A PLANNING TOOL FOR CONTINUOUS IMPROVEMENT OF SERVICES

Thesis submitted in partial fulfilment of the requirements
for the award of the degree of

MASTER OF ENGINEERING IN MECHANICAL ENGINEERING (INDUSTRIAL ENGINEERING)
of BHARATHIAR UNIVERSITY

By

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Under the Guidance of

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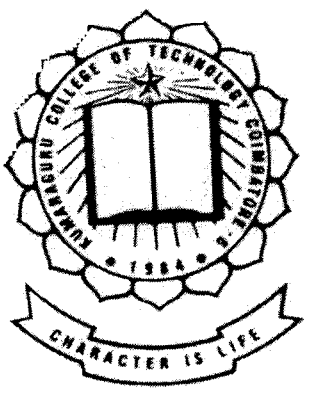

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This is to certify that Mr.K.BOOPATHY, a post graduate student specialising in Industrial Engineering of Kumaraguru collegeofTechnology, chinnavedampatti, Coimbatore-641006 undertaken a Project work titled **"A PLANNING TOOL FOR CONTINUOUS IMPROVEMENT OF SERVICES"** as a part of his academic requirement from June 2002 to August 2002 in our organization.

This project was completed and performance of the same was satisfactory.

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DEDICATED TO

MY PARENTS

ACKNOWLEDGEMENT

ACKNOWLEDGEMENT

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SYNOPSIS

Service is an important term in any industry, production and service to attract the customers and succeed in business. Especially service sectors can survive only when their customers are satisfied. There is no proper gauge or measuring instrument for measuring the quality of services

.

Many tools may have been developed to help organizations overcome these challenges more effectively. This project work is a preliminary step to quality planning. This project work is designed to address a specific issue. It gives more importance to customer requirements, wants and needs. QFD is a process that provides structure to development cycle.

In this project, the service sectors (Educational Institution, Hospital) is taken as a case study. The customer survey is conducted and its feature is analyzed using QFD. This Survey helps us to understand the gap between what the customer wants and what is being delivered. It aims to meet the customer requirements through continuous improvement.

ABBREVIATION

QFD - Quality Function Deployment
SPC - Statistical Quality Control
HOQ - House of Quality
TQM - Total Quality Management
QC - Quality Control
PPC - Process Planning Control
MR - Management Representative
HOD - Head of the Department

CONTENTS

1. INTRODUCTION

1.1 INTRODUCTION

In the era of Globalisation, Liberalization and Privatisation only the fittest organization can survive. This applies not only to production/Manufacturing industries but also to service sectors. There is no method to measure the Quality of services. Services vary from individual to individual and from organisation to organisation.

A move is made in this project to measure the Quality of services. Two services sector, namely a Hospital and an Educational Institution has been chosen for this purpose.

QFD is a powerful tool used for gauging services.

Quality Function Deployment is a basic TQM tool that systematically develops customer needs and expectations. The tool provides a graphical methodology for unearthing a customer stated and unstated needs & expectations. For making decisions in cases where these needs and expectations conflict, and for driving these customer based requirement and expectations into the service development and manufacturing process. QFD is driven by what the customer wants, and, for this reason, the technique is often described as "Deploying the voice of customer"

The thing that makes QFD unique is that the primary focus is the customer requirements.

The process is driven by what the customer wants not by innovations in technology. Consequently, more effort is involved getting the information necessary for determining what the customer truly wants. This tends to increase the initial planning time in the project definition phase of the development cycle.

Actually HOQ is the primary planning tool used in QFD. The HOQ chart is used to measure the quality of service.

The Concept of Quality

The concept of quality must go beyond the concept of simply "Conforming to requirements". It must have a broader context. A concern's or company minimum objective should be to satisfy customers.

A broader objective should be to go beyond satisfaction and to create quality that is exciting and differentiates the product from that of its competition.

Quality will be defined as follows

1. Goods and services that satisfy customers requirements
2. The process that economically produces goods and services that satisfy customer's requirement.

We see from the forgoing discussion that quality is indeed a multi-faced entity. Consequently, a simple answer to questions such as "what is quality?" or "What is quality improvement? " is not easy

i. Traditional definition of quality: Quality is fitness for use.

ii. Modern definition of quality: Quality improvement proportional to variability.

iii. Quality improvement definition: Quality improvement is the reduction of variability in process and products.

Introduction to Project Work

This project deals with introducing scientific method (like quality function deployment) applied for continuous improvement on hospital, educational institution. Most of the Indian concern's lack of the concept of continuous improvement. To persist in the competitive world and also to meet high quality demands of customers. It has become necessary to build the quality at global levels. This project work is carried out with the suitable aid of quality function deployment (HOQ), controlled along with a suitable managerial approach. Due to this, the targets can be faced successfully. Here, analyses are made in the customer requirements and technical requirements using house of quality chart control and the remedies are obtained by analyzing the steps involved in the process.

Chapter 2

LITERATURE SURVEY

2. LITERATURE SURVEY

QUALITY FUNCTION DEPLOYMENT (QFD)

QFD is a planning tool. It can be used to identify customer needs and expectations. It can be used to determine how to meet customer needs defining quantified goals and methodology for identifying and resolving conflicting requirements. One of the advantages of QFD analysis is that it deploys the " Voice of Customer " and forces service-development teams to focus on customer needs expectations. QFD is relatively advanced TQM concept, and is probably best employed when used in conjunction with other previously implemented TQM disciplines (Quality measurement, Taguchi design of experiments, Statistical Process Control, and others)

Lakshmikantan P.R discussed in this paper [3] about the six-sigma concept.

"When customers are more Quality conscious, the concept of cost of quality emerged and thus statistical quality control came into existence.

Six sigma is concept, which starts and ends with the customers. In Six-sigma approach, the fundamental reasons for problems are fathomed so that pinpoints corrective actions can be initiated [3]

Machapathra S.S, discussed in this paper [4] about the Quality Function Deployment.

"Application of Total Quality Management in manufacturing organizations is a way of life these days however the implementation level of end-customers in the case of education (Technical), establishments. To this end, an attempt has been made in this paper to define the customer in an Educational, setting and to apply QFD an important tool of TQM, for collecting the voice of customers. QFD process enables to translate the voice of customers into system design requirements and provides valuable information that helps policy-makes to assess the existing system and adopt new policies to have competitive edge in

the market place. A case study in an Educational (technical) establishment is undertaken to demonstrate the applicability of QFD method [4]

By using QFD method, a complex process becomes manageable and vital information is obtained from problem development through issue revolution. QFD is a Quality assurance system that helps to ensure that the voice of customer is clearly heard and followed in the development of a product or service [4]

One should not be content with one time study, as there is always scope for improvement in any setup. Therefore, Continuous improvement aspect of TQM must be incorporated in an organization to succeed in today's competitive environment. QFD serves as powerful process, which is highly successful in eliciting the strength and highlighting areas that requires attention. It can adopt to any service sector if the customer needs and system design requirements are identified properly [4]

Saxena R.P, discussed in this paper [6] about consumer Behaviour of QFD

Quality function deployment or the process of building the House of Quality is a powerful way to integrate the voice of the customer in to the product being developed. This tool relies on a matrix to incorporate the requirements of the customers, and translate them into functional characteristics that the product must possess. The requirements of the customers are there by deployed to the desired function, which in turn is used to yield the engineering characteristics of the products. Since the matrix puts down comprehensive information on customer requirements, in tandem with other 'engineering data' derived from the basic information provided by the customers. To demonstrate how quality requirements are deployed in the engineering characteristics of a product, the example of deriving a writing instrument [6]

The Japanese have been the first to realize what may have been a product feature that caused customer delight the first time it was introduced, doesn't have the same impact on them and latter point in time, because by them the attribute has come to be taken for granted. Thus "atarimae hinshitu", or

"Quality taken for granted", has to constantly be improvised to " miryokuteki hinshitsu", or " Quality that fascinates or excites". This obviously requires that the teams of people involved in new product development rely not only upon their creative abilities, but upon data gleaned from the market, from customers and made available in a systematized fashion where it is easily enable in adding value to the process of design. It is precisely to make data and facts, especially the qualitative kind that are forthcoming from customers available to design teams, that one has to use certain special tools [6]

Debadyuti Das, discussed in this paper [8] about raising productivity through quality circle.

"How do we find what is important to the customer". On the surface that seams to be the job of sales force and a well-trained team of representative can help keep a company clued in and focused on customer objectives. But even the most perceptive representative can also see things through rose-colored glasses or to be the victim of his own defensiveness or biases [8]

"It is for this reason that formalized surveys before and during a quality implementation are integral part of such programs. In reaching out his way, the customer becomes partners" [8]

"The thing that makes QFD unique in that the primary focus is customer requirements, the process is driven by what the customer wants not by innovation in the information necessary for determining what the customer truly wants".[8]

This process aids the difficult transition of bringing a product from development to manufacturing so that the line operator is capable of running. The process as necessary to produce the highest quality product. "Customer information comes from a verity of sources. Some are solicited and some are qualitative and some are obtained in a random manner" [8]

In [6] the QFD is discussed as an investigating tool for customer requirement and it can be used for the continuous improvement for the product/ service characteristics.

