement is the key strategic task
- iii. Form 'ad hoc' teams around processes
- iv. Create an organisation-wide change oversight team
- v. Enable teams to analyse and take action through delegation
- vi. Align formal measurement and information to process management

TQM efforts that address only some subset of the above six ingredients will inevitably fade and disappoint. Moreover, the failure to achieve team consensus will move TQM down the path to programmatic change (Spector and Beer, 1994).

From the healthcare sector, Godfrey, Berwick and Roessner (1992), suggest the following measures to help achieve TQM:

- i. Physician involvement is extremely important: any healthcare organisation that begins a major TQM initiative without the involvement of physicians and consultants does so at its peril
- ii. Structure is critical if TQM is to work
- iii. Training is not enough: TQM is not a training agenda, it should be, first of all, leadership agenda and training per se is not a substitute for a comprehensive quality management programme
- iv. Measurement drives TQM
- v. Customer focus is the bottom-line
- v. When guarantees are offered, make sure they are always delivered
- vi. Quality is not an exclusive club, all staff need to share commitment to it. Treat staff in the way you would like them to treat patients

However, Swiss (1992) notes that orthodox TQM as espoused by Wilkinson and Witcher and Godfrey et al respectively can easily do more harm than good because it can encourage a focus on the particularistic demands of direct clients rather than the needs of the more important, but often inattentive, customers; the general public. Furthermore, orthodox TQM makes a number of demands for output uniformity and a strong, continuous organisational culture that a healthcare organisation is intrinsically unable to meet.

According to Oakland (1993), there are 10 points for the management of an organisation to adopt in implementing TQM. These ten points constitute the foundation:

- i. The organisation needs long term commitment to constant improvement
- ii. Adopt the philosophy of zero defects to change the culture to right first time

- iii. Train the people to understand the customer-supplier relationships
- iv. Do not buy the products or services on price alone - look at the total cost
- v. Recognise that improvement of the system needs to be managed
- vi. Adopt modern methods of supervision/training
- vi. Eliminate barriers between departments by managing the process, improve communication and teamwork
- viii. Eliminate the following:
 - * Arbitrary goals without methods
 - * All standards based only on numbers
 - * Barriers to pride of workmanship
 - * Fiction. Get facts by using the correct tools
- ix. Constantly educate and retrain - develop the experts in the business
- x. Develop a systematic approach to manage the implementation

In addition, TQM should not be regarded as a woolly-minded approach to running an organisation. Instead it should be viewed as requiring a carefully planned and fully integrated strategy (Oakland, 1993). Oakland's methodology for TQM implementation could be broadly summarised as:

- * Identify customer-supplier relationships
- * Manage processes
- * Change culture
- * Improve communication
- * Show commitment

It seems however, that Oakland's methodology along with the other approaches to quality discussed earlier smack of 'flavour-of-the-month'. They show themselves not to be sustainable in the face of the political and financial pressures prevalent in the healthcare industry. Furthermore, their rigid step-by-step approaches are not sufficiently flexible to permit the integration of directives such as purchaser requirements and clinical audit requirements. Most of the approaches are manufacturing models of TQM which lay emphasis on the elimination of

waste in production, design and management, but they fail to provide advice on how to design mechanisms for improving the staff-customer encounter, empowering the user or for improving access which are important in a healthcare setting (Kogan et al, 1991). What is strongly evidenced is the lack of a systematic quality tool; the 'ends' tend to be defined but not the 'means'.

In the author's opinion, it is important in the implementation of any new management initiative that the people affected have a sense of ownership in the procedures adopted; hence a participative management approach is required (Hagan, 1994). Moreover, the strategy adopted should be jointly developed and owned by everyone within the organisation, thus giving the people on the shopfloor a sense of ownership in the actions taken; irrespective of whether a Juran, Deming or Crosby approach is adopted (Hagan, 1994). The endorsement of TQM by top management alone is not enough. There must be strong endorsement by managers at all levels and these managers must infuse a sense of enthusiasm amongst subordinates. However, the problem with step-by-step incremental approaches to quality is that they are too daunting. Most managers faced with a mandate to implement TQM would ask "Where do I start?" and "How do I proceed?" These models fail to provide such guidelines. They are better suited to a manufacturing setting and fail to meet the underlying characteristics of healthcare organisations (private and public) as depicted in Table 4.6.

Table 4.6: Characteristics of Healthcare Organisations

Characteristics	Healthcare Setting
Structure and Culture	Decision making process through issue. Specific, multi-disciplinary groups of administrators and autonomous professionals negotiating consensus, process of change often diffuses rather than top-down or bottom-up. Mainly non-competitive, though they increasingly compete for resources. Reactive rather than proactive.
Systems	Little experience of TQM and QA except in few areas such as X-ray, Pathology and Medical Engineering. No systems for managerial or financial accountability in medical specialism. Poor information systems and technology.
Staff	Not primarily motivated by profit or efficiency motives, apart from specifically recruited managers, most higher level staff used to administrative or professional lines of control.
Customer Base	Customers use the service because they have to, not because they want to, little or no freedom of choice for most people.

Source: Adapted from Kogan et al (1991) "The Evaluation of TQM initiatives in the NHS". Centre for Public Policy, Brunel University.

However, having examined the different approaches to TQM implementation by the Gurus and the 20 different researchers, two distinct approaches have emerged. These can be categorised as:

- i. The 'Step by Step Approach'
- ii. Culture Change Route

However, these approaches to TQM represent a plethora of prescriptions which, whilst informative per se, falls short of constituting a coherent and comprehensive set of actions which, if they were to be followed consistently would lead to the fizzling out of the TQM programmes within 24 months. For example, how can hospitals understand the needs of the customer? What should a practising manager do to meet customer needs? The answers to these questions cannot be discerned from the approaches to TQM. Thus, the present approaches to TQM represent mere prescriptions that fail to provide the 'how', 'what', 'when', 'where', 'who' and 'why' of TQM implementation. Several writers, for example, Jackson (1990), Chattergee and Yilmaz (1993) have pointed out the need to develop an 'overall' method based on 'picking and mixing' the appropriate aspects of each of the main authorities on the subject. However, at the time of writing, no attempt has been made to produce this all-encompassing generic method nor how a specific TQM model can help practising managers to decide, prepare, start and expand phases of their *Total Quality Journey*. Against this background, the author would demonstrate the use of a TQM tool, QFD, in the development of a total quality healthcare model to guide practising managers for TQM. Furthermore, a 5-phase implementation framework for the proposed model encompassing Awareness, Knowledge, Breakthrough, Implementation and Integration, is provided in Chapter 7 based on the commonly prescribed activities which underpin successful TQM implementation as espoused by the leading proponents of the quality movement. This being one of the purposes of this research project. In the next section, the author presents the findings of empirical studies on TQM practices in Singapore conducted by 4 students.

4.6 Empirical Study on TQM Practices in Singapore

Even though TQM has been around for some time, there are not many empirical TQM studies conducted in Singapore. The works of four students who carried out “pioneer” studies on TQM in Singapore as part of their academic pursuit are discussed.

Yeo (1993) in her exploratory study on TQM development of 102 companies in Singapore found that there was a high level (81%) of TQM awareness in Singapore. However, the percentage of companies practising it was low at 65%. This was especially so for the small companies and companies in the service sector. Furthermore, she opined that TQM was still in its preliminary stage of development in Singapore.

Chong (1994) did a case study of TQM practices in Texas Instruments Singapore. The journey was started in 1986 and it took the company about six years to establish the TQM values and then to bear the fruits of their labour. The company won the first Singapore Quality Award in 1995.

Yap (1994) conducted a TQM study on software companies in Singapore. He found that 99% of the companies did not have a well managed and measured process system and 93% of the companies did not have well-defined software development processes.

Tan (1998) conducted another TQM study on Singapore healthcare organisations. The findings from the study were:

- i. Out of the seven customers of healthcare, the staff are able to identify four or more of them.
- ii. Staff and management team do understand the requirements of an effective TQM program.
- iii. In terms of quality management, healthcare organisations know the importance of it and how to manage it.

- iv. Healthcare providers know only certain meanings of Quality. They tend to use industrial TQM jargons in their quality program. However, they do know that the needs of each individual organisation is different.
- v. Hospital administrators do recognise that training is a must in all departments. However, they face problems from staff who are unwilling to undergo training.
- vi. The ability of healthcare organisations to accept and implement new healthcare plans is very low. This may be due to the fact that receptiveness of new healthcare plans is very poor. Also, healthcare organisations do experience problems during the implementation phase. They recognise the importance of constant submission of work performance reports, which is consistent with the quality guru's perspective.

These studies have indicated that TQM practices in Singapore are very much in its infant stage. Regardless of size, ownership of the companies and industry they are in, few companies have established a sound ground for TQM to flourish in their organisations. There is a little “goldmine” for TQM to be cultivated.

In the next section, the author discusses the findings of an empirical study on the management quality practices in Singapore hospitals and top management understanding in developing a TQM culture. The findings from this empirical study would be compared to the general findings of the quality ‘gurus’ and researchers of TQM.

4.7 Empirical Study on Management Quality Practices in Singapore Hospitals

In the earlier sections, the author provided extensive literature review on the definitions, implementation models and pitfalls of TQM in healthcare. In this section, the author analyses through an empirical study the management quality practices of Singapore hospitals. The overall nature of the study, the research methodology employed, explanation of the research instrument used, findings and analysis will be presented.

4.7.1 Nature of Study

This study seeks to find out the management quality practices in Singapore hospitals. Therefore the study is exploratory in nature. Having established in Section 4.2 the principles of TQM, the objectives of this empirical study are to:

- i. determine the understanding of top management in developing a TQM culture (The Theme).
- ii. find out whether Singapore hospitals seek to understand the needs and expectations of their customers (The Focus).
- iii. determine the activities, processes and analytical skills and tools adopted by Singapore hospitals in their decision-making and evaluation process (The Control).
- iv. find out whether Singapore hospitals maintain consistency in its services through proper documentation of its quality management programmes (The Approach).
- v.. find out whether Singapore hospitals ensure continuous training to improve staff skills (The Scale).
- vi. find out whether Singapore hospitals reward or recognise staff for their contribution towards improved productivity, teamwork and leadership (The Scope).

4.7.2 Research Methodology

This study utilises the following approach. Firstly, a systematic review of major journal articles on quality management in the healthcare industry, together with some books on TQM in healthcare and the views of Quality by various quality gurus. This would allow the author to have a better understanding of the past and current issues of quality in healthcare. Also, a review on the guide to the Malcolm Baldrige Quality Award was done to ensure an understanding of where the emphases of quality were.

Secondly, the basic research method is the survey questionnaire (Appendix B). It was designed using references from "Total Quality in Healthcare" by Gaucher and Coffey (1993), various journal articles and the guide to the Malcolm Baldrige Quality Award. The survey consists of six sections, namely:

- i. Particulars of Respondents
- ii. General Information on the Hospital
- iii. Strategic Planning
- iv. Quality Management
- v. Human Resource Management
- vi. Information and Innovation Management

Thirdly, the questionnaires were sent to all the hospitals in Singapore. A list of the hospitals was obtained from the "Yellow Pages" of the Singapore Phone Book. The author called each hospital to enquire who the questionnaire should be sent to. Based on the information received, the author attentioned the questionnaires to the following persons: CEOs, Quality Manager or Communications Manager. Only one copy of the questionnaire was sent to each hospital. There were altogether 20 hospitals. All these hospitals have a variety of specialists and offer more than one type of healthcare services such as X-ray and Laboratory services. Therefore, these target respondents fit our survey purpose well. Moreover, as the number of hospitals in Singapore is small, the objective is to target all the hospitals to respond to the survey.

Finally, the data was collected and analysed. This included all the data collected through the mail. Telephone calls were made to some hospitals to get more respondents to answer the questionnaire. Out of the 20 questionnaires sent to 20 hospitals, 18 responded with 2 indicating their unwillingness to participate in the survey. Therefore, the usable sample size was only 16 hospitals. The data obtained from the survey was compiled into the required format for performing data analysis testing. The Statistical Package for Social Sciences (SPSS) was used for data analysis. The returns were analysed for descriptive statistics on all the questions/variables. A correlation analysis using the Kendall Tau (τ) coefficient was used to determine the correlation among the variables. The Kendal Tau coefficient technique was chosen because of its wide application for ordinal correlation. Kendall's measure of correlation is given as:

$$\text{Kendall } (\tau) = \frac{N_c - N_d}{n(n-1)/2}$$

where N_c denotes the number of concordant pairs of observations out of the $\binom{n}{2}$ total possible pairs, N_d is the total number of discordant pairs of observations. Because the n observations may be paired $\binom{n}{2} = n(n-1)/2$ different ways, the number of concordant pairs N_c plus the number of discordant pairs N_d plus the number of pairs with ties should add up to $n(n-1)/2$ (Conover, 1980). Only those variables that correlate at 1 percent significance level are considered.

4.7.3 Description of the Survey Questionnaire

This section presents the rationale for each section included in the survey instrument that was developed for the study. The questionnaire consists of Part I and Part II. Part II consists of four sections, which are meant to solicit different answer in each area of hospital management.

Part I looks for the name and designation of the respondents and the demographic data of the hospitals.

Part II consists of four sections, namely:

- Strategic Planning
- Quality Management
- Human Resource Management
- Information and Innovation Management

A five-point Likert scale is used in all the four sections and a higher score indicates a better understanding or stronger importance in the statement.

Section A contains statements about aspects of strategic planning felt to be crucial to the development of a TQM culture. Strategic planning develops a process to align and communicate the most important strategies, goals, capacities and measurements throughout the hospital. It not only provides direction for helping the hospital to navigate the waters of the future but also promotes a common focus for the whole hospital.

Section B contains statements about aspects of quality management felt to be crucial to the development of a TQM program.

Section C contains statements about aspects of human resource management felt to be crucial to the implementation of a TQM program. Like any other service-providing organisations, hospitals are labour intensive and their outputs, as with any 'people' business (Parry, 1992) depends on the recruitment, retention, management and motivation of staff at all levels. The quality of care is critically dependent on the attitudes, skills and knowledge of each individual, working separately and together and on the way these are combined in the organisation as a whole (Irvine, 1990).

The individual worker's dedication to quality and productivity is absolutely necessary for quality healthcare. Continuous quality improvements and high productivity is a people process. This involves the commitment of everyone and each worker must help to improve all processes and functions. There must be personal commitment to quality consciousness and productivity. To accomplish goal, each staff must be empowered and given the tools (training). It is an affirmation that we are all in this together, and no one person in the hospital can ever possess more knowledge and creativity than all of us together (Grazier, 1989).

Section D contains statements about aspects of information and innovation management. Information and innovation both supports and is involved in the total business process. Given the crucial role that information plays in and around organisation, hospitals should adopt strategies involving the use of information technology to increase productivity, improve quality of care, provide better performance measures of services and assist strategic planning. The objective is not just to automate existing information flows and operations but to enable the hospital to achieve and sustain its competitive advantage. Also since the fundamental driver of continuous quality improvement and cost reduction is Innovation, hospitals should offer rewards for innovative ideas, both medical and managerial and all these innovative ideas should be managed strategically.

4.7.4 Survey Response

There are altogether 20 survey questionnaires sent out to the 20 hospitals in Singapore. The number of respondents was 18, giving a response rate of 90%. Out of the 18 respondents, two hospitals indicated that they are not willing to participate in the survey. Thus, the number of valid respondents were 16.

4.7.5 Profile of Hospitals

This section presents to the reader the size of the hospitals and the management level of the respondents.

Table 4.7 summarises the number of beds each respondent has in their hospital and Table 4.8 summarises the management level of the respondents.

Table 4.7: Number of Beds in Respondents

Size	Distribution
100 to 400 beds	7 (44%)
401 to 800 beds	6 (37%)
> 800 beds	3 (19%)

Table 4.8: Management Level of Respondents

Management Level	Distribution
CEO	8 (50%)
Quality Manager	7 (44%)
Communications Manager	1 (6%)

4.7.6 Findings - Quantitative

Table 4.9: Quantitative Findings

Management Quality Practices	Adopted by No. of hospitals	%
Strategic Planning		
Mission statement as an inherent part of strategic plan	15	97.3
Mission statement as a guide for gaining commitment in:		
i. patient care	16	100
ii. training	15	97.3
iii. research	8	50.0
Physician involvement in strategic planning process	15	93.7
Integrated networks to bring healthcare services closer to patients	12	75.0
'Managed care' programmes to contain rising healthcare costs	8	50.0
"One-stop shopping" for the diagnosis and treatment of virtually any medical problem	10	62.5
Quality Management		
Quality consciousness and commitment by all staff	16	100
Conducted customer satisfaction survey	14	87.5
Organisational culture dedicated to continuous improvements	14	87.5
Adopted benchmarking	13	81.3
ISO 9000 certification:		
i. ISO 9000 certified	5	31.0
ii. in the process of ISO 9000 certification	2	13.0
iii. Have QA systems but not ISO certified	4	25.0
iv. None of the above	5	31.0
Human Resource Management		
An affirmative action equal opportunity employer	14	87.5
Training of doctors and staff	16	100
Used external resources for training of doctors and staff	14	87.5
Training as part of strategic or competitive planning process	14	87.5
Organisational culture builds an environment for employee participation and involvement, teamwork and leadership	14	87.5
Developed recognition/rewards	13	81.3
Change management is an important aspect of Human Resource Management	13	81.3
Information and Innovation Management		
Timely information from MIS to improve decision-making process, quality of patient care, productivity and reduction in costs	13	81.3
Extended role of computers from automating processes to enhancing quality	14	87.5
Use of medical technologies to improve process performance without increasing costs	13	81.3
Use of IS/IT and medical technologies for competitive advantage	11	68.6
Innovative ideas from staff resulted in improved productivity and increased customer satisfaction	12	75.0

Source: Complied by the Author

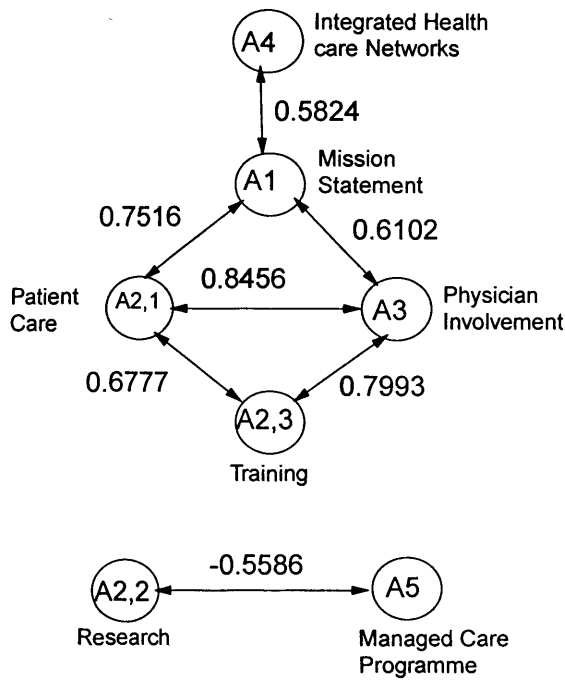
This table shows the understanding of top management in developing a TQM culture and the management quality practices of Singapore hospitals. The case studies in Chapter 6 assesses whether these management quality practices could meet the expectations of the patients.

4.7.7 Findings - Qualitative

Observations and Issues

The results of the Kendall Tau Correlation Analysis carried out identify the correlation among the variables are shown in Figure 4.15 - Figure 4.18.

Figure 4.15: Kendall Tau Correlation on Strategic Planning



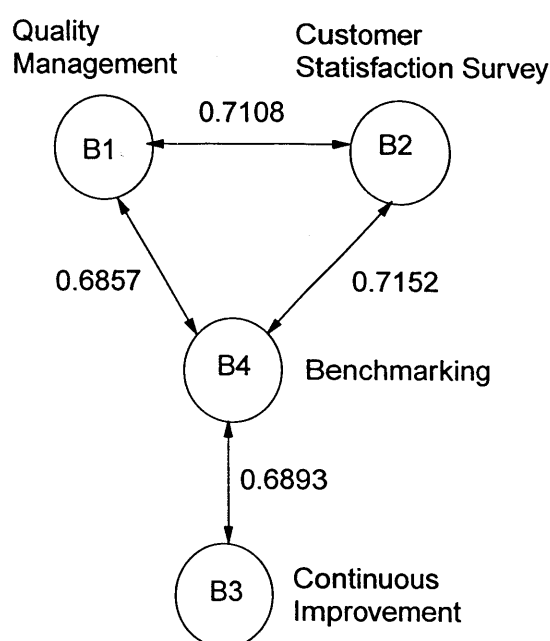
Source: Developed by the Author

The majority of the hospitals have used mission statements as a guide for gaining commitment in patient care and training but not research. Improved patient care is positively related to:

- a. physician involvement in managerial decision-making
- b. forming healthcare networks with other providers
- c. training of staff and doctors because it is people who will play a vital role in delivering service quality to patients

There is a surprise finding. Research correlates with "managed care" negatively. Research activities in hospitals would be reduced if a hospital develops or participates in "managed care" programmes to contain the rising healthcare costs. CEOs of hospitals are always concerned about the bottom-line, with a drop in income due to managed care schemes as compared to fee for service; research activities in hospitals would be reduced as research does not bring in the money.

Figure 4.16: Kendall Tau Correlation on Quality Management

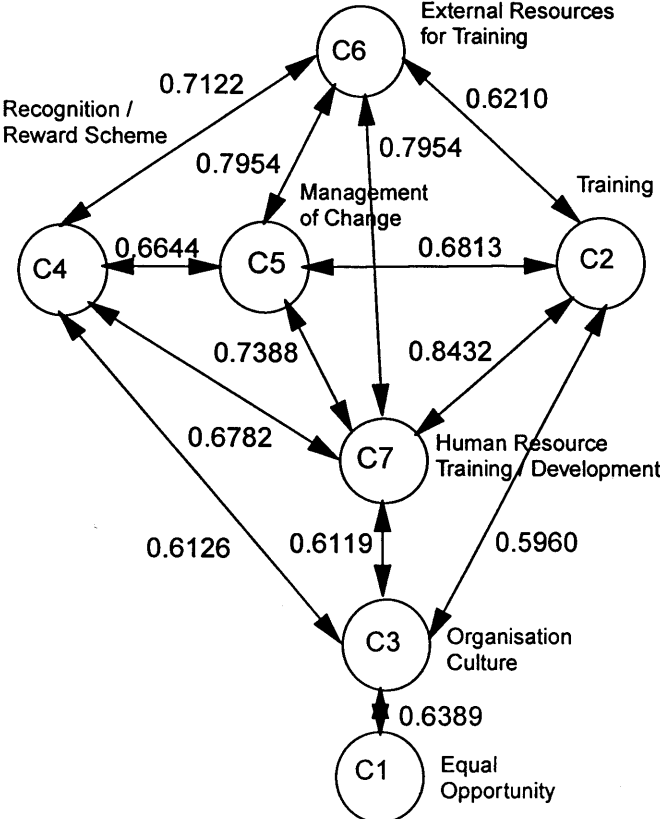


Source: Developed by the Author

The majority of the respondents indicates that customer satisfaction survey (understanding the needs and expectations of their patients) and benchmarking (understanding what others do, learning and implementing these best practices) are positively related to having quality management as a strategic mission shared by every member of the hospital including healthcare professionals.

Benchmarking for quality improvement and total customer satisfaction is positively related to having a quality management environment dedicated to continuous improvements in all business and clinical functions, employ team for problem solving and continuously strive to meet and exceed customers' needs.

Figure 4.17: Kendall Tau Correlation on Human Resource Management

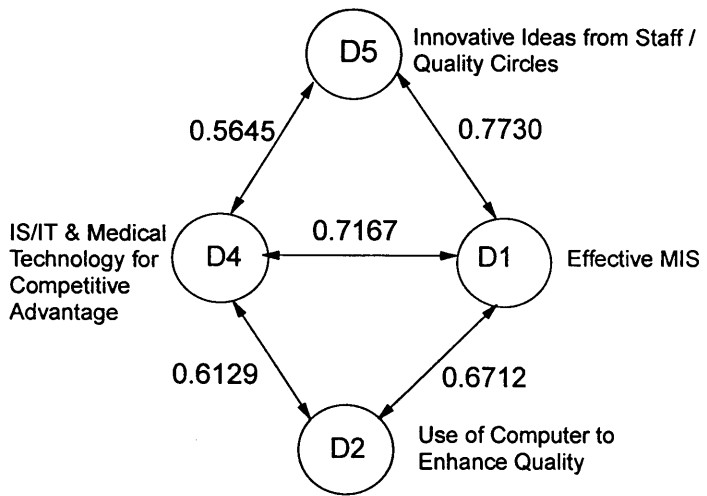


Source: Developed by the Author

The majority of the hospitals has a climate of equal opportunity that nurtures and supports the fullest contributions of every member and this is positively related to building and maintaining an environment for employee participation and involvement, teamwork and leadership. This is very important for a multi-racial country like Singapore.

Emphasis on doctors and staff training and recognition/rewards scheme to encourage innovative efforts are positively related to having an organisation culture that builds and maintains an environment for employee participation and involvement, teamwork and leadership, management of change and using external resources for the training of doctors and staff.

Figure 4.18: Kendall Tau Correlation on Information and Innovation Management



Source: Developed by the Author

Effective MIS aimed at improving decision-making processes, quality of patient care, productivity and reduction in costs is positively related to:

- a. Using IS/IT and medical technologies to enhance quality, to achieve and sustain competitive advantage
- b. Introducing quality circles to explore avenues for more comprehensive care for patients to improve productivity and increase customer satisfaction

4.7.8 Findings - Qualitative

Table 4.9 revealed that the majority of the respondents have:

- i. a high level of understanding of what is required to develop a TQM culture.
- ii. conducted customer satisfaction surveys to understand the needs and expectations of the customers.
- iii. involved physicians in their decision making process, formed integrated networks to bring healthcare services closer to patients, adopted benchmarking,
- iv. used continuous training of doctors and staff
- v. developed recognition/reward schemes for doctors and staff for their positive contributions towards productivity, teamwork and leadership.

However, Table 4.9 revealed that the majority of the respondents did not maintain proper documentation of its quality management programmes.

Managerial Implications

The study shows that it is important for top management of Singapore hospitals to have a high level of understanding of what is required to develop a TQM culture in hospitals. The majority of the respondents has indicated that TQM programmes should include the following activities and processes:

- i. establish a mission statement in their strategic plan
- ii. involve physicians in managerial decision-making
- iii. form healthcare networks with other providers
- iv. continuously train doctors and staff for service improvements and change management
- v. conduct customer satisfaction surveys to understand the needs and expectations of their patients. Integrating the findings from the survey into the service design and delivery would promote better quality care and continuous improvements as patients wants, needs and expectations are met
- vi. adopt benchmarking for quality improvements and total customer satisfaction
- vii. develop recognition/reward scheme to encourage innovative ideas from staff through quality circles for improved productivity and increased customer satisfaction
- viii. adopt effective MIS and new technologies to achieve and sustain competitive advantage

These empirical findings when compared to the implementation models of the TQM 'gurus' and 20 different researchers in Section 4.4 revealed the following similarities and new knowledge.

Similarities:

- i. *Customer-focused, continuous-improvement philosophy.* This is grounded in a philosophy of conducting customer satisfaction surveys to understand the needs and expectations of patients, integrating the findings from the survey into the service design and delivery process. Every member of the hospital including healthcare professionals continuously strived to meet and exceed customers' needs.

- ii. *Analytical knowledge and skills.* Adopt benchmarking for quality improvements and total customer satisfaction.
- iii. *Interpersonal or “people” skills.* Use internal and external resources to train medical and non-medical staff for service improvements and change management.
- iv. *Structure and organisation.* Develop recognition/reward scheme to encourage innovative ideas from staff for improved productivity and increased customer satisfaction, builds and maintains an environment of teamwork and leadership.

New Knowledge:

- i. *Physician Involvement.* Develop strategies to gain physician involvement in quality improvement and managerial decision-making.
- ii. *Information Management and Innovation.* Adopt strategic MIS and new technologies and to form strategic alliance with other healthcare providers.

Having identified the key components of a TQM program, the following questions form the basis of discussion in Chapters 5 and 6.

- i. How should hospitals evaluate their existing management quality activities and processes?
- ii. Could the management quality activities and processes meet the expectations of customers?
- iii. How should hospitals implement the above management quality activities and processes to achieve total quality healthcare.

In the next chapter, Chapter 5, the author examines several TQM tools that Singapore hospitals could use to successfully implement the above management quality activities/processes to meet customers' expectations. It further identifies why the exceptional TQM tool, Quality Function Deployment should be used in the development of a total quality healthcare model for TQM in Singapore hospitals.

5

QUALITY FUNCTION DEPLOYMENT

This chapter examines four quality tools selected by the author for the development of a total quality healthcare model for TQM. This leads to a reconceptualisation of using the QFD tool in the development of a total quality model. The chapter further demonstrates how the first phase and beyond of the QFD technique, the House of Quality, could serve as a vehicle for dialogue to strengthen vertical and horizontal communications. Some insights from past researchers on successful applications of QFD in the manufacturing and service industries are offered. It highlights some of QFD benefits and limitations. The chapter concludes with the identification of the critical success factors and the obstacles to QFD implementation.

Areas to be examined include:

- 5.1 Quality Tools for the Development of a Total Quality Healthcare Model
- 5.2 Why QFD in the Development of a Total Quality Healthcare Model?
- 5.3 The House of Quality (HOQ)
- 5.4 QFD: Evidence Based Practices
- 5.5 The Benefits of QFD
- 5.6 The Limitations of QFD
- 5.7 QFD: Evidence Based Critical Success Factors

5.1 Quality Tools for the Development of a Total Quality Healthcare Model

There are several principles that underlie TQM efforts. In Chapter 4, the author had delineated the principles of TQM that would be adopted in this study. To recap, these principles are:

- i. *The Theme:* TQM is geared to the continuous improvement of quality in an organisation.
- ii. *The Focus:* TQM is customer-focused. It is the customer's opinion that counts and only the customer's opinion.
- iii. *The Control:* TQM requires an organisation's long-term commitment. Improvement efforts must be based on data. Analytical tools and techniques should be used to evaluate and improve processes.
- iv. *The Approach:* TQM is management driven. Management leadership must create a quality culture. TQM should also be integrated into an organisation's quality assurance programme and other quality initiatives. A supportive culture and organisation should be established to ensure the success of a wide range of quality improvement efforts.
- v. *The Scale:* TQM involves interpersonal or people skills. Effective training is needed. The involvement of everyone in the organisation and the empowerment of staff are critical to success in a highly competitive environment.
- vi. *The Scope:* TQM focal point is leadership and collaborative teamwork.

A look into the implementation of the above TQM principles can be confusing. In Chapter 4, the author has examined extensively various implementation models by the Gurus and twenty other researchers and has identified that there is no perfect implementation model. In driving improvement at meeting customers' expectations, total quality tools can make it work (McCloskey et al, 1993). These tools which are grouped into four categories enable an organisation to understand, simplify and improve processes which exist to meet and exceed the expectations of customers and provide an overall co-ordinating discipline for the quality improvement process.

i. **The Seven Basic Tools**

- Flowcharts
- Ishikawa Diagrams
- Checklists
- Pareto Charts
- Histograms
- Scattergrams
- Control Charts

ii. **Other Simple Tools**

- The Force Field
- The "Measles" Chart
- Benchmarking
- Cycle Time Management
- Multi-Vari Charts
- The Five Whys?

iii. **Design of Experiments (DOE)**

- Basic DOE
- Taguchi Methods
- ANOVA

iv. **The Seven Management and Planning Tools**

- The Affinity Diagram
- The Relations Diagram
- The Tree Diagram
- Matrix Analysis
- Quality Function Deployment (QFD)
- The Process Decision Program Chart
- The Arrow Diagram (Activity Network)

For this study, the author examines in-depth one total quality tool from each category. These are:

- i. Flowcharts
- ii. Benchmarking
- iii. Taguchi Methods
- iv. QFD

These tools have been found useful to drive quality improvement and to make TQM works [1].

5.1.1 Flowcharts

A flowchart is a graphical representation of all the steps in a process. The purpose of a flowchart is to establish a representation of what actually happens. Flowcharts alone can lead to significant process improvements because they often reveal steps in the process of which the manager of the process is unaware and which are superfluous. Also flowcharting helps identify productive and non-productive activities. When the chart is assembled, the quality improvement team can then ask questions like: What is the purpose of this activity? Does it add value? Can it be done better? Who can do it best?

A flowchart can be used to represent the flow or movement of people, products, equipment, information and others. A flowchart can represent a past process, current process, alternative processes for consideration, a desired process or a standardised process. The development of a flowchart for a process would provide the following improvements:

- * Every person learns that he or she does not understand the complete process in detail.
- * Every person learns that other team members know some aspect of the process better than he or she does. This leads to greatly improved mutual respect and communication, which extends far beyond the team's project.
- * Every person learns more about the whole process, and how his or her job fits into the whole process.
- * Steps in the process that do not add value are normally discovered. Steps in the process that are unnecessary or redundant, or cause errors, rework and waste are also identified. These can often be eliminated immediately with little additional effort and provide quick

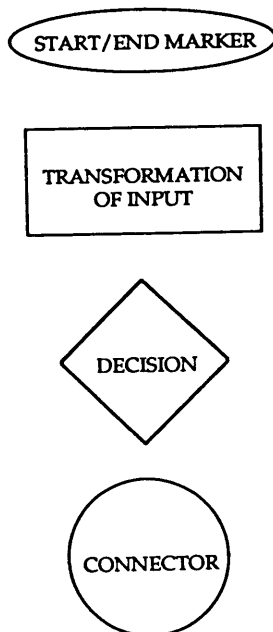
improvements. Opportunities for improvement are often identified as the flowchart is being prepared.

- * Ideas for improvement outside the scope of the team's project are often identified and individual team members will pursue those improvements outside the team.

Symbols for Flowcharting

It is useful but not necessary, to use symbols within a flowchart. As new team members would be intimidated by the use of flowcharting symbols, only commonly used symbols as shown in Figure 5.1 should be used.

Figure 5.1: Flowchart Symbols



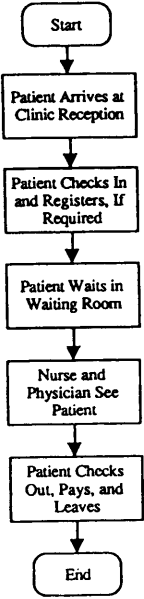
Source: Reliability Analysis Center, (1993), "TQM Toolkit".

Approach to Flowcharting

The specific approach will depend on the subject and objectives of the analysis but the following general approach is often useful. This approach is oriented toward flowcharting a current process, but the same approach can also be used for future alternatives and recommended processes.

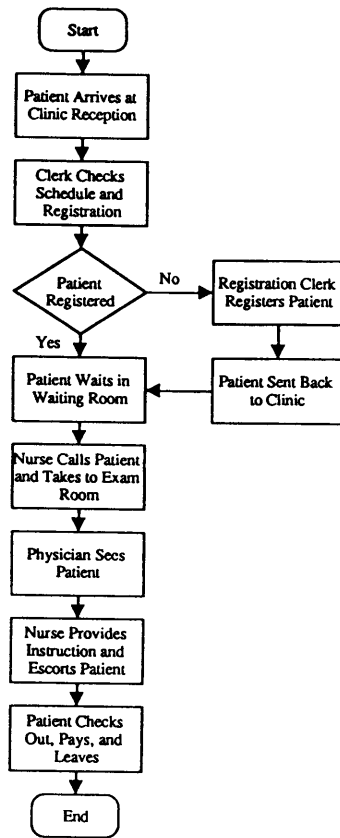
- Develop a very general flowchart first, then expand to the level of detail appropriate for the situation. Illustrations of a very simple flowchart is depicted in Figure 5.2 and a more detailed version of the same process is depicted in Figure 5.3.

Figure 5.2: Sample of a Simple Flowchart



Source: Gaucher, E.J. and Coffey, R.J. (1993), "Total Quality in Healthcare: From Theory to Practice"

Figure 5.3: Sample of a More Detailed Flowchart



Source: Gaucher, E.J. and Coffey, R.J. (1993), "Total Quality in Healthcare: From Theory to Practice"

- * Involve the people who perform the activities, either as part of a team or to provide information.
- * Act out the process. Pretend to be a patient and go through the whole process from beginning to end. Ask questions like, "what happens to me now?"; "what happens if I do not meet the requirements?"; "where do I go next?"; "who helps/sees/processes me?" (note that this is the next customer in the process); "what am I used for?" If there is no meaningful use for the final output, it may be possible to eliminate all preceding steps in the process.
- * Collect all forms or documentation used in the process and identify the sources of the data for the forms and who enters the information. The resulting data and statistics can be no more accurate than the information entered when collected. Also, determine whether there are other sources of similar information.

Separate flowcharts may be required for the flow of patients, employees, equipment, information and other characteristics. One helpful approach is to use a standard format to state process steps, using a subject, verb and object. A sample format would be:

- * Form: (person) (action verb) (object) (for whom)
- * Example: (clerk) (prepares) (form) (for patient)

This format is helpful for understanding the supplier customer relationship and for analysing the flowchart for improvement opportunities. Using this format, the person who performs the action is the supplier of that process step, and the person whom it is done is the customer.

Guidelines to Interpret Flowchart

Creating a flowchart will improve communication and understanding, but the real benefit comes from the review of the process for potential improvements. Sample guidelines to review and interpret a flowchart are shown in Table 5.1.

Benefits of Flowcharting

Some sample benefits of flowcharting processes are:

- * Documents process
- * Allows differing levels of detail
- * Provides a logical summary of process
- * Improves communication
- * Enhances respect and teamwork, as everyone recognises he or she does not fully understand process
- * Allows everyone to see how he or she contributes to providing the final service, product or information

Table 5.1: Guidelines to Interpret A Flowchart

<i>Topic</i>	<i>Method/Approach</i>	<i>Interpretation/Action</i>
Final Use of Service/ Product/ Information	Review whether final service, product, or information is useful to customer.	If not useful: <ul style="list-style-type: none"> Evaluate customer requirements, or Eliminate whole process If useful, what would enhance value?
No/Limited Value	Review each step to determine if value is added, in the view of: <ul style="list-style-type: none"> Next customer in process External customer 	If no value: <ul style="list-style-type: none"> Eliminate step Document changes and benefits
Feedback or Rework Paths	Review for return paths, especially those with large frequencies of activity. Check how far back in process a feedback/rework path goes.	Return paths normally involve some type of rework. Revise process to reduce requirement for rework. The further back in a process it goes, the greater the impact.
Path That Goes Nowhere	Look for paths that go nowhere.	If required, complete path. If not required, eliminate.
Decisions Lacking Clear Actions	Review all decisions (diamond-shaped boxes). Are there clear actions or outcomes for each?	Common problem of infrequent outcomes being undefined or poorly defined.
Duplicate or Repeated Activities	Look for duplicate, repeated, or similar activities in flowchart.	Consolidate, if possible. Co-ordinate. Use fewer suppliers.
Multiple Reviews/ Approvals	Look for multiple review or approval steps. Look for forms handled several times.	Normally these do not add value. Reduce review/approval steps. Empower people to make approvals lower in the organisation.
Few Parallel Activities/ Many Serial Activities	Review precedent requirements of all serial activities (one following another)	If serial activities do not have precedent requirements, do them in parallel, to reduce time.
Verify Connections	Check with both supplier and customer to verify mutual understanding of connections on flowchart.	If understanding is different, correct.
Number of Decisions	Count number of decisions (diamonds).	Larger number of decisions means more complex process. Determine whether complexity is required.
Review Verbs Used	Review verbs in boxes: <ul style="list-style-type: none"> Manual actions Automated actions Transportation Search/look Other 	Verbs provide insight about types of changes. Complex or multiple verbs may indicate more detail required.
Focus Upstream First	Look at upstream (early) decisions and activities first.	The earlier a decision/assumption occurs, the greater its impact. Earlier correction lowers effort and cost.
Elapsed/Cycle Time	Review elapsed/cycle time of activities and groups of activities. Review total elapsed/cycle time of process.	Longer elapsed times offer greater opportunity for improvement.
Delays/Waits	Review all delays/waits in flowchart.	Determine impacts of delays/waits. Reduce delays/waits. Focus on those in critical path, or in critical processes, first.
Outside Review of Flowchart	Have people other than those performing process or preparing the flowchart: <ul style="list-style-type: none"> Review the flowchart Use flowchart to perform process 	People unfamiliar with process will often ask questions that improve flowchart. If flowchart cannot be used to perform process, improve flowchart.

