

Mini-Tutorial

Quality Functional Deploement

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Introduction

The definition of quality means something different to everyone. Generally, quality can be defined as, meeting customer needs and providing value to them as well. Meeting customer's needs places an emphasis on techniques such as Quality Function Deployment (QFD) to help learn the needs of customers and help a company meet them.

Understanding the customer needs is then summarized in a planning matrix called "house of quality". These matrices are used to communicate upper level needs and lower level wants of the customer. The QFD matrix is a great communication tool, the matrices is only useful if is used effectively. To effectively gain the most value from the QFD matrix, all key departments must communicate as a team Such as: Customer Service, Marketing, Design Engineering, Quality Assurance, Manufacturing, Test, Finance, among others.

History

QFD was developed in Japan in the late 1960s by Professors Shigeru Mizuno and Yoji Akao. Shigero and Yoji wanted to develop a method that would design customer's needs into a product before it was manufactured. In 1966, Kiyotaka Oshiumi of Bridgestone Tire in Japan, used fishbone diagram to identify customer needs and to identify design characteristics to manufacture their products. The Mitsubishi company took his one step father when designing an oil tanker at the Kobe Shipyards. They used the fishbone diagrams to form a matrix of customer needs, engineering requirements and quality control aspects of manufacturing. In addition to this, Katsuyoshi Ishihara introduced the Value Engineering principles. The combination of these two ideas was the basis for QFD that is used to day in the world market. In the 1980's the American automotive manufacturers were the first western companies to use QFD in there manufacturing centers.

Necessary steps

There is some documentation that describes QFD in as little as 4 steps. And on the other end of the spectrum there is descriptions of QFD as an infinite work in progress. Listed below is an eleven-step description of QFD from Becker Associates, which I found to be quite good at explaining QFD.

The first step, Customer Requirements: determine what market segments will be analyzed during the process and to identify who the customers are. The team then gathers information from customers on the requirements they have for the product or service. In order to organize and evaluate this data, the team uses simple quality tools like Affinity Diagrams or Tree Diagrams. Develop product concepts to satisfy these requirements.

Step two, Regulatory Requirements: Not all product or service requirements are known to the customer, so the team must document requirements that are dictated by management or regulatory standards that the product must adhere to. Partition system concept or architecture into subsystems or assemblies and flow-down

higher- level requirements or technical characteristics to these subsystems or assemblies.

Step three, Customer Important ratings: on a scale from 1 - 5, customers then rate the importance of each requirement. This number will be used later in the relationship matrix.

Step four, Customers Rating of the Competition: Understanding how customers rate the competition can be a tremendous competitive advantage. In this step of the QFD process, it is also a good idea to ask customers how your product or service rates in relation to the competition. There is remodeling that can take place in this part of the House of Quality. Additional rooms that identify sales opportunities, goals for continuous improvement, customer complaints, etc., can be added.

Step five, Technical Descriptors: The technical descriptors are attributes about the product or service that can be measured and benchmarked against the competition. Technical descriptors may exist that your organization is already using to determine product specification, however new measurements can be created to ensure that your product is meeting customer needs.

Step six, Direction of Improvement: As the team defines the technical descriptors, a determination must be made as to the direction of movement for each descriptor.

Step seven, Relationship Matrix: The relationship matrix is where the team determines the relationship between customer needs and the company's ability to meet those needs. The team asks the question, "what is the strength of the relationship between the technical descriptors and the customers needs?" Relationships can either be weak, moderate, or strong and carry a numeric value of 1, 3 or 9.

Step eight, Technical Analysis of Competitor Products: To better understand the competition, engineering then conducts a comparison of competitor technical descriptors. This process involves reverse engineering competitor products to determine specific values for competitor technical descriptors.

Step nine, Target Values for Technical Descriptors: At this stage in the process, the QFD team begins to establish target values for each technical descriptor. Target values represent "how much" for the technical descriptors.

Step ten, Correlation Matrix: This room in the matrix is where the term House of Quality comes from because it makes the matrix look like a house with a roof. The correlation matrix is probably the least used room in the House of Quality; however, this room is a big help to the design engineers in the next phase of a comprehensive QFD project. Team members must examine how each of the technical descriptors impact each other. The team should document strong

Many companies have reported several benefits to using QFD. Toyota Auto Body reduced start-up losses by 61% and Mazda reduced late design changes by half. US and European companies have reported such results as well.

Here are some examples of how QFD helped companies from around the world.

- When CFCs were banned as a propellant, QFD helped us reformulate without sacrificing customer satisfaction.
- We're developing such new technology; QFD assured we could meet customers' needs.
- Our main customer was reducing its number of suppliers by half; QFD helped us make the cut.
- International business is our future; QFD lighted the path to foreign markets.
- Our product is a commodity; QFD designed a technical support strategy to differentiate ourselves.
- With QFD we can prioritize our goals and objectives to select the best strategies, technologies, and vendors.
- We configured our space-age robotics into an award-winning attraction at Jurassic Park. QFD brought it to life.
- Traditionally a build-to-spec component supplier, QFD helped us see opportunities to develop products in advance of customer demand.
- To lower cost and increase reliability, we want to reuse as many common parts as possible. QFD has given us the means to differentiate components where there is customer value, and commonize those those that are invisible to the user.
- To develop a hybridized product from two of our best selling lines, QFD helped us include the most important features from each.

Other companies that have used QFD include 3M, AT&T, Accenture, Boeing, DaimlerChrysler, EDS, Ford, GM, Hewlett-Packard, Hughes, IBM, Kodak, Lockheed-Martin, Pratt & Whitney, Motorola, NASA, Nokia, Raytheon, Texas Instrument, United Technologies, Visteon, and Xerox.

Best place to get Information

With the proliferation of the Internet, it is by far the most useful resource for Quality Functional Deployment. There are numerous sites offering all the information you need to know regarding QFD. One of them most impressive feature I was in contact with was the availability of training. Several sites on the Internet have opportunities for purchasing training packages of even software package to help learn and implement QFD.

Work Cited

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