In [5] the QFD is an important tool for the company by which they get link with its customers. And also the author discussed about the way's to get the customer requirements and how these customer requirements are changed into technical requirements or the characteristic of a product process with an example of coffee cup and lid.

The [1], [2] are the important websites, for quality area. In this they discuss important events of the developments of quality function deployment with a live / recent example.

Markets are now becoming fiercely competitive. The scramble for customers is getting intensified. Securing edge over rivals is a major challenge facing marketers. Taking customers as a number causes demotionalisation and dehumanization of the marketing process. The focus tends to be limited to the rational aspects. A strategy that focuses on the Human side can be an effective way to competing in the concentrate on the human aspects of services delivery to create bonds with customer [6]

"Provision of quality goods and services is fast becoming a norm rather than exception" [6]

"Marketers have conventionally focused on delivering customer satisfaction on a fundamental premise that a satisfied customer would be kept on a long term basis" [6]

"High customer's satisfaction may not get translated into long term customer patronage" [6]

"The technical quality is transferred to customer during consumption and functional quality is produced and felt by the customer in the whole process" [6]

Ronald G. Day discussed in this book [17] about the quality of function deployment linking with its customers.

Quality Function Deployment and its first house of the house of quality, represent a powerful tool in integrating the new product development team, servicing and focusing it on the voice of customers. The HOQ builds on and extends traditional multi attribute methods by defining the crucial link between customer needs and service design specification. Additional houses under the QFD umbrella step the voice of the customer down further in to the component and manufacturing/servicing design.

QFD is process, a methodology for planning products and services. It starts with the voice of customer. I.e. the input, the customer wants and needs become the drivers for the development of requirements for the new or revised product or services. The QFD process requiring a number of inputs and decisions that are best done through teamwork. Because of this the process tends to remove many of the functional barriers that develop in large organizations. Thereby helping to merge marketing knowledge of the customer with product engineers. Thus, organization that decide to use the QFD method find that they must

1. determine the voice of their customer and
2. examine the organisation response to this voice through on organized team approach. In effect, this links the company to its customers organization works mere co-operatively and the new products or service has increased potential for satisfying it ultimate customers [17]

Kothari.C.R, discussed in this book [21] about the Research Methodology

"The market is becoming at tough battle ground. Now quality has become a common denominator. The danger it has created is that now even a satisfied

customer is likely to quit for he/she has nothing to lose. It is in this context that the marketers have to work out strategies. The marketer can develop an edge over rival by concentrating on the soft dimension of service quality, which is totally interfaced driven. Competing on human touch requires careful focus on issues like selection of people with service orientation, provision of emotion support and role clarity."[21]

Chapter 3

PROBLEM DESCRIPTION

3. PROBLEM DESCRIPTION

3.1 EXISTING SYSTEM OF (SERVICE) QUALITY PLANNING

Many new tools are used for quality, productivity and service improvement. Provide every manager with the tools needed to make planning an effective and satisfying process. They also breakdown Taylor-type barriers by giving more "individuals the ability to contribute to the planning step such tools are as follows.

- TQM (Total Quality Management)
- DOE (Design Of Experiment)
- VE (Value Engineering)
- QFD (Quality Function Deployment)
- SPC (Statistical Process Control)
- FMEA (Failure Mode Effective Analysis)
- FTA (Fault Tree Analysis)
- INVENTORY CONTROL etc.,

These tools have proven useful to virtually any level in a company. It requires a good experience in implementing these tools in any industry.

3.2 PROBLEM DEFINITION

There are two important services, which are needed for a nation to become stronger. They are educational institution service and health care service.

The customers in their two services are students and people respectively. The requirements of their customers are changing as the time changes. What the kind of services are needed should be Known from the customers. Unfortunately the organisations have not thought about such things in the past. However, there are organizations following the latest techniques such as QFD for Continuous improvement.

The two organizations, which are under focus of the study, have already served better in their respective areas.

3.2.1 Hospital Profile

C.S.R Hospital was established in 23 May 1993 by Dr. C.S. R Kumar M.B.B.S. M.S.

The hospital is located at Gandhipuram in heart of the city and that it could be reached by each and everyone easily.

By progressive expansion and modernized program over year, the hospital has now grown in its statue as one of the leading hospitals.

The hospital is equipped with ECG machines, X-ray machine, Ultrasonic sound surgery and may other modern equipments. The doctors and other employees are well trained. The employees working in three shifts a day (7 days a week).

The hospital has a strong quest towards continuously improving the quality of the service its provides to the customers

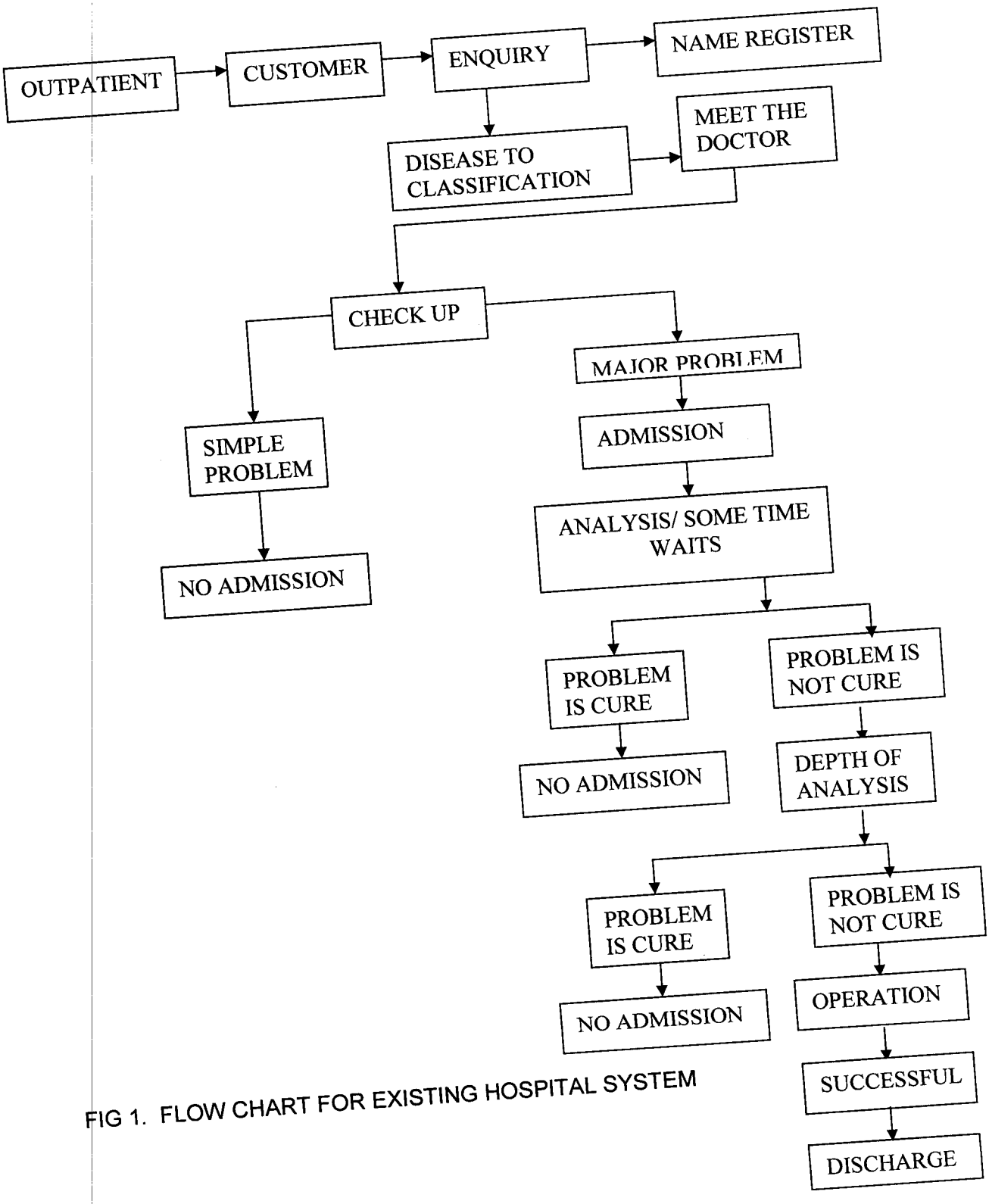


FIG 1. FLOW CHART FOR EXISTING HOSPITAL SYSTEM

Future plans of the hospital

1. Developing new range of service and continuous up gradation of technology in order to keep the hospital service on par with international standards.
2. Better thrust in over all improvement at the quality of their service provided.
3. Improvement in research and development infrastructure and allocation of more funds for such activities aim at new service development and improving the existing service. Beyond the expectation of the customer.

3.2.2 Educational Profile

The Kumaraguru College of Technology was started during 1984 as a self-financing college. In a short span of 18 years, this college has become to occupy a very important place in the technical educational institutions in TamilNadu. Because of the well-deserved reputation, we have earned for the infrastructural facilities, instruction and training and the intense placement assistance we provide to our students.

