

## Quality Function Deployment for Customer Satisfaction in Banking Services

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**Abstract:** Today's customers are quality concerned. For a manufacturer or service provider, it is really a challenge to tune up their product or services with all desirable or even unseen qualities. The paper focuses on the application of quality function deployment on a typical service through designing the house of quality matrix. Demanded qualities are captured by using a questionnaire survey designed in a semi-structured way on the basis of Likert's 5-scale technique. As customers drive manufacturers or service providers to add values, proper care has been given to grab their reactions and then the requirements have been put into the HOQ (House of Quality) that ultimately gives us the solution. The findings are very straightforward. The paper seeks the answer of how a service provider can ensure more customer satisfaction. Customer requirements are prioritized with the technical descriptors to satisfy them in a more focused way. The method is practically applicable to any type of service or manufacturing companies. If you take care of your customers, they will take care of you. Let your customers know that you are listening to them and giving proper feedback.

### 1. Introduction

Quality Function Deployment (QFD) is a way of making the 'voice of the customer' heard throughout an organization. It is a systematic process for capturing customer requirements and translating these into requirements that must be met throughout the 'supply chain'. The result is a new set of target values for designers, production people, and even suppliers to aim at in order to produce the output desired by customers. QFD is an important tool for translating the voice of customer into product's specification (Aka, 1990; Clausing, 1994; Cohen, 1995). It has been widely used for product development and quality improvement around the world. It is a customer-oriented approach, supporting design teams in developing new products based on an assessment of customer needs. Basically, in the QFD, customer needs are translated into design attributes. To begin the design process in the QFD, the design team needs to listen to the voice of the customer.

Satisfied customers are the key to successful competition. However, how do you incorporate the customer's spoken, unspoken, present, and future needs into your

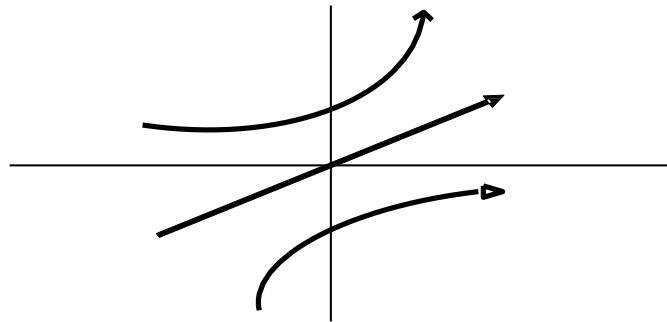
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company's products or services? Many organizations have found the answer in QFD. Different types of customers' needs and level of satisfaction in terms of the degree of requirements' fulfillment may be analyzed by using the Kano Model as presented in Figure 1. Various research studies report that customers are more satisfied when they have their unspoken demands (non-voice) fulfilled from a typical product or service.

**Figure 1: Kano Model (Adapted)**



The voice of the customer contains the customer needs expressed in their own words. It can be captured through questionnaire, observation and so many other ways for an existing product or service. However, for a new product, questionnaire will be the only way in most of the cases. From the responses as collected, the team will identify the level of satisfaction of customers. If the satisfaction level is so poor, customers' grievances should immediately be heard. Customers will not spend a single penny in the long run to purchase dissatisfaction. Even if the customers are satisfied, their voice should be considered to make them more satisfied. The House of Quality is the most commonly used tool in the QFD methodology (Tan & Shen, 2000). This matrix translates the voice of the customer into product specifications. The paper deals with designing a house of quality as a QFD tool to capture voice of customers that leads to devising the way out for ensuring more satisfaction. The use of QFD in manufacturing industry is very common, and from such an assumption, here QFD is used in a service industry to devise out the way of ensuring more customer satisfaction.