Source: Gaucher, E.J. and Coffey, R.J. (1993), "Total Quality in Healthcare: From Theory to Practice"

- * Increases mutual respect among individuals working in the process
- * Provides excellent approach and format to review purpose, value, and outputs of every step in the process, by highlighting feedback or rework, paths, decisions lacking clear actions, duplicate activities and multiple approvals
- * Can represent and/or compare current process, alternative processes, or planned process
- * Identifies suppliers and customers at each step of process

An example of a specialised form of flowchart is known as Critical Path.

Concepts of Critical Paths

"A critical path defines the optimal sequencing and timing of interventions by physicians, nurses and other staff for a particular diagnosis or procedure, designed to minimise delays and resource utilisation and to maximise quality of care" (Coffey et al, 1992). Critical paths have been shown to reduce length of stay and improve cost effectiveness. There are several different terms associated with the general approach and methods of the critical path tool applied to the healthcare industry. Examples are care maps (Zander, 1991), collaborative care (Etheredge, 1989), co-operative care and co-ordinated care.

Characteristics of Critical Paths

Different applications of critical paths have different characteristics. According to Coffey et al (1992) the characteristics are:

- i. *Scope* - the range of application or period of care over which the critical paths will be applied. These include:
 - * Inpatient care applications.
 - * Complete episode of care.
 - * Specialised application, such as critical paths for ambulatory surgery patients or renal dialysis patients.
 - * Life/health management.

- ii. *Format* - the format of a protocol of care is depicted in Appendix H. The advantage of this format is that it is small enough to be able to store in a patient's chart or at the bedside. The disadvantage is that this format does not communicate which actions require the completion of other actions before they can begin, known as precedence relationships.
- iii. *Multi-disciplinary staff actions* - for example, consults/assessments; treatments; nutrition; medications; activity/safety; teaching of the patient and other activities (Zander, 1991).
- iv. *Problem/outcome* - a listing of expected problems and outcomes (Zander, 1991).
- v. *Documentation* - the critical paths may or may not be used as part of the permanent patient documentation.

Process for Critical Paths

According to Coffey et al (1992) the process for development and use of critical paths commonly involves:

- i. Gain support and approval to implement critical paths of care.
- ii. Select diagnoses/procedures for critical paths..
- iii. Select team to develop protocol.
- iv. Select characteristics for critical path.
- vi. Research internal and external practices.
- vii. Develop critical path for selected diagnosis/procedure.
- viii. Develop process to implement and manage critical paths..
- ix. Define key measures of conformance and outcomes.
- x. Develop data documentation/collection process.
- xi. Educate all affected staff.
- xii. Implement the critical path.
- xiii. Analyse results.

- xiv. Review and revise protocol as required.

Critical Paths of care were employed by The University of Michigan Medical Center (UMMC) to manage the care of outpatients in a new cough and dyspnea clinic and inpatients with cervical spinal cord injury. In their application of Critical Paths, they arrived at multiple critical paths per Diagnosis Related Group (DRG), based on the procedure or level of care provided. Based on UMMC experience, the following benefits and reasons for failure or poor results from Critical Paths (Coffey et al, 1992).

Benefits of Critical Paths

- i. Provide plan or "big picture" - The critical path provides the plan for everyone to see, which is particularly valuable when the physician is not present.
- ii. Provide planning and co-ordination of care that can be shared with the patient and family.
- iii. Reduce variation in the process and outcomes of care.
- iv. Education - This includes education of the house officers or residents, medical students, nurses, patients and their families.
- v. Improved working environment, recruitment and retention.
- vi. Benchmarking - The critical paths can be compared among different services and hospitals to determine which approach provides the best outcomes and values.

Reasons for the Failure or Poor Results from Critical Paths

- i. Lack of collaboration.
- ii. Developing a protocol for too large a group.
- iii. Lack of prioritisation.
- iv. Adopting external critical paths.

5.1.2 Benchmarking

Benchmarking is the process of measuring a characteristic of your organisation against the same characteristic of another organisation known for its quality. David T. Kerbs, Chief Executive

Officer of Xerox Corporations, states that "benchmarking is the continuous process of measuring products, services and practices against the toughest competitors, or those companies recognised as industry leaders" (Camp, 1989).

The purpose of benchmarking is to improve processes and outcomes. Benchmarking helps organisation see the need to change, determine the priorities for change and develop a model for change. It helps an organisation become more externally focused. Benchmarking can also stimulate innovation and creativity as people see effective ideas in other organisations.

Why benchmark? There are two parts to this question: why benchmark with others and why become a benchmark? If you identify an organisation doing something substantially better than yours, your reason to benchmark is to learn and improve your processes and results. But why become a benchmark? Firstly, the detailed external review and critique of your processes will stimulate improvements of your already excellent processes. Secondly, no organisation is best in everything. Your organisation can certainly learn something from the organisation wishing to benchmark some of your processes.

Many healthcare organisations have traditionally contacted similar organisations to gather information about what they are doing. This is a simple type of competitive benchmarking, but benchmarking as an implementation framework for the successful implementation of the principles of TQM is a very detailed and resource intensive methodology. The best results are achieved when an organisation acts as a partner and explores processes in depth, learning and improving over time.

Camp (1989) defines four types of benchmarking:

- i. Internal benchmarking to replicate best practices within your organisation.
- ii. Competitive benchmarking to identify and benchmark the best practices among competitors.
- iii. Functional benchmarking to identify and benchmark comparable functions, even if in other industries.

- iv. Generic process benchmarking to identify most important business practices to achieve greatest gains.

Concepts of Benchmarking

Before discussing the process for benchmarking, some of its key concepts according to Gaucher and Coffey (1993) are:

- i. Understand your own organisation and its processes before benchmarking to others.
- ii. Search widely for benchmark processes and organisations. Look beyond your competitors and the healthcare industry. However, do not overlook small organisations; as they are often very skilled in specific processes.
- iii. Expand thinking of managers - get out of the mind-set that the way we do something is "the only way" to do it.
- iv. Benchmarking involves two types of comparisons:
 - Comparison of outcomes or results.
 - "How" is that performance achieved?
- v. Benchmarking is like reverse engineering. You must dissect the processes you are benchmarking to understand them sufficiently to apply what you have learnt. It is inadequate to benchmark on outcomes or general processes only.
- vi. Benchmarking is a two-way partnership. You must be willing to share detailed information about your processes and results. You must also have approval and information to share.
- vii. Benchmarking is an evolving process, not a one-time process or cookbook recipe.
- viii. Establish long-term benchmarking relationships, sometimes called strategic benchmarking.
- ix. Benchmarking is to learn, not just to copy. If you just copy a process from somewhere else it may not be totally appropriate in your organisation. Your organisation can make substantial improvements by just achieving the best-in class performance of the processes you benchmark. However, by the time you have implemented the copy, there will be a new "best-in-class." The objective is to learn and to adapt and improve the best practices found elsewhere, if possible.

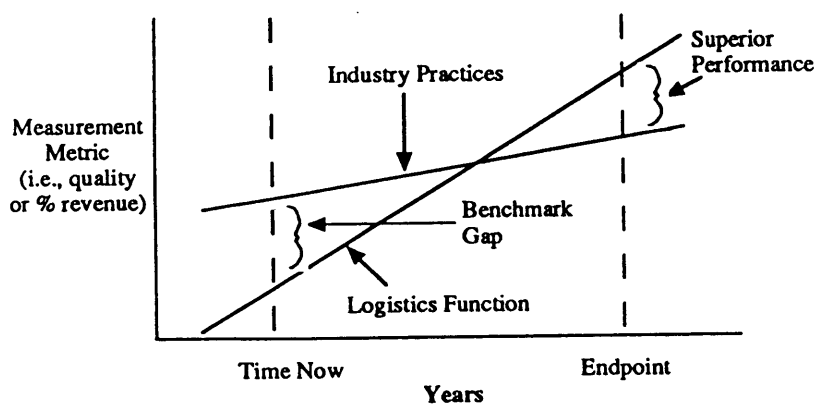
- x. Employee involvement is the key for benchmarking as for other aspects of TQM. Employees who do the work know those processes best.

Process for Benchmarking

According to Gaucher and Coffey (1993) a successful benchmarking process should include the following steps:

- * Secure leadership commitment.
- * Identify what will be benchmarked.
- * Form and train a team.
- * Identify measures.
- * Document current process and results.
- * Benchmark internally.
- * Identify organisations to be benchmarked.
- * Research benchmark organisations.
- * Perform external benchmarking.
- * Analyse gaps - An example of a benchmark gap analysis is illustrated in Figure 5.4.

Figure 5.4: Sample Benchmark Gap



Source: Camp, R. (1989), "Benchmarking".

* Develop action plan.

* Implement action plan.

* Repeat benchmarking process.

Benchmarking - Evidence-Based Practices

According to Whiting (1991) and Biesada (1991), the following are commonly cited benchmark organisations for different types of products, services and processes:

* Accounting: Motorola

* Advertising: Benetton Group

* Asset Management: Emerson Electric

* Billing: American Express

* Compensation and benefits: Herman Miller

* Customer service and retention: American Express, Federal Express, MBNA America, Nordstrom

* Distribution: Federal Express, L.L. Bean, Super Valu Stores, Wal-Mart

* Employee training: Merck Sharp & Dohme

* Facilities, most advanced: Yamazaki Mazak (Japan)

* Healthcare cost management and promotion: Coors, Johnson and Johnson, Kodak, Travelers

* Information systems management: American Airlines/Sabre

* Manufacturing: Hewlett-Packard, IBM, Motorola, Toyota

* Product Development: Hewlett-Packard, Honda, Intel

* Quality Management: Motorola, Xerox

* Sales/marketing: IBM, Marion Merrell Dow, Xerox

* Technology transfer: 3M

Reasons for Failure or Poor Results from Benchmarking

Given the complexity of the benchmarking process, the relationships with external organisations and the difficulty of making major organisational changes, the many reasons for failure (Gaucher and Coffey, 1993) are:

- i. Leadership not considering benchmarking important to achieve the organisation's goals or not supporting the benchmarking team or the required changes.
- ii. Unwillingness of all benchmarking partners to share the detailed information.
- iii. Focus on outcome or result measures rather than the process characteristics that produced those results.
- iv. Too broad a benchmarking topic used, for example, ambulatory care rather than the registration process for ambulatory care patients.
- v. Using too narrow a scope of companies for potential benchmarking. This limits learning, for example, a hospital benchmarks only to competing hospitals in its geographic region.
- vi. Approaching benchmarking as a one-time effort rather than an ongoing, long-term effort.
- vii. Denial of the need to change, the need to benchmark, or the benchmark results.
- viii. No action or changes after all of the efforts to do benchmarking.

5.1.3 Taguchi Methods

The Taguchi method is a combination of an engineering approach and a statistical method to achieve improvements in product/process cost and quality, accomplished through design optimisation. It is a branch of Quality Engineering that addresses the need for methods of design that can bring products to production relatively defect-free. Dr Genichi Taguchi developed the Taguchi Method in the early 1960s in Japan (Phadke, 1989). His method is based on the Design of Experiment (DOE) (Fowlkes and Creveling, 1995) to provide near optimal quality performance. The goal is to identify parameters that can be controlled (control factors) and to reduce the sensitivity of engineering designs to uncontrollable factors (noise). This is achieved

by using small-scale experiments in the laboratory to find reliable designs for large-scale production (Taguchi and Wu, 1989). Taguchi (1986) defines quality as:

"The quality of a product is the total loss to society due to variation and harmful side effects, from the time the product is shipped".

Instead of defining quality as a positive attribute of a product, it is defined as a financial loss or cost to society caused by undesired variance in the product. It includes cost such as warranty, liability, and lost customer goodwill. Every product, process or service has a specific function and ideal performance target (Taguchi and Wu, 1989). The 'ideal' quality a customer can receive is that every product delivers the target performance each time the product is used, under all intended-operating conditions, and throughout the product's intended life (Phadke, 1989).

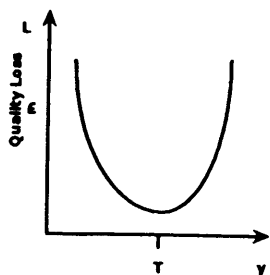
The Taguchi Method has been particularly recognised for three major contributions to the field of quality:

- i. Quality Loss Function
- ii. Orthogonal Arrays
- iii. Robustness

Quality Loss Function

Quality costs are usually measured in terms of scrap, rework, and warranty. These are factors that affect market share. Dr Taguchi calls these costs, loss. Dr Taguchi uses the Quality Loss Function (QLF) to evaluate quantitatively the hidden costs or long-term losses related to engineering/management time, inventory, and customer dissatisfaction (Clausing, 1988). From an engineering point of view, the losses are those caused when a product's quality characteristic deviates from its desired target value. Furthermore, it is reasonable to believe that loss continually increases as a product deviates further from the target value. Dr Taguchi uses a simple quadratic function to approximate the behaviour of loss in many instances as shown in Figure 5.5. Thus, QLF is a measure of quality that reflects not only immediate costs, such as scrap and rework, but long-term losses as well.

Figure 5.5: Quality Loss Function



The Quality Loss Function is given as: $L = k (y - T)^2$






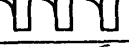




Source: Bouchereau, V. and Rowlands, H. (1998), "An Intelligent Systems Approach to Quality Function Deployment"

Where L is the Loss Function measured in financial terms, k is a constant called the quality loss coefficient, T is the target value and y is the real measurement from the target. The curve is centred on the target value, which provides the best performance in the eyes of the customer (Clausing, 1988). Since the QLF evaluates quality in financial terms, it is a tool for engineering management planning, that is, for finding the balance between cost and quality that can increase profit. Improving quality cost effectively reduce loss (Taguchi and Wu, 1989).

Orthogonal Arrays

The basis for designing an experiment using the Taguchi Method is the use of orthogonal arrays. Orthogonal array is very effective in translating a small amount of data into meaningful results. It can define a balanced study of different environmental conditions. The array forces all experimenters to design almost identical experiments (Peace, 1993). It is a matrix of numbers arranged in rows and columns in such a way that each pair of columns is orthogonal to each other. When used in an experiment, each row represents the state of the factors in a given experiment. Each column represents a specific factor or condition that can be changed from experiment to experiment. This method helps an experimenter determine the possible combinations of factors and identify the best combination. Figure 5.6 illustrates the use of Orthogonal Arrays for baking a cake.

Figure 5.6: Orthogonal Array Table for Baking a Cake

Ingredients	How much/many	
A. Eggs	A ₁ 	A ₂ 
B. Butter	B ₁ 	B ₂ 
C. Milk	C ₁ 	C ₂ 
D. Flour	D ₁ 	D ₂ 
E. Sugar	E ₁ 	E ₂ 

Source: Bouchereau, V. and Rowlands, H. (1998), "An Intelligent Systems Approach to Quality Function Deployment".

The objective is to determine the right proportions of the five major ingredients, eggs, butter, milk, flour and sugar, so that the recipe will produce the best cake most of the time. With the five factors, each at two levels (Level A₁, A₂ etc) there are 32 (2⁵) combinations of all possible factors and levels. To find the best tasting cake, surely 32 cakes need to be baked. For most industrial situations, carrying out a large number of experiments is not desirable. Taguchi uses the Orthogonal Array table to accomplish the same objective with a smaller number of tests.

Robustness

Dr Taguchi's approach allows experiments to be performed and prototypes to be tested on multiple factors at the same time, so that the product/process becomes insensitive to uncontrollable factors. The stability of performance in the face of noise factors is called Robustness. It provides a more efficient, cost-effective way to improve products and processes. In addition, it produces consistent, high-level performance despite being subjected to a wide range of changing customer and manufacturing conditions. Improving robustness allows the engineer to improve quality, without increasing costs. Taguchi has introduced a measure called the Signal-to-Noise (S/N) ratio to measure variability around the target performance. In order to calculate the S/N ratio, it is necessary to repeat each experiment. The S/N ratio is an indicator of the robustness of the quality. The larger the S/N ratio, the more robust the product will be against noise (Taguchi, 1993).

The Benefits of the Taguchi Method

According to Roy (1990), the benefits of the Taguchi Method are:

- * Measures quality in terms of deviation from target using Quality Loss Function and the S/N ratio.
- * Solutions to problems found by team approach and brainstorming.
- * Uses technical information to design low-cost, highly robust products/processes.
- * Reduces time and cost of experiments.
- * Reduces variation without removing its causes.
- * Reduces product warranty and service costs by addressing them with the Loss Function.

Limitations of the Taguchi Method

According to Taguchi and Wu (1989) and Roy (1990), the limitations are:

- * This method can only be effective when applied early in the design stage.
- * It is very effective in the parameter design, but not in systems design stage.
- * It assumes that the system design and the identification of functions have been established before starting.
- * There are situations where the Taguchi Method is not suitable, for example, in simulation studies involving factors that vary in a continuous manner.

5.1.3 QFD

QFD was initially developed in Japan as an effort to get engineers to consider quality early in the design process. It started in the late 1960s at Kobe Shipyard as a way to expand and implement the view of Quality as taught by Deming and others. From there it was developed much further by the Japanese automotive industry. The first reported success story was the "Toyota rust study" in which Toyota reported how in the late 1970's, they practically eliminated warranty costs due to rust (Sullivan, 1986). Yoji Akao together with the late Shigeru Mizuno and other quality experts in Japan, developed the tools and techniques of QFD and organised them into a comprehensive system to assure high level of product quality and customer satisfaction in new products and services (Akao, 1990 and Mizuno and Akao, 1994). In the mid

1980s, Donald Clausing introduced QFD to Xerox Inc., USA. Since then, a large number of organisations world-wide have promoted and successfully utilised QFD.

The original Japanese name of QFD is '*hin shitsu kino ten kai*'. Lockamy III and Khurana (1995) provide the following translation:

- * *hin shitsu* means quality or feature or attribute
- * *kino* means function or mechanisation and
- * *ten kai* means deployment, diffusion, development or evolution.

Hence, QFD is not simply a quality tool, but embodies the broader meaning of taking the features of a product and evolving their functions into an overall product. It is therefore an important planning tool for introducing new products and upgrading existing products (Slabey, 1990).

There were two motives behind the birth of QFD. The first was to enable better determination of design quality, that is, provide a way to carry out quality assurance on the product development process. Secondly, it was to determine key manufacturing operations in advance (Akao, 1990). The fact that QFD is seen as a quality assurance tool in Japan is confirmed in the newly developed 7 Product Planning tools where QFD is said to link the findings from various marketing activities to the design (Kanda et al, 1994 and Kanda et al, 1995). This means that the product is conceptually designed prior to applying QFD. Consequently, if QFD is applied as stated in the literature, incremental improvements will be carried out. Also, it might be noted that the first part of QFD, that is, the customer needs part, is very similar to customer satisfaction research. The aim of QFD and customer satisfaction research is to determine the areas in need of improvement. This is done using the customer to identify the most important items of the product/service and then focus on these items in the product/service development.

Furthermore, the fact that QFD is designed to be a quality assurance tool means that from the start, QFD is not thought of as a tool for developing products but rather, for making sure that the "correct" product is being developed. However, it is without question that the use of QFD goes

beyond this. Volvo, for example, developed an innovative solution in their Ecological Concept Car using QFD.

A number of widely reported definitions of QFD includes:

- * A **philosophy** that ensures high product quality at the design phase (Akao, 1990).
- * A **method** for developing a design quality aimed at satisfying the consumer and then translating the consumers' demands into design targets and major quality assurance points to be used throughout the production stage (Akao, 1990). Add service to production and QFD could be paraphrased as "a system and procedures to aid the plan and development of product and services and assure that they will meet or exceed customer expectations" (Mazur, 1993). QFD expresses its true purpose, which is satisfying customers (Quality) by translating their needs into design and assuring that all organisational units (Function) work together to systematically break down their activities into finer and finer details that can be quantified and controlled (Deployment). Mazur further added that QFD is quite different from traditional quality systems which aim at minimising negative quality. QFD maximises positive quality which creates value to customers. Furthermore, QFD allows customers to prioritise their requirements, benchmark the company against competitors and then direct the company to optimise those aspects that will bring the greatest competitive advantage.
- * A **system** for translating consumer requirements into appropriate company requirements at every stage of a product's life cycle, from research to sales to service (Slabey, 1990). This view is echoed by GOAL/QPC (1989) who sees QFD as a system for understanding what the customer wants and for assigning the responsibility of achieving appropriate quality to all parts of an organisation. Terninko (1990) also defines QFD as a system for translating the needs and wishes of the consumer to design requirements for products and services, and sees QFD as a detailed system with a full range of matrix tools to analyse the elements required for success in product planning, part/subsystem identification, process planning and production planning.

- * **A set of planning and communication routines** to focus and co-ordinate the skills of an organisation, first in design, and then in manufacturing and later in the marketing of the goods that customers want to purchase (Clausing and Hauser, 1988).
- * A **process** that provides structure in the development cycle to focus on customer requirements (Bossert, 1991). This is similarly viewed by GOAL/QPC (1989) who defines QFD as a structured process that provides a means to identify and carry the customer's voice. In addition, QFD is achieved by cross-function teams which collect, interpret, document and prioritise customer requirements. Through the use of charts and matrices, quality responsibilities are effectively deployed to any needed activity within a company to ensure that appropriate quality is achieved.
- * A **technique** that identifies the true voice of the customer and ensures that this information goes through all stages of the product life cycle (Burn, 1990).
- * A **cross-functional tool** which enables organisations to prioritise customer demands, develop innovative responses which are reliable and cost effective, and orchestrate a successful implementation involving all departments (King, 1989). He further adds that QFD is part of TQM and a sub-system of Quality Assurance which is at the core of the quality piece of cross-function management.
- * A **systematic planning process** created to help a project team bring together and manage all elements needed to define, design and produce a product (or deliver a service) that would meet or exceed customer expectations (Daetz, Barnard and Norman, 1995). This view is also echoed by GOAL/QPC (1989) who defines QFD as a flexible planning tool that allows organisations to react quickly in developing or improving products and services. It enables prioritisation of needs, innovative responses to those needs and co-ordinates implementation for maximum effect. When instituted, QFD leads to product or products efforts that enable a company to exceed the expectations of the customer. QFD works best within a company where there is organisational commitment and a disciplined approach to implementation.

* A **team based approach** for planning, communicating and documenting product development that can help cut the time to market for new products, while reducing costs and improving quality (Miller and Bombino, 1992). It helps ensure that products are customer driven and that customer needs are accurately translated into technical requirements for each stage of the development effort. It ultimately helps link the basic concept of TQM into the product and service development processes.

* The **ultimate quality assurance system** (Powers and Harter, 1995). QFD is a systematic approach to assure customer satisfaction which is achieved through:

- defining (new) capabilities required to achieve customer satisfaction.
- developing (new) capabilities through deployment of requirements in the design process.
- maintaining and improving capabilities through creation of a Quality Control or Daily Process Management Plan.

Bergman and Gustafsson (1997) attempts to sum up the definition of QFD as:

* *Customer focus* - QFD always starts with customer input.

* *Cross-function work* - It basically means that better decisions are made since more input is received, that is, more information is considered.

* *Communication* - One of the more significant effects of QFD is improved cross-functional communication. Information is both brought in from all around the organisation and communicated out again via the cross-functional team.

* *Teamwork* - QFD also means teamwork and this work benefits from *group dynamics*. All decisions are made using *consensus* as the leading key word. This in turn facilitates that the organisation works to achieve what is actually agreed upon.

* *Structured way of working* - QFD helps to create a suggested list of tasks that should be carried out during the product development process.

* *Prioritisation* - One of the main reasons for working with QFD. Focus the available resources where it counts in terms of improved customer satisfaction.

- * *Analysis of the system* - QFD helps take a system into account compared to focusing on the separate items and it exposes the cause-and-effect relationship all the way to production.
- * *Documentation* - The work is documented, which ensures traceability and it also helps in speeding up subsequent projects. It also forms a knowledge based preserving experience from the project.

Almost all of the definitions stated earlier lean towards emphasising QFD's application in the product and manufacturing industries. The one exception is Mazur who defined QFD for application in service industries. According to Mazur (1993), QFD consists of a system and a set of procedure to aid in the planning and development of services. It assures that customer expectations will be met or exceeded.

From the above discussion on the definitions of QFD, it is hard to define what QFD really is, since there are many different types of applications, use of the technique and above all, opinions on what QFD does. Furthermore, differences in the view of QFD can be traced to different parts of the world. The Japanese view of QFD is that the main purpose of the method lies in quality assurance during new product development (Mizuno and Akao, 1994 and Nishihara et al, 1995) while the western view focused on that of product development or a translation tool. This can be traced in the following definition for QFD. "QFD is a system for translating consumer requirements into appropriate company requirements at each stage from research and product development to engineering and manufacturing to marketing/sales and distribution" (Slabey, 1990). Quality assurance or system leads the thoughts to a tool that is inflexible and must be used in the same way each time. This is, however, not the case. Professor Akao emphasises the need of being flexible, starting his answer to many questions concerning QFD with "it depends...". As a result of all this reasoning, the question still remains: What is QFD?

According to Hunter and Landingham (1994), all QFD definitions convey the power of QFD as a tool or voice of the customer that drives everything an organisation does, from the development stage through to delivering the products and services. Hence, whether QFD is viewed as a method, a process, a system or a technique, its purpose is to ensure that customer

needs are taken into account in the design and development of new products and services, and that this consideration is made as early as during the design phase. In the next section, the author discusses why the QFD tool is chosen as the methodology for the development of a total quality healthcare model for TQM.

5.2 Why QFD?

Generally, there are four reasons for using the QFD tool for the development of a total quality model for TQM. These are:

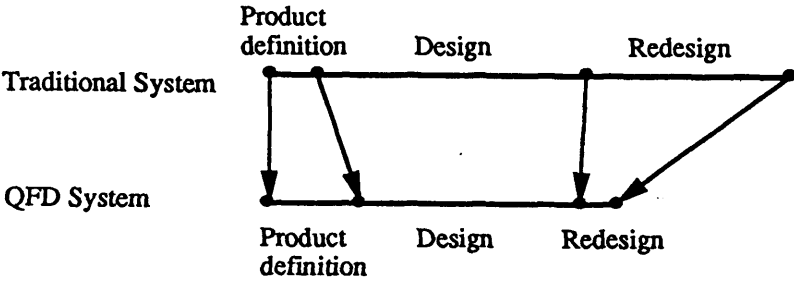
- * customer requirements
- * improved communications
- * better integration of customer requirements into service requirements
- * performance measurement.

Customer Requirements

A tool is needed to address these diverse customer requirements and not lose sight of the external and internal customer needs. Akao (1990) states that in many of the published cases, the use of QFD has cut in half the problems previously encountered at the beginning stages of product development and has reduced development time by one-half to one-third, while also helping to ensure user satisfaction and increasing sales. However, if applied incorrectly, QFD may increase work without producing these benefits. When new products or services are developed, whether in healthcare or in other industries, it is common to experience numerous start-up problems leading to a series of costly redesigns. These typical start-up problems have made many of us leery of being the first person to buy a new product or use a new service. Figure 5.7 illustrates the relative amount of time and resources spent using a traditional design process versus a QFD design process. According to King (1989a), using a traditional approach, little time is spent defining the customer requirements for the product, consequently design takes less time. However, there is often a long redesign period after the new product or service is initiated. Using QFD, although substantially more time is spent upfront understanding the customer requirements and desires and the relative priorities among them, the complete design

process takes less time. By carefully meeting the customer requirements, much less time is needed for redesign after the product or service is initiated. Overall, there is a substantial reduction in the time and cost to achieve an acceptable product or service.

Figure 5.7: Comparison of Traditional and QFD Systems



Source: King, B. (1989), "Better Designs in Half the Time: Implementing Quality Function Deployment in America". (3rd ed.), Methuen, Mass.:GOAL/QPC, pp. 1 - 2.

Improved Communications

A effective communication tool is essential to the success of any quality initiative. Hence, a communication tool is needed to keep a quality improvement team focused and on track with customers' expectations. QFD which is defined as:

"A system for translating consumer requirements into appropriate company requirements at each stage from research and product development to engineering and manufacturing to marketing/sales and distribution" (Slabey, 1990)

shows that QFD takes the voice of the customer (or user) all the way through product development to the factory floor and out into the market place. QFD is therefore not just a quality tool, but an important performance measurement, planning and communication tool for introducing new products and upgrading existing products.

Zairi and Youssef (1995) also have commented on the relationship between QFD and TQM. They state that QFD is a prerequisite for successful implementation of any TQM program. This

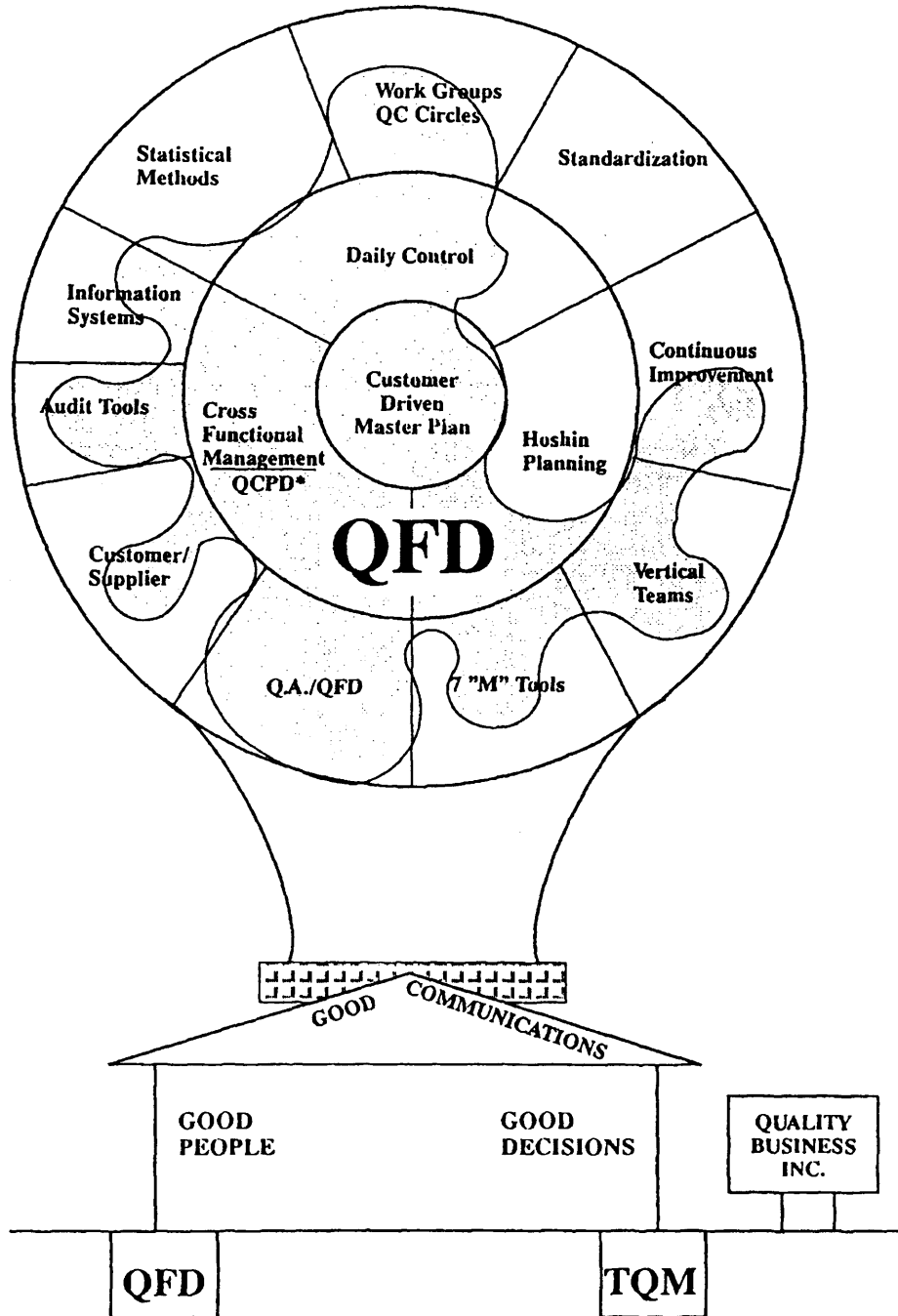
is because QFD is central to the three core principles of TQM, namely, customer focus, collaboration and teamwork, and continuous improvement. Weisbrich and Eneco (1992) have also echoed that QFD is a principal cornerstone in the broadbased pursuit of TQM. They are of the view that QFD is part of TQM and that QFD actually permeates throughout and encompasses many of the other TQM items as illustrated in Figure 5.8. Hence, QFD inherently employs and orchestrates the desired attributes, processes and tools of TQM for improved decisions, good staff and good communications.

Better Integration of Customer Requirements into Service Requirements

The third reason for QFD is better integration of customer requirements into service/production requirements. QFD works with other tools to meet customer needs. Existing procedures and process can continue to service the day to day customer needs. Complementarily, QFD can be used to provide focus on customer needs for products that are not competitive.

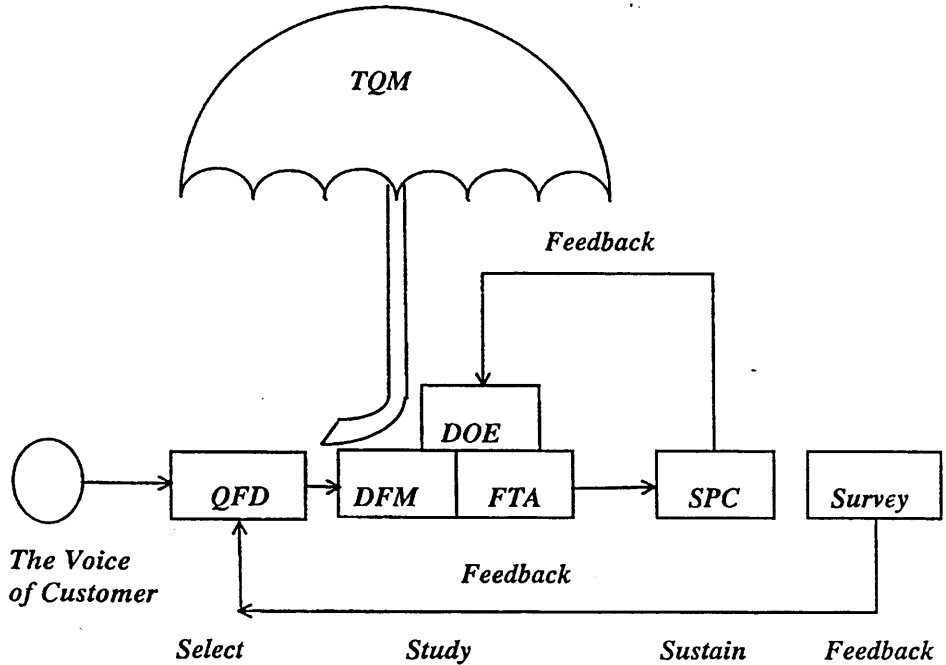
Day (1993) illustrated the relationship between QFD and other quality and engineering tools, such as Design for Manufacturing (DFM), Fault Tree Analysis (FTA), Design of Experiment (DOE) and Statistical Process Control (SPC). As Figure 5.9 shows, the input of QFD process is the voice of the customer. The expected output, then, is the selection of key priority elements that are able to improve customer satisfaction. In other words, QFD translates the voice of the customer into process design.

Figure 5.8: QFD Inherently Incorporates and Orchestrates Many TQM Processes/Tools for Improving Business Operations



Source: Weisbrich, A.L. and Eneco, (1992), "QFD: A TQM Cornerstone for Quality Business Operations and Consolidation Factoring: A QFD Enhancement for Quality Business Decisions".

Figure 5.9: The Relationship Between QFD and Other Quality and Engineering Tools



Source: Day, R.G. (1993), "Quality Function Deployment: Linking a Company with Its Customers".

According to Zairi and Youssef (1995), DFM also known as concurrent engineering, parallel engineering or simultaneous engineering, is "a design philosophy that promotes collective and integrated effort of a number of teams involved in planning, organising, directing and controlling all activities related to products and processes from idea generation to finished product or service such that:

- * available design, manufacturing and information technologies are efficiently utilised,
- * team work is emphasised,
- * redundancies and non-value added activities are eliminated, and
- * customer requirements and qualities are built in design".

Referring to the above DFM definition, QFD has great potential for making DFM work. The reason is because QFD brings together people from different departments within an organisation. Consensus and agreement on the key parameters of a product, process or

manufacturing method can take place after the team has had the opportunity to voice their varied opinions given their different perspectives.

After using DOE, DFM and FTA, SPC is applied in order to sustain quality in production and to assure that the customer needs have been met. The difference between QFD and SPC then becomes obvious. QFD is concerned with the design aspects of products and services whilst SPC is concerned with process improvement, defect prevention and the reduction of process variability.

The last chain as shown in Figure 5.9 is the survey. Surveys are conducted to obtain feedback and evaluation from the customer. Finally, the feedback as shown in Figure 5.9 illustrates the never ending improvement process of quality and engineering tools.

Performance Measurement

The final reason for QFD is performance measurement. Performance measurement provides hospitals with 'hard' evidence about existing practices, values, belief and assumptions within the hospital and end reliance on opinions of the management. Performance measurement is therefore vital for an organisation who wants to succeed in the competitive market (Adam, Hershauer and Ruth, 1981). Thus, a performance measurement tool is necessary to guide an organisation to assess their ability to create value for their customers. Whilst financial measures are important, they are not sufficient as they only provide a single, narrow perspective of how an organisation functions. Increasingly, more creative and better financial measures have been devised, such as the Balanced Scorecard, which is used to monitor the organisation's performance using four perspective: financial, customer, internal business processes and learning, and growth is consistent with the objective of maximisation of shareholder value, but QFD (Akao, 1990) which is described as "a technique for converting the customers' demand into *quality characteristics* and developing a design quality for the finished product by systematically deploying the relationship between demands and the characteristics, starting with the quality of each functional component and extending the deploying to the quality of each part and process" provides a better understanding of customers' expectations, highlights unmet

customers' expectations and identifies critical processes and new processes to address the unmet customer expectations.

In conclusion, although the customers did not specifically call for QFD, their request for quality care placed a heavy interest in the implementation of a TQM system. Hence, hospitals in Singapore need to restructure its management quality practices towards a TQM system. How should they go about doing it? What are the steps involved? Can the QFD tool be used to develop a total quality model to guide hospitals in their TQM endeavour?

Miller and Bombino (1992) sum up the reason for the use of QFD in the development of a total quality healthcare model.

QFD is defined as a team based approach for planning, communicating and documenting product development that can help cut the time to market for new products, while reducing costs and improving quality. QFD helps ensure that products are customer driven and that customer needs are accurately translated into technical requirements for each stage of the development team. A team utilising QFD will:

- * identify and verify customer (end user and in process) requirements.
- * translate customer requirements into design requirements.
- * deploy design requirements into specific technical targets.
- * deploy technical targets into process plans and manufacturing/delivery methods.
- * identify the most critical process elements and key manufacturing requirements.

Hence, the QFD tool can provide the methodology in the development of a total quality healthcare model for the successful implementation of TQM.

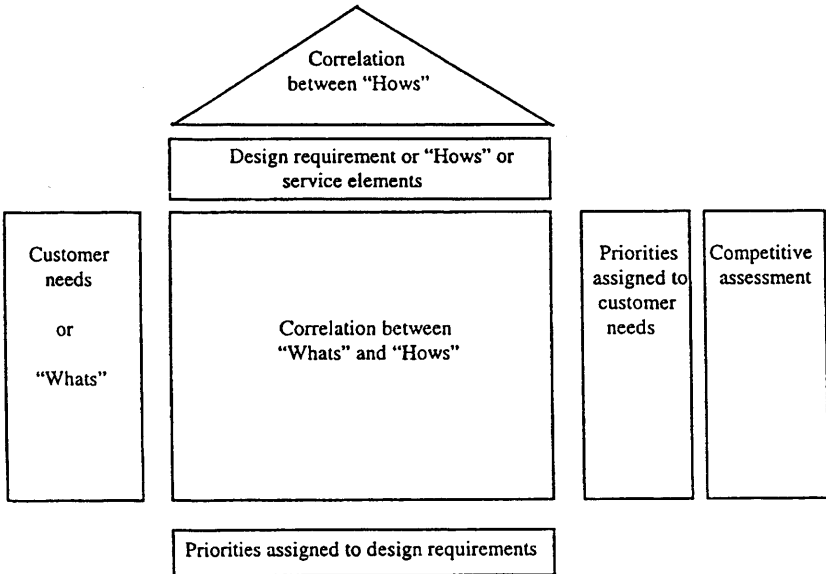
5.3 The House of Quality (HOQ)

QFD uses a matrix format to capture a number of issues vital to its planning process. This matrix is called the House of Quality (HOQ).