Here more than 26000 students are studying with the guidance of more than 250 staff members.

The college offers 22 programs in total, This includes BE/BTech courses in 10 branches of engineering and technology, Two B.Sc (Applied Sciences) Courses, ME (IE), ME (CE) ME (EE) ME (CSE), MSc (CT), MCA

This campus of 150 has well developed infrastructure of 4 lakhs sq.ft building having 64 laboratories with latest equipments, 48 class rooms, 5 drawing halls, hostels for about 600 boys and 500 girls, staff quarters, guest house, modern auditorium of 2000 capacity, gym for boys and girls, indoor games complex, yoga and meditation centre, seminar/conference halls for each block, amenities block, internet centre with 512 kbps and 64kbps, placement, training

and industry-institution interaction cell, canteen and cafeteria, dispensary, bank, Gnanvinayagar temple, vehicle parking facilities, Aruljothi Dhyana mandapam, central finance centre, Research and development etc. TWAD Board water supply, 815 KVA TNEB and gensets power supply, 23 acres of play fields and other facilities involving on investment of Rs. 40 crores in addition to land. A PG hostel of 50,000 sq.ft has been completed very recently. The construction of administrative building and step of 2.5 lakhs sq.ft, The most addition is the tournament standard all weather tennis court with synthetic surface.

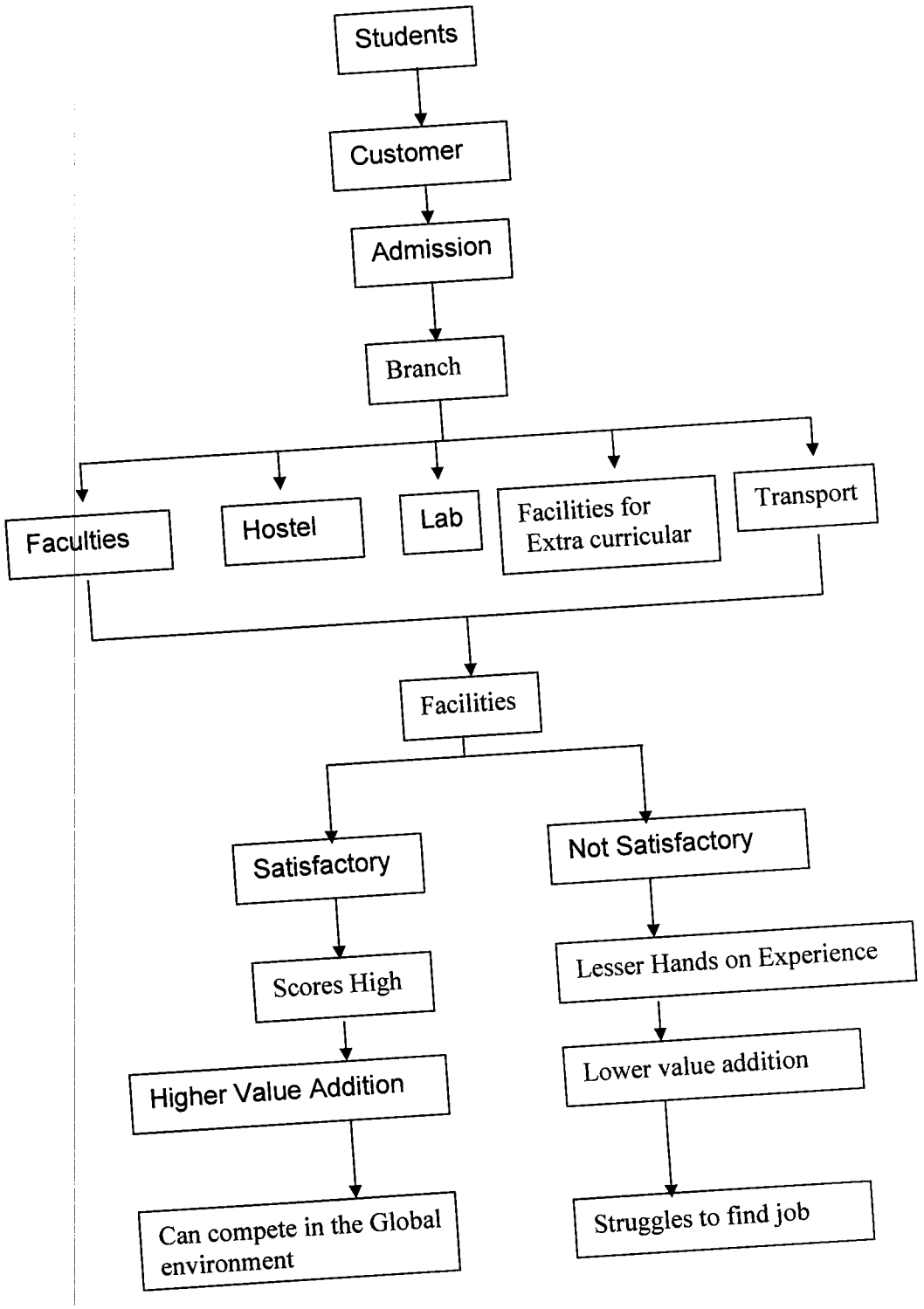
Quality policy of Kumara guru College of Technology.

"We at Kumara guru College of Technology strive to achieve customer satisfaction by providing quality education and training in engineering and technology in a congenial and disciplined environment through

- Involvement at all levels
- Up gradation of facilities and human resources
- Commitment to continual improvement".

MISSION STATEMENT

Kumaraguru College of Technology is committed to provide quality education and training in Engineering and Technology to prepare our students for life and work equipping them to contribute to the technological, economic and social development of India. The College pusses excellence in providing training to develop a sense of professional responsibility, social and cultural awareness and set the students on the path to leadership.


Students
Customer
Admission
Branch
Faculties
Hostel
Lab
Facilities for Extra curricular
Transport
Facilities
Satisfactory
Not Satisfactory
Scores High
Lesser Hands on Experience
Higher Value Addition
Lower value addition
Can compete in the Global environment
Struggles to find job

Future plans of Educational Institution

The Institution also obtained ISO 9001 certificate. In future the college is trying to get autonomous status and also trying for deemed university by making continuous improvement of all activities.

3.3 GOAL OF THE PROJECT

- To meet the customer requirements through continuous improvement
- To improve the quality of the process.
- To simply the process of service planning

3.4 OBJECTIVES

- To study the health care, educational Institute in continuous improvement.
- To study the feedback of respondents
- To study the level of awareness and the opinion about the services.
- To analyse the correlation between customer requirements and technical requirements.
- To study the expectation and opinion of customer about health care, educational institution services
- To draw quality function deployment chart with respect to health care, educational Institute and pinpoint week areas compares with competitors services.

Chapter 4

METHODOLOGY

4. METHODOLOGY

4.1 WHAT IS QFD?

QFD is a practice for designing your process in response to customer needs. QFD translates what the customer wants into what the organization produces. It enables an organization to prioritize customer needs, find innovative responses to those needs and improve process to maximum effectiveness. QFD is a practice that leads to process improvements that enable an organization to exceed the expectation of the customer.

4.2 HISTORICAL DEVELOPMENT OF QFD

QFD was originally developed in Japan and used at the KOBE SHIPYARD in the 1960s. It spread throughout Japan, and it is still widely used there in both manufacturing and service settings. QFD was originally brought to the United States in the MID-1980s by Xerox. It has not yet achieved wide scale adoption in the United States, but it is being used by both manufacturing organization (such as HEWELTT-PACKARD) and service organization (such as St. Clair Hospital in Pittsburgh, Pennsylvania)

QFD is an approach to design of equipment and was introduced in Japan in 1966 by YOJI AKAO. In October 1983 he introduced QFD to the US, through the monthly journal of the American Society of Quality. The monthly journal of the American Society of Quality control. Today QFD is a major force in the effort of quality management in U.S

In 1978 Akao edited a textbook, which led to major increase in the use of QFD. In the early 1980s Akao integrates QFD with value engineering through his research/ he also integrated QFD with new technologies like reliability engineering.

Toyoto used the technique in developing automobiles and from Toyota it spread to the American automobiles industry (most notably ford motor company). QFD is now making headway in other high-technology area. QFD begin as an

engineering tool to ensure that the development process resulted in a product meeting consumer needs and expectation but because it does so it also provides strong marketing advantages to those organizations choose to use it.

4.3 STRUCTURE OF QFD

The most widely used analogy for explaining how QFD is structured is the house. In fig shows how a basis QFD matrix is put together help the team focus on the item that will yield the greatest potential for success in the market place.

Organizations are not willing to devote this level of time and commitment to a project to a project unless there is obvious value received. The principal purpose of developing a QFD matrix is to put the organization touch with its customers wants and needs and to help determine the priority items and needs to help determine the priority items for improved customer satisfaction, same organization and information to the customer portion in setting priorities.