## 2. Methodology

The paper is a conceptual one based on both primary and secondary data. As a quality assurance tool, QFD is widely used in Total Quality Management (TQM) literature. Thus, the theoretical foundation of the paper comes from various secondary sources like

texts on TQM, scholarly articles, quality magazines, article features, published and unpublished papers etc. The research methodology as used here is very much proactive. We have used a questionnaire designed on Likert's 5-point scale; where two extreme values 1 represents unsatisfactory and 5 represents highly satisfied. We have used the scaling technique to quantify qualitative reactions from the customers. Three banks are selected for the study, i. e., BRAC Bank, Hong Kong Shanghai Banking Corporation (HSBC) and Dutch Bangla Bank Limited (DBBL). The banks are similar in the sense that they all belong to third generation bank. The study based on the assumption that BRAC Bank, DBBL belongs to same category, and HSBC belongs to upper category. Such categorization solely based on the responses of the customers. In our study, we have used BRAC Bank as our bank, DBBL as a competitor that bears similar status and HSBC as a bank for benchmarking.

The three banks are selected purposively whereas selection of the sample of customers are not so. First, we have selected Dhaka City only to collect the responses as most of the third generation banks have their basic operation concentrating Dhaka City. Dhaka is the capital city of Bangladesh. Secondly, we have selected three commercially posh areas in the city to trace our targeted customers for response, i. e., Dhanmondi, Gulshan, and Uttara. All of the three selected banks have branches over there. We have collected the responses of 300 customers through the questionnaires, approximately 100 customers belongs to each bank. Some of the customers have overlapping accounts that, we believe, give us a comparative status of the banks and help us to draw a clear conclusion. Customers questioned have various types of accounts, i. e., current, time and savings deposit. In addition, we believe that 300 customers are good enough to grasp the voice of the customers and they rightly represent the total population. As the questions are asked and filled up by the authors, the error depends on the personal feelings of the respondents and obviously, that is also a 'Voice of Customer'.

### **3. Quality function deployment**

QFD was developed in Japan in the late 1960s by Professors Shigeru Mizuno and Yoji Akao. Their purpose was to develop a quality assurance method that would design customer satisfaction into a product *before* it was manufactured. Previously, quality was controlled during or after manufacturing.

Quality Function Deployment (QFD) is a means of translating customer requirements into the appropriate technical requirements for each stage of product or service development and production. This approach seeks answers to the following six questions:

**Voice of the customer:** What do our customers need and want?

**Competitive analysis:** In terms of our customers, how well are we doing relative to our competitors?

**Voice of the technical team:** What technical measures, relate to our customers' needs?

**Correlations:** What are the relationships between the voice of the customer and the voice of the Technical Team?

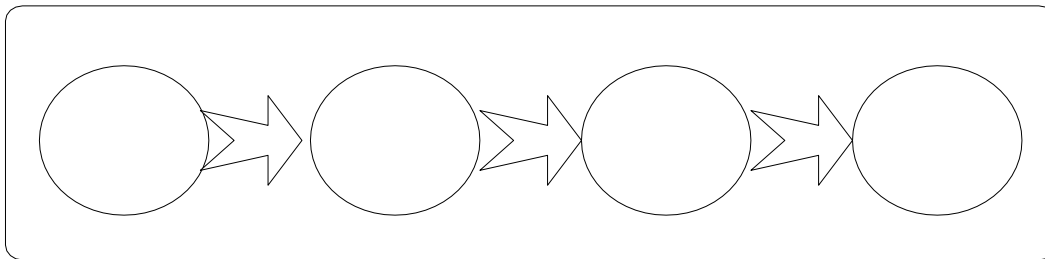
**Technical comparison:** In this comparison, product or service performance compares to the competitors to identify the improvement needs and to guide the design of the product or services.

**Trade offs:** What are the potential technical trade-offs?

#### 4. Quality function deployment phases

QFD is essentially a process where customers' voice is translated into design attributes. A typical QFD process has four successive phases as depicted in Figure 2.

**Figure 2: QFD Process**



4.1 Product planning: This phase begins with customer requirements. A set of design requirements is determined, which, if satisfied, will result in achieving customer requirements.