5.3.1 Building the HOQ

The HOQ is the nerve centre and the engine that drives the entire QFD process. According to Clausing and Hauser (1988), the HOQ is a kind of conceptual map that provides the means for inter-functional planning and communication. Another definition is given by Eureka and Ryan (1994) who define the HOQ as a product planning matrix used to depict customer requirements, company measures, target values and competitive product evaluations. An HOQ contains seven different elements as shown in Figure 5.10.

Figure 5.10: The House of Quality



Source: Evans and Lindsay (1996), "The Management and Control of Quality".

The seven elements in the HOQ are:

i. Customer Needs or The "Whats"

According to Clausing and Hauser (1988), the HOQ begins with the customer, whose requirements are called customer attributes or phrases that customers use to describe product or service characteristics. Other terms for "Whats" include voice of customers (Day, 1993 and Shillito, 1994), customer requirements (Eureka and Ryan, 1994 and Hofmeister, 1995) and demanded quality (Akao, 1990). In this thesis, the term *customer needs* is used to describe expected needs of patients of hospitals.

ii. **Service Elements or The "Hows"**

The customer needs are then translated into corresponding "Hows". The function of the "Hows" is to translate the customer needs into terms measurable by the organisation. It is important that "Hows" be objectively measurable and testable. They should not represent technical solutions for customer needs (Hofmeister, 1995). "Hows" are also called substitute characteristics (Shillito, 1994), engineering attributes (Clausing and Hauser, 1988), quality characteristics (Akao, 1990) and technical requirements (Day, 1993). In this thesis, the term '*service elements*' is used to describe how hospitals meet their customer needs.

iii. **Correlation between the "Whats" and the "Hows"**

After the customer needs and service elements have been identified, the next step involves filling in the body of the HOQ. This part is called the correlation matrix. The correlation matrix indicates the extent to which the service elements affect the customer needs. Symbols are used to portray the strength of the "Whats"/"Hows" relationship.

If no correlation exists between a particular "What"/"How" pair, its matrix space is left blank. Blank rows or columns indicate places where the translation of customer needs into service elements is deficient. This feature of the HOQ provides an opportunity for valuable cross checking. Cross checking is conducted by examining the blank rows/columns. The purpose of cross checking is to identify whether hospitals and customers have the same perception of needs.

A particular service element, which affects no customer need, may indicate that the service element list is redundant, or that a customer need is missed. On the other hand, if a particular customer need is unaffected by any service element, this indicates an opportunity for the hospital to expand its services or products.

iv. **The Correlation Roof Matrix**

This matrix describes the correlation among service elements. The description is done via symbols that represent positive or negative ratings. The correlation matrix can be used to identify which service elements support each other, or which are in conflict.

When there is a positive correlation, one service element supports another; when there is a negative correlation, two service elements are in conflict.

Positive correlation identifies service elements that are closely related. The roof matrix identifies those elements that are interdepartmental and thus, shows where co-operation is needed or where duplication of effort should be avoided. Negative correlation represents conditions that will probably require trade-offs. Trade-offs that are not identified and resolved promote a higher likelihood of unfulfilled customer expectations.

v. **Ratings and Weightings**

Contained in the HOQ also are two rating scales, one for prioritising service elements and the other for prioritising customer needs. A digit between "1" to "5" is placed in the column immediately to the right of each customer need. This reflects the relative importance of the items to the customer.

A priority for the customer needs is obtained by multiplying the weights assigned to each matrix symbol (i.e. weak, medium or strong) with their relative importance. The priority of service elements is calculated by multiplying the relative importance of each customer need with the sum of weights assigned to each symbol that corresponds to a particular service element. The purpose for prioritising the service elements is to guide the hospital on which elements require close attention. The point is that effort should be concentrated on those critical service elements for quality improvement and customer satisfaction.

vi. **Competitive Assessment**

The competitive assessment feature of the HOQ provides an item-by-item comparison between an organisation's products or services and those from its competitors. By assessing the competitive edge, organisations are able to examine their products or service performance. If their products or service performance are low compared to other competitors, organisations should re-evaluate their performance including their perception about customer needs. The competitive assessment, thus, can assist in straightening out any inconsistency between customers and organisation perception. It furthermore, directs the organisation in establishing appropriate strategies for improvement.

In conclusion, one defining feature of the HOQ is that it can be tailored to individual applications. For example, organisations may choose to include additional elements in their HOQs (for example, key selling points, goals, improvement ratios, the level of difficulty or targets for service elements).

5.3.2 Beyond the Basic House of Quality

What occurs after construction of the basic HOQ is a series of four phases that extend the HOQ to additional matrices. According to Guinta (1993), the four phases are:

- i. design
- ii. details (which may be referred to as parts)
- iii. process
- iv. production

Named differently, Sullivan (1986) uses the terms:

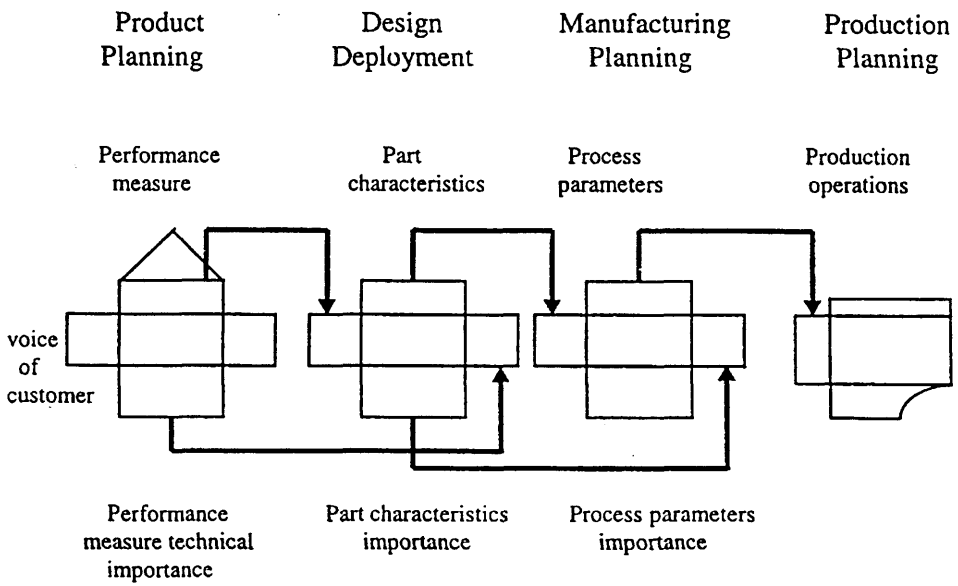
- i. planning matrix
- ii. deployment matrix
- iii. process plan and quality control charts
- iv. operating instructions

Cohen (1995) on the other hand, uses the term:

- i. product planning
- ii. design deployment
- iii. manufacturing planning
- iv. production planning

as shown in Figure 5.11.

Figure 5.11: Four Phases Quality Function Deployment Model



Source: Cohen, L. (1995), "Quality Function Deployment: How to Make QFD Work for You".

Figure 5.11 shows that the result of each phase is a matrix consisting of a vertical column of "Whats" and a horizontal row of "Hows". The "Hows" are considered to be more important than the "Whats" because their substance is carried to the next phase.

Product Planning

In the Product-Planning phase, organisations build their basic HOQ. The steps for establishing the basic HOQ have already been explained in Section 5.3.1.

Design Deployment

The "Hows" carried over from Phase 1 become the "Whats" for the second phase. Here, the details and components necessary to produce the products or services are determined.

The part characteristics are placed on the top of the design deployment matrix. The correlation of each part characteristic with the performance measure (which is the "Hows" in Phase 1) are then estimated. To evaluate the level of importance for each part characteristic, its priority is calculated. Priority of part characteristic is obtained by multiplying row weight of performance measure with the correlation matrix.

This information tells the organisation which part characteristics will be the driver of customer satisfaction. The part characteristics become the "Whats" input for the next phase.

Manufacturing Planning

In Phase 3, a matrix is developed to show the product process for the product. As mentioned, the "Hows" from the second phase (part characteristics) become the "Whats" for this phase. The correlation between part characteristics and process parameters are then defined. After calculating the priority of process parameter, organisations can pinpoint the process parameter that best fulfil the product or service requirements specified by customers. The process parameters, then become the 'Whats' in the next phase.

Production Planning

Two perspectives are offered in discussing this phase. Cohen (1995) has commented that the results of this phase is not a matrix, but rather a table or list which constitutes a checklist of topics or issues that should be considered in production planning. The production steps (for example, machine setting, control methods, sampling size and frequency, etc) are arranged along the top of the table, while the most important process parameters are arranged along the side of the HOQ. The production planner fills the table with comments, target values and/or other appropriate information.

Guinta (1993) argued that this phase is a matrix with production requirements as the "Hows" and process characteristics as the "Whats". Whether it is viewed as a table or matrix, the production planning phase will enable organisations to produce high quality products or services that meet their customer needs.

From the above discussion, the HOQ is demonstrated as a structured quality communication device. It is design oriented and serves as a valuable resource for designers. However, engineers may use it as a way to summarise and convert data into information. Marketing benefits from it because it represents the voice of the customer. Upper management, strategic planners and marketing or technical intelligence can use it to pinpoint strategic opportunities. Again, the HOQ serves as a vehicle for dialogue to strengthen vertical and horizontal communications. Issues are addressed that may never have surfaced before. The HOQ, through customer needs and competitive analysis helps, to identify the critical technical components that require change. The critical issues will then be driven through the other matrices to identify the critical parts, manufacturing operations and quality control measures to produce a product that fulfils both customer needs and producer needs within a shorter development cycle time.

5.4 QFD: Evidence Based Practices

In 1986, Dr Akao, past chairman of the QFD research committee of the Japan Society for Quality Control (JSQC) conducted a survey of QFD usage among the larger member companies of the Union of Japanese Scientists and Engineers. The study showed that although QFD was not being used in some Japanese companies, it had grown significantly and was used with great success at many Japanese companies as shown in Table 5.2.

Early applications of QFD in service organisations in Japan by Ohfuji, Noda and Ogino in 1981 were for a shopping mall, a sports complex and a variety retail store (Akao, 1990). More recently, Kaneko has been integrating QFD, reliability and quality circle activities in hotels, shopping centres and hospitals (Kaneko, 1990a; Kaneko, (1990b); Kaneko, 1991 and Kaneko, 1992).

Table 5.2: Results of JSQC Question: Do You Use QFD?

industry answer	electronics	precision machines	transportation	process industry	metal steel	construction	other manufacturing	service	total
yes	24	14	13	10	1	9	2	7	80
no	14	7	2	15	2	2	11	15	68
number of replies	38	21	15	25	3	11	13	22	148

Source: GOAL/QPC (1989)

A study by the GOAL/QFC Research Committee (1989) has revealed that currently, many U.S. companies are using QFD. They have also revealed the following QFD successes in the U.S.:

- * Clarification of engineering requirements - Ford Lt. Truck
- * Improved sales - Procter & Gamble Hotel products
- * Improved internal customer/supplier relationship - Digital Equipment Corporation
- * Improved external customer/supplier relationship - Ford, Climate Control, Cirtek, General Electric
- * Improved manufacturing documentation and control - General Electric Motor
- * Improved software design - Hewlett Packard and Digital Equipment Corporation
- * Improved education of new engineers - Cirtek
- * Prioritisation and scheduling of design effort - Cirtek
- * Improved new product design and launch - Masland and Deere and Company
- * New design system - The Kendall Company
- * Clarification and prioritisation of customer demands - Digital Equipment Corporation

- * Customer driven quality characteristics and quality in daily work - Florida Power & Light
- * Better documentation of customer demands - All
- * Established applicability in Aerospace/Defense Electronics - Hughes Aircraft
- * Understanding who the customers are - Polaroid
- * Multi-company new product development - Rockwell International

Other successful QFD applications to-date in the U.S. are:

- * Increased revenues - Japan Business Consultants (Mazur, 1993c)
- * Usefulness of QFD to healthcare - The University of Michigan Medical Center (Ehrlich, 1994), Princeton Foot Clinic (Gibson, 1994 and Gibson, 1995)
- * Development of an engineering TQM environment - The University of Michigan College of Engineering (Mazur, 1996b)
- * Application to employee satisfaction and quality of work life - AGT Telus (Harris and Baerveldt, 1995)
- * Improved sales - Host Marriot (Lampa and Mazur, 1996 and Mazur, 1996)
- * Increased customer satisfaction - Ritz-Carlton, Dearborn, Michigan (Kirk and Galanty, 1994)
- * Achieving total customer satisfaction - Motorola (Bosserman et al, 1996)

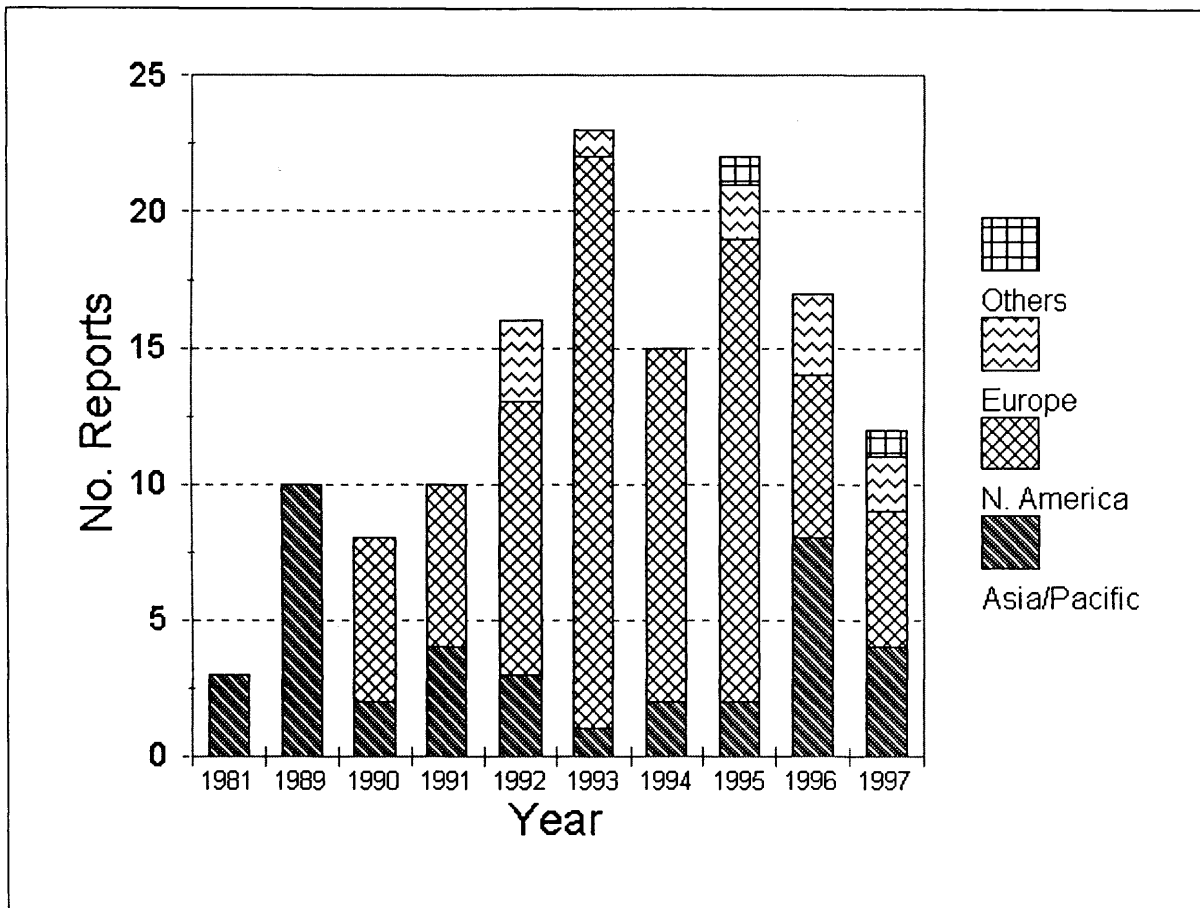
Burn (1990) made the following list that contained the names of some companies that had successfully applied QFD:

- * Computer - IBM, Hewlett Packard, Digital
- * Chemical - Du Pont, ICI
- * Textiles - Miliken
- * Electronics - Texas Instruments, Exact Circuits
- * Electrical - Black and Decker
- * Railways - RENFE (Spanish railways)

- * Component supply - GVC Elastomers
- * Technology management - Philips International

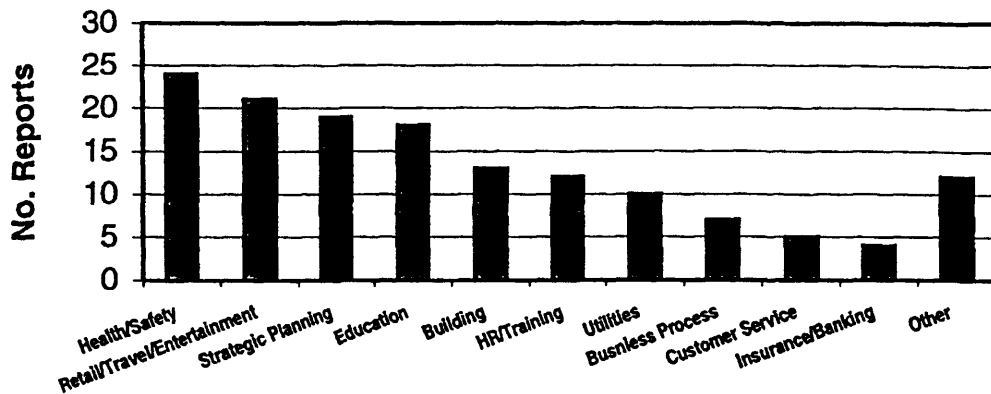
Each year new applications are being reported in small businesses as well (Mazur, 1994). Additional applications in finance, architecture, telecommunications, utilities and others have been published. Figure 5.12 and 5.13 represent cases presented in public at quality related conferences and journals from 1981 to 1997.

Figure 5.12: Service QFD Reports by Region



Source: Mazur, G.H. (1997), "Service QFD: State of the Art". The Third Annual International QFD Symposium, Linkoping, 1997, Vol. 1.

Figure 5.13: Service QFD Reports by Industry (1981 - 1997)



Source: Mazur, G.H. (1997), "Service QFD: State of the Art". The Third Annual International QFD Symposium, Linkoping, 1997, Vol. 1.

European interest in QFD began with Kogure, Akao, Furukawa's 1983 lecture in Chicago (Akao, 1983). Examples of successful QFD applications in Europe are:

- * Time Saving Aspects - The 3M Laboratories (Galgano & Associati, 1992)
- * Exceptional Market Acceptance and New Benchmark for Reliability - Nokia Electronics GmbH (Salminen, 1994)
- * Improved Service Quality - Alitalia (Galgano & Associati, 1992)
- * Improved Information Services, Payment and Loan Procedures - Banco Antoniani (Galgano & Associati, 1992)
- * Improving Business Process - Olivetti Office (Galgano & Associati, 1992)
- * Developed an Environmental Concept Car - Volvo Car Corporation (Ekadhl and Gustafsson, 1997)
- * High Customer Satisfaction and Products that Meet and Exceed Customer Expectations - Whirlpool Sweden (Ekdahl and Gustafsson, 1997)
- * Understanding Who the Customers Are and Their Expectations - SCA Molnlycke (Ekdahl and Gustafsson, 1997)
- * Reduced Product Development Time - Crosfield Electronics Ltd (Galgano & Associati, 1992)

- * Integrate QFD into the Design Process - Coopers & Lybrand (International) (Galgano & Associati, 1992)

Other successful QFD applications in companies in the South Pacific Rim are:

- * Prospect Electricity Sydney (Hunt, 1995)
- * Chinese Productivity Center, Taiwan (Chang, 1994)
- * Texas Instrument Singapore (Hunt, 1995)

The application of QFD by these users demonstrated that QFD has provided a tracking system for development efforts and preserved knowledge for future reference. QFD helps companies determine where to invest time and money, assures that cost-oriented quality is achieved and differentiates their products/services from those of competitors. QFD insures that each phase of the development cycle is rooted in customer needs and, within the development process, serves to facilitate the use of other tools, techniques and in-house expertise at the appropriate time. The successful applications of QFD by these companies demonstrate the feasibility and importance of using the QFD tool in the development of a total quality healthcare model for continuous quality improvement.

5.4.1 QFD's Applications in Service Industry

QFD has been used in service industry for quite a while. The first application was in retail and bookstore in 1987 (Akao, 1990). In the nineties, QFD's application in service industry was already widespread in many areas of service, such as:

- * Education (curriculum design): University of Cincinnati (Houshmand and Krishnan, 1994), Wisconsin University (Ermer, 1993), Temasek Polytechnic Singapore (George-Cosh and Yeo, 1994) and Grand Valley state University (Pitman et al, 1995).
- * Healthcare: University of Michigan Medical Centre (Ehlirch and Kratochwill, 1994) and Princeton Foot Clinic (Gibson, 1994 and Gibson, 1995).
- * Tourist industries: restaurant and hotel chain (Kaneko, 1992), housekeeping system in Ritz-Carlton (Kirk and Galanty, 1994), bagel sales in Host Marriott (Lampa and Mazur, 1996) and Alitalia (Ghobadian and Terry, 1995)

- * Others: Florida Power and Light Company (Hayes and Webb, 1990), emergency road service (Aswad, Glowski and Zink, 1993) and telephone service operation of Pacific Gas and Electric (Tessler and Klein, 1993).

In education, QFD can help the university to evaluate and redesign the curriculum that meets their customer needs. They are students, staff and industries. Further, QFD assists the university to achieve accreditation by higher institution and benchmarks the university against their competitors.

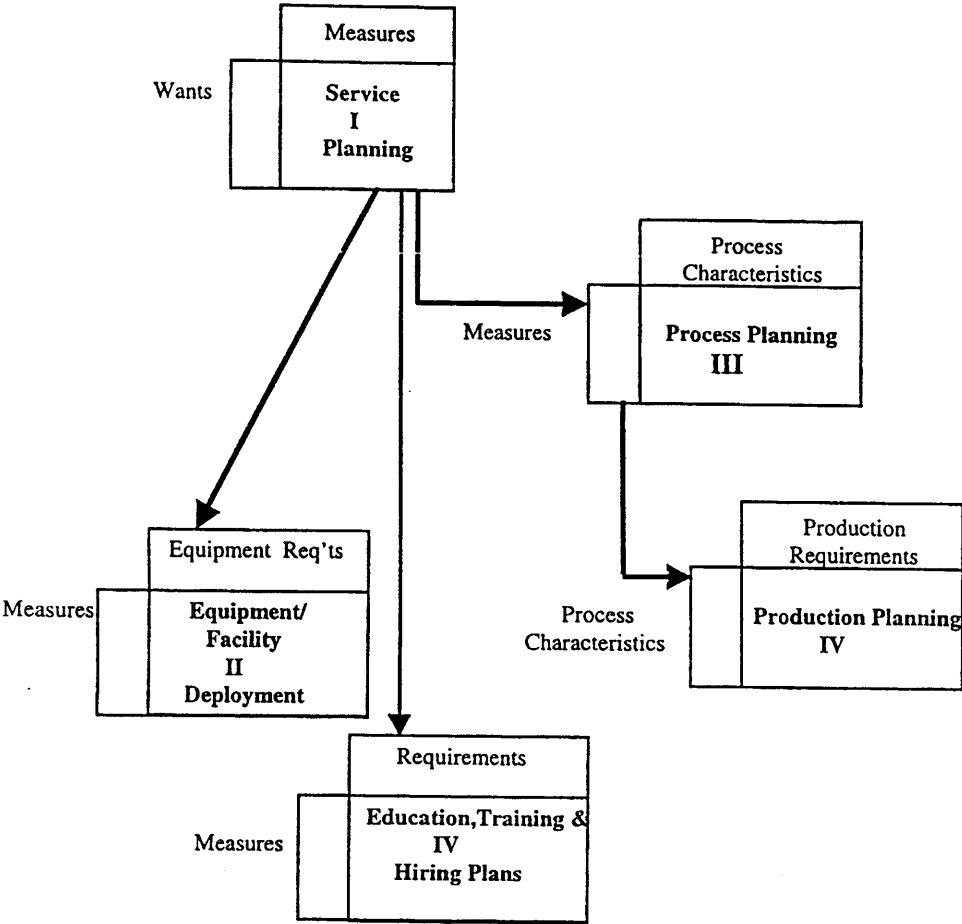
In healthcare, the hospital gains a lot of benefit by applying QFD, such as benchmarking against their competitors, improving the service that can meet their internal and external customer needs and building team work within the hospital.

Due to the inherent characteristics of services as discussed in Chapter 3, to apply QFD in service industries, the standard model of QFD as shown in Figure 5.4 needs to be modified. Hofmeister (1995) therefore, developed a QFD model for use in service oriented applications as shown in Figure 5.14. It consisted of four phases, namely:

- i. Service Planning
- ii. Equipment/Facility Deployment
- iii. Process Planning
- iv. Production Planning
- v. Education, Training and Hiring Plan

This model was used successfully by Florida Power and Light (FPL) to identify customer needs and service elements which was then deployed as job functions throughout the organisation (Hayes and Webb, 1990). FPL applied QFD in order to improve their operators' service quality. The operators' duty were answering five types of calls (for example, request for payment extensions, connections of new services, questions about billing statements, reports of power outages, or complaints relating to any of the above).

Figure 5.14: Modified QFD Model for Service Applications



Source: Hofmeister, K.R. (1995), "QFD in the Service Environment".

The FPL's team created Phase I of the HOQ (Service Planning) to examine the relationship between the customer requirements (for example, fair treatment, courteous friendly employees, etc) and the quality characteristics (for example, thoroughness, communication, and professionalism). Next, the team established Phase IV of the HOQ (Education, Training and Hiring Plans) in order to analyse the key quality characteristics in relation to FPL's existing training program and employee selection process. FPL's team did not publish their Process Planning, Production Planning and Equipment/Facility Deployment phase, but Hofmeister (1995) stated that since the application of QFD to FPL's "response to customer calls" process, customer satisfaction had improved dramatically and the complaints had been significantly reduced.

According to Aswad, Glowski and Zink (1993), the Michigan Emergency Road Services Department had used the standard model. They modified the terminology of the model in order to better capture their particular services. The terminology changes include:

- * *Service Planning* - this corresponds to product planning in the manufacturing environment. Customer needs are identified and related to service quality elements rather than part characteristics.

- * *Element Planning* - this corresponds to design deployment and links the service elements identified in Phase 1 to process characteristics.

- * *Process Planning* - this corresponds to manufacturing planning and links process characteristics to process parameters.

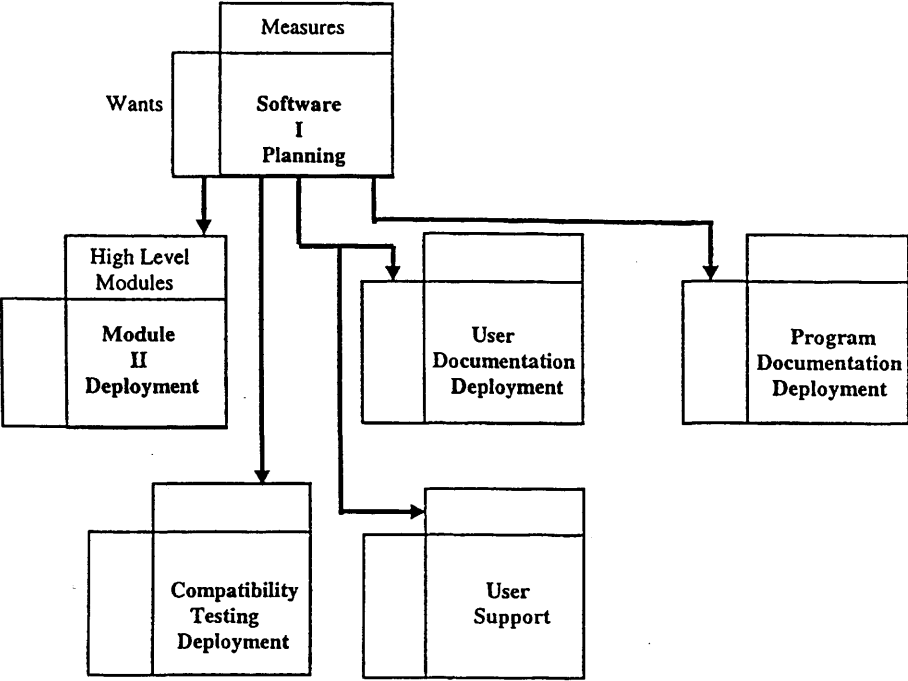
- * *Operation Planning* - this is a change from production planning. It links process parameters to service operations.

Besides the above, other QFD applications of a service nature, such as: academic application (Ermer, 1993; George-Cosh, 1994 and Pitman et al, 1995), bagel sales (Lampa and Mazur, 1996) and health services (Ehlirch and Kratochwill, 1994 and Gibson, 1994) have also modified the standard model.

5.4.2 QFD Applications in Software Industry

Digital Equipment Corporation, NEC, IBM and CSK are some of the several companies that have already applied QFD in software development. In software industries, all have to some extent, modified the standard model and terminology to better suit their requirements. Richard Zultner, has therefore, developed a QFD model for software industries (Cohen, 1995). Hofmeister (1990) discussed on the QFD model developed by the American Supplier Institute for use by software manufacturers as depicted in Figure 5.15.

Figure 5.15: QFD Model for Software Industries



Source: Hofmeister, K.R. (1990), "Applying QFD in Various Industries".

5.4.3 QFD Applications in the Healthcare Industry

As mentioned above, QFD has also been applied in healthcare, such as University of Michigan Medical Centre (Ehlirch and Kratochwill, 1994) and Princeton Foot Clinic (Gibson, 1994). A brief summary of these QFD applications are described.

The University of Michigan Medical Centre piloted QFD in a new unit which consolidated several diagnostic procedures into one unit. The objective was to learn when QFD is most appropriate for a hospital and to stimulate service volume at the new unit. The QFD team which comprised of 8 QFD team members developed an 8 step QFD process for the Medical Procedures Unit (MPU). They are:

- i. Identify Customer Groups.
- ii. Conduct Customer Focus Groups.

- iii. Analyse the Voice of the Customer.
- iv. Verify Customer Priorities.
- v. Determine Priorities of Customer Requirements.
- vi. Analyse MPU's Strengths and Weaknesses.
- vii. Compare these Findings to Your Competitors.
- viii. Align Resources to Meet Customer Expectations.

By applying the first 5 steps of the above QFD process, the MPU was able to facilitate easy accessibility and communication for referring physicians to reach MPU and the Medical Center physicians. It also improves the relationships between the Medical Center Physicians and the Referring Physicians.

The Princeton Foot Clinic (PFC) is a part of the outpatient rehabilitation services offered at Princeton Baptist Medical Centre. The actual QFD process in PFC began in the last half of 1993 with the selection and training of a PFC task force. The PFC mission was "to provide accurate, convenient and effective foot assessment, treatment and education for the patients of Princeton physicians, using resources in a cost-effective manner". The implementation of the QFD process involved the following steps:

- i. Identifying the customers to be served.
- ii. Identifying the Voice of the Customer.
- iii. Building the House of Quality.
- iv. Focusing the Resources of the Foot Clinic.
- iv. Charting the Path of the Customers.
- v. Development of Task Lists.
- vi. Reality Sets In.

The results of the above QFD process enabled PFC to overcome political hurdles. For example, the clinic was originally housed in excess space in a physician's office and the results of the QFD process helped convince management that the service would be more viable in an

alternative location. Ultimately the need to have access to technology without duplicating equipment meant re-integrating the clinic into the hospital's rehabilitation services. Also, the use of QFD in PFC had resulted in greater awareness of the customer among all parties involved with the clinic and had strengthened customer focus in the larger rehabilitation services and the entire outpatient scheduling system.

These applications proved that QFD has given benefits to the healthcare industry. In this research project, the author demonstrates how QFD can be applied to Singapore hospitals which to the author's knowledge, has not been applied before.

5.5 The Benefits of QFD

Generally, QFD can lead to a wide variety of benefits. The results of the 1986 Japan Society for Quality Control (JSQC) survey conducted by Dr Akao and others were published with details on the status of QFD in Japanese companies. The survey revealed that companies which used QFD reported the following benefits:

- * decreased start-up problems
- * competitive analysis became possible
- * control points clarified
- * effective communications between divisions
- * design intent carried through to manufacturing

Another benefit of QFD is problem prevention oriented. According to the Slabey (1990), the major advantage of QFD is that it promotes *preventative* rather than *reactive* development of products, causing organisations to move upstream, working at the high leverage end of the quality lever.

The benefits of QFD according to King (1989) are:

- * strategic choices for increased market share
- * better communication between departments
- * focused effort. Product or service priorities known by all
- * reduced engineering changes on critical design elements

- * better controls of critical elements of critical designs
- * better reliability of critical design elements
- * openness to new concepts
- * cost reduction (value engineering integrated with QFD)
- * competitive benchmarking
- * cross-training of design engineers
- * integration of several improvement tools (e.g. factor analysis, Value Engineering, SPC and documentation)
 - justification for use of tools
 - targeting the use of tools
 - leveraged use of D.O.E.
- * better understanding of customer demands
- * better understanding of different customers
- * better understanding of conflicting customer demands
- * better understanding of engineering requirements
- * better understanding of conflicting engineering requirements
- * improved structuring of the design process
- * better understanding of quality in general
 - practical nature of quality
 - by new groups design, marketing
- * better market research
 - more focused to real design issues
 - focus groups by design engineers
 - direct contact between customer and designer and manufacturer
- * establishes a critical path
 - traceability from final product to customer demand
- * build in quality upstream
- * improved documentation
- * common language for all departments
- * identifying customer(s)
 - different customer groups

- defining customer groups
- * breaks down walls
- * makes quality real - touch, taste, feel
- * improves internal budgeting (potentially)
- * better planning - individual efforts **fit** into product
- * how individual efforts **fit** into product
- * why designs are set the way they are
- * potentially early definition of conflicting Substitute Quality Characteristics - downstream fixing consumer problems without causing other problems

The benefits of the QFD process according to Lyons and Alexandra (1990), Bersback and Wahl (1990), Bossert (1991), Zairi and Youssef (1995), Min and Kuei (1995) and Lockamy III and Khurana (1995), can be elaborated as follows:

- i. QFD makes organisations to be driven by their customers:
 - * defines product or service specifications meeting the customer needs, while paying attention to the competitors
 - * ensures consistency between customer needs and the measurable characteristics of the products or services
 - * prioritises resources and identifies items that can be acted upon
- ii. QFD helps organisations to reduce implementation time of the new services/products:
 - * gets things moving quickly because planning takes place at an earlier stage and mistaken interpretations of priorities and objectives are minimised
 - * avoids future development redundancies

- * identifies future application opportunities

iii. QFD helps organisations to promote teamwork within their own organisations:

- * informs and convince all those responsible in the products or services process about the relationship between the quality of each phases output and the quality of finished products or service
- * brings people together from various disciplines
- * facilitates the formation of teams who is capable to meet customer needs

iv. QFD encourages organisations to provide good documentation:

- * encourages documentation of marketing, design, engineering and manufacturing product knowledge in consistent and objective manner
- * produces living document which can always adapt to change
- * provides framework for sensitivity analysis

In summary, the ultimate benefits of QFD are helping organisations increase their market share and get larger profits. These benefits are possible because QFD plays a major role in creating products or services that meet or exceed customer expectations with reasonable cost and significantly shorten development times. As a result of applying QFD, products or services are intrinsically more appealing to potential customers. QFD is definitely putting an organisation and the customer in a “win-win” situation.

5.6 The Limitations of QFD

As with any technique, there are limitations with QFD. It is not an easy technique to understand and use. Also existing working cultures tend to be mainly functionally inclined and focused on individual contributions rather than on a team approach to drive activities. QFD on the other hand requires multi-functional teams to drive activities. Attempting to build the HOQ in itself

requires hours of arduous work and the HOQ alone is not enough as teams still need to carry out the work of collecting data, designing and interpreting it (Sullivan, 1986). The generation of the HOQ is done through customer survey and manual input of the survey results. It has also been revealed that records relating to QFD were rarely kept. One reason for this was the lack of an established evaluation system suited to QFD. Thus information is needed to track the progress of the QFD project and to provide links between the different QFD phases.

Essentially, the 'voice of the customer' contains ambiguity, multiplicity of meaning and is qualitative in nature. The customers mix their primary needs with their desirable needs. QFD cannot quantify these needs. There is also a need to input large amount of data and make various decisions, such as trade-offs between customer demands, engineering characteristics, determine the degree of interrelationships between them and set precise target values. Many of these have to be based on subjective evaluation (King, 1987). Japanese experts admit that they are still at the trial-and-error stage. These somehow make QFD less objective than it appears.

Although QFD has its limitations, an organisation can take advantage of other quality tools already adopted or incorporate other quality tools within the QFD process to realise its full potential. QFD is a planning tool and organises data in a logical and systematic way, but it is rather a qualitative method. The union of QFD with quantitative methods will yield even greater benefits from its applications (Yoder and Mason, 1995).

One of the most difficult parts of the QFD analysis apart from actually obtaining the customer demands is objectively correlating these demands against service quality characteristics. The strength of the relationship is based on expert opinion. Their opinions on the strength or direction of improvement may not always be precise. The visual inspection of the input and output data associated with a relationship is not rigorous enough to discover this error (Yoder, 1995). The application of the theory of Fuzzy Logic, that takes linguistic variables as its input and output as either crisp or fuzzy numbers, provides a more quantitative method in determining the relationship matrix in QFD.

Another major drawback of QFD is the need to deal with large amounts of data on a rather personal basis. A machine learning approach, using Artificial Neural Network can be used to resolve this problem (Zhang, Bode and Ren, 1996). Additionally, to deal with the vast amount of data, various QFD software could be used, for example, QFD Capture, QFD2000, etc.

The merge of these quality tools is envisaged to make the QFD process more robust, more quantitatively oriented and bring together the different stages of the QFD process. It is not within the scope of this study to review how these quality tools can be used to integrate with QFD. Future work should look at how these tools can be combined together to produce an intelligent systems approach to QFD.

5.7 QFD: Evidence-Based Critical Success Factors

Since QFD's introduction, several studies have explored the use of QFD and the nurturing factors that are important for successful implementation and work with the method (Hunt, 1997b; Griffin, 1992; Vonderembse, Fossen and Raghunathan, 1997; Bond and Tranter, 1997 and Ekdahl and Gustaffson, 1997). These researchers have identified the following critical success factors:

- * Clear company visions and objectives
- * Top management support and strong operational leadership
- * Enhancing team effort by involving positive experienced managers in QFD projects
- * Team members with multi-disciplinary competence
- * Importance of networking between different QFD teams within the organisation
- * QFD facilitator with the expressed purpose of training and guiding the teams
- * Getting staff involved in the QFD projects
- * A history of customer orientation
- * Separate customer needs from technical responses
- * Teams should be committed to using QFD

- * Having computer support and team members who know how to use the software - vast amount of information and difficulty in organising the information
- * In the collection of data, avoid filters from other parties such as market research firms
- * Adjust and customise the QFD process to the company context

According to GOAL/QPC (1989), QFD as a planning tool and a process for translating customer requirements into products or services, works best within a company where there is organisational commitment and a disciplined approach to implementation. This view is consistent with that of Blumstein (1996), who has indicated that the foundation of an effective QFD effort is commitment. An executive who wants to successfully implement QFD in their organisation, must believe and be committed to QFD. The next step is to demonstrate the belief (commitment) to the people around them. In addition, GOAL/QPC (1989) has indicated that fundamental changes in company culture may also be required.