4.3.1 Goal

It is used to record the results of the team's judgement concerning the customer satisfaction goals for the new product. For example the goal of 4.5 means that the team believes its company should strive to improve this requirements so that the customers evaluation of the new product would average 4.5 on the 1 to 5 scale in using a column for goals. Some managers still a mindset that to establish a target less than maximum represents some form of weakness some form of weakness for the organization. If the organization's personality is such that establishing any goal less than 5 would be judged as improper, then there is no value in using this column.

4.3.2 Sales Point

This should be used to highlight those rows in which to improve the product can provide a competitive edge in these cases; the company can advertise this competitive edge. The advertising should have a significant effect because these items had high levels of importance coupled with current low to moderate customer competitive evaluations. An arbitrary weight can be assigned to the presence of a sales point and used in calculation of the "Row Weight".

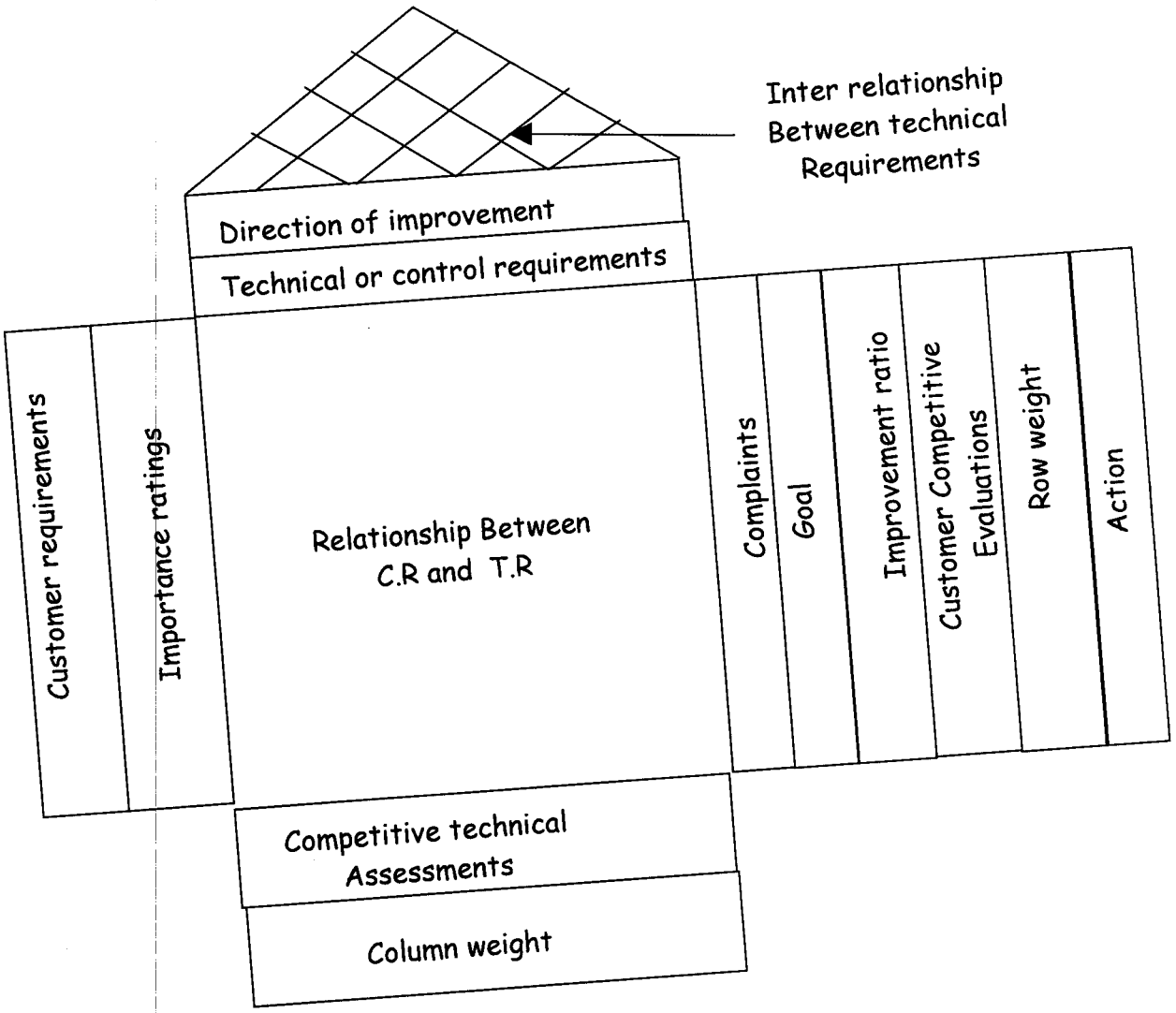


FIG .3. HOUSE OF QUALITY.

4.3.3 Importance Rating

The customer rating is a measure of the relative importance the customer assign to each of the voices. A scale 1 to 9 is used to rate the voices.

4.3.4 Improvement Ratio (I.R)

It is a calculated measure representing the scope of the improvement required to achieve the goal shown in the goal column.

$$I.R. = \frac{\text{Goal}}{\text{Current customer evaluation ratings}}$$

4.3.5 Row Weight (R.W)

It is the product of three columns such as the customer level of importance, sales points and the improvement ratio.

R. W= Importance x sales point x improvement ratio

These row weights can help an organization evaluate the relative significance of rows. These can assist a team by lending some quantitative value to use in conjunction with judgments about competitative evaluations complaints and other data such as marketing and sales trends and changing special issue and demographics

4.3.6 Action

A decision column has been added ranks the items to shows the suggested order of action, these decisions must represent a term balance of issues such as the estimated time, cost and human resourced involved in working on the priority item.

4.3.7 Column Weight

The customer importance rating value is specified by W_i the performance rating value is specified by R_i usually W_i values are 1 to 5 where 1 industries least importance and 5,3,1 where is 5 is the strong relationship 3 for medium relationship and 1 for weak relationship, from the above values

Technical importance rating

$$= \sum_{i=1}^{n} W_i \times R_i$$

(Or)

Column weight

The technical importance ratings are the guiding factor for the next phase of the QFD. Higher the value of technical importance ratings more the concentration required to get better results.

If the technical importance rating value is very less, and if the supplier feels there is nothing to improve further the quality characteristics, those quality characteristics can be dropped at his stage. This is not of major significance of the team continues to recognize that these calculation of goals, ratios, and row weight are simply to help in the decision process. They are not a substitute for common sense. They are not algorithms that replace judgments. They are simply aids in the decision process.

In fig. 3 the peak of the matrix is the manufacturer's requirements. This is where trade-offs are identified. By identifying those early on product development people can narrow their development efforts, thus speeding up the development cycle. The body of the matrix is where the relationship are categorized. This is where customer's requirements are translated into manufacture's terms. It is also where interactions between relationships are identified so that the synergistic effect is seen.

The bottom is the prioritized manufacturer's requirements. This identifies that are the most critical for success as well as the degree of technical difficulty to achieve. All other matrix will be comprised of these fundamental features. Once the format is understood, all the matrices are easily understood.

4.4 QFD PROCESS

The Basic information elements in the QFD matrix are

- WHAT the requirements are
- HOW they are to be met
- Relationship between the requirement and how they are to be met.
- Determining target values for the technical requirement
- Plotting customer competition evaluation data
- Plotting technical competitive assessment data.
- Use of symbols to indicate the direction of improvement
- Putting a roof on the house of quality
- Prioritising the action based on evaluation of the customer portion of Matrix.

Each of the QFD elements in furthers developed below and it can be explained.

- WHAT the requirements are:

State the service requirements in customer terms, that is what the customer wants. The primary customer requirements (Basic customer wants) are expanded to obtain a more definite list as shown in fig 4, 5.This information is obtained from a variety of sources such as marketing, research data, Focus groups, Mail Questionnaires, Interviews (i) Telephone (ii) one to one and special

customer surveys. The special surveys information can be listed as shown in fig 4, 5.

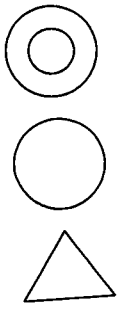
- How they are to be met:

List the final service control characteristic (Technical requirements) that should meet the customer stated service requirements as shown in fig (3). These characteristics are the service that are related directly to the customer requirement and must be relatively deployed throughout the design, manufacturing and service process to manifest themselves in the final product performance and customer acceptance.

- Relationship between the requirement and how they are to be met.

Develop the relationship matrix between customer requirement and final product control characteristic (technical requirements) as shown in fig (3). A set of symbols is used to represent the relationship, such as strong, moderate and weak relationship. Filling out this matrix using symbols provides an easy tool for checking whether the final product control characteristics adequately represent customer expectations. If the matrix shows a majority of "weak relationship" signs. It is an indication that some customer requirements are not addressed properly. An important aspect of this matrix is its ability to identify conflicting design requirements.

Relationship Legend



Strong

Moderate

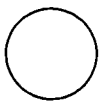
Weak

Points are given each relationship. A five-point scale (5,3,1) for strong, moderate, weak relationship respectively might be used.