4.2 Product development: It involves design /redesign and fabrication of new or modified product and then testing it to find its usefulness. Product development is essential in order to meet changing consumer needs, maintain sales position and profit margin etc. The various steps involved in developing a product are given below (Khanna, 1992);

- get new ideas
- evaluate ideas technically
- evaluate ideas from market's point of view
- take the final decision
- get into production and
- introduce product into the market

4.3 Process planning: Process planning is the systematic determination of the methods by which a product is to be manufactured economically and competitively. When a product is designed, certain specifications are established; physical dimensions, tolerances, standards, and quality are set forth. Then it becomes a matter of deciding the specific details of how to achieve the desired output. This decision is the essence of process planning.

4.4 Production planning: Finally, production requirements are determined from key process operation. This phase ends with prototyping and production launch.

### **5. House of quality: As a QFD tool**

The primary tool used in QFD is the house of quality. The house of quality translates the voice of the customer into design requirements that meet specific target values and matches those against how an organization will meet those requirements. It is a collection of six interrelated matrices clustered in such a way that essentially gives shape of a house having boundaries, pavements, ceiling, roof etc. as shown in Figure 3. Different parts of the house of quality are stated below:

**5.1 The customer attributes:** The left exterior walls of the house represents customer requirements determined by the market research is essentially the Voice of the Customers.

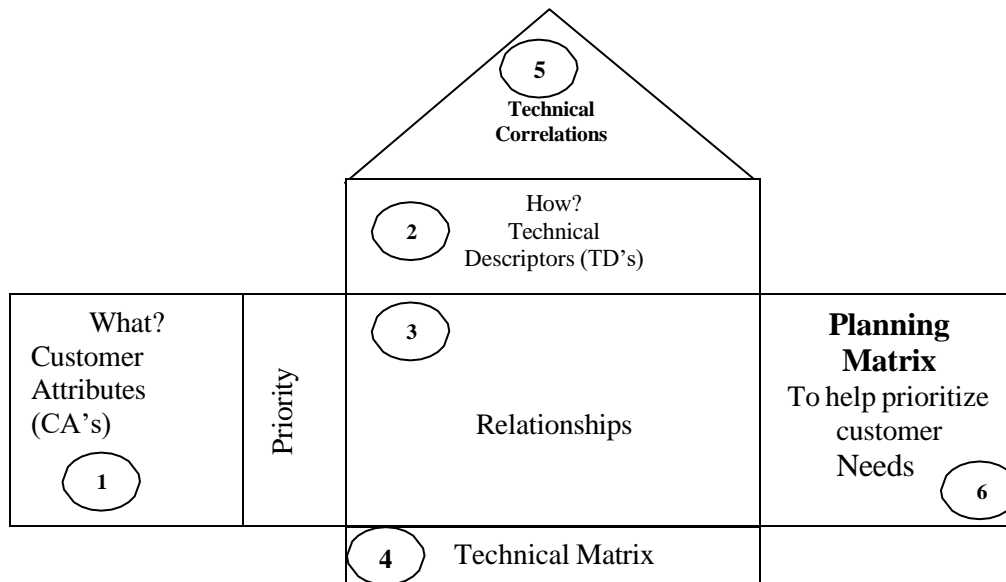
**5.2 The technical descriptors:** The ceiling or second floor, of the house contains the technical descriptors describing how the product may achieve its required performance in general terms which are not solution specific that represents the Voice of the Designer.

**5.3 Relationships:** The interior walls of the house are the relationships between customer attributes and technical descriptors indicating where there are strong, moderate or weak relationships.

**5.4 Technical matrix:** The foundation of the house is the prioritized technical descriptors based on the relationships between customer attributes and technical descriptors.

**5.5 Technical correlations:** The roof of the house is the technical correlations representing the interrelationship between technical descriptors. This correlation is important to show to what extent the technical descriptors may be mutually supporting and contradictory.

**5.6 Planning matrix:** On the right side are the prioritized customer requirements or planning matrix providing quantitative market data for each of the customer attributes based on user research, competitive analysis or team assessment.