The critical success factors identified by Alterescu, Newhart and Tiedemann (1994) in their case study involving three distinct QFD projects in separate clinical services areas are:

- * Scope of the QFD project must be clearly delineated from the outset and all parties involved must have accepted that scope
- * Quantification can be a guide but should not replace qualitative analysis of the matrix
- * The Voice of the Customer must precede the development of any matrices (at least insofar as they are related to customers)
- * Provide formal QFD training for all involved parties and upper management
- * People untrained in QFD should not be brought into the project after it has commenced
- * People thoroughly trained in QFD must outnumber the people untrained in QFD when the project has commenced
- * The roles and responsibilities of all people involved in the project need to be precisely defined
- * Stakeholder/internal customers of the outcome of the project should be managed in such a way that their voices are heard - but not to the extent that these voices drown out the voices of the customers - external customers in particular

- * A specific timeline needs to be established so that stakeholders and sponsors understand where the core groups are at any given time and when the group will be meeting with them next
- * The core group facilitator and chair need to maintain close ties so that they not only set an example for the rest of the group, but also have precisely aligned perceptions regarding each step of the process
- * Do not lose sight of the more fundamental issues which are critical for long term success
- * The facilitator or sponsor should follow-up on all recommendations provided by the QFD project

Ehrlich and Kratochwill (1994) identified the following critical success factors when they applied the QFD process in the University of Michigan Medical Center to stimulate service volume at a new unit:

- * QFD project should involve a close working relationship with an external consultant to ensure that the project is completed in the most timely manner. Ensure that at least one staff member is appropriately trained as a QFD facilitator.
- * Teams should have support from, and accountability to senior management or faculty.
- * In clinically focused efforts, the QFD project should be clinically driven, and be a clear priority for the department requesting it.
- * The team should comprise of members who are both close to the project and can provide good ideas, as well as people experienced with QFD who can expedite the process.
- * The QFD project undertaken should have a narrow focus with a clearly identified key customer group.
- * The organisation should invest the resources to have one or two trained facilitators who have as part of their job responsibilities facilitating and supporting QFD activities.

- * Approval of QFD projects should be done through the corporate lead team so that resources are appropriately allocated.
- * A trained team leader needs to be assigned and given appropriate work time to lead the project, both at meetings and outside the meetings.
- * Every team member needs time allocated, both for meeting time and for work time between meetings
- * A strict project time frame should be developed and adhered to for each step of the process.

Having discussed the critical success factors by the various researchers, the author would like to point out that these factors are broadly in agreement. In Chapter 7, “Total Quality Healthcare Model Implementation for TQM”, the author proposes an implementation framework that would take into consideration the following critical success factors:

- * Hospitals should be driven by the needs of both their internal and external customers. They should develop a culture aimed at delighting customers (e.g. eliminate bureaucracy, etc).
- * Hospitals should develop and rely on teamwork and multi-disciplinary team approach. Teams should be empowered. Furthermore, there is a need for top management support.
- * Hospitals should internalise the QFD technique and use it regularly to evaluate their performance. This means that organisations need to have teams which meet several times a month to discuss their progress, identify difficulties and co-ordinate activities.

These critical success factors are consistent with the view of Ghobadian and Terry (1995). However, even though companies abide by these critical success factors, some companies would achieve great success whilst others would fail miserably. Based on a study by Elg et al

(1998), they further emphasised the importance of understanding the dynamics in an organisation before implementing QFD. With knowledge about the situational factors: **organisational structure and pervading company culture** and an understanding of how they influence each other, an implementation of QFD is likely to be successful. This view is similarly shared by Bond and Tranter (1997). Furthermore, there is an need to adjust the method to each specific company and even to each specific application.

In the next chapter, the author presents three case studies to demonstrate how the QFD tool can be applied to Singapore hospitals. Considering the benefits that could be achieved using the QFD tool, the author together with the focus group members developed a total quality healthcare model for TQM.

6

CASE STUDIES

This chapter contains the case studies. Detailed account is offered on the application of QFD with a goal towards understanding the voice of the customer, in service planning, and in measuring the performance of hospitals surveyed. In addition, a cross-case analysis of the three cases is presented to determine the applicability and importance of applying the QFD tool in hospitals. Considering the advantages and the superiority of the QFD tool, this chapter concludes with the development of a total quality healthcare model using QFD. The author further advocates the need of a context specific implementation framework for the successful implementation of the proposed model in Singapore hospitals.

Areas to be examined include:

- 6.1 Background to the Case Studies.
- 6.2 Case Study 1: Application of QFD to Understand the Voice of the Customer at Temasek Hospital.
- 6.3 Case Study 2: Application of QFD for Service Planning at Raffles Hospital.
- 6.4 Case Study 3: Application of QFD as an Innovative Framework for Performance Measurement at Merlion Hospital.
- 6.5 Cross-Case Analysis.

6.1 Background to the Case Studies

The three cases that will be discussed in this chapter involve how QFD can be applied in Singapore hospitals. The author did not have the luxury of choosing the three hospitals to conduct the case studies and had to make-do with the hospitals (restructured and private) that were willing to participate. Nevertheless, these three hospitals met the objectives in terms of

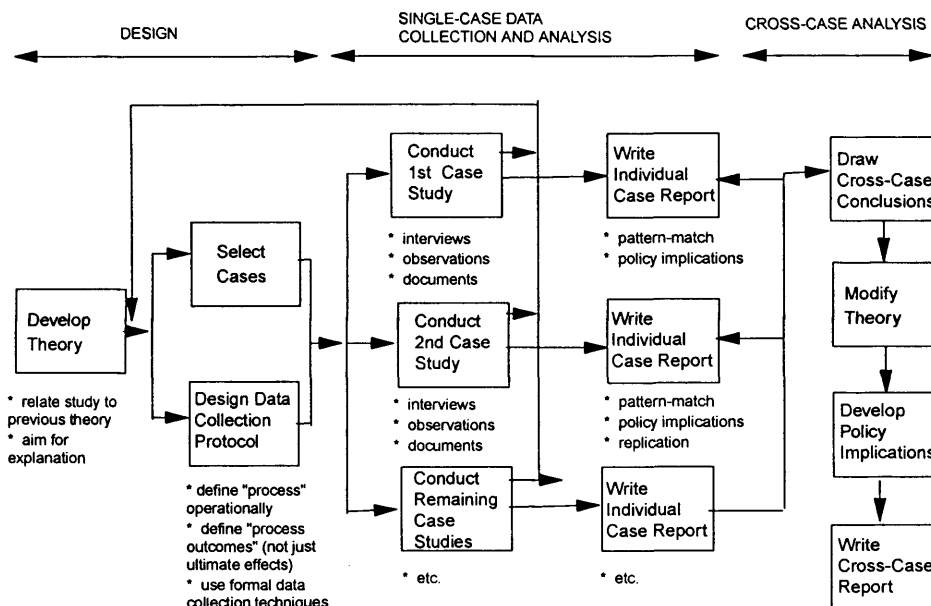
suitability, feasibility and tactics (Schatzman and Strauss, 1993). In order to preserve the anonymity, which was promised by the author at the beginning of the study, the three hospitals would be designated Temasek Hospital, Raffles Hospital and Merlion Hospital respectively.

The objectives of this Chapter are to:

- i. explain why QFD is chosen as a communication and planning tool to understand the voice of the customer, in service planning and in performance measurement.
- ii. examine in-depth 'how' QFD can be applied in healthcare to understand the voice of the customer, in service planning and in performance measurement.
- iii. analyse the three cases to determine the applicability and importance of applying the QFD tool in hospitals.
- iv. development of a total quality healthcare model using QFD.

This approach to the cases offered is congruent with Yin's (1989) replication approach to multiple case studies as shown in Figure 6.1.

Figure 6.1: Approach to Case Studies



Source: Yin, K.R. (1989) "Case Study Research, Design and Methods". Applied Social Research Methods Series, Vol. 5, Sage Publications.

Analysis

The analysis of the three case studies will be based on Yin's (1989) theory of 'Explanation Building in Multiple Case Studies'. This entails the development of a general explanation that fits each of the three cases, even though the cases vary in their details. The cases are analysed from the perspective of comparability, that is, the replicational logic which exists among the three cases (Yin, 1989).

The research methodologies to the three case studies are as follows:

Data Collection

The author made the initial approach by telephoning the CEO of the three hospitals, Temasek, Raffles and Merlion in May 1997 seeking their consent to serve as a collaborator in the research. However, the CEOs were informed that collaboration would be on absolute confidentiality.

Having received the agreement of the CEOs, the decision was made to use the semi-structured interview format as one of the instruments of data collection. With the approval of the CEOs, a focus group comprising of 10 persons including the CEO, doctors, medical and non-medical staff was formed at each hospital for data collection.

Interviews

A set of 10 questions (Appendix A) was worked out in advance, but the author felt free to modify their order based upon her perception of what seems most appropriate in the context of the conversation. The author undertook three series of allocated one-hour interview at each hospital. The central theme of the initial interview on July 1997 was to obtain an overview of each hospital's management quality practices and service design with particular focus on the background, aims and objectives. The second interview conducted in November 1997 concentrated on the service elements and management quality activities/processes adopted and the reasons for its adoption. The last interview on June 1998 concentrated on the new service

elements and improvements in management quality activities/processes which have been made or which would be made in 1998/1999.

Focus Group Sessions

The author undertook 1 series of allocated two hours and 2 series of allocated 3 hours brainstorming sessions with each focus group. The first session lasted the two allocated hours was on December 1997 to identify the service elements (Case Study 1 and 2) and management quality activities/processes (Case Study 3) that hospitals should adopt to meet the expectations of patients of Singapore hospitals. Another two focus group meetings lasting 3 allocated hours were conducted in July 1998 and December 1998 to update the service elements/management quality activities/processes adopted and to complete the correlation matrix.

Surveys

In November 1996, a postal questionnaire survey was carried out to determine the understanding of top management in developing a TQM culture and the management quality practices in Singapore hospitals. Based on the findings of this questionnaire survey, interviews were conducted in July 1997, November 1997 and June 1998 with the CEOs of the three hospitals to determine the service elements and management quality activities/processes adopted by the hospitals.

In October 1998, a questionnaire survey was carried out at 4 general practitioners' clinics and 2 specialists' clinics to identify patients' perceptions and expectations of Singapore hospital services. From the findings of this questionnaire survey as discussed in Chapter 3, the author for these three case studies used **only** the expectations and perceptions of patients from Temasek, Raffles and Merlion Hospitals. Out of 252 valid respondents, the number of respondents from Temasek, Raffles and Merlion Hospitals was 58, 52 and 48 respectively.

Table 6.1 presents summary information of patients' expectations. As can be seen, the three most weighted service quality dimensions are Assurance (4.48), Responsiveness (4.40) and Reliability (4.34).

Table 6.1: Mean Level of Importance of Patients' Expectations

No	Level of Importance	Temasek Hospital	Raffles Hospital	Merlion Hospital	Weighted Average
	Tangibility:	4.32	4.05	4.12	4.16
1	Up-to-date and well-maintained facilities and equipment	4.62	4.15	4.42	4.40
2	Clean and comfortable environment with good directional signs	4.38	4.15	4.17	4.23
3	The appearances of doctors/staff	4.28	4.08	4.00	4.12
4	Informative brochures	3.93	3.46	3.85	3.75
5	Privacy during treatment	4.41	4.41	4.17	4.33
	Reliability:	4.50	4.24	4.27	4.34
6	Services provided at appointed time	4.52	4.23	4.33	4.36
7	Services carried out right the first time	4.48	4.39	4.45	4.44
8	Doctors/staff professional and competent	4.67	4.45	4.58	4.57
9	Error free and fast retrieval of documents	4.45	4.23	4.00	4.23
10	Consistency of charges	4.38	3.92	4.00	4.10
	Responsiveness:	4.60	4.31	4.29	4.40
11	Prompt services	4.55	4.23	4.19	4.32
12	Responsive doctors/staff	4.66	4.31	4.27	4.41
13	Doctors/staff attitude instilled confidence in patients	4.70	4.46	4.45	4.54
14	Waiting time of not more than 1 hour	4.48	4.23	4.25	4.32
	Assurance:	4.60	4.43	4.40	4.48
15	Friendly and courteous doctors/staff	4.31	4.23	4.17	4.24
16	Doctors possess a wide spectrum of knowledge	4.59	4.62	4.59	4.60
17	Patients treated with dignity and respect	4.69	4.38	4.33	4.47
18	Thoroughness of explanation of medical condition	4.79	4.47	4.50	4.59
	Empathy:	4.42	4.21	4.22	4.28
19	Obtaining feedback and keeping patients informed	4.31	4.15	4.25	4.24
20	24-hour service availability	4.03	4.00	3.90	3.98
21	Doctors/staff have patient's best interest at heart	4.69	4.38	4.41	4.49
22	Doctors/staff understand patient's specific needs	4.66	4.31	4.33	4.43
	Accessibility & Affordability:	4.01	3.98	3.83	3.94
23	Adequate parking facilities	3.71	3.85	3.67	3.74
24	Location of premises is easily accessible	4.00	4.06	3.83	3.96
25	Affordable charges for services rendered	4.31	4.02	4.00	4.11

Source: Compiled by the Author

Table 6.2 presents summary information of patients' perceptions by hospitals. From this empirical study, the mean Level of Satisfaction identified that Temasek Hospital exhibited the highest overall service quality level (3.61), followed closely by Merlion Hospital (3.57). Raffles Hospital attained the lowest overall rating (3.37).

Table 6.2: Mean Level of Satisfaction

No	Level of Satisfaction	Temasek Hospital	Raffles Hospital	Merlion Hospital
	Tangibility:	3.92	3.67	3.71
1	Up-to-date and well-maintained facilities and equipment	4.21	3.77	3.78
2	Clean and comfortable environment with good directional signs	4.09	3.85	3.75
3	The appearances of doctors/staff	3.97	3.69	3.77
4	Informative brochures	3.66	3.40	3.50
5	Privacy during treatment	3.66	3.66	3.75
	Reliability:	3.57	3.29	3.63
6	Services provided at appointed time	3.24	2.69	3.48
7	Services carried out right the first time	3.46	3.54	3.67
8	Doctors/staff professional and competent	3.77	3.54	3.90
9	Error free and fast retrieval of documents	3.59	3.23	3.66
10	Consistency of charges	3.79	3.46	3.42
	Responsiveness:	3.43	3.12	3.67
11	Prompt services	3.52	2.92	3.58
12	Responsive doctors/staff	3.59	3.38	3.83
13	Doctors/staff attitude instilled confidence in patients	3.62	3.54	3.83
14	Waiting time of not more than 1 hour	2.97	2.62	3.42
	Assurance:	3.61	3.65	3.91
15	Friendly and courteous doctors/staff	3.69	3.62	4.05
16	Doctors possess a wide spectrum of knowledge	3.76	3.77	3.92
17	Patients treated with dignity and respect	3.52	3.54	4.00
18	Thoroughness of explanation of medical condition	3.45	3.68	3.66
	Empathy:	3.47	3.35	3.63
19	Obtaining feedback and keeping patients informed	3.38	3.00	3.45
20	24-hour service availability	3.52	3.38	3.58
21	Doctors/staff have patient's best interest at heart	3.55	3.54	3.80
22	Doctors/staff understand patient's specific needs	3.41	3.46	3.67
	Accessibility & Affordability:	3.63	3.15	2.89
23	Adequate parking facilities	3.59	3.15	2.67
24	Location of premises is easily accessible	3.72	3.23	3.08
25	Affordable charges for services rendered	3.59	3.08	2.92
	Overall Quality	3.61	3.37	3.57

Source: Compiled by the Author

The findings from the empirical study on patients' perception of Singapore hospital services form the basis of the case studies. Since Temasek Hospital received the highest overall service quality level, it would be beneficial to find out if patients of Temasek Hospital expectations are similar to the expectations of patients from the other two hospitals. Hence, Case Study 1 is based on the application of QFD to understand the voice of the customer at Temasek Hospital.

Since Raffles Hospital attained the lowest overall service quality rating, it was chosen for Case Study 2 which involves the application of QFD in service planning. Through an analysis of overall importance of customer expectations, service elements and benchmarking, Raffles Hospital would be able to identify the dimensions and aspects that they should concentrate on to improve their service quality.

Although Merlion Hospital ranked second in terms of overall service quality rating, it achieved the highest rate of satisfaction for the following dimensions:

- * Reliability
- * Responsiveness
- * Assurance
- * Empathy

Merlion Hospital overall service quality was weighed down by the accessibility and affordability dimension with a substantially large difference (>0.7). Merlion Hospital should therefore be used as the standard to be achieved for the reliability, responsiveness, assurance and empathy dimensions. Hence, Case Study 3 involves the application of QFD as an innovative framework for performance measurement of Merlion Hospital.

Through the above data collection methods, the author obtained the following information:

- i. *Identifying Customer Expectations* - The questionnaire method was used to gauge patient's expectations and perceptions of Singapore hospitals' services. Twenty-five patients' expectations were identified from a pilot survey. These were classified into six service quality dimensions of: tangibility, reliability, responsiveness, assurance, empathy

and accessibility and affordability. Detailed information on questionnaire design, data collection method, data processing and data analysis were discussed in Chapter 3.

- ii. *Identifying Current Service Elements/Management Quality Activities* - Through the brainstorming sessions at focus group meetings together with literature reviews undertaken by the author, 30 service elements were determined for Case Study 1 and 2 and 18 management quality activities were determined for Case Study 3.
- iii. *Development of Correlation Matrix* - The correlation matrix was completed through focus group discussions and consensus. For instance, there is a strong relationship when all the 10 persons in the focused group felt strongly that there existed a relationship between the expectation statements of 'services should be provided at appointed time' and the use of 'the appointment system', with the service elements, 'doctor-to-bed ratio' and by having 'quick registration procedures'. Finally, by going through column by column and row by row, through tedious discussion, the HOQ was completed in 2 sessions, lasting the allocated 3 hours per session.

6.2 Case Study 1: Application of QFD at Temasek Hospital to Understand the Voice of the Customer

Background

Temasek Hospital is poised as a major general hospital with more than 500 beds to serve the healthcare needs of Singaporeans. The hospital has been tastefully designed to exude a warm and welcoming atmosphere, breaking away from the stereotypical image of a hospital. Besides mere image, new services are added to the existing services which include a dental clinic and a birthing centre to cater to the needs of the younger population in the region. After functioning as a government hospital for more than 30 years, it was officially restructured to allow for decentralised operation and administration. Under the restructuring program, Temasek Hospital remained a wholly owned government hospital which received subsidies and continue to follow the Ministry of Health's policy directions and guidelines. Following that, the hospital

transformed its management and service philosophies to reflect the objectives of the restructuring program.

6.2.1 Why Use QFD to Listen to the Voice of the Customer?

In Chapter 3, the author has used the widely used service quality measurement tool, named SERVQUAL, to identify patients' expectations and perceptions of hospital services in Singapore. In this section, the author compares SERVQUAL and QFD to find out their similarities, differences and QFD's advantages over SERVQUAL. This comparison is based on published applications of both methods.

The Similarities and Differences Between SERVQUAL and QFD

The following are five similarities between SERVQUAL and QFD:

- * The primary goal of both methods is to satisfy the organisation's customers by providing the services that they expect.
- * Both methods aim at identifying, prioritising and improving weaknesses of service quality and ensuring that valuable resources are allocated to the most effective areas.
- * By using both methods for assessing service quality regularly, organisations can monitor the effects of the service quality programs or trace whether customer expectations of the services have changed over time.
- * They also can be used to analyse competitors. The power of SERVQUAL is in situations involving comparisons of one firm with another within a common service segment (Fick and Ritchie, 1991).
- * Before applying either method, they need to be tailored according to the characteristics of the organisation.

The SERVQUAL's function, in fact, is almost similar to Phases 1 and 2 of the QFD framework. By developing the "Whats" part in the HOQ, organisations can identify their customer satisfaction for each area, pinpoint their strengths and weaknesses and analyse their competitive

advantages. After the strengths and the weakness areas have been identified, the organisation can then prioritise which areas to improve first. All of these benefits can be gained by applying SERVQUAL. It can therefore, be concluded that SERVQUAL's function is similar to the "Whats" phase of constructing the HOQ.

Despite the above similarities, there are differences between SERVQUAL and QFD as shown in Table 6.3.

Table 6.3: The Differences between SERVQUAL and QFD

No.	SERVQUAL	QFD
1.	Measures customer perceptions and expectations to understand customer satisfaction.	Directly inquires about customer satisfaction data from the customer.
2.	Relies on assumption that satisfaction score can be calculated by subtracting expectation score from perception score.	Does not rely on any equation assumption.
3.	Performs sophisticated statistical analysis, such as factor analysis, multiple regression, etc.	Performs less sophisticated statistical analysis, e.g. descriptive statistics, chi-square test, t-test, etc.
4.	The questionnaires are very long because they consist of three parts, namely, perception, expectation, and rate of importance. The perception and expectation parts encompass 22 statements. Rate of importance comprises five statements.	If the organisations use questionnaires, it will consist of two parts, namely: level of importance and level of satisfaction.
5.	Helps the organisation to identify and prioritise the areas that have to be improved.	Besides identifying and prioritising the areas, QFD further provides the organisation with guidelines on improving the weak areas right from the design level to the operational level.

Source: Developed by The Author

Benefits of Using QFD over SERVQUAL

After analysing the similarities and differences between SERVQUAL and QFD, several QFD benefits over SERVQUAL come to light. They are:

- * QFD can help organisations to improve its weak areas, from design to operation. Hence, QFD provides a way to improve the weak areas, not just *identify* them.

- * QFD can help organisations to delight their customers. Referring to the opinion of Bergman and Klefsjo (1994), they stated "The finding of exciting features of a service does not relate to any gaps that can be removed. On the contrary, delight is formed by human interaction and by creative acts based on knowledge and understanding the customer".
- * QFD is based on a systems approach, whereas SERVQUAL is not. According to Bergman and Klefsjo (1994), services are more often considered as elements in a value-creating network, that is, there are a lot of interacting stakeholders. Therefore, the systems approach has to be taken in order to understand how customer delight and satisfaction are formed.
- * QFD provides trade-off information, whereas SERVQUAL does not. This information is very useful to organisations because it can assist the organisations to set service quality targets.

Considering the above benefits of QFD over SERVQUAL, this case study attempts to examine how QFD can help hospitals to understand the voice of the customer (i.e. identify and prioritise the expectations of patients).

The value of QFD, especially with its requirement for and support of cross functional teams having direct contact with the external customer makes the QFD tool a strong fit of process to need. QFD's provision for documenting the information in a comprehensive form, the matrix, results in a much more reliable definition of patient's expectations and it also allows patients to prioritise their needs.

6.2.2 Implementation of the QFD Tool to Understand the Voice of the Customer at Temasek Hospital

The framework for the use of QFD to understand the voice of the customer involves 6 phases.

Phase 1: Identifying Who is the Customer

The first of the process is to define all the customers of hospitals. In most industries, the customer makes the purchasing decision and pays for the product or service. In healthcare, the

purchasing decision, payment and receipt of services are separated. As a result, there are multiple tiers of customers, such as:

- i. the patients - who pay in full or who pay part of the actual cost of the service.
- ii. the employers - who pay in full or a part of all medical expenses incurred by their employees or who purchase healthcare coverage for their employees.
- iii. the third-party payers - such as insurance companies and health maintenance organisations which collect premiums and then pay providers.
- iv. the doctors or other medical staff - who determine or advise on the tests and treatments for patients.
- v. the government - who decides on healthcare funding, Accreditation bodies.
- vi. the observers - the family and friends of patients who represent potential future patients or who influence patients' healthcare choices.

Since hospitals are multi-customer enterprises, any quality tool must take into consideration the expectations of different categories in their definition of quality, but the significance of each is important. The other important point is whether the term "customer" encompasses people both external and internal to the hospital.

Phase 2: Identifying Customers' Expectations

As mentioned in Chapter 5, the initial and most critical step of the QFD process involves identifying what customers want and expect from a hospital. In this context, the term 'customer' refers to patients who have received medical treatment at Singapore hospitals from October 1997 to October 1998. A questionnaire survey was conducted to identify these patients' expectations in October 1998.

Several methods can be used to establish patients' expectations: structured or unstructured interview; questionnaires; observations; feedback; focused group discussions, etc. Due to the complex nature of hospitals, it may be necessary to utilise a combination of methods.

Phase 3: Ranking of Customers' Expectations

At any one time, it is unlikely that a hospital is able to meet all of its patients' expectations. It is, therefore, necessary to systematically prioritise expectations that are to be met within a planning cycle. Towards this end, it is necessary to understand the relative importance that patients place on each expectation.

Using a structured questionnaire, 300 patients of general practitioners' and specialists' clinics were asked to rate the importance and satisfaction of their expectations. The rate of importance information is used for the determination of row weights in the HOQ. The row weights are then multiplied with one or more values in the same row of the correlation matrix in order to obtain overall importance values.

Phase 4: Identifying Current Service Elements

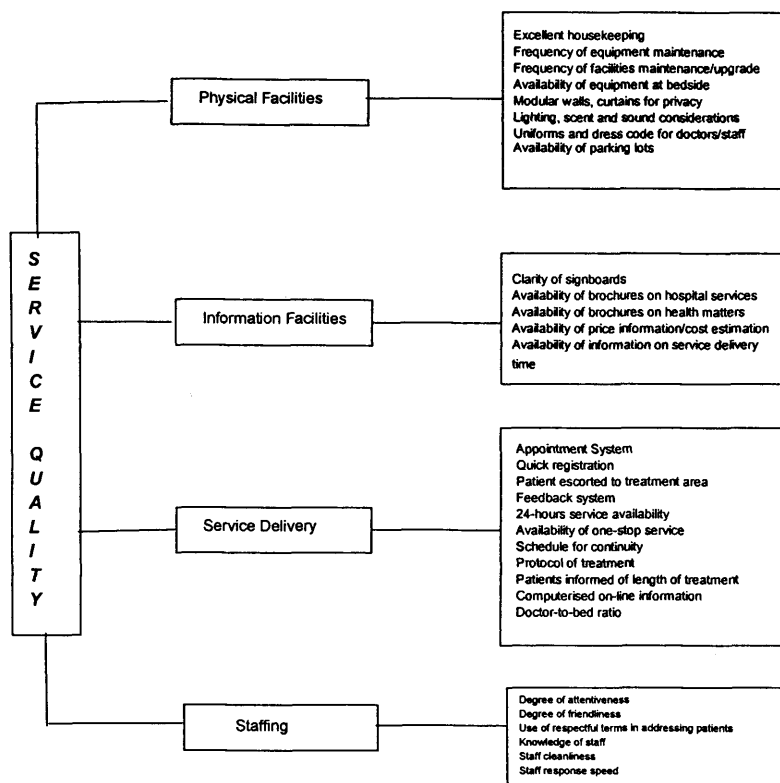
Phase 4 of constructing the HOQ involves identification of the design features of a hospital's service elements. The design features that make up the service elements are similar for all the hospitals studied. However, the performance of each, differs in terms of satisfying their patients and other customers.

It is noted that the service elements do not represent solutions. Rather, each service element should be something that should be worked on in order to meet patient expectations, is measurable, is global in nature, and does not imply any specific design intent (Day, 1993).

It is not the intent of the HOQ to imply any design solution. Its purpose, instead, is to provide a series of service elements that specify a generic design, which can respond to patients needs.

The service elements determined for hospitals through a brainstorming session in December 1997 at a focus group session together with literature reviews undertaken by the author are shown in Figure 6.2. These elements are classified under physical facilities, information facilities, service delivery and staffing.

Figure 6.2: The Service Elements Determined for Hospitals



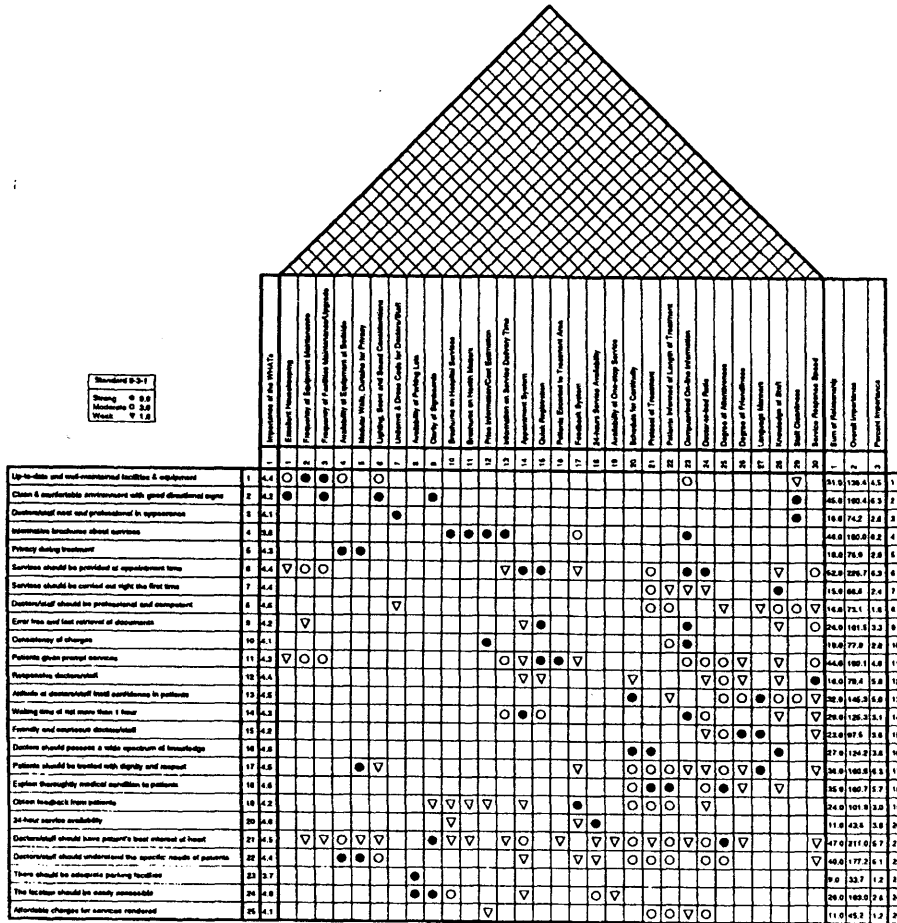
Source: Compiled by the Author

Phase 5: Development of Correlation Matrix

This step establishes the relationship between the identified service elements and the patient's expectations. A matrix consisting of the 25 customer expectations on the vertical axis and the 30 elements on the horizontal axis was constructed as depicted in Figure 6.3 and Appendix I. Either a strong, moderate, low or no relationship was assigned to cells in the matrix. The overall importance values were then computed by multiplying the customer importance ratings with the value of the relationship matrix. These values indicate how important the service dimensions and aspects are to patients of Temasek Hospital. Due to the inherent characteristics

of health services as discussed in Chapter 3 (i.e. intangibility, heterogeneity, inseparability, etc), the correlation matrix is likely to be large and difficult to work with. To avoid clumsy handling during the deployment phase, the original matrix should be broken into several smaller matrices.

Figure 6.3: The HOQ of Temasek Hospital



Source: Developed by the Author

Phase 6: Analysis of the House of Quality (HOQ)

The above phases, Phase 1 to 5 enabled Temasek Hospital to identify and prioritise their customer expectations systematically.

Analysis of Overall Importance

As mentioned above, overall importance is based upon customer importance values calculated from data constructed within the correlation matrix. As Figure 6.3 shows, the three most important quality dimensions of patients of Temasek Hospital are:

- i. **Assurance (135.8)** which includes: friendly and courteous doctors/staff, doctors should possess a wide spectrum of knowledge, patients should be treated with dignity and respect and thoroughly explain medical condition to patients.
- ii. **Responsiveness (135.0)** which includes: prompt service, responsive doctors/staff, attitude of doctors/staff should instil confidence in patients and waiting time should not exceed 1 hour.
- ii. **Empathy (133.5)** which includes: obtaining feedback from patients, 24-hour service availability, doctors/staff should have patient's best interest at heart and doctors/staff should understand the specific needs of patients.

The above result shows that patients focus their expectations on the 'how it is done'. Thus, this lends support to the theory espoused by Ware et al (1983), Yi (1990), Koch (1991), Oliver (1993) and Jayanti (1993). By using the QFD tool to understand the voice of the customer, the 'Empathy' dimension is the third most important dimension, whilst the 'Reliability' is the third most important dimension when SERVQUAL is used. This shows that patients do not really know what they want or tell you directly what they want. Hence, to improve satisfaction through the provision of higher quality, managers and doctors of Singapore hospitals should focus on the functional aspects (how it is done) of service quality captured in the assurance, responsiveness and empathy dimensions, rather than the technical aspects captured in the tangibility, reliability, and accessibility and affordability dimensions (what is done).

The results also show that high on the priority list of patients expectation statements are:

- * *services should be provided at appointed time (226.7) - reliability dimension*
- * *doctors/staff should have patient's best interest at heart (211.0) - empathy dimension*

- * *clean and comfortable environment with good directional signs* (190.4) - tangibility dimension
- * *prompt services* (190.1) - responsiveness dimension
- * *doctors/staff understand patient's specific needs* (177.2) - empathy dimension

In the assurance dimension, *patients should be treated with dignity and respect* is the most important aspect (160.9), followed by *doctors/staff should explain thoroughly medical condition to patients* (160.7), *doctors should possess a wide spectrum of knowledge* (124.2) and *friendly and courteous doctors/staff* (97.5). This is logical considering the importance of healthcare services to human beings.

Prompt services is the most important aspect in the responsiveness dimension (190.1). It is much more important than *doctors/staff attitude should instil confidence in patients* (145.3). The reason for this may be due to the medical condition of the patients. They would want to be treated/relieved of the pain/stress of their medical condition soonest.

In the empathy dimension, *doctors/staff should have patients best interest at heart* (211.0) was rated the most essential aspect, followed by *doctors/staff should understand patient's specific needs* (177.2). These results are again logical considering the importance of healthcare and medical services to human beings.

Services provided at appointed time (226.7) and clean and comfortable environment with good directional signs are the most important aspects in the reliability and tangibility dimension respectively.

The least important aspect of all the service expectation statements is adequate parking facilities. Firstly, this may be due to the fact that the percentage of the population owning cars is small. Secondly, patients mainly visit hospital by public transportation (i.e. taxi, and MRT) instead of private cars.

This case study demonstrated how hospitals can use the QFD tool to understand the voice of the customer which is one of the principles of TQM, **THE FOCUS**. Looking at the importance of

patient's expectations would help pinpoint areas for quality improvement that would yield the greatest customer satisfaction.

6.3 Case Study 2: Application of QFD for Service Planning at Raffles Hospital

Background

Raffles Hospital is a restructured regional acute care hospital situated in the central part of Singapore. The 1980s saw rapid expansion of departments and subspecialties when it became one of the major hospital service providers in Singapore. It had a bed size of more than 1,000 serving close to a million people in Singapore. Under the restructuring program, Raffles Hospital remained a wholly owned government hospital which received subsidies and continued to follow the Ministry of Health's policy directions and guidelines. Essentially, through a series of TQM INITIATIVES and sheer hard work, Raffles Hospital has evolved to keep in step with rapidly changing times in the healthcare environment.

6.3.1 Why Use QFD for Service Planning at Raffles Hospital?

In service industries, of which hospitals are a part, customer satisfaction or dissatisfaction takes place during moments of truth (also called service encounters or critical incidents). A moment of truth is every instance in which a customer comes in contact with an employee of a company (Evans and Lindsay, 1996). At moments of truth, customers form perceptions about the quality of service by comparing their expectations with the actual outcomes. Given the highly personalised nature of services in hospitals, great attention should thus be paid to its delivery.

As discussed in Chapter 5, QFD is not designed to replace other quality and engineering tools already in use by hospitals. Rather, QFD works with other tools to meet customer needs. In Case Study 1, the author has demonstrated that the QFD tool delivers value by seeking out the spoken and unspoken needs of customers. This finding is consistent with the view of Mazur (1996). According to Mazur, QFD focuses on delivering value by finding out both the spoken and unspoken needs. It then translates customer needs into actions and designs, and communicates them throughout the organisation. QFD allows customers to prioritise their

needs. It benchmarks an organisation against its competitors and directs the organisation to optimise aspects that will bring out the greatest competitive advantage. Considering these QFD descriptions, it is concluded that QFD is the right tool to implement service planning in hospitals. The use of QFD will enable hospitals to optimise aspects of its services that are of 'value' to customers so as to achieve the greatest competitive advantage.

6.3.2 Implementation of the QFD Tool for Service Planning at Raffles Hospital

This case study presents the development of a generic 6-phase QFD framework as a reference model for hospitals to improve their service quality. This framework which is presented together with empirical findings involves the following 6 phases:

- Phase 1: Identifying Who is the Customer
- Phase 2: Identifying Customers' Expectations
- Phase 3: Ranking of Customers' Expectations
- Phase 4: Identifying Current Service Elements
- Phase 5: Development of Correlation Matrix
- Phase 6: Analysis of the House of Quality (HOQ)

In case study 1, the author has illustrated the different activities involved in each of the above six phases. Since the activities and findings of Phase 1 to Phase 4 are similar to that of Case Study 1, for this Case Study, the author will discuss and present the activities and findings as from Phase 5.

Phase 5: Development of Correlation Matrix

The information obtained from Phase 1 to Phase 4 enhances understanding of customers' expectations but this is not sufficient. In determining service performance level, it is necessary to establish a correlation matrix between customer expectations and service elements.

As mentioned earlier, this phase establishes the relationship between the identified service elements and the customers' expectations. A matrix consisting of 25 customer expectations on the vertical axis and the 30 service elements on the horizontal axis was constructed as depicted

Analysis of Overall Importance

Referring to the HOQ as shown in Figure 6.4, the three most important dimensions are:

- i. **Assurance (137.8)** which includes: friendly and courteous doctors/staff, doctors should possess a wide spectrum of knowledge, patients should be treated with dignity and respect and thoroughly explain medical condition to patients.
- ii. **Empathy (131.7)** which includes: obtaining feedback from patients, 24-hour service availability, doctors/staff should have patient's best interest at heart and doctors/staff should understand the specific needs of patients.
- iii. **Responsiveness (130.0)** which includes: prompt service, responsive doctors/staff, attitude of doctors/staff should instil confidence in patients and waiting time should not exceed 1 hour.

These important service dimensions were chosen based on high overall importance values. The results show that patients focus their expectations on the 'how it is done'. Similarly, this lends support to the theory espoused by Ware et al, Yi, Koch, Oliver and Jayanti and on the findings of Case Study 1.

Analysis of Service Elements

In general, inevitable resource constraints often restrict the number of improvements possible within one planning period. This step enables hospitals to manage the inevitable trade-offs by establishing an order priority for the improvements to be made. The service elements may be prioritised according to the service element importance values. The service element importance values were calculated by multiplying each column weight with its corresponding row weights.

The following two most significant service elements as shown in Figure 6.4 are:

- i. **Staffing (130.9)** which includes: degree of attentiveness, degree of friendliness, use of respectful terms in addressing patients, knowledge of staff, degree of staff cleanliness and service response speed.

- ii. **Service Delivery (103.9)** which includes: appointment system, quick registration, patient escorted to treatment area, feedback system, 24-hours service availability, one-stop service availability, schedule for continuity, protocol of treatment, patients informed of length of treatment, computerised on-line information and doctor-to-bed ratio.

Analysis of Benchmarking Results

In order to determine which areas need improvement, benchmarking is carried out on the overall importance and service elements information. This would reveal the hospitals strengths and weaknesses.

Benchmarking analysis was performed based on the level of customer satisfaction. Amongst the three hospitals, the highest rated hospital was Temasek Hospital, followed closely by Merlion Hospital as shown in Table 6.2. Raffles Hospital's overall quality was the lowest. This ranking is not surprising, considering that Temasek Hospital was awarded the National Productivity Award and the Outstanding QC Circles of the Year (Experienced Award) in 1995.

Furthermore, Table 6.4 shows that Raffles Hospital is weakest in the service dimensions of Accessibility and Affordability and Responsiveness. Since the Responsiveness dimension is the third most important dimension for patients as shown by the high importance value of 130.0 in Figure 6.4, efforts should therefore be made in improving the 'prompt services' statement relating to the Responsiveness dimension due to the large difference, (>0.6) between the rate of satisfaction for Raffles Hospital and Temasek Hospital.