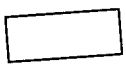
- Plotting Customers competitive evaluation data:

Enter market evaluations that include customer-expressed importance ratings for the listed requirement and competitive evaluation data for existing services as shown in fig (3). The objective is to evaluate the strength and weakness of the product vis-a vis the competition so that areas of improvement are clearly identified. These data's show the customer's perception about the service. Further more, they indicate where product stands in fulfilling a particular need of the customer

Key:



Surveying Company

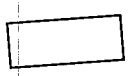


Chief competitor

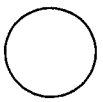
- Plotting technical competitive assessment data:

Enter technical competitive assessment data and compare these with market competitive evaluation as shown in fig (3). These evaluation data should be expressed in objective and measurable terms. This helps in indicating the inconsistencies between customer requirements and own evaluation. However own evaluation indicates that the company product is better in the characteristic related to the requirement of the customer. Then it is logical to conclude that here is something wrong with internal evaluation or that the wrong characteristic was chosen to meet the customer need.

Key:



Chief competitor



Surveying Company

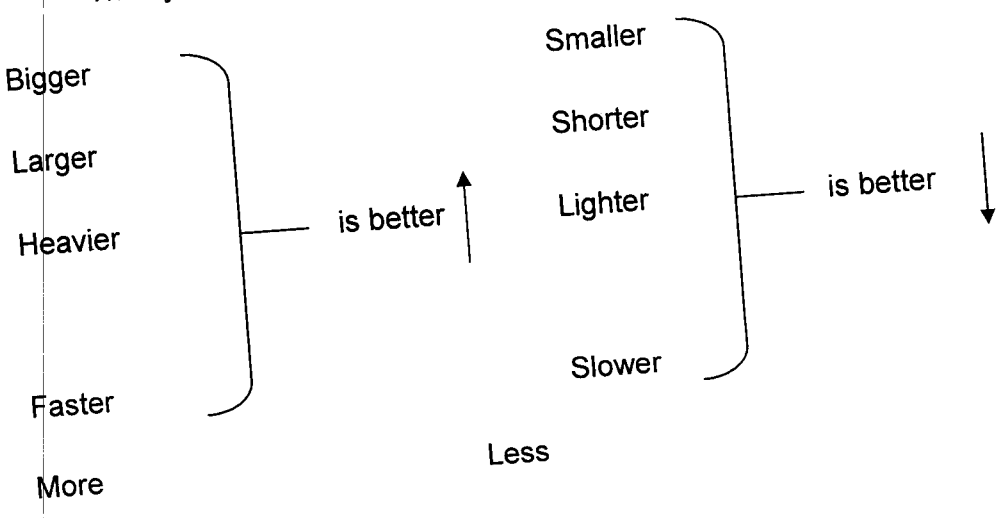
- Determining target values for the technical requirements

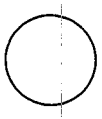
Develop measurable targets as shown in fig.3 for final product control characteristic. The attainment of these targets should be measured at each stage of the product development and testing process.

- Use of symbols to indicate the direction of improvement

Determine the direction of improvement for customer shown in fig.3. This depicts ways for improvement with respect to operational goals/ targets. The symbols are used in the respective column to achieve the desired improvement for customers.

The symbols used to denote the direction of improvement are





Meeting a definite target is best for customer satisfaction

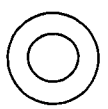
Target should be achieved or it should be on the lower side.

Target should be reached or it should be on the higher side

- Putting a roof on the house of quality

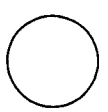
Putting a roof on the house of quality shows the "correlation matrix" as shown in fig (3). The QFD correlation matrix made up of diagonal lines that allow one how to another. The concept is to show if one how supports or is in conflicting with another how. This form of correlation matrix allows this comparison to be made between all the HOWs. In the correlation matrix. The comparison is being made strictly among HOWs.

Correlation legend



Strong positive

Strong Positive



Positive

X negative

- Prioritizing the action based on evaluation of the customer portion of the matrix. Action key are

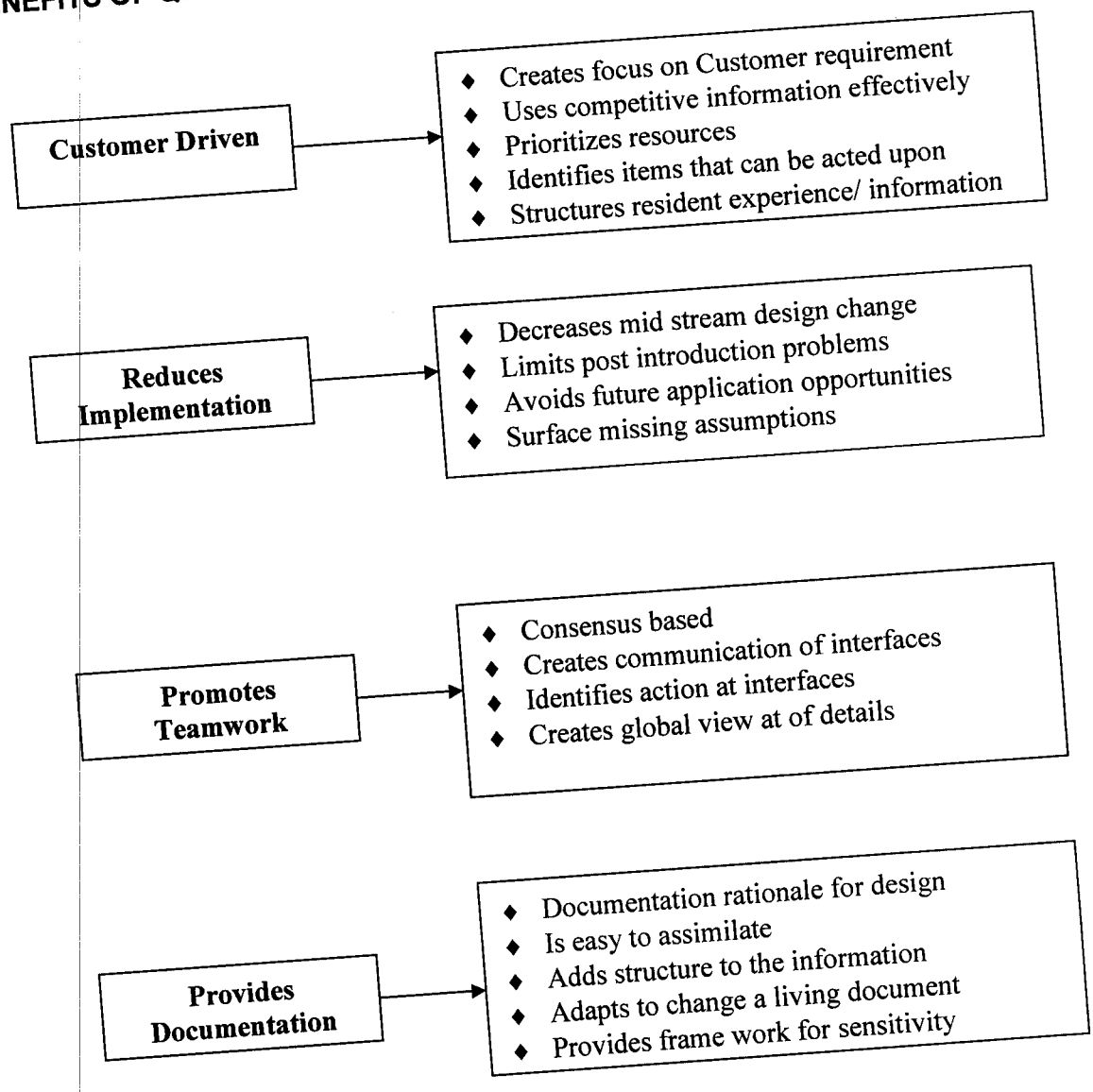
A= Examine competitions current product

B= Examine competitions plus other concepts

C= Competitive opportunity – develop new ideas.

These categories A, B, C are in order of increasing difficulty. Category A would be easiest, and category ' C' the hardest. All of the designated items in the action column represent priorities for increasing customer satisfaction with the next generation of product are shown in fig (3).

BENEFITS OF QFD



4.6 CONCLUSION

Success will not be achieved simply as results of introducing the organization to a new concepts and stating that they are enlarged by management. The effort needs to be accompanied by an investigation of the process by which the concern currently plans & design services. Once agreement is achieved that these represent the most efficient is flow of the overall process from concept to deliver and service, they should be come the established process. People should become the established processes. People should be trained for reviews at critical points. Continued improvement of the organisation. If QFD is a made a formalized part of the service development cycle. It will help an organization accomplish the objective of understanding its customer and designing product and services that meet the customer's requirements in a superior, exciting way.

Chapter 5

CASE STUDIES

5. CASE STUDIES

QFD is a fairly advanced TQM concept and as such, cannot be implemented in an organization that does not have other underlying TQM concepts. These prerequisite underlying TQM concepts include recognizing that most quality problems are system related an organization willingness to invest more time up front in the product development process to present fewer problems downstream.