## 6. Building a house of quality

Building a house of quality is not a simple task. Marketing experts, quality team (or, say, QFD team), and technical experts should work collectively to design the house that will ensure better quality for the customers. However, the designing of a house of quality follows seven consecutive steps as mentioned below:

Step 1: List Customer Requirements (WHATs)

Step 2: List Technical Descriptors (HOWs)

Step 3: Develop a Relationship Matrix between WHATs & HOWs

Step 4: Develop an Interrelationship Matrix Between HOWs.

Step 5: Competitive Assessments

Step 6: Develop Prioritized Customer Requirements.

Step 7: Develop Prioritized Technical Descriptors.

## 7. QFD Implementation through house of quality

### Step 7.1: List customer requirements (WHATs)

Quality function deployment starts with a list of customer requirements (WHATs) that a customer requires from a particular product or service. A primary customer requirement may encompass numerous secondary customer requirements. Although the items on the list of secondary customer requirements represent detail than those on the list of primary customer requirements, they are often not directly actionable by the engineering staff and require extension. Primary and secondary requirements of customers in bank have been

identified and extended further for more specific requirements under the head of tertiary requirement, which is not included in the appendix. Table I shows the weights put by the customers with reference to various hierarchy of customer requirements.

**Table I: Status of customer requirements across the banks**

CUSTOMER REQUIREMENTS	AVERAGE SCORE BASED ON 1 – 5 SCALE		
	DBBL	BRAC	HSBC
<b>AESTHETICS:</b>			
• Image	4	4	4
• Branches	4	4	3
• Employees	4	3	4
<b>PERFORMANCE:</b>			
• Relationship with Customers	3	3	4
• Cost Effectiveness	4	4	4
• Manual/Real Time	4	3	4

**Step 7.2:** List of technical descriptors (HOWs)

The QFD team must come up with engineering characteristics or technical descriptors (HOWs) that will affect one or more of the customer requirements. Each characteristic must directly affect a customer perception and be expressed in measurable terms. These technical descriptors have been divided into primary and secondary characteristics. The technical staffs are responsible for determining the technical descriptors.

**Step 7.3:** Development of a relationship matrix between WHATs and HOWs

Such a matrix traces the relationships between the customer requirements and technical descriptors that may be very confusing. Each customer requirement may affect more than one technical descriptor, and vice versa. The strength of the relationship is indicated by coded symbols with values and meanings as follows (Rao et al., 1996).

Symbol	Value
○	9 (very Strong)
□	3 (strong)
△	1 (weak)

**Step 7.4:** Development of an interrelationship matrix between HOWs

The roof of the house of quality, called the correlation matrix, is used to identify any interrelationship between each of the technical descriptors. Specific symbols are used to describe the strength of the interrelationships: for example,

1. A solid circle (●) represents a strong positive relationship;
2. A circle (○) represents a positive relationship;
3. A cross (X) represents a negative relationship; and
4. An asterisk (◆) represents a strong negative relationship

#### Step 7.5: Competitive assessments

The competitive assessment tables separated into two categories, customer assessment and technical assessment. The numbers 1 through 5 are listed in the competitive evaluation column to indicate a rating of 1 for the worst and 5 for the best. The customer competitive assessment contains an appraisal of where an organization stands relative to its major competitors in terms of each customer requirement. The technical competitive assessment is often useful in uncovering gaps in engineering judgment.

#### Step 7.6: Development of prioritized customer requirements

Prioritized customer requirements contain columns for importance to customer, target value, scale-up factor, sales points, and an absolute weight. The QFD team ranks each customer requirement by assigning it a rating. Numbers 1 through 10 are listed in the importance to customer column to indicate a rating of 1 for least important and 10 for very important. The target value column is where the QFD team decides whether they want to keep their product unchanged, improve the product, or make the product better than the competitors.