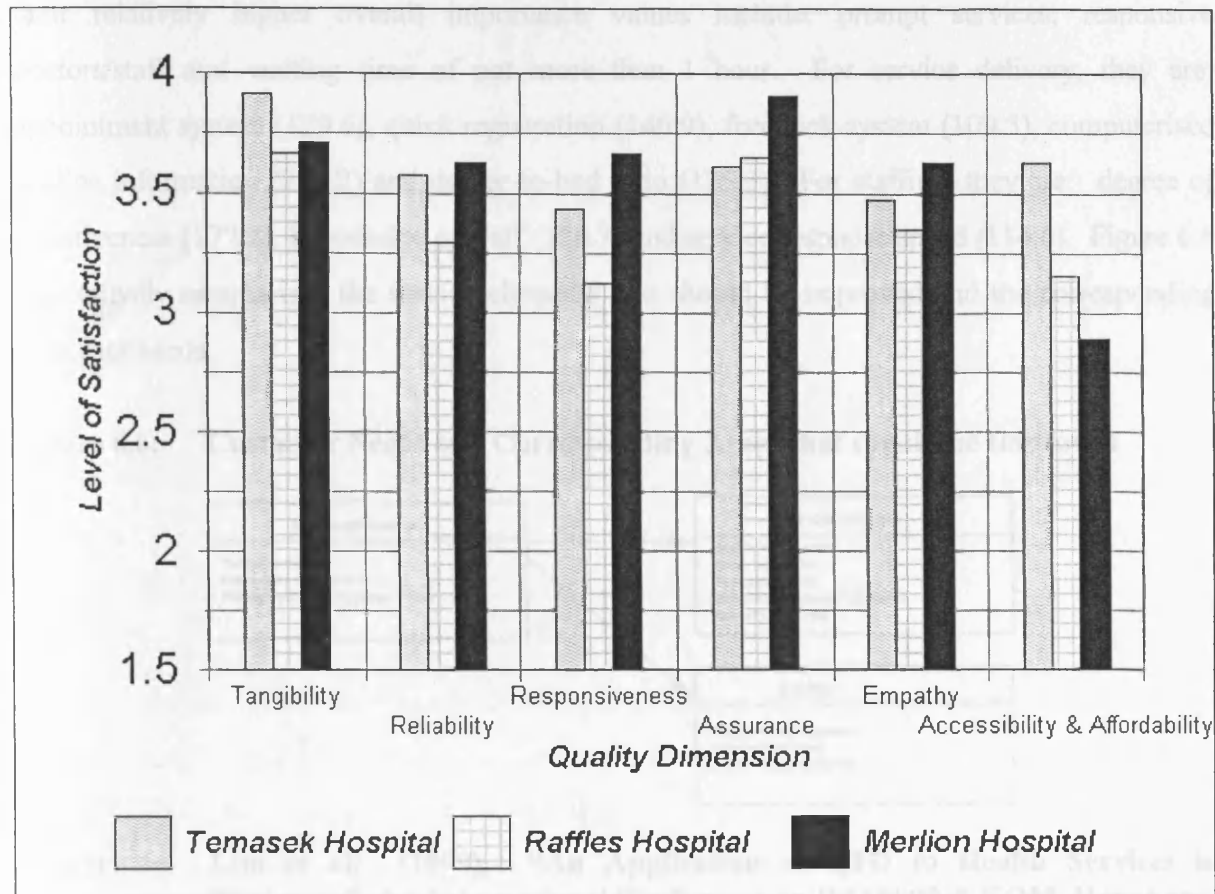
Table 6.4: Differences between Service Dimension Values of Temasek Hospital and Raffles Hospital

Service Quality Dimensions	Competitors		Value Difference
	Temasek	Raffles	
Tangibility	3.92	3.67	(0.25)
Reliability	3.57	3.29	(0.28)
Responsiveness	3.43	3.12	(0.31)
Assurance	3.61	3.65	0.04
Empathy	3.47	3.35	(0.12)
Accessibility & Affordability	3.63	3.15	(0.48)

Source: Compiled by the Author

The overall quality of Temasek and Merlion Hospital was almost similar, that is 3.61 and 3.57. In fact, as shown in Figure 6.5, for most service quality dimensions: Reliability, Responsiveness, Assurance and Empathy, Merlion Hospital attained the highest rate of satisfaction. It should, therefore be used as the standard to be achieved. Merlion Hospital overall service quality was weighed down substantially by the Accessibility and Affordability dimensions. This result implies that being a private hospital, Merlion Hospital charges were expensive. Also, there were inadequate parking facilities at the hospital due to the close proximity of the hospital to the city.

Figure 6.5: Benchmarking of Service Quality Dimension



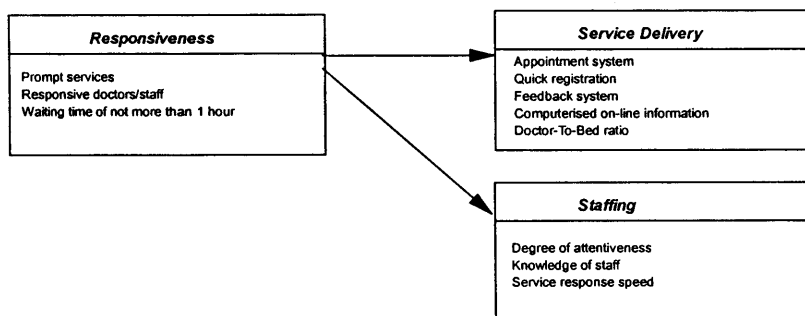
Source: Lim et al, (1999), "An Application of QFD to Health Services in Singapore", 4th International Conference on ISO 9000 & TQM, Hongkong.

According to Figure 6.4, assurance is the most important dimension for patients (137.8). However, Raffles Hospital performed better in this dimension than Temasek Hospital. Thus, Raffles Hospital has the opportunity to make significant strides in this dimension. Also, Raffles

Hospital performed better than Temasek Hospital in several aspects, such as "services carried out right the first time" in the Reliability dimension, "thoroughness of explanation of medical condition" in the Assurance dimension and "doctors/staff understand patient's specific needs" in the Empathy dimension. Thus, Raffles Hospital has the opportunity to make significant strides in these areas.

After evaluating the dimensions and aspects that need to be concentrated on, Raffles Hospital has to determine the service elements that should be improved. In this case, service delivery and staffing are areas that need to be improved in order to attain higher customer satisfaction for the responsiveness dimension. Those service elements that are targeted for improvement due to their relatively higher overall importance values include: prompt services, responsive doctors/staff and waiting time of not more than 1 hour. For service delivery, they are: appointment system (129.6), quick registration (146.9), feedback system (109.5), computerised on-line information (202.2) and doctor-to-bed ratio (135.3). For staffing, they are: degree of attentiveness (177.2), knowledge of staff (156.7) and service response speed (114.6). Figure 6.6 qualitatively summarises the service elements that should be improved and the corresponding customer needs.

Figure 6.6: Customer Needs and Corresponding Areas that should be Improved



Source: Lim et al, (1999), "An Application of QFD to Health Services in Singapore", 4th International Conference on ISO 9000 & TQM, Hongkong.

This case study demonstrated how hospitals can use the QFD tool for service planning. It also provides managerial implications. CEOs and doctors of Singapore hospitals clearly need to pay attention to satisfaction issues in general, something that they have been hesitant to do. For instance, Singapore hospitals rarely conduct patient satisfaction and feedback studies. Also,

since patients focused their expectations on the functional aspects of quality, particular attention should be paid to 'doctor-patient' relationship and 'staff-patient' relationship, staffing and service delivery elements.

6.4 Case Study 3: Application of QFD As An Innovative Framework for Performance Measurement at Merlion Hospital

Background

Merlion Hospital is a private specialists' hospital with a bed size of more than 500. Situated in the central part of Singapore, Merlion Hospital is poised as a major hospital to serve the healthcare needs of the more affluent Singaporeans and patients from our neighbouring countries.

6.4.1 Why Use QFD for Performance Measurement at Merlion Hospital?

In healthcare, quality is an elusive and a multi-dimensional construct. Often mistaken for imprecise descriptions like "goodness or luxury, or shininess or weight" (Crosby, 1979), quality and its requirements are not easily articulated by consumers (Takeuchi and Quelch, 1983). Furthermore, the inherent characteristics of services discussed in Chapter 3 exacerbate the efforts to improve service quality. Consequently, it is difficult for customers to identify and prioritise their expectations and for management to include these expectations in the service package. The direct participation of customers in the delivery process also introduces an uncontrollable element, which in turn affects the perception of quality.

With the growing consensus that customer satisfaction is an important indicator of healthcare quality, many hospitals in Singapore are searching for ways to change the delivery of patient care through TQM. A widely accepted TQM principle is to know the customers and to meet or exceed their expectations (Tennor and DeToro, 1992). Furthermore, hospitals provide the same type of service, but they do not provide the same quality of service. It is *performance* (or service quality) that differentiates one hospital from another, creates true customers who are more loyal and spread favourable "word of mouth". Hence, performance measurement provides hospitals with 'hard' evidence about existing practices, values, belief and assumptions within the hospital and ends reliance on opinions of the management. Performance measurement is

therefore vital for an organisation who wants to succeed in the competitive market (Adam, Hershauer and Ruth, 1981). Through performance measurement, hospitals will be in a position to develop a systematic means of identifying shortfalls and enhance its future performance. In recent years, one such performance tool that has become popular is the Balanced Scorecard developed by Kaplan and Norton (1992). Hence, the author compares the Balanced Scorecard and QFD to find out their similarities, differences and QFD's advantages over the Balanced Scorecard. This comparison is based on published applications of both methods.

The Similarities and Differences Between the Balanced Scorecard and QFD

The following are five similarities between the Balanced Scorecard and QFD:

- i. The primary goal of both methods is to evaluate and improve performance and to create future value for customers.
- ii. Both methods aim at focusing the entire organisation on what must be done to create breakthrough performance.
- iii. By using both methods as a communication and measurement tool, organisations can understand, at least implicitly, many interrelationships. This understanding can help the organisation improve decision making and problem solving. According to Kaplan and Norton (1992), the Balanced Scorecard keeps organisations looking - and moving - forward instead of backward.
- iv. They can also be used as an integrating device, an umbrella, for a variety of diverse, often disconnected corporate programs, such as quality, reengineering, process redesign and customer service.
- v. Before applying either method, they need to be tailored according to the characteristics of the organisation. Furthermore, organisations need to develop a structure formed by the following key elements: clear company vision and mission, top management

support and commitment, cross-functional integration, customer-supplier partnerships, continuous improvement philosophy and team rather than individual accountability.

Despite the above similarities, there are differences between the Balanced Scorecard and QFD as shown in Table 6.5.

Table 6.5: The Differences Between the Balanced Scorecard and QFD

No.	BALANCED SCORECARD	QFD
1.	Translates an organisation's strategic objectives into a coherent set of 4 performance measures: financial, customer, internal processes and innovation and improvement.	Translates customer requirements into appropriate service quality specifications at every stage of a product's life cycle, from research to sales to service.
2.	Demands that managers translate their general mission statements on customer service into specific measures that reflect the factors that really matter to customers.	Directly inquires about customer satisfaction data from the customer.
3.	Requires sophisticated tools, such as stimulation and cost modelling, to explore the complex dynamics of linking operations and finance.	Requires less sophisticated tools, such as charts and matrices, to effectively deploy the critical service elements/work processes.
4.	It cannot be used to analyse competitors.	It allows for competitive analysis and helps organisations to benchmark themselves against their competitors..
5.	Establishes goals, but assumes that employees will adopt whatever behaviours and take whatever actions are necessary to arrive at those goals. It puts strategy and vision, not control, at the centre.	Besides identifying and prioritising customer needs and service elements/work processes, QFD further provides the organisation with guidelines on improving the weak areas right from the design level to the operational level.

Source: Developed by the Author

Benefits of Using QFD over the Balanced Scorecard

After analysing the similarities and differences between the Balanced Scorecard and QFD, several QFD benefits over the Balanced Scorecard come to light. They are:

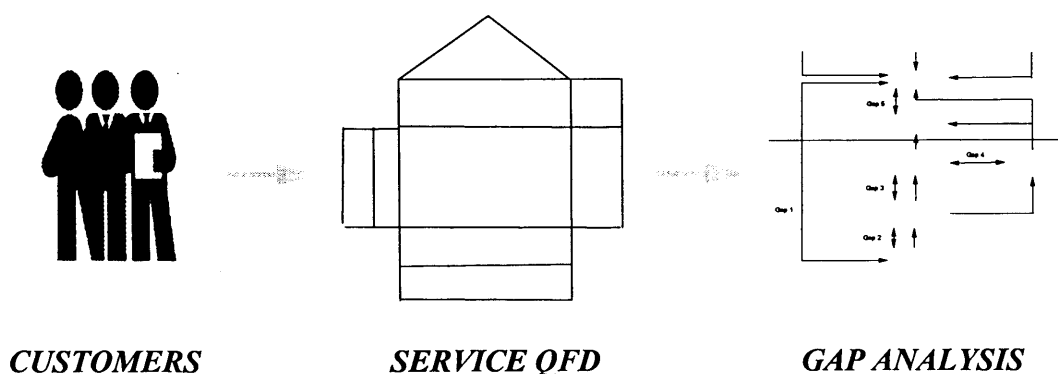
- * QFD is a customer driven tool for evaluating the relationships between customer expectation and service elements/work processes, whereas the Balanced Scorecard is not. Translating customer requirements into business parameters is a powerful technique

for aligning business strategy to compete successfully in the increasingly competitive healthcare industry.

- * QFD provides trade-off information on customer expectations and service elements/work process, whereas the Balanced Scorecard does not. This information is very useful to organisations because it can assist the organisations to set service quality targets for performance measurement.
- * QFD assesses service quality performance by highlighting the unmet customer expectations. QFD also monitors the service quality performance of an organisation against its competitors.
- * QFD can help organisations to improve its weak areas, from design to operation. Hence, QFD provides direction to improve the weak areas, not just *identify* them.

Considering the above benefits of QFD over the Balanced Scorecard, QFD is the right tool to use for the performance measurement of hospitals. This case study framework as shown in Figure 6.7 illustrates the application of QFD for performance measurement at Merlion Hospital.

Figure 6.7: QFD: A Performance Measurement Framework for Merlion Hospital



Source: Lim et al (1998) Proceedings of WISC Conference, ISQFD 1998, Sydney

6.4.2 Implementation of the QFD Tool for Performance Measurement at Merlion Hospital

This case study presents the development of a generic 6-phase QFD framework as a reference model for hospitals to bring out the importance of having some form of communication and measurement tool for facilitating the know-how process of TQM implementation. The use of QFD as a performance measurement technique involves the following 6-phases:

- Phase 1: Identifying Who is the Customer
- Phase 2: Identifying Customers' Expectations
- Phase 3: Ranking of Customers' Expectations
- Phase 4: Identifying Current TQM Activities
- Phase 5: Development of Correlation Matrix
- Phase 6: Analysis of the House of Quality (HOQ)

In case study 1 and 2, the author has illustrated the different activities involved in each of the above phases. Since the activities and findings of Phase 1 to Phase 3 are similar to that of Case Study 1 and 2, for this Case Study, the author will discuss and present the findings as from Phase 4.

Phase 4: Identifying Current TQM Activities

The author has identified in Chapter 4 the management quality practices in Singapore hospitals through an empirical study. In the light of the questionnaire survey findings, structured interviews were conducted with the CEO of Merlion Hospital. At the interview, the author clarified the specific activities adopted by the hospital. For example, with regards to the statement on 'quality management is a strategic mission shared by every member of our organisation including healthcare professionals', the specific activities adopted by the hospital are:

- a. Service quality programmes for all staff.
- b. Quality orientation for all new staff.

- c. Patients feedback surveys and forums for identifying service gaps.

Phase 5: Development of Correlation Matrix

As mentioned earlier, this phase establishes the relationship between the identified management quality activities and the customer expectations. This matrix showing the relationship between the "what" list and the "how to" list seeks to match patients' expectations with the management quality activities adopted by the hospital. The logic here is to determine whether or not the existing management quality activities are meeting patients' expectations. If existing activities are meeting all of the patients' expectations adequately, there is no need to pursue new process development. On the other hand, it highlights the patients' expectations that are not being met by existing activities. This provides a starting point for new process development via QFD.

A blank row in the matrix would suggest that there is a patient expectation that is not being met by any of the management quality activities provided by the hospital. On the other hand, a blank column implies that there is an activity that the hospital provides that does not address any of the patients' expectations. In order to determine which management quality activities are critical from patients' perspective, derive weights for each activity based on their high/moderate/low relationship to patients' expectations. Assign numerical values as follows: high = 9, moderate = 3 and low = 1.

Phase 6: Analysis of the House of Quality (HOQ)

Analysis of Unmet Patients' Expectations

The completed Matrix depicted in Figure 6.8 and Appendix K shows the 25 patients' expectations and 18 management quality activities. From the two focus group sessions, lasting the allocated three hours per session, the 25 expectations are assigned raw scores based upon the summation of their relationships with the 18 management quality activities. These raw scores ranged from 0 to 78. In order to determine which patients' expectations are not being addressed by the given activities, the author concluded that each critical activity which had a raw score of less than 16 (a score of less than or equal to 20% of the total possible points), should be regarded as an unmet customer expectation.

The resulting list of unmet patients' expectations is:

- * *informative brochures about services* (tangibility dimension)
- * *services provided at appointed time* (reliability dimension)
- * *patients should be given prompt services* (responsiveness dimension)
- * *waiting time of not more than 1 hour* (responsiveness dimension)
- * *obtain feedback from patients* (empathy dimension)
- * *24-hour service availability* (empathy dimension)
- * *adequate parking facilities* (accessibility and affordability dimension)
- * *location easily available* (accessibility and affordability dimension)
- * *affordable charges for service rendered* (accessibility and affordability dimension)

This list represents 36% of the established patients' expectations but none of these unmet expectations is ranked amongst the five most important patients' expectations and none of these unmet expectations is in the assurance dimension which is the most important dimension ranked by patients. This explains why 66.7% (32 out of 48 respondents surveyed) of the respondents rated the service quality provided by Merlion Hospital from good to very good.

Additionally, the result highlights the discrepancies in perception gap between what the hospital felt the patients considered important, and what the patients actually believed was important. For example, managers felt that 'having patients best interest at heart' was very important, whilst patients felt it was quite important. Also, some activities for example, 'community service', 'patient education' and 'advance medical research' were deemed necessary by management but viewed as unimportant by patients.

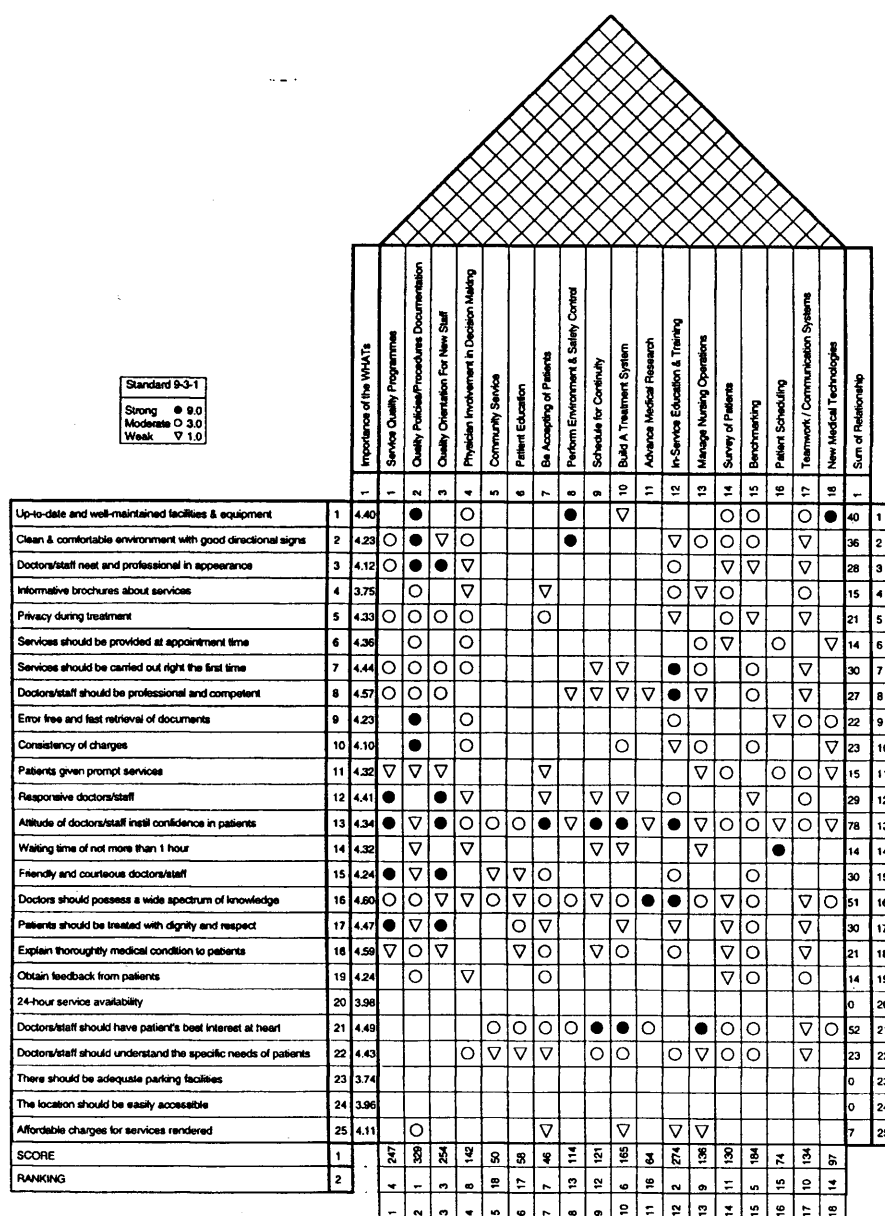
These unmet customer needs and the discrepancies in perception gap could be caused by doctors/staff not having the same set of expectations of Singapore hospital services as identified in Chapter 3.

The following five most critical management quality activities as shown in Figure 6.8 are:

- i. Quality Policies/Procedures Documentation
- ii. In-Service Education and Training

- iii. Quality Orientation for New Staff
- iv. Service Quality Programmes
- v. Benchmarking

Figure 6.8: The HOQ of Merlion Hospital



Source: Lim et al (1998) Proceedings of WISC Conference, ISQFD 1998, Sydney

This case study demonstrated how hospitals could use the QFD tool as a performance measurement instrument. According to Ghobadian, Speller and Jones (1994), service quality is a measure of how well the total service package meets the customers' expectations. The attainment of high service quality is dependent on the ability to identify accurately the expectations of customers, tailor identified expectations into the service package and perform existing management quality activities assessment to identify unmet customer expectations.

6.5 Cross-Case Analysis

The author had demonstrated through three case studies the different applications of QFD in healthcare. In Case Study 1, the use of the QFD tool to understand the voice of the customer demonstrates that QFD is a systematic approach for identifying and prioritising customer expectations. This information on customers' expectations is valuable for the development of marketing strategies. In this context, QFD is more superior to the SERVQUAL instrument.

In Case Study 2, the use of the QFD tool in service planning demonstrates that QFD allows for competitive analysis. At the baseline, QFD helps organisations to benchmark themselves against their competitors. The results from this case study revealed that the service quality of Merlion Hospital is generally the best whilst Raffles Hospitals is the worst amongst the three hospitals. Although Temasek Hospital is generally rated second, it is better than Merlion Hospital in the Tangibility and Accessibility and Affordability dimensions.

Furthermore in Case Study 3, the use of QFD as a performance measurement tool demonstrates that QFD provides an overview of an organisation at a given time. It provides information on the strengths and weaknesses of an organisation and identifies the unmet expectations of customers. In this context, QFD is more superior to the Balanced Scorecard as a measurement instrument.

From the three case studies, the author have demonstrated that the application of QFD involves a 6-phase implementation framework which includes:

Phase 1: Identifying Who is the Customer

Phase 2: Identifying Customers' Expectations

- Phase 3: Ranking of Customers' Expectations
- Phase 4: Identify Service Elements/Current Activities
- Phase 5: Development of Correlation Matrix
- Phase 6: Analysis of the House of Quality (HOQ)

Based on this framework, it is imperative therefore, that CEOs or Quality Managers of Singapore hospitals who have the responsibility of providing total quality care to patients start their TQM efforts from the premise that the requirements, needs and expectations of the customer must be understood first. They need to move from the 'prescribed perspective' of professional quality to the 'felt perspective', that is rendering services according to customers' felt needs and expectations rather than according to the 'professionals' ordainment.

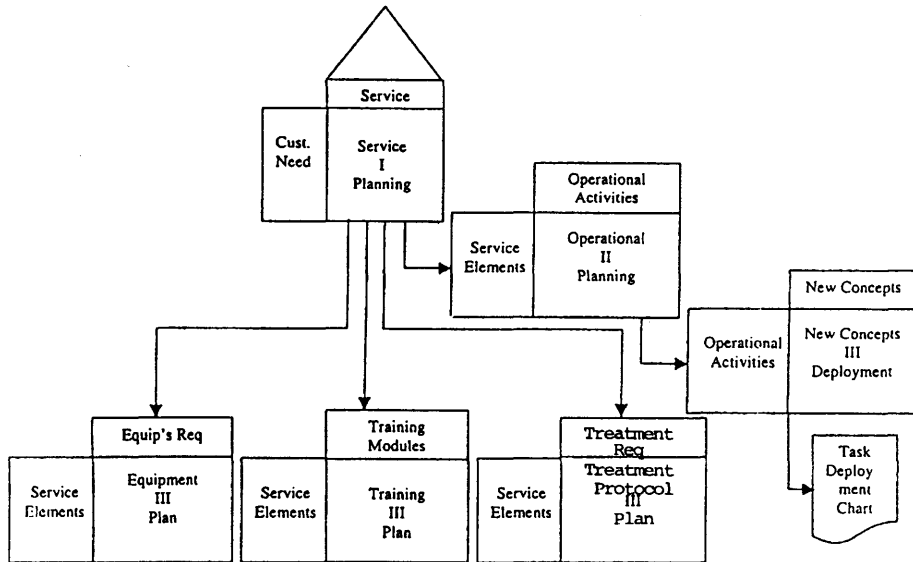
In conclusion, the three case studies have demonstrated the wide applicability of QFD as an organisational tool for hospitals. Furthermore, the author considers the QFD tool more superior than other organisational/TQM tools such as SERVQUAL, Balanced Scorecard, Taguchi Methods, Critical Paths, etc. QFD not only enables an organisation to identify and prioritise customers' expectations, it is capable of assessing the unmet expectations of customers and provides a map for the organisation to improve its services. Considering the superiority of the QFD tool over other organisational/TQM tools, the author proposes the use of QFD in the development of a total quality healthcare model. As QFD's application in the manufacturing industries are structurally different from its applications in the service industries, especially healthcare, a modified QFD model for total quality healthcare is developed by the author together with the 30 focus group members. This model as shown in Figure 6.9 consists of seven parts. The applicability and usefulness of this total quality model for hospitals are validated by 2 top-level executives of Singapore hospitals. Please refer to Appendix L and M for their comments.

The power of the proposed total quality healthcare model comes from the detailed discussions with customers about their requirements and needs, comparisons with competitors and considerations of how the hospital can meet the customers' requirements most effectively. The initial comparison may be based on customer perceptions, but more detailed benchmarking can be achieved. To derive the full benefits that could be achieved from the proposed model, the

author advocates the need for a context, specific implementation framework. The implementation framework would involve the deployment of the following plans and chart:

- * Equipment Plan
- * Training Plan
- * Treatment Protocol Plan
- * Operation Plan
- * New Concepts Deployment Plan and
- * Task Deployment Chart

Figure 6.9: The Total Quality Healthcare Model



Source: Developed by the Author and the Focus Group Members. Modified from Noda, 1990; Mazur, 1993; Hofmeister, 1995

The QFD process initially appears to be very complex, and it can be, if carried to great levels of detail, but the basic chart described above can be understood fairly quickly. Furthermore, QFD software, for example, QFD Capture, QFD2000 should be used to process and analyse the data. Although QFD team members and staff would take about 2 to 3 months to learn the approach and to gather input from the various customer groups, however, once used, the participants would begin to think critically about the processes, facilities and personnel providing the services.

7

TOTAL QUALITY HEALTHCARE MODEL IMPLEMENTATION

This chapter provides an examination of the critical success factors for the implementation of the total quality healthcare model through the use of a questionnaire survey based on Porter and Parker's critical success factors on TQM implementation, and Ghobadian and Terry's critical success factors on QFD implementation. The analysis of the data confirmed that these researchers' critical success factors have applicability but there are other critical success factors specific to Singapore hospitals, which these prescriptions failed to take into account. Thus, a contribution is made by extending the Porter and Parker's and Ghobadian and Terry's critical success factors to include other essential critical success factors for the implementation of the proposed model in Singapore hospitals. A further contribution to knowledge is offered in the form of the development of an implementation framework for the proposed total quality healthcare model. This implementation framework involving 5-phases: Awareness, Knowledge, Breakthrough, Implementation and Integration, encompasses the need for infrastructure and measurement management. Additionally, this framework is compared to the orthodox TQM implementation models.

- 7.1 Embarking on Total Quality Healthcare Model Implementation in Singapore Hospitals.
- 7.2 Critical Success Factors for the Implementation of the Total Quality Healthcare Model.
- 7.3 Total Quality Healthcare Model Implementation Framework.
- 7.4 Comparison between the Total Quality Healthcare Model Implementation Framework with the Orthodox TQM Implementation Models.
- 7.5 Advantages of the Total Quality Healthcare Model Implementation Framework for TQM

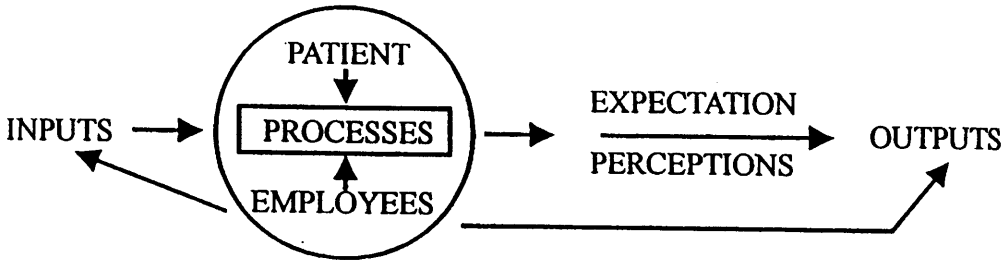
7.1 Embarking on Total Quality Healthcare Model Implementation in Singapore Hospitals

In the previous chapter, Chapter 6, the author has demonstrated the applicability and benefits of using the QFD tool in healthcare, in understanding customers' expectations, in service planning and in performance measurement. In view of the problems identified as the pitfalls of TQM implementation in healthcare in Chapter 4 and the gap in the literature as to what the 'best' approach to TQM implementation should be, a total quality model consisting of seven parts was developed by the author in Chapter 6 to guide Singapore hospitals in achieving the goal of continuous quality improvement. It is hoped that the proposed model will have applicability beyond the confines of Singapore hospitals. As the author has discussed earlier, Singapore hospitals are attempting to adopt or have adopted management quality activities/processes as a response to customers' expectations. However, the quality experience of Singapore hospitals has been less than satisfactory as demonstrated through the case studies in Chapter 6. The reasons might be due to operational realities, physicians' attitudes, short-term orientation of administrators, resistance by physicians, nurses and other staff and that the quality initiatives might not have been correctly implemented. To remedy this situation, the proposed model is developed as a guideline for hospitals as they attempt to become more quality and customer-oriented. The author is of the opinion that the proposed model represents the best way of achieving continuous quality improvement. Whilst traditional TQM implementation models call for process improvement, they fail to take into consideration customers' expectations and requirements in their process redesign and improvement. Thus, many TQM initiatives became mainly activity based without being customer-focused. As the analysis of the case studies revealed, the proposed model which focuses on delivering value by finding out both the spoken and unspoken needs of customers, translating these needs into actions and designs and communicates them throughout the hospital will enable vital changes in the systems associated with the delivery of patient care. Thus, the proposed model if properly implemented, will create an environment of continuous improvement by ensuring that those with the primary responsibility for caring of patients will work in concert.

The author shares the view of Nwabueze, Morris and Haigh (1994) that not only should Singapore hospitals concentrate on improving processes, they should ensure the holistic integration of the entire system: the inputs, throughputs and outputs as shown in Figure 7.1. To

do otherwise, would lead to a situation whereby organisational structures will fail to work in a consistent co-ordinated and complementary manner.

Figure 7.1: Systematic Representation of Organisation Process



Source: Nwabueze et al (1994), Proceedings of BPR Conference, Cranfield University.

Therefore, the author warns that concentrating only on streamlining and improving processes without adhering to the holistic nature of the proposed model will lead to internal disputes primarily between management and clinicians. It must also be emphasised that in improving organisational processes, attention should focus on the improvement of those critical processes that would meet and exceed customers' expectations, thus impacting on the bottom-line. The proposed model must be made to deliver on financial performance, as otherwise interest in it will be lost.

Finally, Singapore hospitals should use the proposed model not only to meet the regulatory requirements emanating from government and purchasers, but also to meet and exceed the expectations of all their customers. The goal should be to advance quality in order to provide high quality patient care as well as efficient use of resources. This means that rather than focusing on the traditional approach to QA, Singapore hospitals should focus on 'prevention'. Even when performance meets national and purchaser specification, Singapore hospitals should strive further to improve the provision of services, driven by a "never settle for less" mindset. From a TQM perspective, Singapore hospitals should direct its attention and expend substantial energy and resources on the 'key' inhibitors of the current performance level. If attacked, these would enable the improvement of everyone's level of performance thereby improving overall

organisational performance. The focus should be on improving processes to meet and exceed customers' expectations and eradicating errors so that service improvements are secured from all practitioners, not just from those at the sharp end of the performance spectrum, but also from staff in departments with non-clinical responsibilities, for example, Invoicing Department, Catering Services, etc. In addition to favourable clinical outcomes and cost containment, the interpersonal relationship between staff/doctor and patients and the quality of the environment all present opportunities for quality improvement. It is, therefore, essential to create a seamless hospital in which patients and staff/doctors communicate efficiently and without barriers, across departmental and/or directorate lines.

Having discussed 'why' the proposed model should be adopted by Singapore hospitals, in the next section, the author provides an examination of the critical success factors for its successful implementation.

7.2 Critical Success Factors for the Implementation of the Total Quality Healthcare Model

Before proceeding to the framework for the implementation of the proposed total quality healthcare model in Singapore hospitals, the author feels compelled to establish the Critical Success Factors (CSFs) for its implementation. It is fundamental that the implementation framework be problem-specific, that is, be designed to solve empirically defined problems, but also it is essential that they exhibit the essential characteristics for success. Against this background, a fourth questionnaire as depicted in Appendix E was designed and modelled upon the eight CSFs for the successful implementation of TQM identified by Porter and Parker (1993) and the three CSFs for the successful implementation of QFD identified by Ghobadian and Terry (1995). These factors are:

- i. Necessary management behaviour: clear leadership, commitment and vision is required of senior management.
- ii. A strategy for quality implementation.
- iii. Organising for quality: quality requires an organisational structure which harness the full potential of the workforce.

- iv. **Communication for quality:** provides awareness, involvement and reinforces the quality message.
- v. **Training and education.**
- vi. **Employee involvement as a key determinant of a successful programme.**
- vii. **Process management as a key determinant of TQM.**
- viii. **Quality techniques such as Statistical Process Control (SPC), quality costing and benchmarking necessary to reduce variation.**
- ix. **A customer-focused philosophy.**
- x. **Teamwork and a multi-disciplinary team approach.**
- xi. **Regularly evaluate performance.**

Research Methodology

Thirty questionnaires were distributed to the thirty members of the three focus groups at the focus group meeting in December 1998. The questionnaire asked the focus group members to simply answer yes or no to whether each of the eleven factors would be a CSF for the implementation of the proposed model in their hospitals. In addition, they were to add any other factor(s), which they considered 'critical' for the proposed model to succeed in their hospitals.

Of the 30 questionnaires distributed, 30 questionnaires were returned, representing a 100% response rate.

Findings

Quantitative Findings

Table 7.1 presents the results of responses from the 30 focus group members on the CSFs for the successful implementation of the proposed total quality healthcare model in the Singapore context.

Table 7.1: CSFs for the Successful Implementation of the Total Quality Healthcare Model in the Singapore Context

<i>Critical Success Factors For Total Quality Healthcare Model</i>	<i>Responses</i>			
	Yes	Percentage	No	Percentage
i	27	90	3	10
ii	25	83	5	17
iii	24	80	6	20
iv	27	90	3	10
v	30	100	-	-
vi	20	67	10	33
vii	18	60	12	40
viii	12	40	18	60
ix	23	77	7	23
x	26	87	4	13
xi	24	80	6	20

Source: Developed by the Author

Qualitative Findings

Whilst 90% of the focus group members felt that leadership and commitment from senior management are a necessary condition for the successful implementation of the proposed model, 10% did not agree. Those who did not agree pointed out that leadership and commitment from top management is a necessary but not a sufficient condition for success. They indicated that the leadership and commitment of the professional groups such as doctors, nurses, etc was just as necessary for successful implementation. In the author's opinion, it is important to make sure that the leadership of QA, TQM and daily operations have a common direction and are co-ordinated. Furthermore, senior management must show exemplary leadership and commitment to quality. The leadership must also be supportive of the total quality culture and communicated to all members of the staff; macho management no longer works.

In relation to CSF (ii), 83% of the focus group members acknowledge the need for a strategy for the successful implementation of the proposed model. One focus group member indicated that although a systematic strategy was required before embarking on implementation but of more importance was the need for an adequate infrastructure to support and sustain the drive of implementation. In addition, another focus group member noted the need to put adequate

systems in place before embarking on implementation and having a robust audit system to support the implementation. The author fully supports a system and an infrastructure to sustain the implementation of the proposed model because no matter how organisations radically design and streamline processes, if the system is not optimised the model will fail to deliver its intended purpose, that is in achieving the state of continuous improvement. Deming (1986) has argued that poor quality is due to 85% failure in the system. This contention was verified and found to be true in Chapter 4 where the analysis of the pitfalls of TQM in healthcare revealed four elements of the managerial activity to be responsible for TQM barriers in healthcare: professional dominance by consultants, insufficient Board involvement and education, poor information transfer, and vertical hierarchy. Hence, for successful implementation of the proposed model, not only is a strategy for implementation required but, also a change in managerial activities via systems management is a fundamental requirement. Thus, Singapore hospitals should not only concentrate on redesigning processes, it should also redesign and optimise the entire system of INPUT -> PROCESS -> OUTPUT, in order to ensure that there is indeed a departure from the status quo. A redesigned and optimised system would lead to a flatter organisational structure which would facilitate the flow of communication between the various directorates, thereby ensuring a 'joint quality agenda' for every member of the workforce.

For CSF (iii), 80% of the respondents felt that having an organisation structure, which harnessed the full potential of the workforce, is critical for the successful implementation of the proposed model. This means that hospitals have to move towards a flatter organisational structure which entails a change in culture and the empowerment of staff to 'take risks' but not medical risks. Taking risks here implies having a forum whereby good ideas are explored from whichever quarter they come from and not just exploring those that are emanated from the upper levels. This would bring about a flat paradigm structure required for effective implementation.

For CSF (iv), the need for communication for quality is a rather obvious factor for the successful implementation of the proposed model particularly in healthcare, where the terms 'customer' and 'quality' are rather vague phenomena. 90% of the respondents noted that communication for quality was the key factor whilst 10% felt that ensuring that all employees were aware of the hospital's values/beliefs was more important than communication for quality.

In the author's opinion, it is important to communicate the similarities and differences of TQM and the QA program adopted by the organisation. Hence, for the successful implementation of the proposed model, top management must break down the class distinctions between consultants, doctors, nurses, paramedics and non-clinical providers. This can only be achieved through a dependable communication system.

Furthermore, in response to CSF (v); 100% of the respondents felt that training and education was an important factor for the successful implementation of the proposed model. It should cover all employees as part of an ongoing process suited to each group's needs. The author agreed with Porter and Parker that training and education should instead be done on a needs assessment basis rather than organisation-wide; the contention being that whilst shopfloor staff know what are the problems, they lack the delegated authority to effect changes. Furthermore, the author's contention, which Porter and Parker fail to indicate, is the need to extensively train and educate top level managers on the basics of TQM and QFD in order for them to be aware of and to acquire conceptual and holistic understanding of the proposed model. It is also important to educate QA staff in the use of quality improvement methods, train QA leaders, QFD team members and facilitators. Similarly, it is important to educate QFD members about the QA processes, data sources, and staff capabilities.

For CSF (vi), 67% of the respondents felt that employee involvement was a key determinant for the successful implementation of the proposed model. The remaining 33% were of the opinion that top management and professional groups' involvement were of paramount importance because only the positive influence of top management and professional groups could bring about culture change. In the words of Deming (1993), "why involve people who can only make minimal changes to the system, whilst the status quo remains very much intact". In the author's opinion, without all the players at the table, you might miss some important opportunities or information that otherwise would be played. It is therefore critical that all areas be represented, thus, total organisation involvement is a significant factor for successful implementation of the proposed model.