W. Edwards's Deming teaches that most quality problems are not the result of workmanship problems, but are instead due to poorly defined processes and management systems (Deming postulate that only 15 percent of problem are due to people problems. The other 85 percent are due to poor management systems, service deficiencies or process deficiencies). Accepting this concept is necessary in order to implement the QFD approach successful. If an organizations does not believe it must create a product design, a process and a management system that eliminate much of potential for quality deficiencies, the QFD team members will be unable to deploy the voice of customer successfully to create a service that can consistently meet customer needs and expectations. As explained alone, multidiscipline involvement and willingness to have engineers, marketers and manipulating personal work together to deploy the voice of customer is also a prestige for successful QFD analysis. The Service design must be responsive to needs and expectations of the customer and it must be producible. Good interdepartmental communications are necessary, particularly between an organizations management and the servicing departments.

QFD is by a nature a preventive tools and like most preventive tools, it requiring that an organization be willing to invest earlier in a program that it otherwise would (i.e. Without QFD) many organizations focus more on problem detection and correction than on problem prevention organisation install this culture without realizing it consider the people in most organization are typically good " Fire Fighters" (i.e. people who resolve crisis) the problem with Fire fighters

through that they almost never focus on fire prevention. In essence they become unwilling arsonists. QFD helps reverse the opportunity for this form of organizational arson defining the needs end expectations of the customer early in the product development process will help prevent problems by creating a product that meet customer needs and expectations working though the QFD process with both the engineering and servicing departments will help assure productivity. The time spent on QFD early in a program can result in significantly less time.

5.1 SURVEY METHODOLOGY

Under this sample survey method employed here. We have selected group of respondents. So that a feed back as close of possible to the ground situation is obtained which in turn can make the findings more meaningful?

Having decided this sample survey method, questionnaire is devised in such a way so as elite the required informal. This is achieved through informal " one-to one" meeting with the respondents and through personal interviews. The purpose of the questionnaire technique is to facilitate understanding to predict the behaviour of the respondents. The information so elicited was initially done for a small group of individuals.

The questionnaire is inserted in the appendix –A

5.2 LIMITATIONS

The research methodology enumerated above through effective and also an easy to adopt technique, is however not without its limitations that cast its influences on the accuracy of the study. The main limitations that confront us in such a venture can be listed as follows.

This sample survey technique was adopted as the target population is quite vast and the availability of time restricted. However, this surveyed group constitutes only a very small percentage of the overall populace and hence cannot in real sense be constructed as a reflection of the entire group. In fact,

theoretically, there is every possibility that the verdict of the overall populaces is different from that of the sample group. In such an eventuality, the findings themselves can go away.

There is chance that the information so obtained may be biased in nature. The details furnished need not necessarily be objective but a degree of subjective ness cannot be ruled out.

Under this study the present market conditions and the individual's behaviour at a given period of time alone have been considered.

5.3 SCOPE

This technique could be further used for any service. The graphical representation of evaluation of the health cares, Educational Institution competitor could be further aligned vertically in future to make the technique more effective. They need to include good engineering analysis tools stitch as FMEA, FTA, VE analysis and DOE. The most effective way to ensure the organization uses these processes and tools effectively is to embed them in the process /development and audit the process sufficiently to ensure its efficiency.

5.4 CASE STUDY ON C.S.R HOSPITAL

A study has been conducted on CSR Hospital. This hospital is located at Gandhipuram in heart of the city of Coimbatore. This hospital is especially famous for surgery. They have facilities such as a scanning, X-ray, ECG, USS and etc. A brainstorming session is conducted and various customer requirements are identified. The author has made an extensive survey using questionnaire which is given in Appendix A. and the customer requirements are listed in the left hand side of QFD matrix as shown fig 4. And the based on the discussion with doctors and workers in the hospital various technical factors requirements that are controlling customer requirement are identified. These technical requirements are listed in the top of the QFD matrix as shown fig 4.

The relationships between the customer requirements, technical requirement are studied. This relationship are mentioned as strong  , moderate  , weak  by using appropriate symbols in the QFD matrix then important matrix are given to the customer requirements from 1 to 9 in which 9 represent high importance and 1 represent low importance then the Goal and Sales point values are assign in the matrix. Customer Competitive evaluation and technical competitive evaluation are plotted in the graph using 1-to 5-scale ratio.

Hospital

Example

Customer evaluation table

Customer Needs	Technical Parameters	Relationship	Point obtained
Response the to track the health record	Service time of registration tracking health record		3
Kindness shown	Number of feed back registered positively or negatively		3
Correctness of direction of patients to meet specialist	Number of feedback's with respect to changes of specialist		5

Example of Technical Competitive Evaluation

Technical Need	Customer Need	Relationship	Point obtained
Number of Patient attended during an hour	Minimum time to meet the doctor	◯	3

The improvement ratio, row weight, column weight are a calculated and mentioned the matrix by using matrix analysis are made and suggestion are given.

5.5 CASE STUDY ON EDUCATIONAL INSTITUTION

A study has been conducted on Kumaraguru College of Technology was started during 1984 as a self-financing college. This College is located at chinnavedampatti near in Coimbatore. They have the facilities such as well developed 150 acre campus, seven college buses/city buses, more than 4,00,000 sq.ft of buildings, 64 laboratories/60 computer systems 512 kbps, 250 staff members and etc.,

A brainstorming session is conducted and various customer requirements are identified. The author has made an extensive survey using questionnaire which is given in Appendix A. and the customer requirements are listed in the left hand side of QFD matrix as shown fig 5. And the based on the discussion with lecturers and students in the educational institution various technical factors requirements that are controlling customer requirement are identified. This technical requirement are listed in the top of the QFD matrix as shown fig .5

The relationships between the customer requirements, technical requirement are studied. This relationship are mentioned as strong ◎ , moderate ◯ , weak △ by using appropriate symbols in the QFD matrix then important matrix are given to the customer requirements from 1 to 9 in which 9 represent high importance and 1 represent low importance then the Goal and

Sales point values are assign in the matrix. Customer Competitive evaluation and technical competitive evaluation are plotted in the graph using 1 to 5scale ratio.

Education

Example

Customer evaluation table

Customer Needs	Technical Parameters	Relationship	Point obtained
Laboratory Facilities	Management attitude	◎	5
	Budget allotment	○	3
	Staff Turnover	△	1
		Total	9

Therefore 9/3 = 3. Plotted point is 3.

Example of Technical Competitive Evaluation

Technical Need	Customer Need	Relationship	Point obtained
Separate rooms /cells	Faculty Level	○	3
	Internet Facilities	△	1
		Total	4

Therefore 4/2 =2. Plotted point is 2The improvement ratio, row weight, column weight are a calculated and mentioned the matrix by using matrix analysis are made and suggestion are given.