The scale-up factor is the ratio of the target value to the product rating given in the customer competitive assessment. The sales point tells the QFD team about how well a customer requirement will sell. The sales point is a value between 1 and 2, with 2 being the highest. Finally, the absolute weight is calculated by multiplying the importance to customer, scale-up factor and sales point.

#### Step 7.7: Development of prioritized technical descriptors

Prioritized technical descriptors contain degree of difficulty, target value, absolute and relative weight. The degree of difficulty helps to evaluate the ability to implement certain quality improvements. Target value measures values that must be obtained to achieve the technical descriptor.

The absolute weight for each technical descriptor is determined by taking the dot product of the column in the relationship matrix and the column for importance to customer. The relative weight for each technical descriptor is determined by taking the dot product of



the column in the relationship matrix and the column for absolute weight in the prioritized customer requirements. Higher absolute and relative ratings identify areas where technical efforts need to be concentrated.

## **8. The study findings (Through the process of house of quality)**

From the previous discussion, it is evident that for completing the HOQ, we need some calculations to fit into the house. This section is devoted to those algorithms required for completing the HOQ.

**8.1 Prioritized customer requirements:** This section consists the following factors and their calculations have been shown below:

Importance to customer: The QFD team ranks each customer requirements by assigning it a rating number of 1 through 10 and are listed in the importance to customer column. The more important the customer requirement, the higher the rating is.

Target value: This column is where the QFD team decides whether they want to keep their product unchanged, improve the product or make the product better than the competitors. For instance, target value 5 has been set for 'image', which is more than DBBL and HSBC bank. Therefore, BRAC Bank needs to improve their feature in this particular situation.

Scale-up factor: The scale-up factor is determined by dividing the target value by the product rating given in the customer competitive assessment. For instance, if 'relationship with customer' has a product rating of 8 and the target value is 4, then the scale-up factor is 2.

Sales point: The objective here is to promote the best customer requirement and any remaining customer requirements that will help in the sale of the product. For example, the sales point is a value between 1 and 2, with 2 being the highest. The sales point 2 has been set for 'relationship with customers' that is the highest value and it will be the one of the best selling point.

Absolute weight: Finally, the absolute weight is calculated by multiplying the importance to customer, scale-up factor, and sales point. For instance, absolute weight for 'employees' is calculated as 40.5 ( $9 \times 2.25 \times 2$ ). Finally, the customer requirements have been prioritized in order of absolute weight; e.g.; employees and manual/real time has been ranked as number one for carrying the highest absolute weight.

**8.2 Prioritized technical descriptors:** These technical descriptors contain degree of technical difficulty, target value, absolute weight and relative weight and calculation of each factor has been shown below:

**Technical difficulty:** The degree of difficulty is determined by the technical team rating from 1 (least difficult) to 10 (very difficult).

**Target value:** This column is where the QFD team decides whether they want to keep their product unchanged, improve the product or make the product better than the competitors. For instance, target value 4 has been set for 'employee selection' that is equivalent to HSBC bank. That means, BRAC bank (our bank) should improve this technical descriptor.

**Absolute weight:** The absolute weight for each technical descriptor is determined by taking the dot product of the column in the relationship matrix and the column for 'importance to customer'. For instance, for waiting time analysis is  $3 \times 7 + 3 \times 9 + 9 \times 8 + 9 \times 8 + 9 \times 9 = 273$ .

**Relative weight:** The relative weight for each technical descriptor is determined by taking the dot product of the column in the relationship matrix and the column for absolute weight in the prioritized customer requirements. For instance, for 'employee selection' the relative weight is calculated as 1075 ( $3 \times 14.7 + 3 \times 13.5 + 9 \times 40.5 + 9 \times 32 + 9 \times 24 + 3 \times 40.5$ ). Higher absolute and relative ratings identify areas where technical or engineering efforts are required (Besterfield et. al, 1999). See figure number 4.

A careful study of the HOQ matrix as depicted in Figure 4 give us the prioritized customer requirements and technical descriptors in response to those customer requirements. The findings are presented in the following table (Table II).

