

Implementation of Quality Function Deployment (QFD) for Indian Automobile sector: A Case Study

¹Hitesh Hooda, ²Naveen Khatak, ³Ravinder Kundu

¹Student, ²Assistant Professor, ³Guest Faculty

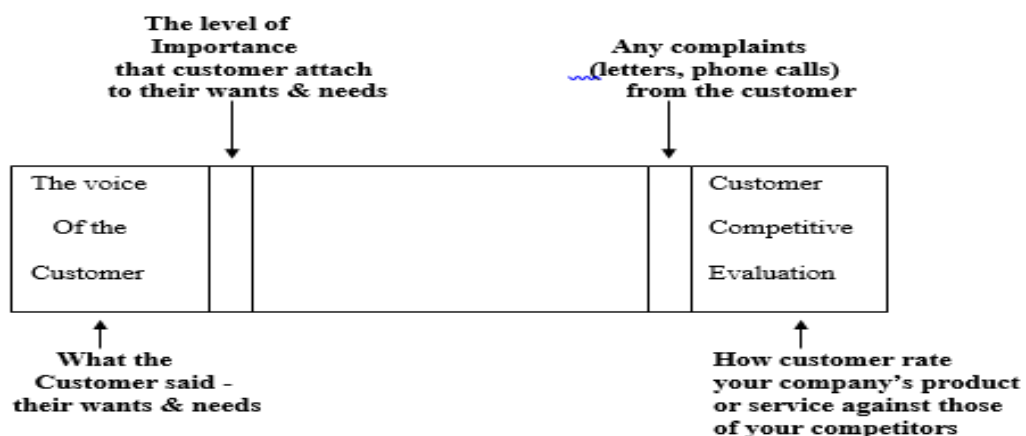
^{1,2,3}Department of Mechanical engineering,
University institute of Engineering and Technology ,Rohtak,Haryana-124001.

Abstract : Quality Function Deployment (QFD) has been an excellent tool to develop or modify the product or production procedure according to the customer demands. It can be called as voice of customer. The QFD technique has been implemented in ABC Limited for small car section. The questionnaire was prepared and circulated among the dealers and service centers of the company. The existing clients and the new customers were targeted to collect the data. The data was mathematically examined and the absolute ranking was given to the parameters.

Keyword –R&D, Quality Function Deployment (QFD),Design, QFD Matrix., ignition ,insert.

I. INTRODUCTION

Organizations generally begun in light of the fact that their originators perceive a client need and accept that they can fulfill it superior to different Companies. Most organizations comprehend the requirement for proceeding with client contact. They challenge their deals and advertising individuals to be mindful of consumer loyalty with their items and administrations and of any changing Customer Needs. A few organizations use Questionnaires to create proportions of consumer loyalty. Judgments produced using deals and showcasing data sources are generally founded on discussions as opposed to any organized and reliable addressing approach. Grumbings about existing items speak to clear disappointment with the current items highlights, execution or administration. To ensure proceeded with business achievement each organization ought to have forms set up to continually screen and refresh its information of its clients needs, needs and levels of fulfillment. Since it is clients who must purchase the items and who must be happy with it, the item should be created with their needs and needs as the chief contributions to the new item improvement venture. People in the United States have a fascination with new ideas and tools. There are problems and challenges in any business, so when a new tools appears on the scene, there is always a hope that this will represent a solution. Experience shows that most of these tools tend to have a half-life of about 2 years. Some tools such as Statistical process control (SPC) do survive and are resurrected many years later, and they are often observed to work well in another industry or concern. The curve labeled “reactive represents the U.S Company’s experience, the curve representing the Japanese company is labeled “Proactive”. The reactive curve shows that there are few changes in the early stages of PDC. QFD is not a toll but it is a planning process that provides basis for the development cycle. It assists an organization to achieve its desired goal by effective utilization of its resources. It can help in focusing the customer concern areas such as the team involvement and the use of special propose tools can be most fruitful so that maximum customer satisfaction can be gained. QFD is Customer driven process enables utilization of all the resources to reduce implementation time. The QFD Matrix has two boss parts. The even piece of the matrix contains information relative with the customers. The vertical piece of the structure contains particular information that responds to the



client inputs.

Figure 1: QFD Matrix

The voice of the client is the fundamental information required to start a QFD venture. The client's significance rating is a proportion of the relative significance that client allocate to every one of the voices. The client's focused assessment of the organization's item (or administration) allows an organization to see how its client rates its item on a numerical scale. The study procedure aims at deciding the customers needs. This might be alluded to as the Customer's necessities, or basically the voice of the customer. An association can get the voice of the customer in the quantity of ways once the issues of portions, socioeconomics, and strategy have been chosen. The process toward addressing individuals won't uncover everything engaged with understanding the customer's needs and needs. Crafted by 'Noritaki Kano' gives the model that encourages us comprehends the general range of customer desires and fulfillment. Some key issues engaged with working with the customer's voice are demonstrated. One effective way to group the voices is to use the 'Affinity Diagram' process. This is a simple and straightforward team process.

2.0 QFD implementation in Indian automobile sector: The visits have been made to ABC Limited (name changed due to company policy) in connection with the application of QFD to small segment car.

Development of QFD matrices for small segment car (ABC Limited)

Application of QFD includes the development of four matrices viz. House of Quality, Design Matrix, Operating matrix and control matrix. In this section the chapter development of these matrices is discussed.