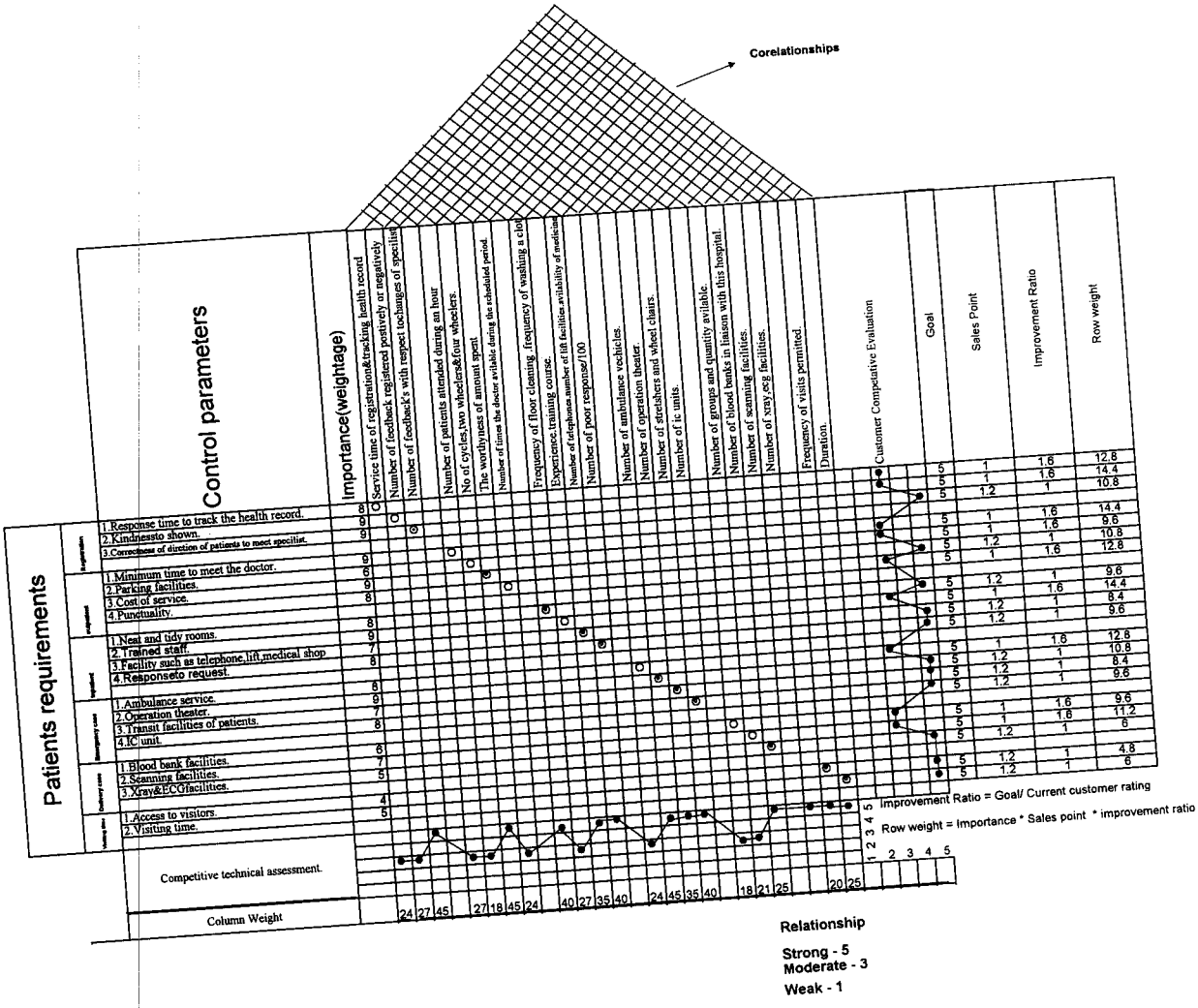


FIG.4 QFD OF CUSTOMER REQUIREMENTS-CASE STUDY ON HOSPITAL.

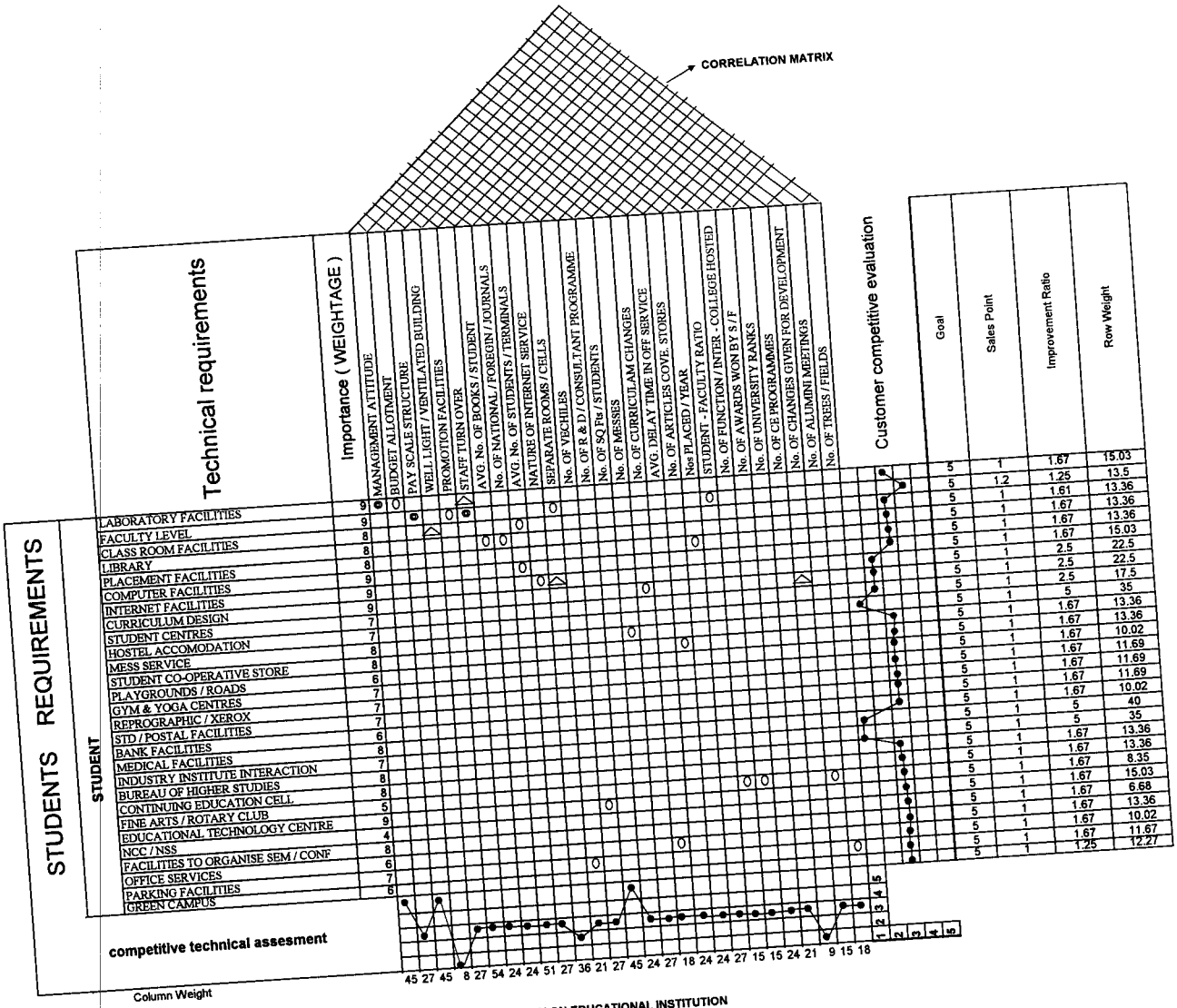


FIG.5.QFD OF CUSTOMER REQUIREMENTS -CASE STUDY ON EDUCATIONAL INSTITUTION

Chapter 6

RESULTS AND DISCUSSIONS

6. RESULTS AND DISCUSSION

The hospital services are studied in detailed for their quality improvement. Twenty customer requirements have been identified through past data and discussions with the organizations.

The doctor and workers along with other staff have contributed to arrive about twenty one control parameters.

The customer requirements, response time to track the health record, kindness shown, minimum time to meet the Doctor, punctuality, trained staff ambulance service scanning facilities are the areas which improvements are expected, They are indicated by higher demanded weights as it is shown in fig 4. The column weight indicates that the number of feedbacks with respect to changes of specialist; The worthiness of amount spends frequency of floor cleaning, frequency of washing a cloth, No of IC unit and control parameters need to be attending for improvement of quality while they continue to maintain other parameter.

The Educational services are studied in detailed for their quality improvement. Twenty eight customer requirements have been identified through past data and discussions with the organizations.

The lecturers and students along with other staff have contributed to arrive about twenty seven control parameters.

The customer requirements, Mess Service, Medical Facilities, Industry Institute Interaction, Placement Facilities are the areas in which improvements are expected they are indicated by higher demanded weights has it shown in fig 5. The column weight indicates that the management attitude, pay scale structure, staff turnover, average number of students turn over, separate room/cell. And control parameters need to be attending for improvement of quality while they continue to maintain other parameter.

Chapter 7

CONCLUSION

7. CONCLUSION

The QFD has provided comprehensive information about the service evaluation. This is used for continuous improvement of quality of services while they were normally used for new developments. The brain storming sessions have helped the employee's to know their contribution for the quality improvement of the service. The people blaming each other came down heavily.

- The weaker and stronger areas have been evidently shown in the QFD Chart.
- The QFD chart has enabled them to have comprehensive information about product evaluation.
- MS Excel software is used for the creation of QFD chart. It is very easy for any small scale industry to learn and use this software.
- Multiple copies could be taken for any reference.
- Modification could be very easily done on every further service evaluation.

Future Improvement

Software can be designed at cheaper price for the preparation of QFD chart.

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BIBLIOGRAPHY

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APPENDIX-A
QUESTIONNAIRE

CUSTOMER REQUIREMENTS/EXPECTATION TOWARDS HOSPITAL.
QUESTIONNAIRE FOR HOSPITAL SERVICE

HOSPITAL UNDER STUDY:

PLEASE TICK [✔] AGAINST YOUR CHOICE:

1. HOW DO YOU RATE THE SERVICES OF REGISTRATION WITH RESPECT TO TIME, DIRECTION OF PATIENTS TO RIGHT SPECIALIST AND THE KINDNESS SHOWN?

☐ EXCELLENT ☐ GOOD ☐ SATISFACTORY ☐ POOR

2. RATE THE DOCTORS TIME CONSCIOUSNESS?

☐ EXCELLENT ☐ GOOD ☐ SATISFACTORY ☐ POOR

3. WHAT DO YOU THINK ABOUT PARKING FACILITIES?

☐ EXCELLENT ☐ GOOD ☐ SATISFACTORY ☐ POOR

4. RATE THE WORTHINESS OF THE AMOUNT SPENT?

☐ VERY HIGH ☐ HIGH ☐ MODERATE ☐ LOW

5. HOW DO YOU CLASSIFY THE NEATNESS OF ROOMS PROVIDED?

☐ EXCELLENT ☐ GOOD ☐ SATISFACTORY ☐ POOR

6. RATE THE TRAINING GIVEN TO THE STAFF?

☐ EXCELLENT ☐ GOOD ☐ SATISFACTORY ☐ POOR

7A). ARE THERE ENOUGH FACILITIES SUCH AS TELEPHONE, LIFT, AND MEDICINES AVAILABLE?