**Table II:**

Rank	Prioritized Customer Requirements		Prioritized Technical Descriptors		
	Customer Requirements	Absolute Weight	Technical Descriptors	Absolute Weight	Relative Weight
1	Employees	40.5	Employee Selection	291	1075
2	Manual/Real Time	40.5	Waiting Time Analysis	273	1034
3	Relationship with Customers	32.0	HR Development	273	1034



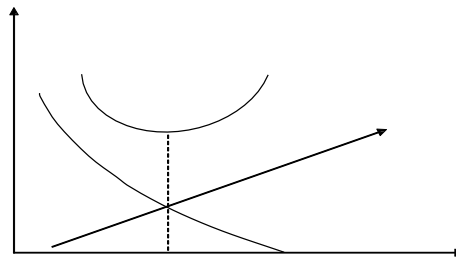
## 9. Recommendations

The findings section is important for the banks to decide about ‘what to do’ and ‘what not to do’ for satisfying their customers. HOQ concludes the customer requirements in a prioritized way to show which requirements should be fulfilled at the very beginning to have customers satisfied and also devises the way (technical) to do that. Now, it is the company itself to decide over the issue. Our recommendations from the analysis follow:

9.1. To ensure customer satisfaction, taking care of employees is a must. Employees are the internal customers who satisfy the external customers continuously. Thus, organizations should take care of their employees first with utmost care. The process starts from employee selection. The selection process should be rigorous enough with no flexing and ‘Zero Tolerance’. HRM implementation significantly affects the Total Quality Management (TQM) practices of “culture change and development” and “customer satisfaction. management” (*Ching-Chaw-Yong, 2006*). It is wise to remember that the degree of employee satisfaction affects the degree of customer satisfaction.

9.2. The second priority should be given on real time, which is focused on long queue in the line, time to handle irregular issues, and real time on-line banking. To solve this problem queuing model can be used. Therefore, average number of customers in the system, average time a customer spends in the system, average number of customers in the queue, average time a customer spends waiting in the queue, utilization factor for the system, and percent of idle time can be computed. Therefore, management will be able to take right decisions for reducing real time in the system if properly implemented. The goal of queuing model is to find the optimum service level at lowest total expected cost (*Barry & Ralph, 1997*) as given in Figure 5.

**Figure 5: Optimum service level**



Source: Barry & Ralph, p. 651

9.3. The third prioritization should be given on customer relationship management. Relationship marketing is imperative to give emphasis on how customers are treated and

dealt with. Relationship marketing is based on the premise that important accounts need identified, focused and continuous attention. Employees should monitor key accounts, know their problems, and be ready to serve them in a number of ways, sometimes even over the phones. If relationship management program is properly implemented, the organization will begin to focus as much on managing its customers. Therefore, automatically supplier (banker)-customer relationship will be built-up. (Kotler,1999). Customer defections (customers lost due to the competition) have a substantial effect on profits and cost, more than market share, economies of scale, or unit costs. If a relationship is established, the marginal cost of each additional dollar of services diminishes. Improving the processes and reducing the process variations that reduce customer defections can be perceived not as a cost but as an investment. (Ross, 1999).

## 10. Conclusion

Quality Function Deployment is based on the philosophy that the 'voice of customer' drives all company operations. This total quality management technique seeks to identify those features of a product or service, which satisfy the real needs and requirements of customers. It is usual to express the customers' needs in their original words and then translate these needs into the technical language of the organization.

It promotes the mechanism to target selected areas where improvement would enhance competitive advantage. Both manufacturing and service industries should implement quality function deployment to improve the process continuously to improve the products and services. Customers now-a-days are very choosy for spending pennies. Quality is the first and foremost preference. Even, they like to state that 'we are paying not for the product but for the value.' Therefore, it becomes a challenge for every company to pay heed to their customers continuously and also to show proper respects to their feelings. QFD is the right tool to listen to the customers and responding to what they want continuously. Once customers get the idea that they are rightly addressed, they will take care of you (the company).

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