Development of this matrix is done in the following steps

Step 1: Identification of Customer needs: The customer needs and priorities are found through Questionnaires and personal interviews. The customer at large belong to middle class, as small segment car has been chosen. The outcome of this exercise is 15 customer needs. Then through Brainstorming similar needs were clubbed under single heading to get the final customer needs, which are –

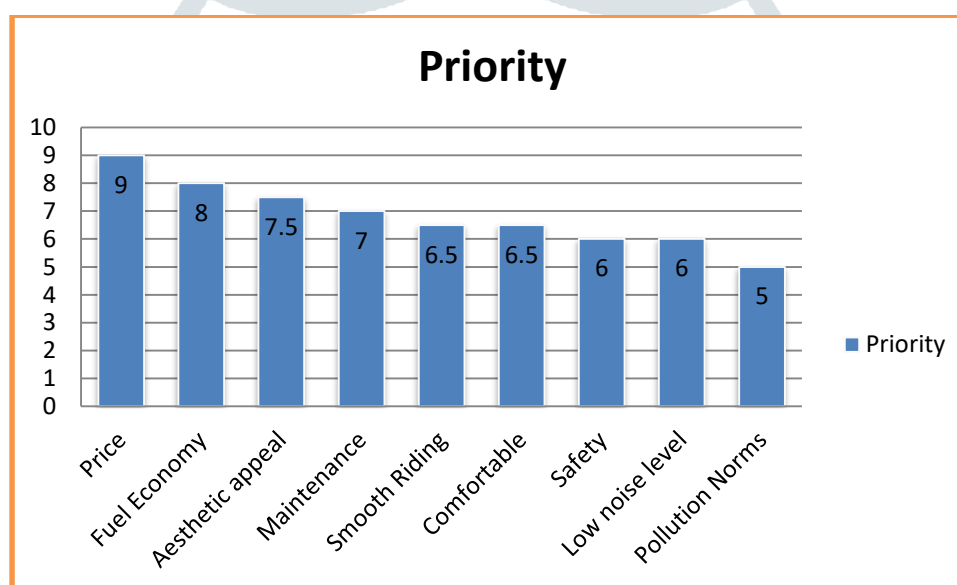
- Low price of the car
- Fuel Economy
- Safety
- Stability of car at high speeds
- Effective braking system
- Safety at the time of accident
- Pollution Norms
- Low noise level
- Aesthetic Appeal
- Maintenance
- Reliability
- Cost of spares
- Accessibility of dealers
- Smooth riding
- Comfortable

Step 2: Prioritizing the Customer Needs: These 9 customer needs were listed on a questionnaire and then it was distributed to the people for getting the relative priorities of these Customer need. Then these priorities were averaged for each of the customer need.

The final customer need and their priority are as follows:-

Customer Needs	Priority
Price	9
Fuel Economy	8
Aesthetic appeal	7.5
Maintenance	7
Smooth Riding	6.5
Comfortable	6.5
Safety	6
Low noise level	6
Pollution Norms	5

Table 1 : Customer Needs & Priorities



Step 3: Identification of design elements: First brainstorming was done with the faculty members to get the understanding of the engineering attributes for these customer needs. Then, a ABC car dealer was visited to discuss the related things. To get the final design attributes, ABC Ltd, Gurgaon, was visited. Through discussions with engineers of different departments, important design parameters required for fulfilling the customer needs are finalized, which are as follows :-

- Method of charge preparation
- Design of tyres
- Engine performance
- Material used and its thickness
- Types of Steering system
- Shape & size of the car
- Gearing system
- Suspension system
- Interior & exterior design
- Network of authorized service station
- Insulation type used for reducing the noise
- Pollution control method
- Type of Braking system

Step 4: The relationship between the customer needs and the design elements are established through brainstorming with research scholars and Engineers (ABC, Gurgaon).

Step 5: Calculation of Absolute Ranking of design elements : These are calculated as

$$(AR)_j = \sum ((CP) I \times (RL)_{ij})$$

n = Total No. of Customer Needs

For e.g. $(AR)_2 = 8 \times 1 + 6.5 \times 3 + 6 \times 3 = 46$

Similarly, others are calculated.

Step 6: Relative Ranking: To get Comparison on scale of 1 to 10, we scaled down absolute rankings by a common factor.

Discussion: From the Relative Rankings, the top 7 Design Parameters are identified.

These are-

Quality Characteristics	Absolute Ranking
1. Engine Performance	183
2. Interior & Exterior Design	115
3. Shape & size of the car	107
4. Material used & its Thickness	104
5. Method of Charge Preparation	95
6. Type of Steering system	96
7. Suspension System	92

From the above exercise important Design attributes of a small segment car are identified

Among these attributes the first four Design characteristics viz. Engine, Performance, Interior & Exterior Design, Shape & size of the car & material used & its thickness are the most important design parameters that must be properly integrated in the system to fulfill the customer needs. The engine performance outweighs all other design parameters, as it is strongly related to most of the customer needs.

Therefore, with the help of House of Quality, most important design parameters can be identified, which must be given importance to meet the customer requirements.

Conclusion

The article exercise is to demonstrate the application of QFD in the industry & service sector. The project has been carried out with an idea to become familiar with the QFD methodology and its application. The exercise carried out show the QFD application to various areas.

The basic methodology and approach of the QFD process is same for any area. There are product & services in the market & thus, project deals with both the sectors viz. Manufacturing & Service sector, in two phases.

The work includes the QFD application to small segment car of ABC Limited, Manufacturing sector. In this exercise starting with the customer requirements, priorities of Design elements were identified which helped in getting the relative importance of various components. Then, from these components manufacturing/ procurement priorities for these components were found out. Finally, from the production processes various control strategies for the implementation of processes were decided.

The field of QFD application is a new one and its use is increasing in every sector. Thus the project is going to be helpful for not only academic purposes but also for industrial purpose. The exercise done will give guidelines in future, for application of QFD to various sectors.

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