For CSF (vii), only 60% of the respondents felt that process management and systems were a key factor for the implementation of the proposed model. This means that an understanding of

how work flows through the system is critical in healthcare, where the provision of service is distanced from the customer. There is thus a fundamental need to re-appraise the process of service provisions in hospitals. However, the author would add that in as much as streamlined processes and robust audit systems for monitoring and measurement are a key factor for the successful implementation of the proposed model, in a healthcare setting, the proposed model should not be devoid of process improvement.

In relation to CSF (viii), only 40% of the respondents agreed with Porter and Parker that quality techniques are necessary to reduce variation in the implementation of the proposed model. In the author's opinion, statistical thinking which recognises the concept of variability must be encouraged. Basic tools and techniques should be used to reduce variation in process outputs, to improve uniformity and decrease over control or tampering throughout the implementation. The 60% who disagreed contended that what was required was not quality tools and techniques but the proposed model should be part of organisational development linking behaviour change to organisational change, emphasising systems management.

For CSF (ix), 77% of the respondents felt that the key to successful implementation of the proposed model was having a customer-focused philosophy in place. This means that an organisation needs to listen, meet and exceed the expectations of the customer. In the author's opinion, knowing who your customers are and understanding customer needs and expectations are an important step in the successful implementation of the proposed model. Hence, to know and understand customer expectations, involve the customer. Remember that "customer musts" and "exciting quality features" are those least spoken about, either due to assumptions or lack of knowledge.

For CSF (x), 87% of the respondents felt that teamwork and a multi-disciplinary team approach are the basic building blocks for the successful implementation of the proposed model. In the author's opinion, developing true teams, consistency of team membership and members from multiple functional areas would contribute to the successful implementation of the proposed model. A multi-functional team is required in order to get buy-in and input from all important functions, but to be able to implement the proposed model successfully, the team should be a fully functioning, empowered team. However, creating a fully functioning, empowered team

requires extensive planning, resource allocation and leadership. To enjoy the benefits of teamwork, the leadership must be prepared to tap the creative potential of the workforce. This means listening to the suggestions of employees performing the work, involving everyone in organisational planning to improve customer satisfaction and recognising and rewarding team behaviours.

For CSF (xi), 80% of the respondents felt that regularly evaluating performance was the foundation to the successful implementation of the proposed model. This means that organisations need to have teams that meet fortnightly to discuss their progress, identify difficulties, co-ordinate activities and develop strategies. In the author's opinion, the improved communication, the shared successes, ownership, mutual respect for each person's contributions, and team pride are factors derived from regular evaluation. All these factors would support and sustain the implementation of the proposed model. Furthermore, a systematic audit of the progress of the model should be conducted on a quarterly basis against pre-determined indicators to ensure that the implementation is on track. A half-yearly audit would constitute the platform for further quality improvements.

Although ten of the CSFs are seen by the 30 focus group members as significant and of importance to ensure successful implementation of the proposed total quality model, the author felt that Singapore hospitals have neither the time or nor staff to carry out the following four of the essential ten factors satisfactorily:

- i. Factor (iv) - Communicate for quality
- ii. Factor (v) - Training and education
- iii. Factor (vii) - Process management
- iv. Factor (ix) - Adopting a customer-focused philosophy

This failure arises because of staffing levels in Singapore hospitals. For example, staff are only released from their duties for what their departmental managers consider 'essential' training such as training in infection control. Quality issues are not seen as essential when staff time is at a premium. To deal with these issues, top management should provide more budget for training. Departmental staff need to be given time to attend training sessions because these are essential if

patient needs are to be met. Nevertheless, the 30 focus group members who responded to the questionnaire, identified further, additional critical factors specific to the successful implementation of the proposed model. Some of these CFSs were neither acknowledged by Porter and Parker, Ghobadian and Terry nor recognised in the TQM and QFD literature. The analysis of these additional factors are:

- * A QFD champion within the hospital is a must. Someone must know the QFD tool inside and out. When the team gets stuck or has questions about the results, an in-house knowledgeable QFD practitioner can come to the rescue.
- * Managers should work in partnership with clinicians in order to create a more genial environment by improving the polarised relationship between management and clinicians. The CEO must drive the implementation. There is no substitute for a strong leader.
- * Streamlining processes by proactively ensuring that services meet purchasers' requirements and meet the expectations of the patients. People can only be as good as the system that they operate. Hence, streamlined processes will facilitate the breaking down of barriers between departments and put an end to the 'we have always done it this way' argument.
- * The implementation of the proposed model should be centred on the professional groups because they represent clinical quality, which has direct clinical relevance to the patients, and because they represent the most stable element in the organisation. At the initial stage, organise training workshops exclusively for the professional groups with a respected well known consultant, who must have engineered 'change'.
- * Empower shopfloor staff, the people who deal on a daily basis with patients. They are the people closest to the problems. Thus, their ideas should be sought before fundamental changes are made. If the hospital employs empowerment, it is imperative that staff are involved in the decision making process on issues that affect them and in essential changes to their work areas.

- * The preferred implementation framework should be sufficiently flexible to permit it to accommodate the complex nature of healthcare. The implementation framework should have the flexibility of accommodating the various external requirements. A rigid framework, would therefore not succeed.
- * Top management should always be honest about its intentions. There should be no hidden agendas, such as changing clinical practices, which have the capacity to impede successful implementation. Employees are quick to notice inconsistencies in management behaviour. 'Not walking the talk' is a major cause of implementation failure. As Deming (1986) has noted, 'management should eliminate the barriers that rob workers of their right to pride of workmanship. It is the job of management to create 'joy' in work for every employee. Furthermore, quality activities and involvement should be included in all job descriptions. The objectives of the proposed model should be filtered through all employee levels to enable the achievement of departmentally based and company-wide objectives.
- * Reward all good efforts in quality. Quality should be integrated into performance management. This achieves the motivational element of ensuring shopfloor commitment and innovative ideas.

In the author's opinion, just as location, location, location is the key ingredient in real estate value, *prioritisation, prioritisation, prioritisation* is the key ingredient for the successful implementation of the proposed model. Constantly reducing the scope of the analysis to the most high impact customer expectations, and the most important service elements or critical work processes would make the implementation process less complex. In addition, to deal with the vast amount of data, use QFD software, for example, QFD Capture, QFD2000, etc to process the data.

The CSFs for the implementation of the total quality healthcare model could be represented in the form of a table as depicted in Table 7.2.

Table 7.2: The CSFs for the Implementation of the Total Quality Healthcare Model

<i>Phases</i>	<i>Critical Success Factors</i>
Awareness	<ul style="list-style-type: none"> • Adopt a customer-focused philosophy.
Knowledge	<ul style="list-style-type: none"> • Organise for quality: institute an organisational structure. • Institute teamwork and a multi-disciplinary team. • Involve the professional staff on a continual basis. • Appoint QFD champion(s). • Management behaviour: ensure demonstrable leadership, commitment and vision from top management and Board of Directors. • Institute training and education.
Breakthrough	<ul style="list-style-type: none"> • Adopt a holistic strategy. • Communicate quality across functional areas: to all staff within departments and directorates.
Implementation	<ul style="list-style-type: none"> • Always prioritise expectations: customers and work processes. • Involve and empower employees. • Institute honesty: management should 'create joy in work'. • Managers must 'walk-the-talk'. • Process management: redesign and streamline critical work processes. • Regularly evaluate performance: institute robust systems for monitoring and measurement. • Institute reward system.
Integration	<ul style="list-style-type: none"> • Review on a continual basis the quality process. • Integrate into strategic Business Plan: quality should be a way of life.

Source: Developed by the Author

The extensive identification of the CSFs will enable practising managers to be aware of the underlying requirements for the successful implementation of the proposed model. Hence, practising managers should benchmark his/her approach in order to ascertain that the relevant factors for success are adequately represented in the implementation framework. However, caution has to be exercised to avoid the fizzling out of the implementation programme. All too often, organisations start with speed only to stop after 12 months due to a lack of sustainable commitment and ignorance of the interlinked critical factor requirements. In the next section, the author interlinks the critical success factors to the implementation framework of the proposed model.

7.3 Total Quality Healthcare Model Implementation Framework

The author has discussed in Chapter 5 the different TQM implementation models, and has identified that there is no one best way to implement TQM. However, an analysis of these models has revealed that there are similar phases in the implementation process. Also, it is important to note that the implementation framework is an educational and communication process that can only be carried out through people. This would be the staff who deal with the patients on a daily basis and not the high profile manager locked away in the office. As both empirical and anecdotal evidence had suggested that, many well-intentioned TQM initiatives failed due to the lack of an adequate infrastructure, the author starts the implementation framework by building the organisational infrastructure that would be required for successful implementation. This means laying the foundation stone that will support and sustain the implementation process. It is the author's belief that by dividing the implementation process into five phases, namely, Awareness, Knowledge, Breakthrough, Implementation and Integration, with prescribed activities identified for each phase, strategic planning and implementation would be more manageable. In addition, the critical success factors identified in the earlier section would be taken into consideration at each phase. The author presented in Table 7.3 a systematic overview of the implementation framework for the total quality healthcare model.

Table 7.3: Total Quality Healthcare Model Implementation Framework

Phases	Prescribed Activities	Pitfalls of TQM Implementation
Awareness	<ul style="list-style-type: none"> • Organisational assessment (SWOT Analysis): Use Phase 1 of the proposed total quality model 	<ul style="list-style-type: none"> • Not aware of organisational readiness for change, difficulty in establishing key weaknesses, strengths, opportunities and threats
Knowledge	<ul style="list-style-type: none"> • Develop infrastructure and specify roles, relationships and responsibilities of: <ul style="list-style-type: none"> a) Total Quality Council b) Facilitators c) QFD Team Members • Train top management • Train facilitators • Train QFD team members 	<ul style="list-style-type: none"> • No organised approach; due to lack of conceptual understanding of TQM • Quality initiative locked into formal hierarchical structure • Lack of corporaticism • Top management not aware of its QI responsibilities • Training programme too vague • Training needs incorrectly identified
Breakthrough	<ul style="list-style-type: none"> • A case of action (objectives) • Identify a vision • Establish a mission • Identify strategy(ies) • Identify value system • Identify key issues • Adopt a definition of quality 	<ul style="list-style-type: none"> • Lack of clarity of purpose • Does not reflect actions of management • Confusion as to the meaning • Mostly adhoc, lacks systematic focus • Not important
Implementation	<ul style="list-style-type: none"> • Identify customers • Identify customer's expectations • Evaluate customer's importance ratings • Evaluate the level of performance for each dimension of customer expectation against main competitors • Identify the tangible and intangible components of quality elements • Correlate customer's expectations and quality elements/critical work processes • Prioritise quality elements/critical work processes • Conduct organisational assessment (SWOT Analysis) • Carrying training, equipment, treatment protocol and operation plans • Evaluate new ideas against existing management quality processes • Standardise processes and develop control plans • Planning and allocation of responsibility • Monitor progress 	<ul style="list-style-type: none"> • Difficulty in establishing the ultimate customer • Wrong choice due to lack of understanding and ambiguity about work processes • Not aware of organisational readiness for change, difficulty in establishing key weaknesses, strengths, opportunities and threats • Too vague and too extensive • QI teams select own projects • No organised approach: tends to be ad-hoc • Confusion as to what the 'best' approach is • Individualised approaches • No accepted recognition and reward system • Partial implementation
Integration	<ul style="list-style-type: none"> • Team maintenance activities to ensure continuity • Integrate quality improvement project(s) • Consolidate lesson learnt from pilot quality improvement project into training • Training and retraining at all levels • Integration of quality improvement projects into business plan 	<ul style="list-style-type: none"> • Lack of integration of quality improvement projects • Lessons learnt not acted upon • Poor co-ordination • Gains in knowledge taken for granted • Everything treated as tactical

Source: **Compiled by the Author**

7.3.1 Awareness Phase

The first thing the Quality Manager should do is to conduct an in-depth organisation-wide audit.

This would involve:

- i. Internal audit - to identify the key organisational strengths and weaknesses and determine the critical flaws in the system.
- ii. External audit - to identify opportunities and threats. This will mean focusing on and creating a balance between governmental directives and purchaser specifications and marrying them to the hospital's key strengths whilst eliminating the weaknesses. The external audit should focus on critical business survival issues. In view of the constant changes in the external environment, the external audit should also assess how fit the hospital is in relation to meeting the expectations of:
 - a. Purchaser Specifications
 - b. Medical Audit and Accreditation Unit
 - c. Ministry of Manpower
 - d. Patients Needs

In addition, the assessment should determine those factors that might impinge upon the hospital in the following year and entail a comparison of how the internal environment relates to the external environment. This will enable it to determine where the hospital stands in relation to pressures emanating from external sources.

The organisational audit is an important aspect of quality that traditional quality management approaches have tended to ignore. However, in the author's opinion, it forms one of the most essential phase of the implementation framework. An audit exercise provides the hospital with an account of where it stands in relation to quality. From this premise, a hospital can establish:

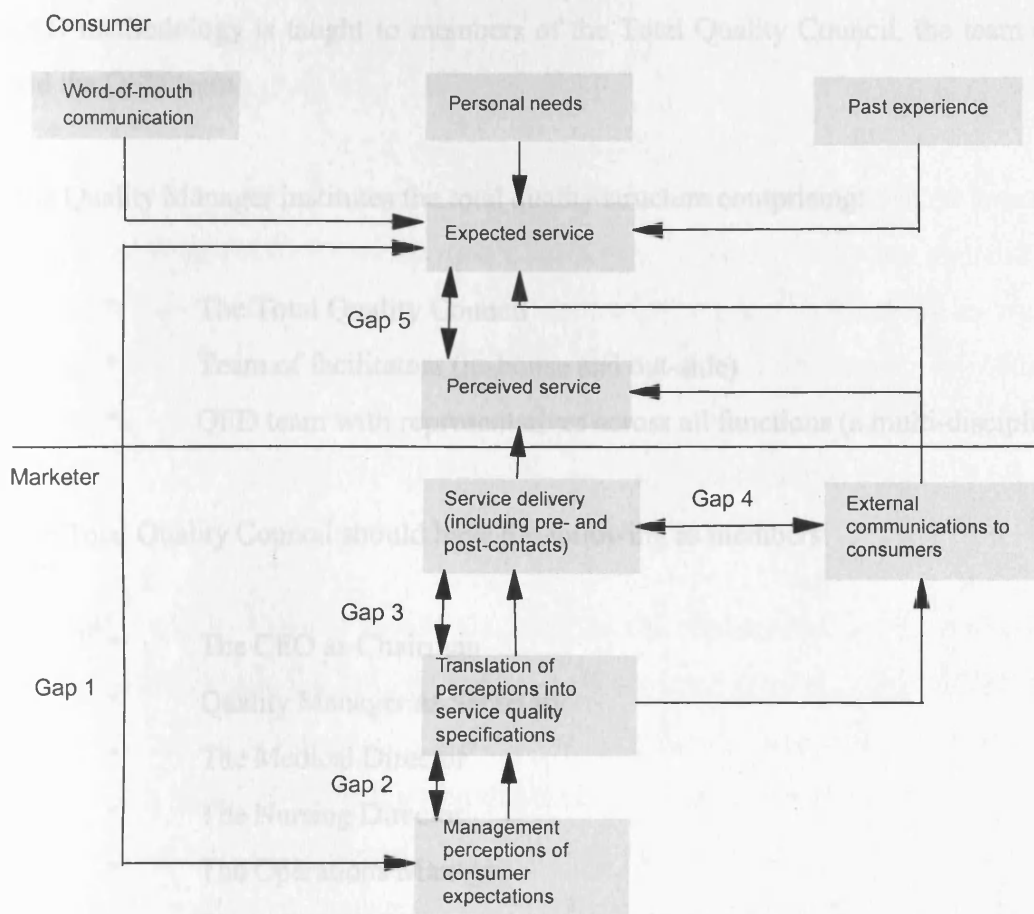
- Where it is?
- Where it wants to be?
- How to get there?

The hospital should know, in empirical terms, whether its culture is conducive to the ethos of providing total quality. It can then build on its strengths to further the principles of TQM. Furthermore, the audit will provide the Quality Manager with 'hard' evidence about existing practices, values, beliefs and assumptions within the hospital and end reliance on the opinions of the management or the clinicians. Through analysis of this data, the hospital will be in a position from which to develop a systematic means of enhancing its future performance. The author had demonstrated through 3 case studies in Chapter 6 that the proposed total quality model is a valuable audit instrument. It can help hospitals to understand patients' expectations, identify critical work processes or service elements, and assess the hospital's performance by identifying the unmet patients' expectations. Hence, the proposed model would enable the Quality Manger to ascertain whether the hospital is providing a patient focused service. It also helps the hospital to identify whether or not the seven gaps identified by Parasuraman, Zeithaml and Berry (1985) as shown in Figure 7.2 exist. As Parasuraman et al noted, 'the gaps represent the major discrepancy between customers' expectations and what the organisation perceives to be the needs of the customer'. The case studies in Chapter 6 have identified the gaps in the service quality of Singapore hospitals and in consequence, reveal that Singapore hospitals are not providing a quality service to its customers, the patients.

In the final analysis, the author would suggest that the organisational assessment be done at different levels within the structure to determine the various needs and problems concerning the system of healthcare delivery. These levels include:

- * The Board level
- * The Director level - Heads of Services
- * Service Manager level
- * Consultants/medics
- * Staff
- * Support Staff
- * Patient

Figure 7.2 The Gap Analysis Model



Source: Parasuraman, Zeithaml and Berry, 1990; Speller, 1992.

Having undertaken the assessment exercise, the team should prioritise suggestions but ensure that the focus is on the critical mass of the business as it relates to the needs of the patients and the market. Realistic targets should be set which would have an immediate impact on the bottom line and consequently improve organisational performance.

7.3.2 Knowledge Phase

At this phase, the hospital is learning about the potential of the QFD tool and the proposed total quality model for TQM in the hospital. This is where an organisational decision to implement the proposed model is made and the energy is created to facilitate the change. The objective of this phase is to develop the infrastructure and specify roles, relationships and responsibilities of

the teams for successful implementation of the proposed model. At this phase, the TQM and QFD methodology is taught to members of the Total Quality Council, the team of facilitators and the QFD team.

The Quality Manager institutes the total quality structure comprising:

- * The Total Quality Council
- * Team of facilitators (in-house and out-side)
- * QFD team with representatives across all functions (a multi-disciplinary team)

The Total Quality Council should have the following as members:

- * The CEO as Chairman
- * Quality Manager as Secretary
- * The Medical Director
- * The Nursing Director
- * The Operations Manager
- * Three Directors of any of the clinical services
- * A Clinician
- * A Nurse

The Total Quality Council should have in total ten members. The composition of the Council should be such that it represents the diverse professional groups. If a QA Council has been established in the hospital, the members of the QA Council should be included in the Total Quality Council.

As Juran (1989) suggested, the responsibilities of the Council would include:

- * Formulate the quality improvement policy, e.g. priority of quality projects, need for annual quality improvement audit and mandatory participation.
- * Establish the pilot selection process.
- * Establish the team of facilitators selection process.

- * Provide resources: training time for working on total quality projects, diagnostic support.
- * Provide recognition.

To Juran's list, the author adds the need to provide a documented plan for the implementation of the proposed model that encompasses a systematic approach, measures and boundaries of the process. There must be demonstrable leadership, commitment and vision from top management and Board of Directors. The rest of the hospital should be encouraged to see and know that the Quality Manager has the total support of the Total Quality Council and particularly that of the CEO. It is only then that the Quality Manager can influence the actions of his or her fellow senior managers.

The Total Quality Council should also oversee the implementation process and continuously provide facilitation in the form of taking part in training sessions. This will send out a strong signal that top management is 'serious' about adopting the proposed model to improve quality and that it is not a new attraction that will fizzle out with the passage of time. The Total Quality Council must be seen by the rest of the workforce to 'walk the talk'. It is pointless to embark on a quality improvement project if top management is not prepared to change its style of management.

In addition, the Council should review reports by the facilitators and present awards to those who have made exemplary contributions to quality improvement process. Nonetheless, its involvement will be restricted to the planning role. This is because in most cases the early enthusiasm of the Total Quality Council does not seem to last the full course.

The Team of Facilitators should be the senior ward sisters because the senior ward sister oversees the day to day activities within the wards. They serve as the 'middle women' between management and the shopfloor. Thus, they have the confidence of the staff and are, by the virtue of their strategic positions, better placed to facilitate quality at the bottom. They know the problems, the fears and what needs to be changed.

The facilitators will:

- * become the hospital's QFD champions.
- * assist in establishing the QFD team members.

According to Haigh and Morris (1993), as guide, the facilitators will:

- * aid in training of the QFD team. This is to ensure that every member of the QFD team is trained on the virtues and methodology of TQM and QFD.
- * recount, both as an aid to training and as a means for maintaining motivation, the lessons which have been learned from the experiences of other such teams outside the hospital.
- * chart the essential interactions between the QFD team and the Total Quality Council, and ease the way for cross-team exchanges.
- * ease resourcing, resource allocation and accountability for resource management.

As philosopher, the facilitators will:

- * explain the hospital's quality vision, mission, values and strategy, delineates the QFD team's term of reference as these have been devised by the corporate Total Quality Council and helped to foster the team's awareness of top management's commitment to adopt the proposed model for continuous quality improvement.

As friend, the facilitators will:

- * assist in the building of a cohesive, viable and enduring set of relationships between the QFD team members.
- * advise on the directions the QFD team may elect to follow in order to effectively, efficiently and economically focus its collective quality improvement efforts.
- * advise the Total Quality Council through monthly reports of quality initiatives and concrete improvements.

As educator, the facilitators will:

- * serve as the hospital's in-house quality management instructors (Haigh and Morris, 1993).

The team of facilitators should meet regularly, at least fortnightly, to compare and share experiences, but, in particular, to establish quality improvement initiatives across functions. To enable the team of facilitators to accomplish its herculean responsibilities, they must be thoroughly trained in the principles of TQM and QFD and team dynamics.

The role of the team of facilitators is imperative for the successful implementation of the proposed model. As Juran (1989) has noted, the facilitator is an integral part of the infrastructure necessary for continuous quality improvement.

A QFD team of ten members comprising the Quality Manager, the heads of the main departments and staff representatives across all functions should be instituted. QA team members should be integrated into the QFD team. The responsibility of the QFD team is to serve as a watchdog unit to guard against failure in the implementation of the proposed model and the provision of poor quality in all of the hospital's operation. The QFD team should also:

- * **Assist** in pilot scheme nomination.
- * **Conduct** training in quality improvement.
- * **Co-ordinate** the activities of the team of facilitators.
- * **Provide** support services to quality improvement project(s).
- * **Assist** in the preparation of reports to the Total Quality Council.

Serving on the QFD team should be a part-time job that supplements, not replaces, other duties. QFD team members should lay out the entire implementation process, represent their departments on the team, represent the team to their departments, cause the decisions of the team to be executed in their departments and actively contribute to the successful implementation of the proposed model.

The Quality Manager, having completed the composition of the organisational structure should create awareness of the proposed model and embark on extensive training and education of the three main groups. As TQM requires that everyone be encouraged and empowered to address and improve processes, it is then necessary to create employee awareness as to what the proposed model is about and what is expected of all employees. Thus, the CEO and two other

members of the Total Quality Council, preferably the clinical and nursing directors, should lead a one day awareness session. By their presence, these top managers would be signalling to the workforce that there is a serious commitment to adopt the proposed model for continuous quality improvement in the hospital.

Education And Training

The Quality Manager should elicit the support of a team of management consultants not to draw up a plan but to help in facilitating the training programme for the Total Quality Council members, facilitators, and QFD team. The key functions of the three groups should be explained in detail, in particular, their interdependent roles and what is expected of them. The training session should concentrate on the basic principles of TQM, the underlying assumptions, the QFD methodology, problem solving, team building and what the hospital stands to gain from the implementation of the proposed total quality model. The training session should not be concerned with the Gurus' message or with the evolution of quality. These are known to be boring as participants switch off and there is always a tendency to forget the Gurus' message. The theme should always be the 'what' and 'how' approach to successful implementation of the proposed model for TQM. The involvement of outside consultants should be limited in order to limit cost.

At some stage of the training programme, the Quality Manager should involve a practising medic who believes in and has been involved with QFD in a healthcare setting. The practising medic should highlight 'how' his or her hospital adopted the TQM and the QFD methodology for continuous improvement and the roles played by its Total Quality Council, Facilitators and QFD Team in the implementation process. This will convince or help to persuade the medical consultants on the Total Quality Council that the proposed model would contribute effectively to continuous improvement in their hospital. It is important that the invited medical guest concentrates more on how TQM, QFD and the proposed model is of clinical relevance to patients and the hospital as a whole. It is also important that at the training sessions the proposed model is not presented as something new but is portrayed as a continuation and an expansion of collaborative processes that have already been used successfully by hospitals (Hughes, 1992). That is, the proposed model establishes through the empowerment of individuals together with a cross-functional approach, a mechanism to enhance an organisation's

ability to communicate, document, analyse and prioritise customers' requirements. The documentation and analysis steps would lead to breakthroughs, which illuminate understanding and enhance competitiveness (Hughes, 1992).

The Quality Manager should be responsible for facilitating teaching courses in TQM and the QFD methodology to all employees depending on their degree of involvement. This will enable the sharing of a common language amongst employees, the ability to work in teams in order to foster co-operation as members of the same hospital, to solve problems and to continuously improve the quality of care. Attendance in these training sessions must be made compulsory for all staff and it should be conveniently spread over time to suit the working hours of staff. Often in Singapore hospitals, managers prevent their staff from attending training sessions and cite staff shortages as an excuse. This should not be allowed. It is important that the CEO attends the first day's training session to talk to staff about his expectations and the hospital's vision. The CEO should also attend the last day of the training session. This would reinforce the message that management is serious about quality. Oakland (1989) has stated that training is the single most important factor in actually improving quality, once commitment to do so is present. Quality training must be continuous to meet not only changes in technology, but also changes involving the environment in which a hospital operates, its structure and perhaps, most importantly of all, the people who work there (Oakland, 1989).

This phase is completed when top management and the majority of staff have attended training sessions on quality, QFD, and have been oriented to the benefits of the proposed model. Another indicator is when a decision has been made by the hospital to adopt the proposed model for quality improvement.

7.3.3 Breakthrough Phase

This is the phase in which the foundation for TQM is built. At this phase, the quality improvement plan is established. After the training session is completed, the Total Quality Council together with the QFD team, should meet to draw up the organisation quality improvement plan. At this stage, the assumption is that the participants will be equipped with a sound grasp of the theory of TQM, QFD, the benefits of the proposed model and are clear in

their minds as to the way forward for the hospital. The quality improvement plan should establish (Kanji, Morris and Haigh, 1993):

- * **a case for action**
- * **the vision**
- * **mission**
- * **strategy**
- * **values**
- * **key issues**

A case for action: encompasses the hospital's objectives and short term goals. As hospitals are prone to incessant government intervention, having long term goals is wasteful. However, the plan should include where the hospital is expecting to be in 3 to 5 years. A case for action should say why the hospital must use the proposed model for improved customer satisfaction. It should be concise, comprehensible and compelling. It will embody a persuasive argument stating:

- where the hospital is
- why it cannot remain static
- what the hospital needs to become

and show how, through the attainment of the stated objectives and, by adopting the proposed model the hospital will move towards a new lease of life; the life of continuous quality improvement.

A case for action must be so persuasive that no one in the hospital will think that there is any alternative than the proposed model for the attainment of continuous improvement and customer satisfaction. It must convey a forceful message that the proposed model is essential for the hospital's survival.

The vision: should be the future desired state, the situation that is being sought, to which the hospital and its personnel are committed. It should provide the central focus against which the managerial process of planning, leading, organising and controlling can be co-ordinated. Its

acceptance should serve to give purpose to day-to-day actions and activities at all organisational levels and to all organisational functions. The vision should appeal to all and must be told to every member of the staff in order for them to be a part of it, understand it and act on it. The vision would represent the unifying force that brings the diverse professional functions into acting like one big family which is an essential requirement for the successful implementation of the proposed model aimed at achieving continuous improvement and total quality in healthcare. The vision should contain the following three elements:

- i. focuses on work activities
- ii. includes measurable objectives
- iii. sets new milestones

The vision should be posted in every public room of the hospital for managers, employees, volunteers, consultants, patients and other members of the community to know what the future holds for the hospital in the context of continuous quality improvement.

Mission: represents a series of statements of discrete objectives, allied to vision, the attainment of all of these will ensure the attainment of the future desired state that is in itself the vision. Thus, the mission is the necessary steps along the way to continuous quality improvement and total quality. The mission statement should discuss what you will do, why you do it, who you do it for, and how you will do it. Many organisations embark on total quality without being clear how to achieve it. It is like embarking on a journey without knowing where to begin and how to get to your destination. The consequence is a journey that never take place.

Strategy: should comprise the sequencing and added specificity of the mission statements to provide a set of objectives which the hospital has pledged itself to attain. The strategy should entail the milestones from which the progress towards accepted goals is gauged.

Values: should serve as a source of unity and cohesion between the members of the hospital and should also serve to ensure congruence between organisational actions and external customer demands and expectations. Without such congruence no hospital can expect to attain efficiency, effectiveness and economy let alone ensure its long term survival.

Key issues: these are the hospital weaknesses which must be addressed. A key issue can be characterised as one which is:

- * important to the customer
- * creating substantial cost arising from poor quality
- * happening frequently
- * having substantial impact upon the hospital
- * creating substantial delay in the delivery of a service

After establishing what the key issues are, the Total Quality Council should adopt a hospital-wide definition of quality. This will provide a central focus for the implementation of the proposed model. In the author's opinion, Juran's definition of quality is appropriate; 'quality is fitness for use' (Juran, 1988). This is because in the provision of care, services provided should be fit for the purpose of the customers, that is, it should meet the expectations of customers. It is also congruent with the Singapore government's policy whereby hospitals have to address the healthcare needs of the community. In addressing those needs, services must be fit for the purpose for which they are provided. Once a hospital-wide definition of quality is agreed upon and adopted, the Quality Manager must ensure that every member of the staff, including those engaged in support services, receives a copy of the definition, together with the vision statement. In addition, it is pertinent that the Quality Manager be aware of the common pitfalls at each phase of implementation and learns to avoid them. "The mistakes are all there, waiting to be made". Avoid them and the organisation cannot help but get it right (Hammer and Champy, 1993).

The knowledge phase is completed when the hospital has adopted a holistic strategic and a customer focused philosophy that can demonstrate progress towards customer satisfaction. The Quality Manager should also make sure that there is a strong link between the elements of the infrastructure. If there is a waning of commitment on the part of any of the three main groups, The Quality Council, Facilitators and QFD team, it must be resolved before the 'Implementation' phase otherwise it might lead to implementation failure and derail the TQM initiative. It is essential therefore, that an honest flow of information and communication exists between the three groups and this is the responsibility of the Quality Manager.

7.3.3 Implementation Phase

At this phase, based on the report of the organisational assessment conducted by the Quality Manager, the Total Quality Council, in liaison with the QFD team, should nominate the improvement projects or new process development. In order to prevent the programme from fizzling out, and to maintain the manageability of the implementation process, a project-by-project approach is most appropriate. This approach with its emphasis on short-term success and structural gains should serve to win over institutional sceptics and fence sitters, and in the long term have a domino effect on the rest of the hospital. A project-by project approach has the advantage of ensuring that the hospital stays focused on the key processes rather than having many improvement projects going on at the same time. As each project is being introduced one at a time, the process of assimilating the paradigmatic change that the proposed model entails become less unsettling to employees. Nevertheless, the selected projects should firstly address improvements on services that already exist and are well understood. It will be worth starting with those common projects that are the origin of the majority of customer complaints, for example:

- * long waiting time at the Admission Department
- * long waiting time at the Accident and Emergency Department
- * lack of information
- * missing medical records
- * rude staff

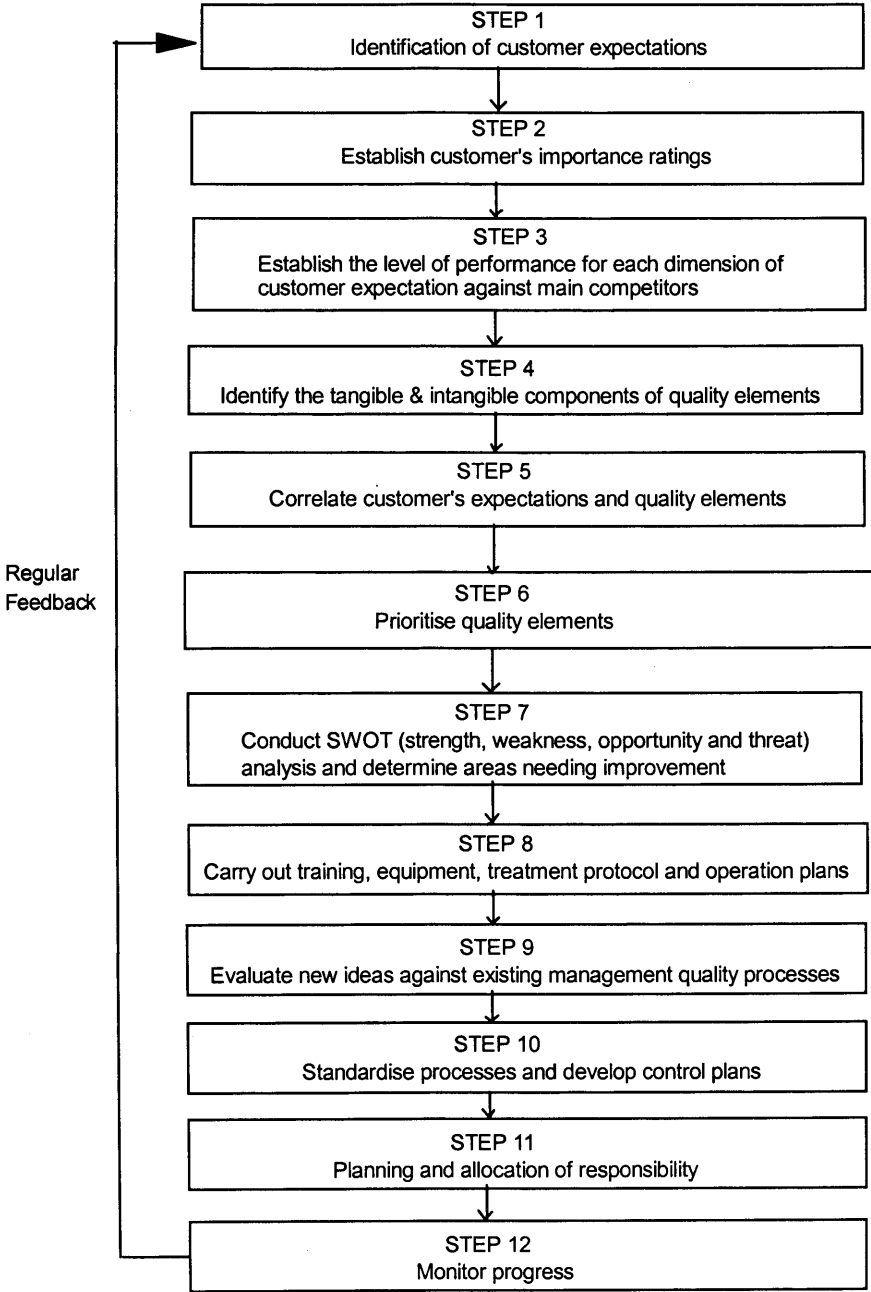
Hence, it might be appropriate to start the initial pilot at the Accident and Emergency or the Admission Department which are the main problem areas in hospitals.

Having discussed the infrastructure required for successful implementation of the proposed model in the Knowledge and Breakthrough phases, the author in this phase propose a close-loop 'implementation' phase framework as depicted in Figure 7.3 to provide hospitals with a step by step methodology to improve efficiency, quality and cost effectiveness throughout the hospital.

The author has demonstrated through 3 case studies in Chapter 6, the mode of implementation of Step 1 to Step 7 of this close-loop 'implementation' phase framework in an operational setting. Hence, in this section only a brief summary of the activities involved in these 7 steps

would be discussed. These 7 steps are Phase 1 of the proposed total quality model developed by the author and the focused group members in Chapter 6. At this phase the first sign of quality teamwork is visible and the department for this pilot project begins to conduct an organisational assessment to determine where it stands in relation to quality.

Figure 7.3: A Close-Loop ‘Implementation’ Phase Framework



Source: Developed by the Author

The first step is to identify the customers of the department. This should be the responsibility of the department manager. However, the department manager should involve the QFD team in developing a list of the department's internal and external customers. One of the ways in which the department manager can carry out this process is through a brainstorming session with the QFD team and the team of facilitators. Having identified the external customers such as patients, patients' family, friends, government, General Practitioners, insurance companies and others, it is important to establish their needs and expectations. The next step is to identify and prioritise their expectations. It is also important that no common assumption is made as to customers' needs and expectations. Ever so often, hospitals' professional staff, because they provide services to the patients and make daily decisions about medical care, assume that they know the patient. Similarly, many managers believe that their internal professional standards are adequate assurance of customer satisfaction. However, quality standards developed by staff are often designed to reduce inefficiencies or conform to policies rather than being focused on meeting patient needs. Thus, it is imperative to identify the customers in order to determine their expectations and to establish the level of performance for each dimension of customer expectation against main competitors.

The next step is for the department manager, team of facilitators and the QFD team to identify the service elements or critical work processes adopted by the department. These are the processes staff have to undergo to provide and improve quality of care. Often in hospitals, processes are either too bureaucratic or designed for the convenience of staff. For example, in one hospital which the author visited, it took the x-ray department more than an hour to attend to the patient after the patient had seen the medical officer and a further delay of another half an hour to collect the results of the x-ray investigations. To avoid the long waiting time, it is important that those critical processes that impact upon waiting time be identified and resolved. Therefore, the team of facilitators should concentrate on identifying the critical systems and processes used to produce, deliver and support patient care.

Having identified customers' expectations and critical processes or service elements, the next logical step is to correlate customer's expectations and service elements/critical work process and to conduct an in-depth department audit to identify the strengths, weaknesses, opportunities and threats and in empirical terms, the gaps in service quality.

Having identified the gaps in service quality, the implementation process proceeds with Steps 8 to Steps 12 of the 'close-loop' implementation phase framework. These steps involve the following 4 interrelated activities which are:

- Planning -> Leadership
- Checking -> Process Redesign
- Doing -> Measurement
- Acting -> Customer Focus

and the absence of any one of these sequential activities is a recipe for disaster. These four interrelated activities represents a departure from the activity centred approach of most traditional TQM implementation models to a more short term, results oriented approach. These signify the need to redesign, improve and streamline process that would meet and exceed customers' expectations, thus having an immediate effect on the bottomline. The Department Manager should engage the QFD team, the team of facilitators, the members of the total quality council and staff in the department to perform the above 4 interrelated activities.

Planning

This requires the development of an empowered workforce and the realignment of the hospital value system to conform to the ethos of total quality. The CEO must be seen by the rest of the hospital to walk his talk, he should provide the resources for training and participate in the education of the workforce. He should also ensure the creation of a non-threatening environment conducive to the quality process. This requires the 'real' empowerment of individuals and teams with the ability to affect changes which will collectively result in continuous quality improvement. The CEO must ensure that the department manager is actually empowering those staff who deal with patients on a daily basis to suggest and implement changes to processes that inhibit the quality of care. Once this is achieved, the other activities, process redesign, measurement and customer focus, would as a matter of consequence, be implemented and successfully accomplished.