☐ SUFFICIENT ☐ INSUFFICIENT

7(B) INCASE INSUFFICIENT, WHAT IS YOUR SUGGESTION?

8. HOW DOES THE DOCTOR OR ADMINISTRATIVE STAFF RESPOND TO YOUR REQUEST?

☐ GOOD ☐ MODERATE ☐ NEED IMPROVEMENT

9. HOW DO YOU RATE THE AMBULANCE SERVICE PROVIDED BY THE HOSPITAL?

☐ EXCELLENT ☐ GOOD ☐ SATISFACTORY ☐ POOR

10. ARE THERE SUFFICIENT OPERATION THEATERS?

☐ ENOUGH ☐ NOT ENOUGH

INCASE, NOT ENOUGH WHAT IS YOUR SUGGESTION?

11. CAN YOU RATE THE TRANSIT FACILITIES INSIDE THE HOSPITAL PROVIDED?

☐ EXCELLENT ☐ GOOD ☐ SATISFACTORY ☐ POOR

12. GIVE YOUR OPINION ON THE NUMBER OF BEDS IN IC UNITS AVAILABLE IN THE HOSPITAL?

☐ SUFFICIENT ☐ INSUFFICIENT

13(A). HOW DO YOU RATE THE SERVICES OF DELIVERY CASE WITH RESPECT TO BLOOD BANK, SCANNING, X-RAY& ECG FACILITIES?

☐ EXCELLENT ☐ GOOD ☐ SATISFACTORY ☐ POOR

13(B). IF POOR, WHAT DO YOU WANT TO BE IMPROVED?

14. GIVE YOUR OPINION ON THE FREQUENCY OF VISIT PERMITTED?

☐ ENOUGH ☐ NOT ENOUGH

15 .CAN YOU GIVE YOUR OPINION ON THE DURATION OF VISITING TIME?

☐ MORE ☐ LESS ☐ ENOUGH.

16.PLEASE ADD ANY OTHER FEEDBACK, WHICH YOU WANT TO INCLUDE?

NAME:
[OPTIONAL]
ADDRESS:

CUSTOMER REQUIREMENTS /EXPECTATION TOWARDS EDUCATIONAL INSTITUTION.

QUESTIONNAIRE FOR EDUCATIONAL INSTITUTION SERVICE

EDUCATIONAL INSTITUTION UNDER STUDY:
PLEASE TICK [✔] AGAINST YOUR CHOICE.

1. HOW DO YOU RATE LAB FACILITIES PROVIDED BY THE COLLEGE?

☐ GOOD ☐ SATISFACTORY ☐ NEED IMPROVEMENT ☐ POOR

2. GIVE YOUR OPINION ABOUT THE SKILLS OF FACULTIES IN THE COLLEGE?
[1] SUBJECT KNOWIEDGE:

☐ GOOD ☐ SATISFACTORY ☐ NEED IMPROVEMENT ☐ POOR

[2] COMMUNICATION SKILLS:

☐ GOOD ☐ SATISFACTORY ☐ NEED IMPROVEMENT ☐ POOR

3. CAN YOU GIVE YOUR OPINION ABOUT THE CLASSROOM FACILITIES IN THE COLLEGE?

☐ EXCELLENT ☐ GOOD ☐ SATISFACTORY ☐ POOR

4. ARE THERE ENOUGH BOOKS AVAILABLE IN THE LIBRARY?

☐ SUFFICIENT ☐ INSUFFICIENT

5. DOES THE COLLEGE PROVIDE ENOUGH PLACEMENT FACILITIES?

☐ SUFFICIENT ☐ INSUFFICIENT

6. ARE THERE ENOUGH COMPUTERS IN THE COLLEGE?

☐ SUFFICIENT ☐ INSUFFICIENT

7. GIVE YOUR OPINION ABOUT THE INTERNET PROVIDED BY THE COLLEGE?

☐ GOOD ☐ SUFFICIENT ☐ NOT SATISFACTORY ☐ POOR

8. HOW DOES THE CURRICULUM DESIGN OF THE COLLEGE MATCHES THE BEST IN THE STATE?

☐ FINE ☐ NEED IMPROVEMENT ☐ POOR

9.STUDENTS CENTER?

☐ EXCELLENT ☐ GOOD ☐ SATISFACTORY ☐ POOR

19(A). CAN YOU GIVE YOUR OPINION ABOUT INTERACTION OF THE COLLEGE WITH INDUSTRIES?

☐ EXCELLENT ☐ GOOD ☐ SATISFACTORY ☐ POOR

19(B) INDICATES HOW MANY INDUSRIAL VISITS / TRAINING UNDERGONE BY YOU?

☐ INDUSTRIAL VISIT ☐ INDUSTRIAL TRAINING

20. GIVE YOUR OPINION ABOUT THE BUREAU OF HIGHER STUDIES PROVIDED IN THE COLLEGE?

☐ CONDUCT FREQUENT GUIDANCE SEMINAR ☐ NON EXISTING ☐ HELPS WHEN CONDUCTED.

21. IS THERE ANY CONTINUING EDUCATION CELL AVAILABLE? YES/NO IF YES, WHAT LEVEL OF SERVICE PROVIDED

☐ DIPLOMA ☐ DEGREE ☐ POST GRADUE ☐ COMMON PEOPLE

22.HOW DO YOU RATE THE OFFICE SERVICE PROVIDED BY THE COLLEGE?

☐ EXCELLENT ☐ GOOD ☐ SUFFICIENT ☐ POOR

23. GIVE YOUR OPINION ABOUT CO-CURRICULAR ACTIVITES IN TERMS OF NUMBER OF OPPURTUNITIES GIVEN?

☐ GOOD ☐ NEED IMPROVEMENT ☐ SATISFACTORY ☐ POOR

24. HOW MANY CHANCES ARE GIVEN TO PARTICIPATE IN THE EXTRA - CURRICULAR ACTIVITES IN THE COLLEGE?

☐ GOOD ☐ NEED IMPROVEMENT ☐ SATISFACTORY ☐ POOR

25.WHAT IS YOUR OPINION ABOUT PARKING FACILITIES IN THE COLLEGE?

☐ EXCELLENT ☐ GOOD ☐ SUFFICIENT ☐ POOR

26. HOW CAN YOU RATE CAMPUS ENVIRONMENT IN THE COLLEGE?

☐ EXCELLENT ☐ GOOD ☐ SUFFICIENT ☐ POOR

HOW MANY GREEN FIELDS ARE AVAILABLE?

☐ ☐

ANY OTHER INFORMATION (USE THE BACKSIDE).

DEPARTMENT:

YEAR:

SEX: ☐ MALE ☐ FEMALE

10. HOW CAN YOU RATE THE HOSTEL FACILITIES PROVIDED BY THE COLLEGE?

☐ EXCELLENT ☐ GOOD ☐ SATISFACTORY ☐ POOR

11. GIVE YOUR OPINION ABOUT THE MESS SERVICE PROVIDED BY THE MANAGEMENT?

☐ EXCELLENT ☐ GOOD ☐ SATISFACTORY ☐ POOR

12(A). ARE THERE ENOUGH MATERIAL AVAILABLE IN THE COOPERATIVE STORES?

☐ SUFFICIENT ☐ NOT SUFFICIENT

(B). IF NOT SUFFICIENT, WHAT ARE THE ITEMS RECOMMENDED?

13(A). HOW CAN YOU RATE THE PLAY GROUND/ROAD FACILITIES PROVIDED BY THE COLLEGES?

☐ EXCELLENT ☐ GOOD ☐ SUFFICIENT ☐ POOR

13(B). IF POOR, WHAT DO YOU WANT TO BE IMPROVED?

14. WHAT IS YOUR OPINION ABOUT GYM & YOGA CENTER IN THE COLLEGE?

☐ WASTE OF TIME & MONEY ☐ HELPS TO IMPROVE ☐ NEED MORE SUCH PROGRAMS

15 .ARE THERE ENOUGH REPROGRAPHICS/XEROX FACILITIES IN OUR COLLEGE?

☐ EXCELLENT ☐ GOOD ☐ SUFFICIENT ☐ POOR

16.CAN YOU GIVE YOUR OPINION ABOUT THE STD/POSTAL FACILITIES?

☐ EXCELLENT ☐ GOOD ☐ SUFFICIENT ☐ POOR

17.WHAT IS YOUR OPINION ABOUT BANK FACILITIES IN THE COLLEGE?

☐ SUFFICIENT ☐ NOT SUFFICIENT

18.WHAT IS YOUR OPINION ABOUT MEDICAL FACILITIES IN THE COLLEGE?

☐ EXCELLENT ☐ GOOD ☐ SUFFICIENT ☐ POOR