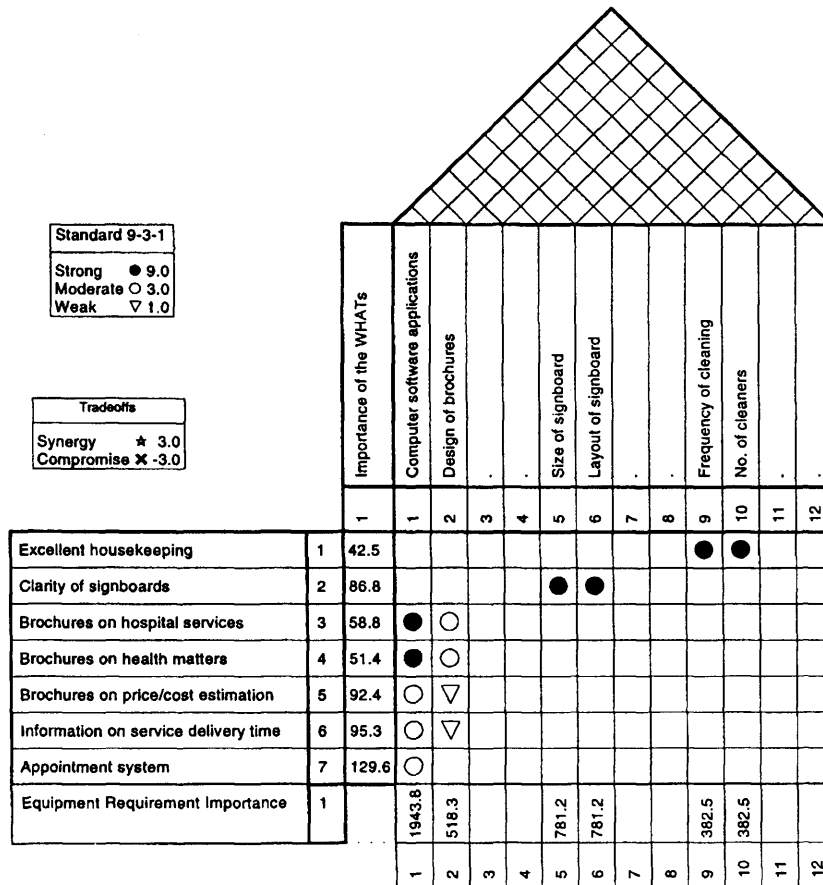
The Department Manager should engage the QFD team, facilitators and members of the total quality council, in deploying the equipment plan, training plan, treatment protocol plan,

operation plan, new concepts deployment plan and the task deployment chart of Phase II and III of the proposed total quality healthcare model.

Equipment Plan

The Equipment Plan is a matrix that identifies critical characteristics of equipment needed by the hospital. For example, in order to design informative brochures, hospitals should consider the computer software applications required, the size, the layout, the amount of details in the brochure, etc. An example of an equipment planning matrix is shown in Figure 7.4.

Figure 7.4: Equipment Planning Matrix for Singapore Hospitals



Source: Developed by The Author

Training Plan

The relationship between service elements or work processes is an essential component of the Training Plan. Medical and non-medical staff need to be distinguished from one another. Medical staff are employees who are paid to treat or attend to patients. They include doctors, nurses, radiographers, laboratory technicians, etc. Non-medical staff, on the other hand, are employees whose job functions differ from those of medical staff (e.g. administrative staff, accounting staff, marketing personnel, etc). An example of a training plan matrix proposed for Singapore hospitals is shown in Figure 7.5.

Figure 7.5: Training Plan Matrix for Singapore Hospitals

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Importance of the WHATs	Singapore healthcare policy	Customer courtesy pays	Health services information	Cross training																	
1	1	2	3	4	5	6															
Degree of attentiveness	1	177.2		●																	
Degree of friendliness	2	127.5		●																	
Language manners	3	152.6		●																	
Knowledge of staff	4	156.7	●		●	●															
Staff cleanliness	5	76.8																			
Service response speed	6	114.6		○	▽	●															
Training Module Importance	1		1410.3	4459.5	1524.9	2441.7															
			1	2	3	4	5														

Source: Developed by The Author

Treatment Protocol Plan

A treatment protocol plan identifies the requirements for the provision of standard medical treatment/procedures for each particular injury or medical problem. Diagnoses or procedures can be selected and prioritised for protocol development based on criteria such as the volume of cases, financial impact of cases, profitability of cases, quality assurance issues, interest of physicians and other staff. The scope of the protocol, format, etc must be decided. For example, for a cervical spine injury, the treatment protocol should include: the tests required, the medications required, the diet required, patient and family education. An example of a treatment protocol planning matrix for Singapore hospitals is shown in Figure 7.6.

Figure 7.6: Treatment Protocol Planning Matrix for Singapore Hospitals

		Standard 9-3-1				
		Strong ● 9.0				
		Moderate ○ 3.0				
		Weak ▽ 1.0				
		Tradeoffs				
		Synergy ★ 3.0				
		Compromise ✕ -3.0				
		Importance of the WHATs				
		1	2	3	4	
		1	2	3	4	
Schedule for continuity	1	40.7	○	○	○	○
Protocol of treatment	2	72.1	●	●	●	●
Patients informed of length of treatment	3	97.9				▽
TREATMENT PROTOCOL REQUIREMENT IMPORTANCE	1		771.0	771.0	771.0	868.9
			1	2	3	4

Source: Developed by the Author

Clearly, for varying reasons, the care of some patients will vary from the protocol because of the patient's condition or other factors. When this happens, the variation and the reason for it must be documented, along with the plan of action. Furthermore, the treatment protocol should be reviewed and updated regularly, reflecting improvements in clinical practices and other changes. The treatment protocol plan should be seen as documenting current practices, which will continually improve.

Operation Plan

The operation plan relates to work processes or activities in a hospital that are important to customers. The "Whats" for operational planning consists of work processes that may be divided into three stages: namely, before, during and after a patient visits the hospital. The activities suggested for each stage are:

i. Before Visiting:

- * Putting up brochures on hospital services, brochures on health screenings, preventative medicine/vaccinations available, etc in the Reception Areas.
- * Conducts health talks at community centres and at the same time create an awareness of the services provided by the hospital.
- * Scheduling (e.g. personnel planning and rotation)

ii. During Visiting

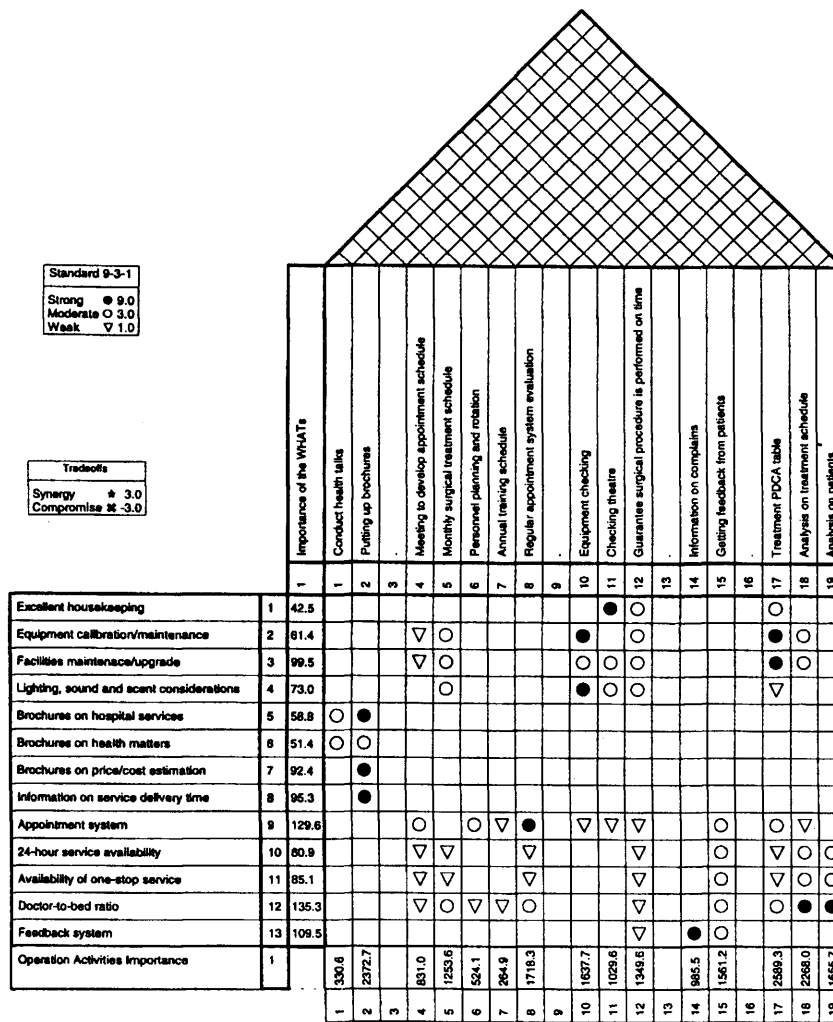
- * Operating Theatre maintenance such as the preparation for the surgical instruments, emergency drugs and equipment before a surgical procedure is carried out.
- * Customer information (e.g. information on complaints and getting feedback from customers).

iii. After Visiting

- * Data analysis such as Medisave Claims processing, treatment PDCA (plan-do-check-action) tabling, analysis on surgical schedule, etc.

The above operational planning can help hospitals to pinpoint the important activities required to satisfy and delight customers. Shown in Figure 7.7 is the Operational Planning Matrix proposed for Singapore hospitals.

Figure 7.7: Operational Planning Matrix for Singapore Hospitals



Source: Developed by The Author

Furthermore, operational planning is the precursor to the development of the New Concepts Deployment Plan. The New Concepts Deployment Plan is used to select new processes that will best meet customer needs. The famous method that is usually used to select the best process/concept is the Pugh Concept Selection Method (Pugh, 1981 and Pugh, 1990). This method helps organisations to select between alternative concepts, or converge to a concept that is better than starting alternatives. Pugh Concept Selection Method increases likelihood that the

best concept of all the alternatives will be reflected in the chosen alternative. It means that the chosen alternative will be better than any of the starting alternative. Table 7.4 shows an example of New Concept Development Plan using the Pugh Concept Selection Method.

Table 7.4: An Example of A New Concept Development Plan Using the Pugh Concept Selection Method

Operational Activities	Weight	Target	Concept 1	Concept 2
Equipment checking before surgical procedures begins.	1637.7	n times	S	+
Treatment PDCA table.	2589.3	...	S	+
Analyse on treatment schedule.	2268.0	...	S	+
Putting up brochures.	2372.7	...	+	+
Getting feedback from patients.	1561.2	...	+	+
Regular appointment system evaluation.	1718.3	...	+	+
.
.
Sum +				

Source: Developed by The Author

These planning activities would enable the Department Manager to communicate to his/her colleagues the critical work processes/service elements required by customers and what is expected of them (task deployment charting). Task deployment chart is used to break down critical jobs into tasks and steps. It identifies what the tasks are, who does them, where they are carried out, when, how, how well, and with what equipment. Table 7.5 provides an example of a Task Deployment Chart for Singapore hospitals.

In addition, the Department Manager with the support of the CEO should establish a department reward system for selfless efforts and contributions to the improvement of quality. Such a reward system would help motivate staff and change the culture of the department and the hospital.

Table 7.5: Example of a Task Deployment Chart for Singapore Hospitals

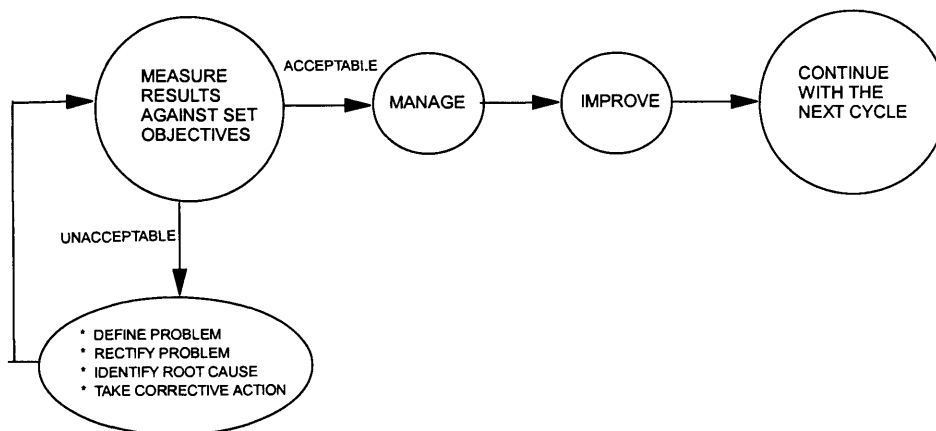
What	Who	When	How	How much	Why
Checking surgical instruments	Staff Nurse	10 minutes before the surgical Instruments procedure	Check whether the surgical instruments are autoclaved and emergency drugs trays are ready for use	Per type of procedure	to assure that the surgical procedure goes on smoothly
Checking the operating theatre	Clinic Assistant	20 minutes before the surgical procedure	Per # of surgeon and per type of procedure	Check whether theatre is clean, ready for next procedure, lighting in good condition, doctors' gown ready for use	to assure that the surgical procedure is carried out at scheduled time
.
.

Source: Developed by The Author

Doing

Having completed the planning process, a measurement and monitoring exercise should be carried out using the suggested framework as shown in Figure 7.8. This is to evaluate new ideas against existing management quality processes, and to ensure that the new activities would achieve set objectives and that overall regulatory requirements would be met.

Figure 7.8: The Measurement Framework

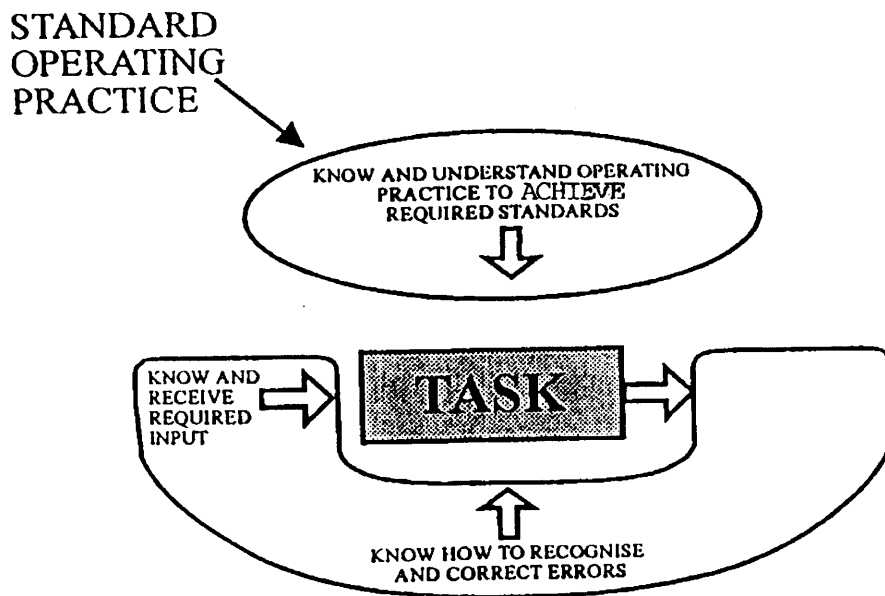


Source: Developed by the Author

This measurement exercise has the advantage of giving information as to how the department is doing against set goals. It is intended to reveal any snags in the provision of quality care so that corrective action may be taken. All the people involve in the quality improvement process, for example, the Department Manager, the QFD team members, facilitators, members of the Total Quality Council, should be aware that 'what you cannot measure, you cannot manage'. Through measurement, all processes become manageable in a concise, systematic and comprehensive manner.

It is hoped that the above measurement framework will serve as a guide for the department to continuously monitor progress at all stages. The results of the measurement exercise should be reported to the key players, that is, the employees working in the department so that they could see that the proposed model actually delivers results. The Department Manager together with the QFD team should make certain that every single member of the staff in the department understands 'best practice' as depicted in Figure 7.9 when adopting the proposed model for continuous quality improvement.

Figure 7.9: Every Employee Should Understand the 'Best Practice'



Source: Underwood, B. (1991), Lecture Notes - MBA, University of Wolverhampton

Checking

The CEO and the Contracts Manager should lead the checking activities. The main activities are to critically assess the adoption of the proposed model for all total projects. A further survey of the external customers should also be undertaken to identify from the patients' perspectives, those areas of service provision which they feel should be a focus for future improvement.

On the basis of the data collected, the CEO together with the Contracts Manager, Department Manager, the QFD team, facilitators, and members from the Total Quality Council, should redesign and if need be streamline the identified problems areas to re-align them into previously set objectives. The re-designed process should be grounded in fact as revealed by the surveys and not on managerial 'gut feel'. Measurable standards against which to measure data with the intention of fulfilling patient needs and expectations should be set. Thus, after clarifying customer expectations, professional standards based upon customer expectations should be the key to the provision of effective and appropriate quality service.

Acting

The Acting activities entail a systematic evolution of the effectiveness of the proposed total quality model in helping a hospital to redesign, improve and streamline its work processes or service elements in meeting set standards, thus having an impact on business performance. If performance is encouraging, the hospital should adopt and integrate the redesigned and streamlined processes to other quality improvement initiatives within the hospital. This would ensure the delivery of quality care to every patient, thereby constituting the first full cycle of the 12-steps 'implementation' phase framework.

The adoption of the proposed model provides a meticulous revisiting via auditing of new processes to eradicate any remaining inhibitors in the system, thus ensuring continuous quality improvement. It is expected that total quality care should arrive hospital-wide within a period of 18 - 24 months, provided that the 12-steps 'implementation' process are revisited several times to continuously improve performance against set targets which reflect changing customer needs and regulatory requirements. In the next section, the author discusses the activities involved in the integration phase.

7.3.4 Integration Phase

This is the phase where the proposed model becomes the way work gets done within the hospital. Total quality is also woven into the fabric of the hospital. This phase involves:

- * increase in pilot schemes
- * retraining for top managers, facilitators and the QFD teams
- * further training for all staff
- * the integration of total quality initiatives into the hospital's business plan

The QFD team in association with the facilitators should address these elements. The hospital should not rest on its laurels at this stage. It should continually improve all work processes or service elements and move toward exceeding patients' expectations. However, at this stage there is always a tendency for the hospital to feel that they are already a quality hospital; an attitude which leads to the abandonment of the proposed model. This should never be the case because patients needs and expectations are not static, but continually changing, that is what excites patients now, would be changed to expected needs. Also, what satisfies one patient may be an anathema to another. Hence, the hospital's effort and energy should be channelled towards continually improving the services provided, in pursuit of a dynamic quality of care which meets the changing needs of patients.

Furthermore, continuous departmental training for all staff will show that management has maintained its commitment to quality. At this stage, training should be more exciting because the staff must all have had first hand experience in adopting the proposed model and should be in a better position to share their knowledge and critic of the proposed model. This will afford the hospital a further insight into a new cycle of quality initiatives as it moves forward with the implementation process, particularly, the integration of the proposed model into the hospital's business plan. Furthermore, with training, people in the organisation would be empowered and decisions can be made by the front-line.

Additionally, it is fundamental that top management creates the proper environment, stays involved and exhibits its responsibility through managing the implementation process of the proposed model.

A cultural shift must occur if the hospital is to enjoy the benefits of the proposed model. But that shift will not happen without management's perpetual, enthusiastic and demonstrated commitment to the proposed model. Getting people involved without management's commitment and leadership is a recipe for disaster. But this, can only be achieved by the top, hence, the CEO and the Board of Directors must be overtly committed to quality improvement using the proposed model.

During this phase, the proposed model is adopted in every quality improvement initiative of the hospital, thus becoming the way of doing business. Nevertheless, it has been noted that failure to institute a full blown cultural change most frequently arises from top management being sometimes uncomfortable with the pursuit of quality. Hence, top management, in particular, the CEO should create the demand for quality within the hospital by insisting that autocratic styles of managing are abandoned. Delegation through the empowerment of staff should become the new way of managing. Top management must stick to the requirements made upon it if the benefits of a new quality culture are to be realised.

In conclusion, the implementation framework for the proposed total quality model represents a fluid, context specific approach which this research project has indicated is required by Singapore hospitals for continuous quality improvement. The flexibility lies in its ability to be implemented across functional areas. Although the logistics are prescribed, the implementation process can be adapted to fit any specific organisational characteristics. Nonetheless, it is important that should this approach be operationalised, this has to be correctly done. A piecemeal application would result in partial implementation. Thus, a thorough understanding of the various elements or activities within the implementation framework is required of the Quality Manager prior to implementation.

7.4 Comparison between the Total Quality Healthcare Model Implementation Framework and the Orthodox TQM Implementation Models

In order to establish the reliability of the implementation framework for the total quality healthcare model, it is necessary to compare it to the orthodox TQM implementation models. The aim of this comparison is to show that the implementation framework for the total quality model being suggested by the author represents the most complete and comprehensive framework for the implementation of TQM in Singapore hospitals. This implementation framework is grounded in empirical data and thereby represents a problem-specific implementation framework.

A number of key differences can be identified from the comparison. These are:

i. **The mode of implementation**

The total quality healthcare model implementation framework is specific and clear cut about its advocacy of a QFD-led strategy for total quality, whilst the orthodox TQM implementation models leave the interpretative steps of implementation to the practising manager. This means that the traditional TQM implementation models lack a concise formulation of the present elements or activities to be undertaken by an organisation en-route to total quality.

ii. **Concepts of change**

The total quality healthcare model implementation framework emphasises a people-focused approach to implementation, whilst the orthodox TQM implementation models have no organised approach due to lack of conceptual understanding of total quality in healthcare.

iii. **Leadership for change**

The total quality healthcare model implementation framework indicates that the Board of Directors and the CEO should lead the way for using the proposed model for TQM. Quality initiatives would falter if the Board of Directors and the CEO is not committed to the process. Through its actions and only through its actions can any hospital move forward to achieve and sustain TQM efforts. Consistent with Deming's view (Deming,

1986), the total quality healthcare model implementation framework emphasises organisational and departmental reviews rather than a review of the individual. This will enable employees to work better in teams and without holding vital information that would enable improvements in the provision of quality care. On the other hand, the orthodox TQM implementation models does not reflect actions and support of management.

In the final analysis, the author is of the opinion that the orthodox model is inappropriate in dealing with the complexity of Singapore hospitals as it fails to address the complex, functional requirements of a hospital, which necessitates integrating the various functional structures such as the roles and responsibility of:

- * The Board of Directors
- * Service Managers
- * Senior Ward Sisters
- * The Clinicians

The author is of the opinion that, for any implementation framework to work in Singapore hospitals, the responsibility and the roles of these key functionaries must be determined and integrated within the framework to create a managerial focus for the implementation of the total quality model. The orthodox model fails to make this important provision. Hence, it lacks the comprehensiveness of a specific implementation framework for Singapore hospitals, whilst the total quality model implementation framework has specifically delineated the functions and responsibility of each of the key players to avoid conflicts of interest. Furthermore, orthodox TQM models represent piecemeal approaches to total quality.

7.5 Advantages of the Total Quality Healthcare Model Implementation Framework

If the implementation framework proposed for the total quality model is applied within the context of Singapore hospitals, the author contends that it is capable of:

- * Dealing with the confusion that exists in Singapore hospitals on how to understand the expectations of customers.
- * Drawing managerial attention to the existence of service gaps in the hospital.
- * Facilitating communication, horizontally, vertically and cross-functionally, and improving co-ordination by stressing the importance of processes and laying the foundation for a team driven approach to problem solving and process improvement.
- * Enabling the planning of crucial work processes to satisfy and delight the customers.
- * Providing a clear sense of corporate direction and a climate supportive of continuous quality improvement.
- * Ensuring constant measurement and monitoring of the total quality initiatives in order to know whether the hospital is moving in the right direction.

The implementation framework suggests that, managers should concisely and properly administer the principles of TQM and QFD. This will ensure the achievement of a quality focused culture across all strata of organisational activities.

In conclusion, the way the proposed model is implemented using infrastructure and measurement management has important implications for decision makers in Singapore hospitals. Hospitals who have adopted the implementation framework for the proposed model for continuous quality improvement as a means to an end rather than an end in itself will have more success. However, it is essential to have operative leadership in a hospital. Another important factor is the need for dedicated leaders who believe that the proposed model together with the implementation framework is the best way to support the development of service design. Finally, another important factor is how to choose project leaders when initiating TQM in hospitals.

8

CONCLUSION & RECOMMENDATIONS

This chapter presents a summary of the research findings and the managerial implications involved. The chapter further wraps up the study by restating the key benefits of using the QFD tool in the development of a total quality healthcare model. Very often, it is the patients' perceptions of what makes a good hospital that matter in hospital services but understanding the expectations of patients is not an easy task. Furthermore, understanding how these patients expectations are being met by existing management quality practices present an even more difficult problem. In view of these considerations, a total quality healthcare model is developed and a 5-phase implementation framework for the proposed model is offered to guide hospital management in its TQM endeavour. The limitations of this research project and suggestions for future research will also be discussed at the end of the chapter.

8.1 Research Overview

Herein is an analysis to establish the key benefits of using the QFD tool in the development of a total quality healthcare model. These are:

- i. QFD is a relatively simple and inexpensive means of measuring performance and translating customer needs to critical work processes. Due to intense competition and changes in healthcare demand, satisfying and exceeding customer needs are very important. Thus the information obtained from QFD would be invaluable for hospitals.
- ii. QFD allows management to better tailor its efforts to ensure that customer needs are met. This includes identifying, prioritising, and improving weaknesses in particular

service areas in order to ensure that valuable resources are allocated to the most worthwhile areas for improvement.

- iii. QFD helps hospitals to benchmark themselves against their competitors. Benchmarking is useful in realising an organisation's strengths and weaknesses. To more effectively position itself in the marketplace, a hospital may emphasise certain service strengths, or downplay other aspects in which competitors perform more competently.

Furthermore, the wide applicability and the superiority of the QFD tool over the SERVQUAL instrument and the Balanced Scorecard make QFD the right tool to be used in the development of the total quality healthcare model.

As discussed earlier, this research project was embarked upon for three main reasons:

- i. why QA and management quality practices in Singapore hospitals fail to meet the expectations of customers
- ii. the limited number of research on quality management in healthcare in Singapore
- iii. the applicability of QFD as a communication and planning tool for TQM implementation in Singapore hospitals

The research methodology chosen, which represents the use of both qualitative and quantitative data, enables a wider and more in-depth analysis of the expectations and perceptions of patients and doctors/staff of hospital services and the management quality practices in Singapore hospitals. Earlier studies, for example, Yap (1991) concentrated on the operational definition of healthcare quality based on the Systems View (where quality is not so much an attribute of the actual healthcare provided but of the process of healthcare delivery and self-scrutiny). Furthermore, Yap's study merely provided an overview of the professional aspect of QA program adopted by Singapore hospitals without any empirical studies conducted. Thus, the methodological instruments used in this research project facilitated a wide coverage of Singapore hospitals and this enabled a more systematic, reliable and valid account of:

- i. the quality expectations of patients and doctors/staff of Singapore hospitals
- ii. the management quality practices of Singapore hospitals

- iii. where Singapore hospitals stand in relation to quality
- iv. the critical key success factors for the implementation of the total quality healthcare model

Based on the rigorous assessment of the above essential elements for total quality healthcare, the author advocates the use of the QFD tool to help Singapore hospitals understand the changing needs of the customers, in service planning, in performance measurement, in strategy formulation, in process improvement, in education and training, and in communication.

Additionally, the methodological instrument in contrast to popular belief shows that case study research is capable of statistical analysis. By using the statistical package for social scientists (SPSS) for the analysis of data, this research project offers the first reported empirical evidence into the state of development of management quality practices in Singapore hospitals and the determination of quality expectations of patients and doctors/staff in the Singapore context.

One reported criticism of case study research is that the data collected does not give room for generalisation (Gummesson, 1991). However, this study does not have this problem because the use of four different but interrelated questionnaires and the three main case studies enable generalisation across hospital settings. Furthermore, the use of Yin's explanation building technique also enabled a cross-analysis of the three case studies (Yin, 1989). This unique methodological approach makes certain that this research project establishes reliable answers to the 'Why and 'How' questions posed by the research.

8.2 Research Findings

In reviewing the literature, this research project found a number of differing definitions of quality:

- Product based - quality is defined as precise and measurable
- User based - quality is defined as fitness for intended use
- Value based - quality is defined in terms of costs and price

However, the definitions put forward by Crosby and Juran were found to be widely accepted, that is 'quality is fitness for use' (Juran, 1988) and 'quality is meeting requirements' (Crosby, 1979). But in Singapore hospitals, these two definitions have no remarkable significance. There is in existence differing interpretations of the meaning of quality from one hospital to the other, from one employee to another. In one hospital, the author has identified four different definitions of quality:

- i. To the medical staff - 'quality is about "curing", effectiveness of medical care, thoroughness and clinical outcomes'.
- ii. To the receptionists - 'quality is about how we attend to patients queries'.
- iii. To the Chief Executive - 'quality is low cost'.
- iii. To the Quality Manager - 'quality is about meeting every patient's needs if possible. We can only try to provide the patient with what is medically advisable'. This means what the patient actually needs.

Thus, there exists a lack of a common definition of quality in Singapore hospitals. This finding is congruent to the study by Kogan, Henkel and Spink (1991) who noted that the lack of a common definition of quality is due to the diverse professional groupings. The lack of a common definition of quality, the author notes, is one of the contributory barriers to meeting customers' expectations in Singapore hospitals. Against this background, it is essential to delineate the quality expectations of customers because a lack of it would cause quality initiatives to lose a central focus on which to align all organisational members. Hence, the need to do an empirical study on patients and doctors/staff expectations of hospital service quality. From the empirical studies, the top five quality expectations specific to patients of Singapore hospitals are:

- * Explain thoroughly medical condition to patients
- * Doctors/staff should be professional and competent
- * Patients should be treated with dignity and respect
- * Responsive doctors/staff

- * Doctors should possess a wide spectrum of knowledge

The top five quality expectations specific to doctors/staff of Singapore hospitals are:

- * Doctors/staff should be professional and competent
- * Doctors should possess a wide spectrum of knowledge
- * Attitude of doctors/staff should instil confidence in patients
- * Explain thoroughly medical condition to patients
- * Doctors/staff should have patient's best interest at heart

The findings from both the empirical studies have revealed that the Assurance dimension is the most important dimension. Responsiveness is the second most important dimension followed closely by Reliability. From these empirical studies, hospitals are alerted to the service attributes that patients feel are important in a good hospital. With the difference in expectations between patients and doctors/staff on the statements, 'patients should be treated with dignity and respect' and 'waiting time of not more than 1 hour', from the two most important dimensions, Assurance and Responsiveness, it is therefore recommended that hospitals incorporate the view points of patients, as service users, into their TQM process.

Furthermore, with regards to TQM implementation, the literature is inundated with prescriptions in the form of step-by-step approaches or TQM as a culture change. These prescriptions, in particular the "Gurus" philosophy, are not problem specific and have not been derived from empirical evidence. They fall short of the holism required of TQM. Their apparent limitations can be summarised as:

- * the lack of attention directed to the 'people issues' within organisation
- * the absence of a realistic approach to organisational politics, in particular, the politics of organisational change
- * the failure to address the issue of organisational culture

- * weak on 'how' to operationalise, sustain and follow through their ideas in an organisational context
- * failure to furnish the specific/essential details of an action plan
- * failure to contextualise their ideas within a comprehensive framework
- * failure to deliver a 'statement which both underpins and elaborates the philosophy of TQM

The author is of the opinion that these obvious limitations have led to 'Cafeteria Management' in TQM implementation in Singapore hospitals. Hospital management (CEOs, Quality Managers, etc.) charged with the responsibility for the maintenance and enhancement of quality healthcare provision in Singapore hospitals, have opted for 'individualised' models based upon their personal experience. Whilst 'individualised' approaches have the merit of affording recognition to the essential management quality practices of any one hospital, they have failed to guarantee that the activities/processes adopted by the hospital would meet patients expectations and continuity of implementation which are essential requirements for the sustainability of any TQM process. The empirical findings on patients' perceptions on Singapore hospital service quality have indicated that generally the service quality in Singapore hospitals is below patients' expectations. Only two group of patients who have rated the service quality good and very good has a SERVQUAL score more favourable than the average weighted SERVQUAL score. The other three groups representing 40% of the total number of patients have reported that service quality is below expectation. On the basis of this finding, the empirical study suggests that there exist service delivery gaps in the services provided by Singapore hospitals. This is congruent with Zeithaml, Parasuraman and Berry's (1990) view, that "the presence of gaps in any organisation suggests that the organisation is not providing a quality service". The largest five service quality gaps are:

- i. Waiting time of not more than 1 hour (1.23) - Responsive dimension
- ii. Explain thoroughly medical condition to patients (0.96) - Assurance dimension
- iii. Patients should be treated with dignity and respect (0.95) - Assurance dimension

- iv. Affordable charges for services rendered (0.94) - Accessibility and Affordability dimension
- v. Doctors/staff should have patient's best interest at heart (0.90) - Empathy dimension and Services should be provided at appointed time (0.90) - Reliability dimension

The overall quality ratings are:

- * 11.9% rated the service quality very good
- * 48.4% rated the service quality good
- * 31.0% rated the service quality fair
- * 7.1% rated the service quality poor
- * 1.6% rated the service quality very poor

In view of the above findings, the author used a survey questionnaire to determine the management quality practices in Singapore hospitals. The survey seeks to find out whether top management of Singapore hospitals understand what is required to develop a TQM culture and the management quality practices of Singapore hospitals. The exploratory analysis indicates that top management of Singapore hospitals has a high level of understanding of what is required to develop a TQM culture. Majority of the respondents has indicated that TQM programmes should include the following activities and processes:

- * establish a mission statement in their strategic plan.
- * involve physicians in managerial decision-making
- * form healthcare networks with other providers
- * use internal and external resources to train doctors and staff for service improvements and change management
- * conduct patients' surveys to understand the expectations and perceptions of patients. Integrating the findings from the survey into the service design and delivery would promote better quality care and continuous improvements as patients wants, needs and expectations are being met
- * adopt benchmarking for quality improvements and total customer satisfaction

- * develop recognition/reward scheme to encourage innovative ideas from staff through quality circles for improved productivity and increased customer satisfaction
- * adopt effective Management Information Systems (MIS) and new technologies to achieve and sustain competitive advantage

Based on the findings of this empirical study, the author interviewed the CEOs/Quality Managers of three hospitals to identify the specific service elements and management quality activities/processes adopted. For example, the statement on 'quality management is a strategic mission shared by every member of our organisation including healthcare professionals', the specific activities adopted by one of the hospitals are:

- a. Service quality programmes for all staff
- b. Quality orientation for all new staff
- c. Patients' feedback surveys and forums for identifying service gaps

From the findings of these two empirical studies, the author is of the opinion that 'orthodox TQM implementation models' in the quality literature is inadequate to deal with the unique organisational complexities inherent in hospitals. What is required is a model for TQM, which would recognise that hospitals are not mere apparati but instead, a conceptualisation of human interactions working towards the achievement of overtly stated purpose. Motivated by the practical and theoretical implication of this issue, the author in this research project uses an exceptional TQM tool, QFD to develop a total quality healthcare model to help hospital management understand customers' expectations, in service planning, and in organisational assessment (where the hospital stands in relation to quality). In the final analysis, it is in the pursuit of making the TQM principles manifest, in making it operational, that hospital management need help and guidance. Whilst most writers in the quality field advocate the need for an organisational infrastructure to support and sustain TQM, they have failed to provide such a framework. To date, there have been only a few piecemeal and non-empirical attempts made to offer an effective implementation model for TQM that could serve as a reference point for managerial efforts in hospitals. Against this background, it is essential for this research project to offer a context, specific implementation framework for the proposed total quality model to guide hospital management in its TQM endeavour. The critical success factors

specific to the implementation of the proposed total quality healthcare model are explored. Eighteen critical success factors are empirically discerned as being of specific relevance for the total quality healthcare model. These are:

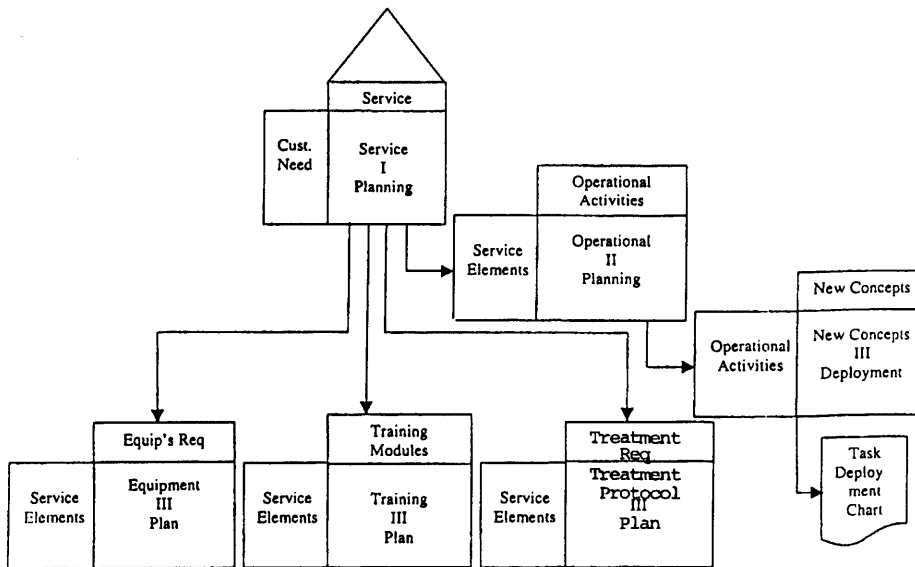
- * the need to institute an organisational structure
- * the need to institute teamwork and a multi-disciplinary team approach
- * the need to appoint a QFD champion
- * demonstrate leadership, commitment and vision from top management and Board of Directors
- * education and training
- * a need for a holistic approach
- * communication quality across functional areas
- * the need to adopt a customer-focused philosophy
- * the need to involve professional staff on a continual basis
- * the need to always prioritise expectations of customers and work processes
- * involvement and empowerment of employees
- * management should create joy in work by instituting honesty
- * managers must 'walk-the-talk'
- * the need to redesign and streamline critical work processes
- * institute robust systems for monitoring and measurement
- * institute reward system
- * review continually the quality process
- * integrate into strategic business plan

The awareness of the critical success factors underpinning the total quality healthcare model would enable hospital management to benchmark against the specific requirements of their individualised approaches to ensure that the essential factors for success are adequately represented. However, caution must be exercised to avoid unsuccessful implementation of the proposed total quality model for TQM endeavour. In order to guard against this, this research project also offers a context, specific 5-phase implementation framework: Awareness, Knowledge, Breakthrough, Implementation and Integration which provides the 'foundation' stone upon which the implementation of the total quality healthcare model could best be

implemented in Singapore hospitals. However, it must be noted that although the specific logistics of the implementation framework are given, it is not written in tablets of stone. The implementation framework can be adapted to fit any specific organisational characteristics.

Hence, the analysis herein fits the title of the study: 'an analysis of the feasibility of QFD in the development of a total quality healthcare model', albeit with modifications to suit the healthcare environment. The usefulness of the proposed total quality healthcare model (Figure 8.1) as a communication and planning tool is validated by 30 focus group members and 2 top level executives of Singapore hospitals. An organisation-wide adoption of the proposed total quality model together with the government implementation of the guidelines proposed in Chapter 2, in the author's opinion, would enable Singapore healthcare organisations to deliver total quality healthcare.

Figure 8.1: The Total Quality Healthcare Model



Source: Developed by the Author

8.3 Contributions of the Research Project

The contributions of this research project are as follows:

- a. *Provides an understanding of the new trends and developments facing Singapore's healthcare/hospital industry.*

Consumers' attitudes toward medical services have changed due to rising standards of living and educational levels. Major medical breakthroughs in the last five years have led to the proliferation of new methods in surgery and diagnostics. In the long run, technological advancement will result in fewer inpatient days and lower the demand for hospital beds. There would be a shift in healthcare dollars from inpatient to outpatient treatment, public to private practice and curative to preventive medicine. Along with the health consciousness of people, there may be reduced need for inpatient services in the long run. It is hoped that this research project would let hospital practitioners understand how the trend could affect them and how they could use it to their advantage. In other words, hospitals need to identify their opportunities and threats, the two external components of the venerable SWOT analysis framework in their strategic planning process.

- b. *Provides guidelines for a nation-wide, government-led encouragement on the provision of total quality healthcare.*

Singapore's hospital industry is experiencing significant changes due to escalating healthcare costs, rising patients' expectations and increasing technological complexity. These changes initiate a change of strategy by all hospitals together with changes in government-led policies. Eight guidelines are proposed for a nation-wide encouragement of total quality initiatives. Pragmatically it is difficult to assess the effectiveness of these guidelines in improving the quality of Singapore hospitals. Some of these guidelines would definitely provide solutions to some of the prevailing problems encountered by Singapore hospitals, for example, manpower development, resource centre on best practices, funding of research and teaching, and industrial and academic collaborations. Thus, these guidelines have much to contribute to total quality healthcare in Singapore. However, its success now depends on how well its implementation creates a total quality healthcare environment.

- c. *Creates an awareness of the importance of understanding what is Quality in healthcare.*

As discussed, there is a lack of a common definition of quality in Singapore hospitals due to the diverse professional groupings and the inherent characteristics of healthcare services. The traditional "fee for service" is rapidly being replaced by a system known as "capitation". Furthermore, customers are demanding better quality services and doctors have to provide and be seen to provide the best possible level of medical care at the lowest possible cost and to uphold the long tradition of moral integrity, technical excellence and consistent professionalism of the healers' craft. Therefore, this research project hopes to contribute knowledge to practitioners that having a common definition of quality by all employees is a good starting point because it provides the hospital with the ultimate 'focus' for TQM. Also, an understanding of the quality expectations of customers is the key to understand why management quality practices have failed to meet customer expectations in Singapore hospitals.

- d. *Provides an understanding of current management quality practices in Singapore hospitals.*

It is hoped that this research project would add on to the existing knowledge of management quality practices in Singapore hospitals and serve as a basis for future research. Additionally, this research project hopes to help the regulators in this area to understand the state of development of management quality practices better.

- e. *Provides guidelines to hospitals or other healthcare organisations that have not implemented TQM practices.*

This research project hopes to help hospitals or healthcare organisations that have not implemented TQM programs. The use of the proposed total quality model would help these hospitals or healthcare organisations understand the expectations of customers, and where the hospital stands in relation to quality. The proposed implementation framework would provide the infrastructure and measurement management required. This would help hospitals or healthcare organisations to avoid potential problems and to

prevent their TQM initiatives from fizzling out. Additionally, this would greatly speed up their learning processes and improve their competitive positions.

f. Demonstrates the applicability of the QFD tool in healthcare.

This research project has analysed why the QFD tool is used in the development of a total quality healthcare model. Although other TQM tools like benchmarking, flowcharting, etc could help hospitals identify and evaluate the existing management quality activities/processes adopted by hospitals, they do not provide the most important information - customers' expectations and perceptions, and this is an important aspect of total quality healthcare. QFD which is part of TQM is a cross-functional tool which enables hospitals to prioritise customer demands, develops innovative responses to those needs, which is reliable and cost effective, and orchestrates a successful implementation involving all departments makes this tool a strong fit of process to need. QFD's provision for documenting the information in a comprehensive form, the matrix, results in a much more reliable definition of who our 'Customers' are and allows 'Customers' to prioritise their needs. Considering these QFD descriptions, it can be concluded that QFD is the right tool to implement the principles of TQM and should be used in the development of a total quality healthcare model. Furthermore, the three case studies have demonstrated that QFD is equally applicable to the service industries as it is to the manufacturing industries, even in labour intensive establishment such as hospitals. QFD is a relatively inexpensive means of identifying customer needs, translating customers' needs to service elements and management quality activities/process and in measuring performances.

In Table 8.1, the author made a comparison of the ranking derived from the empirical study on patients' expectations (refer Chapter 3, Table 3.1) with the rankings obtained from the QFD Case Study 2 on Raffles Hospital (see Chapter 6, Figure 6.4). The left half of Table 8.1 is service attributes taken from the survey questionnaire. On the right hand side is a reproduction of Case Study 2 rankings of service attributes.

Eyeballing the table, it can see that the importance rankings from the QFD case study do not coincide with that obtained from the patient survey. This confirms the author's view that it is difficult to understand the voice of the customers. Many a time, customers do not know exactly what they want. Although many attributes or quality dimensions may be positive to customers, QFD is an excellent tool to find those quality attributes that are of most value and determine their preference patterns to obtain customer satisfaction and delight in an economic way.

Table 8.1: Patient Survey Rankings and QFD Rankings

Patient Survey Ranking	Expectation Statements	QFD Ranking
V	<i>Tangibility</i>	IV
16	Up-to-date and well-maintained facilities and equipment	11
16	Clean and comfortable environment with good directional signs	3
19	Doctors/staff should be neat and professional in appearance	20
25	Informative brochures about services	4
5	Privacy during treatment	22
III	<i>Reliability</i>	V
11	Services should be provided at appointed time	1
6	Services should be carried out right the first time	21
4	Doctors/Staff should be professional and competent	23
11	Error free and fast retrieval of documentation	15
23	Consistency of charges	18
II	<i>Responsiveness</i>	III
11	Patients should be given prompt services	10
9	Responsive doctors/staff	6
3	Attitude of doctors/staff should instil confidence in patients	9
11	Waiting time of not more than 1 hour	16
I	<i>Assurance</i>	I
11	Friendly and courteous doctors/staff	13
1	Doctors should possess a wide spectrum of knowledge	14
7	Patients should be treated with dignity and respect	1
2	Explain thoroughly medical condition to patients	8
IV	<i>Empathy</i>	II
16	Obtain feedback from patients	17
22	24-hour service availability	12
7	Doctors/staff should have patient's best interest at heart	7
9	Doctors/staff should understand the specific needs of patients	5
VI	<i>Accessibility and Affordability</i>	VI
24	There should be adequate parking facilities	24
20	The location should be easily accessible	19
21	Affordable charges for services rendered	25

Source: Developed by the Author

- g. *Provides a context, specific implementation framework for the total quality healthcare model for TQM in Singapore hospitals.*

An empirical study amongst the 30 focus group members identifies the 18 critical success factors for the implementation of the total quality healthcare model. These 18 critical success factors must be integrated into the implementation framework. This is the first implementation framework that provides not only infrastructure and a measurement management but also a step by step methodology to improve efficiency, quality and cost effectiveness throughout their organisations. Hence, the total quality model together with its implementation framework provides guidelines for hospitals deciding, preparing, starting and expanding the phases of their Total Quality Journey. It is important to recognise that every hospital or healthcare organisation or every environment is different. Thus, the framework must be adapted to a hospital's need, according to the services provided, culture, experience, customers' requirements and knowledge base.

8.4 Limitations and Recommendations for Future Research

The population size of Singapore hospitals is too small to show any conclusive evidence of their thoughts and practices. Also, the number and types of hospitals are diverse and there are a wide variety of departments in each hospital. Hence, the survey questionnaire on patients' expectations of a general nature, may not be able to capture all the data needed for specialists' hospitals. Therefore, the data may not be fully representative of the local healthcare industry. The empirical study concerns only with the expectations and perceptions of patients who receive medical treatment in Singapore hospitals and doctors/staff of hospitals. Future research may consider other types of customers, such as observers (that is, family members and friends of patients), the third party payers etc. By considering all types of customers, hospitals would be able to integrate and prioritise their customer needs to enhance service quality. Furthermore, it would be preferable to obtain financial figures for each hospital, such as those, relating to cost of program, profit or loss data etc. In this way, the research project would be more complete. If there are financial figures such as those mentioned above, the author would be able to show the

financial impact of implementing the proposed total quality model for TQM in Singapore hospitals.

The provision of a context specific implementation framework for the proposed total quality healthcare model in this research project is consistent with Black's doctoral thesis that a scientifically derived model for the implementation is required (Black, 1993). However, any implementation framework that lays claim to providing a pathway for TQM should be tested under operating conditions. Although the feasibility of using the QFD tool in the development of a total quality healthcare model has been validated by 2 top level executives as relevant and reliable for TQM, the implementation framework for the total quality model encompassing 5 interrelated phases: Awareness, Knowledge, Breakthrough, Implementation and Integration, has been proposed based on extensive literature reviews and through exploratory study on the critical success factors of TQM and QFD implementation. In this research project, the author has tested under operating conditions only Step 1 to Step 7 of the 'implementation' phase, that is, beginning with the identification of customer needs to determining areas needed for improvement, hence, future research is required to test Step 8 to Step 12. This would provide information on how the hospital's operations has improved after acting on patients' responses and the effectiveness of the proposed total quality model to take the hospital towards the future state, the state of continuous quality improvement, thus achieving total quality healthcare. This constitutes the limitation of this research.

In addition, even though the QFD tool is useful, it has limitations. The major drawbacks are the element of subjectivity and the need to deal with vast amount of data. Several tools are available to resolve these problems, for example, Fuzzy Logic, Artificial Neural Network, QFD software tools, etc. Future research can focus on how these tools can be combined to reduce the element of subjectivity and to produce an intelligent systems approach to QFD.

Furthermore, future research can also be developed by applying the same total quality model to other kinds of health services, such as medical clinics, clinical laboratories and also the government health service ministry. Lastly, it would also be helpful to conduct the same study in hospitals of other countries. Such studies would enable inter-country comparison to be made.

APPENDIX A

THE RESEARCH QUESTIONS FOR THE INTERVIEWS

1. How did TQM start in the hospital? Whose idea was it? Why TQM?
2. In order to implement TQM program successfully, an effective management team must be in place. Does your management team recognise the importance of the following:
 - a. *Human Resource Development and Management*
 - b. *Goals and Aims*
 - c. *Leadership*
3. In TQM, one of the key team players is the physicians. Are physicians involved in your hospital's TQM program? Are there any physicians in the TotalQuality Council? Are concerns and suggestions from physicians taken into consideration?
4. During the course of implementing TQM, continuous training is needed to ensure smooth implementation. Is training continuously developed in the hospital? What arrangements are needed to ensure continuous training of staff?
5. Do you consider the following service elements important in determining hospital service quality?
 - * *Physical Facilities*
 - * *Information Facilities*
 - * *Service Delivery*
 - * *Staffing*
6. In relation to the above service elements, how do you rate the activities taken by your hospital in meeting the needs of your patients? For example, weak, moderate or strong.
7. In the section, 'quality management' in the postal questionnaire survey, what are the specific activities adopted by your hospital?
8. In relation to your hospital management system, how do you rate the activities in meeting the needs of your patients? For example, weak, moderate or strong.
9. What problems were encountered at:
 - i. the start
 - ii. during implementation
10. What problems do you anticipate in the future?

STRICTLY CONFIDENTIAL

PROJECT QUESTIONNAIRE

Name of Hospital/Clinic: _____

Address of Hospital/Clinic: _____

Name of respondent: _____

Designation of respondent: _____

Respondent contact number: _____

Please return completed questionnaire by 15 November 1996 to:

Attn: Ms Jaslyn Chan
Thames Centre For Open Learning
(A member of Informatics Group)
1 Selegie Road #05-06 Paradiz Centre
Singapore 188306

OR

Ms Lim Puay Cheng
Fax : 4840348

In case of doubts or questions concerning the questionnaire, please do not hesitate to contact:

Ms Lim Puay Cheng
5357100

Healthcare Organisation Information

Please circle one choice that relates BEST on your organisation.

1. Classification

- a. General practice - group of doctors
- b. General practice - solo
- c. Specialist practice - group of doctors
- d. Specialist practice - solo
- e. Hospital with beds

2. Organisation Management (What is the background of your organisation's CEO or equivalent?)

- a. Doctor(s)
- b. Non-medical practitioner(s)
- c. Mixed

Please circle one choice that relates BEST on your organisation's Strategic Planning.

Section A - Strategic Planning

A1. We do have a mission statement as an inherent part of our strategic plan.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

A2. Our mission statement is used as a guide for gaining commitment in:

i) Patient care

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

ii) Research

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

iii) Training

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

A3. Physician involvement has been and will continue to play an important role in our strategic planning process.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

A4. We have merged with other providers to form integrated health care networks to bring health care services closer to patients.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

A5. We have developed a "managed care" programme or have signed agreements to participate in "managed care" programme to contain the rising health care costs.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

A6. Our strength is our comprehensiveness and our ability to provide "one-stop shopping" for the diagnosis and treatment of virtually any medical problem.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

Please circle one choice that relates BEST on your organisation's Quality Management.

Section B - Quality Management

B1. Quality management is a strategic mission shared by every member of our organisation including health care professionals.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

B2. We conduct consumer satisfaction survey to understand the needs and expectations of our customers to achieve continuous quality improvements.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

B3. Our quality management environment is dedicated to continuous improvement in all business and clinical functions, employs team for problem solving and continuously strive to meet and exceed customers needs.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

B4. We have adopted benchmarking as a strategic application for quality improvement and total customer satisfaction.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

B5. We are an ISO 9000 certified organisation. We now have the formality, the discipline and the procedures to ensure that all essential quality assurance systems are implemented.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

OR ISO 9000 certification is now an inherent part of our quality management process.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

OR Although we are not an ISO 9000 certified organisation, we have the procedures to ensure that all essential quality assurance systems are implemented.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

Please circle one choice that relates BEST on your organisation's Human Resource Management.

Section C - Human Resource Management

- C1. Our organisation has a climate of equal opportunity that nurtures and supports the fullest contributions of every member.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

- C2. Our organisation has placed great emphasis on doctors and staff training because whatever that is learnt can be transformed into tangible service improvements.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

- C3. Our organisation culture builds and maintains an environment for employee participation and involvement, teamwork and leadership.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

- C4. Recognition/reward schemes have been developed in our organisation to encourage innovative efforts.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

- C5. Management of change has been and is an important aspect of human resource management in our organisation.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

- C6. Our organisation uses external resources for training our doctors and staff.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

- C7. Our organisation considers human resource training/development to be part of our strategic or competitive planning process.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

Please circle one choice that relates BEST on your organisation's Information and Innovation Management.

Section D - Information and Innovation Management

- D1. The availability of timely information from our management information system has enabled us to improve our decision-making process, quality of patient care, productivity and reduction in costs.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

- D2. Our organisation has extended the role of computer from simply automating processes to that of enhancing quality.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

- D3. The use of new medical technologies in our organisation did not improve our process performance but has increased our costs.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

- D4. The use of information system/information technology and medical technologies in our organisation has enabled us to obtain competitive advantage.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

- D5. Our staff/quality circles have developed many innovative ideas. The implementation of these ideas resulted in improved productivity and increased customer satisfaction.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

APPENDIX C

Dear Patients

Please Help The Providers Of Medical Services To Serve You Better! I am doing a research on how to improve service quality and achieve excellence in healthcare delivery. Please assist me by circling the number most closely matching your expectation of healthcare service quality. Thank you for your time and effort. Please return completed questionnaire to the Receptionists.

Ms Lim Puay Cheng, PhD Student, University of Leicester, UK

SECTION I: PATIENT EXPECTATION QUESTIONNAIRE

<i>Expectation of Services</i>	<i>Least Important</i>					<i>Most Important</i>				
Tangibility (T):										
Up-to date and well-maintained medical facilities and equipment	1	2	3	4	5	1	2	3	4	5
Clean and comfortable environment with good directional signs	1	2	3	4	5	1	2	3	4	5
Doctors/staff should be professional and neat in appearance	1	2	3	4	5	1	2	3	4	5
Informative brochures about services	1	2	3	4	5	1	2	3	4	5
Privacy during treatment	1	2	3	4	5	1	2	3	4	5
Reliability (RL):										
Services should be provided at appointed time	1	2	3	4	5	1	2	3	4	5
Services should be carried out right the first time	1	2	3	4	5	1	2	3	4	5
Doctors/staff should be professional and competent	1	2	3	4	5	1	2	3	4	5
Error free and fast retrieval of documents	1	2	3	4	5	1	2	3	4	5
Consistency of charges	1	2	3	4	5	1	2	3	4	5
Responsiveness (RS):										
Patients should be given prompt services	1	2	3	4	5	1	2	3	4	5
Responsive doctors/staff	1	2	3	4	5	1	2	3	4	5
Attitude of doctors/staff should instil confidence in patients	1	2	3	4	5	1	2	3	4	5
Waiting time of not more than 1 hour	1	2	3	4	5	1	2	3	4	5
Desired waiting time: _____ minutes										
Assurance (AS):										
Friendly and courteous staff/doctors	1	2	3	4	5	1	2	3	4	5
Doctors should possess a wide spectrum of knowledge	1	2	3	4	5	1	2	3	4	5
Patients should be treated with dignity and respect	1	2	3	4	5	1	2	3	4	5
Explain thoroughly medical condition to patients	1	2	3	4	5	1	2	3	4	5
Empathy (E):										
Obtain feedback from patients	1	2	3	4	5	1	2	3	4	5
24-hour service availability	1	2	3	4	5	1	2	3	4	5
Doctors/staff should have patient's best interest at heart	1	2	3	4	5	1	2	3	4	5
Doctors/staff should understand the specific needs of patients	1	2	3	4	5	1	2	3	4	5
Accessibility & Affordability (AA):										
There should be adequate parking facilities	1	2	3	4	5	1	2	3	4	5
The location should be easily assessable	1	2	3	4	5	1	2	3	4	5
Affordable charges for services rendered	1	2	3	4	5	1	2	3	4	5

Other Expectations:

OVERALL IMPORTANCE: T [] RL [] RS [] AS [] E [] AA []

SECTION II: PATIENT PERCEPTION QUESTIONNAIRE

Please complete this Section if you have received medical treatment at a hospital in the *last 12 months*, otherwise please indicate N.A. across the page. Once again, thank you for your time and effort.

Name of Hospital: _____

Medical Services Received: Surgery/Childbirth/A&E/Others

Any changes in your expectation of service quality in the *last 12 months*? Yes / No

If yes, please specify:

Perception of Services

	<i>Very Poor</i>				<i>Very Good</i>
Tangibility:					
Up-to date and well-maintained medical facilities and equipment	1	2	3	4	5
Clean and comfortable environment with good directional signs	1	2	3	4	5
Doctors/staff are professional and neat in appearance	1	2	3	4	5
Informative brochures about services	1	2	3	4	5
Privacy during treatment	1	2	3	4	5
Reliability:					
Services provided at appointed time	1	2	3	4	5
Services carried out right the first time	1	2	3	4	5
Professionalism and competence displayed by doctors/staff	1	2	3	4	5
Error free and fast retrieval of documents	1	2	3	4	5
Consistency of charges	1	2	3	4	5
Responsiveness:					
Prompt services	1	2	3	4	5
Responsiveness displayed by doctors/staff	1	2	3	4	5
Doctors/staff attitude instilled confidence in patients	1	2	3	4	5
Waiting time of not more than 1 hour	1	2	3	4	5
Assurance:					
Friendly and courteous doctors/staff	1	2	3	4	5
Doctors possess a wide spectrum of knowledge	1	2	3	4	5
Patients treated with dignity and respect	1	2	3	4	5
Thoroughness of explanation of medical condition	1	2	3	4	5
Empathy:					
Obtaining feedback and keeping patients informed	1	2	3	4	5
24-hour service availability	1	2	3	4	5
Doctors/staff have patient's best interest at heart	1	2	3	4	5
Doctors/staff understand the specific needs of patients	1	2	3	4	5
Accessibility & Affordability					
Adequate parking facilities	1	2	3	4	5
Location of premises is easily assessable	1	2	3	4	5
Affordable charges for services rendered	1	2	3	4	5
OVERALL RATING:	1	2	3	4	5

APPENDIX D

Dear Doctors

I am doing a research on how to improve service quality and achieve excellence in healthcare delivery. Please assist me by circling the number most closely matching your expectation of healthcare service quality. Thank you for your time and effort.

Ms Lim Puay Cheng, PhD Student, University of Leicester, UK

SECTION I: EXPECTATION QUESTIONNAIRE

<i>Expectation of Services</i>					
	<i>Least</i>				<i>Most</i>
	<i>Important</i>				<i>Important</i>
Tangibility (T):					
Up-to date and well-maintained medical facilities and equipment	1	2	3	4	5
Clean and comfortable environment with good directional signs	1	2	3	4	5
Doctors/staff should be professional and neat in appearance	1	2	3	4	5
Informative brochures about services	1	2	3	4	5
Privacy during treatment	1	2	3	4	5
Reliability (RL):					
Services should be provided at appointed time	1	2	3	4	5
Services should be carried out right the first time	1	2	3	4	5
Doctors/staff should be professional and competent	1	2	3	4	5
Error free and fast retrieval of documents	1	2	3	4	5
Consistency of charges	1	2	3	4	5
Responsiveness (RS):					
Patients should be given prompt services	1	2	3	4	5
Responsive doctors/staff	1	2	3	4	5
Attitude of doctors/staff should instil confidence in patients	1	2	3	4	5
Waiting time of not more than 1 hour	1	2	3	4	5
Desired waiting time: _____ minutes					
Assurance (AS):					
Friendly and courteous staff/doctors	1	2	3	4	5
Doctors should possess a wide spectrum of knowledge	1	2	3	4	5
Patients should be treated with dignity and respect	1	2	3	4	5
Explain thoroughly medical condition to patients	1	2	3	4	5
Empathy (E):					
Obtain feedback from patients	1	2	3	4	5
24-hour service availability	1	2	3	4	5
Doctors/staff should have patient's best interest at heart	1	2	3	4	5
Doctors/staff should understand the specific needs of patients	1	2	3	4	5
Accessibility & Affordability (AA):					
There should be adequate parking facilities	1	2	3	4	5
The location should be easily assessable	1	2	3	4	5
Affordable charges for services rendered	1	2	3	4	5

Other Expectations:

OVERALL IMPORTANCE: T [] RL [] RS [] AS [] E [] AA []

SECTION II: PATIENT/DOCTOR PERCEPTION QUESTIONNAIRE

Please complete this Section if you have received medical treatment at a hospital in the *last 12 months*, otherwise please indicate N.A. across the page. Once again, thank you for your time and effort.

Name of Hospital: _____

Medical Services Received: Surgery/Childbirth/A&E/Others

Any changes in your expectation of service quality in the *last 12 months*? Yes / No

If yes, please specify:

Perception of Services

	<i>Very Poor</i>				<i>Very Good</i>
Tangibility:					
Up-to date and well-maintained medical facilities and equipment	1	2	3	4	5
Clean and comfortable environment with good directional signs	1	2	3	4	5
Doctors/staff are professional and neat in appearance	1	2	3	4	5
Informative brochures about services	1	2	3	4	5
Privacy during treatment	1	2	3	4	5
Reliability:					
Services provided at appointed time	1	2	3	4	5
Services carried out right the first time	1	2	3	4	5
Professionalism and competence displayed by doctors/staff	1	2	3	4	5
Error free and fast retrieval of documents	1	2	3	4	5
Consistency of charges	1	2	3	4	5
Responsiveness:					
Prompt services	1	2	3	4	5
Responsiveness displayed by doctors/staff	1	2	3	4	5
Doctors/staff attitude instilled confidence in patients	1	2	3	4	5
Waiting time of not more than 1 hour	1	2	3	4	5
Assurance:					
Friendly and courteous doctors/staff	1	2	3	4	5
Doctors possess a wide spectrum of knowledge	1	2	3	4	5
Patients treated with dignity and respect	1	2	3	4	5
Thoroughness of explanation of medical condition	1	2	3	4	5
Empathy:					
Obtaining feedback and keeping patients informed	1	2	3	4	5
24-hour service availability	1	2	3	4	5
Doctors/staff have patient's best interest at heart	1	2	3	4	5
Doctors/staff understand the specific needs of patients	1	2	3	4	5
Accessibility & Affordability					
Adequate parking facilities	1	2	3	4	5
Location of premises is easily assessable	1	2	3	4	5
Affordable charges for services rendered	1	2	3	4	5
OVERALL RATING:	1	2	3	4	5

APPENDIX E

QUESTIONNAIRE 4: CRITICAL SUCCESS FACTORS FOR THE IMPLEMENTATION OF THE TOTAL QUALITY HEALTHCARE MODEL

Please tick YES or NO to the following statements and if possible, kindly add to the list any other additional factor(s) you consider 'critical' for the successful implementation of the total quality healthcare for TQM in the Singapore context.

	CRITICAL SUCCESS FACTORS	YES	NO
1	Necessary Management Behaviour: Clear leadership, commitment and vision is required of senior management.		
2	A Strategy for Quality Implementation: The specific quality objectives and requirements of the total quality healthcare model must be determined. Quality must be integrated in the organisation's business plan.		
3	Organising for Quality: Quality requires an organisation structure which demands and harness the full potential of the workforce.		
4	Communication for Quality: Communication provides the means of raising quality awareness and involvement and reinforcing the message		
5	Training and Education: Education and training should cover all employees as part of an ongoing process suited to each group's needs.		
6	Employee Involvement: Involvement in quality process is a key determinant of a successful programme.		
7	Process Management and Systems: Process management and systems are a key part of a successful programme.		
8	Quality Techniques: Quality techniques such as Statistical Process Control (SPC), quality costing and benchmarking are necessary to reduce variation.		
9	A Customer-Focused Philosophy.		
10	Teamwork and a Multi-Disciplinary Team Approach.		
11	Regularly Evaluate Performance		

OTHER COMMENTS:

.....

.....

APPENDIX F

Comparative Healthcare Systems of Selected Counties - Healthcare System

<i>Singapore</i>	<i>USA</i>	<i>UK</i>	<i>Australia</i>
<p><u>Primary Healthcare</u></p> <p>Provided by :-</p> <ul style="list-style-type: none"> * Govt. OPDs/Polyclinic which provide Community Health and Maternal & Child Health Services. Health Services for the Elderly available in designated Polyclinics. Responsible for 25% of Primary health services. * GPs and Specialists in private practice. Responsible for 75% of Primary health services. <p><u>Institutional Care</u></p> <p>Provided by :-</p> <ul style="list-style-type: none"> * Public Sector hospitals which also offer specialist OPD services. Provides 80% of care. * Private hospitals and nursing homes. Provide 20% of care. <p>Many specialists in private practice have admitting privileges in the private hospitals.</p>	<p><u>Primary Healthcare</u></p> <ul style="list-style-type: none"> * Mainly provided by private GPs and specialists. * Govt. Public Health Agencies run community health, maternal and child health, school health and preventive health services. <p><u>Institutional Care</u></p> <ul style="list-style-type: none"> * Most are private hospitals providing short-term acute curative services. There is a free movement of generalists and specialists between hospitals and doctors' clinics. * The Govt. runs the Veterans' Hospitals and Hospitals for Eskimos and Indians. * Nursing Homes (75% private) 	<p>Services provided by NHS:</p> <p><u>Primary Healthcare Services</u></p> <ul style="list-style-type: none"> * General Medical Services * Primary Healthcare Teams * General Dental Services * Pharmaceutical Services * Ophthalmic Services * Chiropody Services <p><u>Hospital Services</u></p> <ul style="list-style-type: none"> * Specialist Care provided through referral from primary healthcare * Inpatients, outpatients and day patients <p><u>Private Healthcare</u></p> <ul style="list-style-type: none"> * Private medical practice is small. * Provides both outpatient and inpatient care * Inpatient care provided in private beds in NHS hospitals and private hospitals. 	<p>1. <u>Primary Healthcare</u></p> <p>Provided by:</p> <ul style="list-style-type: none"> * Community Health Centres * GP's * Private Specialists * Pharmacists <p>2. <u>Institutional Care</u></p> <ul style="list-style-type: none"> * Public hospitals ranging from small rural hospitals providing basic medical/surgical care to large urban district hospitals and teaching hospitals with full range of services. * Private hospitals Mental Institutions * Nursing Homes <p>3. Domiciliary Care Services</p> <p>4. Aerial Medical Services</p>

APPENDIX G

Comparative Healthcare Systems of Selected Counties - Health Financing

Singapore	USA	UK	Australia
<p>Healthcare Services generally taxation based.</p> <p>Medisave - a compulsory savings scheme covering 6% of an employee's salary (7% for employees aged 35 years and above). Mainly used to cover hospitalisation and day surgery.</p> <p>MediShield - a national catastrophic health insurance scheme. Premiums paid from Medisave funds.</p> <p>Medifund - entirely government funded, provides a safety net of last resort for Singaporeans who are unable to meet medical expenses.</p>	<p>a. Private Health Insurance for the general population.</p> <p>b. National Insurance Schemes.</p> <p>- Medicare: population aged over 65 years.</p> <p>- Medicaid: for the needy regardless of age.</p>	<p>97 - 98% Healthcare provided by NHS.</p> <p>NHS:</p> <p>* Nationally financed</p> <p>* Income derived from:</p> <p>- government taxation (89%)</p> <p>- NHS Insurance Contributions (9%)</p> <p>Charges (2-3%)</p>	<p>* National Health Insurance Scheme called Medicare.</p> <p>Medicare financed from taxes:</p> <p>Covers full costs in public hospitals and part of costs in private hospitals.</p> <p>* Private Health Insurance also available for private patients in public hospital or private hospital charges.</p> <p>* Federal Pharmaceutical Benefits Scheme to assist in meeting cost of drugs.</p>

APPENDIX H

SAMPLE CRITICAL PATH PROTOCOL OF CARE

UNIVERSITY OF MICHIGAN - NEUROSURGERY

CRITICAL PATHWAY: Cervical Spinal Cord Injury with neurological deficit without respiratory complications

PHYSICIAN: _____

DATE INITIATED: _____

PATHWAY CODE: 9.1.1 MCLA 333.21515.20175

August 8, 1991

ADMIT DIAGNOSIS:

Cervical Spinal Cord Injury

DRG: 9

PROCEDURE: Spinal fusion

EXPECTED LOS: 4-5 days

	DAY 1 (Admission)	DAY 2/3 (Surgery)	DAY 4/5 (Transfer)	DAY 6/7 (Discharge)
Date				
Consults	PMR, SCI social worker, SCI nurse. Orthotics, Rehabilitation engineering	Physical, occupational therapy	Dietitian	Transfer to PMR-SCI service
Tests	Lateral C-spine, CXR, MRI, ABG, Admission Profile.	PARU: CBC, CHEM A & B, ABG, CXR, Lateral C-spine	PARU: CBC, CHEM A & B, ABG, CXR, Lateral C-spine with position change.	
Activity	Bedrest (if Stryker do not turn until lateral C-spines and resident's orders) Turn q2h. ROM q4h. Consider roto test for pulmonary management.	Hospital bed turn q2h (logroll). HOB no greater than 30 degrees. ROM q4h. Splints per OT.	ROM q4h with progression to sitting. Splints per OT.	
Treatments	Vitals, spinal motor scale checks q1h Pin level checks q1h Temperature q2-4h Respiratory assessment q2-4h with Respiratory parameters q2-4h Quad cough technique q3-4h Foley to DD	Vitals, spinal motor scale checks to q1-3h Pin level checks q1-3h Discontinue Foley ISC q3-4h to maintain <300cc of urine volume.	Vitals, spinal motor scale checks q4h Pin level checks q4h Assess for Hyperreflexia (BP, Sweats, HA)	
	Assess need for P & PD			
	Bowel Program begun: LOC/SUPP		Continue Bowel Program	
	O ₂ per NC	Discontinue O ₂ if O ₂ sat > 96%.		
	Antiembotic socks with SCD			
	IS q1h C & DB			
	Nurse Call Device (rehab engineering)			
	Prism Glasses (OT)			
	Maintain traction as ordered (check topknot q2h)	Maintain Halo Vest. Pin care q day		
	Pin care q day.	Neck dressing checked q1-3h.		
Medications	Consider Heparin SQ			
	IVF as ordered		Consider Heparin lock	
	Antibiotics x 24h	Discontinue antibiotics		
	Histamine Antagonists IV/NG		Histamine antagonist PO	
	Narcotic Analgesics IV/IM/NG		Analgesics PO	
	Benadryl PRN			
Diet	Consider Steroid NPO x Ice chips NG to LCS if nauseated - NPO	Discontinue steroid drip Advance to clear liquids if bowel sounds present.	Diet as tolerated (at preadmission level)	
Patient and family education	Teach anxiety relief measures (i.e., guided imagery, relaxation techniques). Preop education per unit policy. Orient patient and family to NICU policy, procedures, and family support group. Assess discharge needs.	Assess family/patient knowledge of injury and consequences. Assess psychological stage of injury. Assess questions/concerns of sexuality.	Prepare for transfer to acute care unit. Reassess discharge needs. Consider rehabilitation tour. Patient and family.	Prepare for transfer to rehabilitation unit.

Source: Coffey, R.J., Richards, J.S., Remmert, C.S., LeRoy, S.S., Schoville, R.R. and Baldwin, P.J. (1992), "An Introduction to Critical Paths", Quality in Management Health Care, Vol. 1, No. 1, pp. 49.

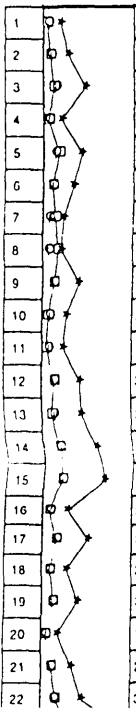
Trademarks
 Strong Synergy * 9.0
 Synergy * 3.0
 Compromise * 3.0

Standard 8-3-1
 Strong ● 9.0
 Moderate ○ 3.0
 Weak ▽ 1.0

Up-to-date and well-maintained facilities & equipment	1	4.4
Clean & comfortable environment with good directional signs	2	4.2
Doctors/staff neat and professional in appearance	3	4.1
Informative brochures about services	4	3.8
Phlebotomy during treatment	5	4.3
Services should be provided at appointment time	6	4.4
Services should be carried out right the first time	7	4.4
Doctors/staff should be professional and competent	8	4.6
Error free and fast retrieval of documents	9	4.2
Consistency of charges	10	4.1
Patients given prompt services	11	4.3
Responsive doctors/staff	12	4.4
Attitude of doctors/staff instill confidence in patients	13	4.5
Waiting time of not more than 1 hour	14	4.3
Friendly and courteous doctors/staff	15	4.2
Doctors should possess a wide spectrum of knowledge	16	4.6
Patients should be treated with dignity and respect	17	4.5
Explain thoroughly medical condition to patients	18	4.6
Obtain feedback from patients	19	4.2
24-hour services availability	20	4.0
Doctors/staff should have patient's best interest at heart	21	4.5
Doctors/staff should understand the specific needs of patients	22	4.4
There should be adequate parking facilities	23	3.7
The location should be easily accessible	24	4.0
Affordable charges for services rendered	25	4.1
Service element importance (Standard)	1	
Service element importance (Ideal)	2	
Service element importance (Proportional)	3	
Percent importance of service element	4	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1 Importance of the WHATs	▽	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
2 Excellent Housekeeping	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
3 Frequency of Equipment Maintenance	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4 Availability of Equipment at Bedside	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
5 Frequency of Facilities Maintenance/Upgrade	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6 Availability of Equipment at Bedside	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
7 Modular Walls, Curtains for Privacy	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
8 Lighting, Scent and Sound Considerations	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
9 Uniforms & Dress Code for Doctors/Staff	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
10 Availability of Parking Lots	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
11 Clarity of Signboards	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
12 Brochures on Hospital Services	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
13 Brochures on Health Matters	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
14 Price Information/Cost Estimation	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
15 Information on Service Delivery Time	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
16 Appointment System	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
17 Quick Registration	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
18 Patients Escorted to Treatment Area	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
19 Feedback System	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
20 24-hours Service Availability	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
21 Availability of One-stop Service	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
22 Schedule for Continuity	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
23 Protocol of Treatment	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
24 Patients Informed of Length of Treatment	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

1.5	1.1	4.7	42.5																			
2.3	2.0	6.8	61.4	▽																		
3.5	2.9	11.1	99.5	▽	▽																	
1.6	1.5	4.9	44.2	○	○																	
3.2	4.3	10.2	91.4			●																
2.6	2.6	8.1	73.0		▽																	
1.8	3.4	5.6	50.8							○												
1.6	4.3	5.1	45.5	○	●																	
3.1	3.1	9.6	86.8	○	●																	
2.1	1.8	6.5	58.8	○	○																	
1.8	1.3	5.7	51.4	▽	▽																	
3.3	3.6	10.3	92.4	▽	▽																	
3.4	2.7	10.6	95.3	○	○																	
4.6	4.3	14.4	129.8	▽	▽																	
5.2	5.0	16.3	140.9	▽	▽																	
2.2	2.0	6.9	62.5	○	○																	
3.9	3.8	12.2	106.5	○	○																	
2.2	2.4	6.8	60.9	○	○																	
3.0	3.1	9.5	85.1	○	○																	
1.4	1.3	4.5	40.7	○	○																	
2.0	2.7	8.0	72.1	○	○																	
3.5	4.0	10.9	97.9	○	○																	



Standard 9-3-1
 Strong ● 9.0
 Moderate ○ 3.0
 Weak ▽ 1.0

	Importance of the WHATs																		Sum of Relationship	1	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18			
Up-to-date and well-maintained facilities & equipment	1	4.40	●	○				●		▽				○	○		○	●	40	1	
Clean & comfortable environment with good directional signs	2	4.23	○	●	▽	○		●				▽	○	○	○		▽		36	2	
Doctors/staff neat and professional in appearance	3	4.12	○	●	●	▽						○		▽	▽		▽		28	3	
Informative brochures about services	4	3.75		○		▽		▽				○	▽	○			○		15	4	
Privacy during treatment	5	4.33	○	○	○	○		○				▽		○	▽		▽		21	5	
Services should be provided at appointment time	6	4.36		○		○							○	▽		○		▽	14	6	
Services should be carried out right the first time	7	4.44	○	○	○	○			▽	▽		●	○		○		▽		30	7	
Doctors/staff should be professional and competent	8	4.57	○	○	○			▽	▽	▽	▽	●	▽		○		▽		27	8	
Error free and fast retrieval of documents	9	4.23		●		○						○				▽	○	○	22	9	
Consistency of charges	10	4.10		●		○				○		▽	○		○		▽		23	10	
Patients given prompt services	11	4.32	▽	▽	▽			▽				▽	○			○	○	▽	15	11	
Responsive doctors/staff	12	4.41	●		●	▽		▽		▽	▽	○			▽		○		29	12	
Attitude of doctors/staff instil confidence in patients	13	4.34	●	▽	●	○	○	○	●	▽	●	●	▽	○	○	▽	○	▽	78	13	
Waiting time of not more than 1 hour	14	4.32		▽		▽				▽	▽		▽			●			14	14	
Friendly and courteous doctors/staff	15	4.24	●	▽	●		▽	▽	○			○			○				30	15	
Doctors should possess a wide spectrum of knowledge	16	4.60	○	○	▽	▽	○	▽	○	○	▽	○	●	●	○	▽	○	▽	○	51	16
Patients should be treated with dignity and respect	17	4.47	●	▽	●		○	▽		▽		▽		▽	○		▽		30	17	
Explain thoroughly medical condition to patients	18	4.59	▽	○	▽		▽	○		▽	○		○		▽	○	▽		21	18	
Obtain feedback from patients	19	4.24		○		▽		○						▽	○		○		14	19	
24-hour service availability	20	3.98																	0	20	
Doctors/staff should have patient's best interest at heart	21	4.49				○	○	○	○	●	●	○		●	○	○	▽	○	52	21	
Doctors/staff should understand the specific needs of patients	22	4.43			○	▽	▽	▽		○	○		○	▽	○	○	▽		23	22	
There should be adequate parking facilities	23	3.74																	0	23	
The location should be easily accessible	24	3.96																	0	24	
Affordable charges for services rendered	25	4.11		○				▽		▽		▽	▽						7	25	
SCORE	1		247	329	254	142	50	58	146	114	121	165	64	274	136	130	184	74	134	97	
RANKING	2		4	1	3	8	18	17	7	13	12	6	11	2	9	11	5	15	10	14	

APPENDIX L



Founded 1905

THE NATIONAL UNIVERSITY *of* SINGAPORE

Ref:

**Department of Community, Occupational
and Family Medicine**

To whom it may concern

6 Sep 1999

Dear Sir,

RE: MISS LIM PUAY CHENG'S THESIS

Miss Lim has asked me to comment on her thesis. I am pleased to do so. Her work on the Quality Function Deployment (QFD) methodology is interesting and has utilitarian value as an organising tool. The parameters of tangibility, reliability, responsiveness, assurance, empathy and accessibility & affordability give the assessor a broad range of items to appraise the organisation. The scores obtained do have face validity in that one who is familiar with the local hospital's profile is able to identify a hospital without knowing its name. The different parameters cover different aspects of organisational function and it is up to the decision making unit to focus on one or more areas to improve upon in line with the prevailing corporate philosophy. It is useful both as a general appraisal tool as well it can also be used as a tool for monitoring the organisation.

Miss Lim has taken the effort to compare the QFD tool against existing tools of management. It can be used for capturing the customer's views on the strengths, weaknessness of service quality. In this way there is an objective reason for improvement. The advantage of QFD over SERVQUAL is the ability of the former to provide a map for the organisation to improve its services. QFD has two other applications, namely, service planning and performance management.

The appeal of Miss Lim's work is the wide applicability of QFD as an organisational tool.

Yours sincerely,



Λ/Prof Goh Lee Gan
Associate Professor

APPENDIX M



28 Aug 1999

Ms Lim Puay Cheng
6 Cactus Drive, #01-03
Singapore 809685

Dear Ms Lim

STUDY ON THE APPLICATION OF HEALTH CARE MANAGEMENT IN SINGAPORE

It gives me great pleasure to review Chapter 6 Case Studies of your Ph.D. thesis.

The study is correctly directed at what the patients, as primary customers, have to say about the hospitals operations. The emphasis should fall on more quantitative assessment of the responses. The QFD serves as a good and feasible model to work on. This model could have been proven useful and appropriate, if the case studies have adequate time frame to study how the hospitals operations have improved after acting on the patients' responses.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Chin Koy Nam', written in a cursive style.

Dr Chin Koy Nam
PhD. MB ChB
Chairman

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