



## TenStep Supplemental Paper

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### **The Basics of Quality Function Deployment - The Voice of the Customer!**

For today's manufacturers, meeting customer expectations is no longer sufficient. Companies need to exceed these expectations. Because of this, listening to customers has taken on a new importance. Everyone in the organization, from the CEO to the person who directly interacts with the customer, must be aware of the customer's needs.

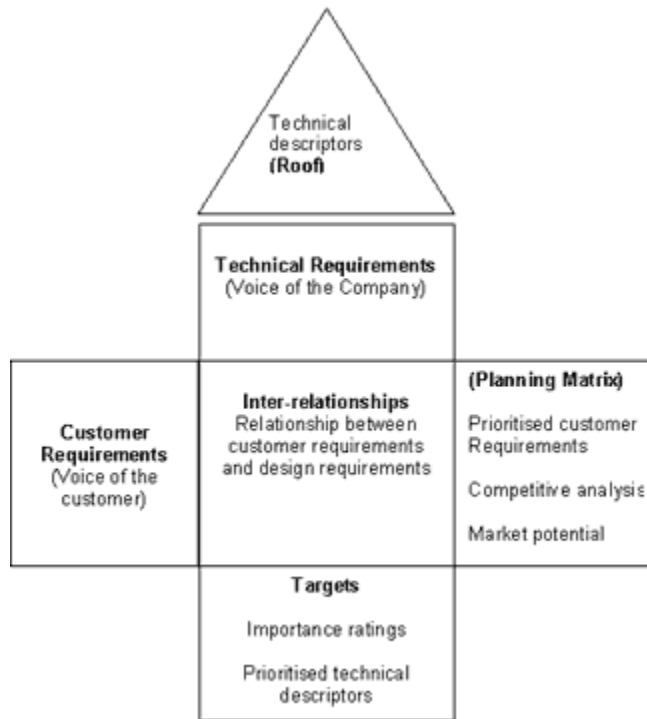
Quality Function Deployment (QFD) is a technique used to optimize the process of developing and producing new products on the basis of customer need. It is a team-based methodology used to identify and translate customer requirements into technical specifications for product planning, design, process, and production. In simple terms, it is used to transform customer requirements into company requirements.

#### **Background**

First introduced in Japan by Yoji Akao, the term Quality Function Deployment, also known as Voice of the Customer or House of Quality, was derived from its Japanese counterpart, hin shitsu (quality), ki nou (function) and ten kai (deployment). The QFD method was created by the Japanese to support the development process for complex products by linking the planning elements of design and the construction process to specific customer requirements. Over the years, QFD helped many companies to effectively meet customer requirements. This gave them the competitive edge. In recent years, QFD has been successfully applied both in the manufacturing and service-based sectors.

#### **QFD - The House of Quality**

QFD utilizes charts to arrange information in a simple yet comprehensive manner. A typical QFD chart looks like the one below. Because of the shape of the chart, QFD is also called the "House of Quality".



1. The left side of the house represents the customer’s requirements. This area is also referred to as ‘The Voice of the Customer’. It contains a structured list of requirements obtained through customer feedback, market research, and benchmarking studies. Feedback should come directly from the customer, as well as all organizations that touch the customer.
2. The top of the house (not the roof) shows the organization’s view, and is also called ‘The Voice of the Engineer’. This is the company’s view of “how” the customer requirements can be met. A set of relevant and measurable product characteristics is recorded here. For instance, the customer may say that they want an “error-free” product. This requirement is broken down into engineering characteristics (how) such as “reliability”, “consistency” and “availability”.
3. It is likely that not every customer require can be met fully. The right side of the matrix shows the planning considerations. This information is taken from customer-completed market surveys and includes the relative importance of customer requirements. It can also include information on what competitors are doing.
4. The center of the matrix represents the relationship between customer requirements and the detailed engineering characteristics. The QFD team must come to a consensus on the information noted here, so this step can be very time-consuming. Concentrating on key relationships and key requirements can help speed up this process.
5. The top part of the matrix (its triangular roof) represents the interrelationships between the engineering characteristics (top). This is used to identify the areas in

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which technical requirements either support or hurt each other in the product design. It is possible, for instance, that optimizing one requirement (system is never down) may hurt another requirement (keep costs low). If too many characteristics are in conflict, you would want to re-examine the customer requirements.

6. The bottom of the matrix indicates numerical rankings and targets. For instance, you can assign a numerical value to the detailed characteristics (top) depending on how many customer requirements the characteristic helps to meet. The numeric totals can be added up on the bottom to help prioritize which detailed characteristics are most important

### **Put it All in Perspective**

Note that the “house” diagram shown above is a simple drawing. The actual “house” you build for your product will be subdivided into many rows (for customer requirements on the left) and columns (for the engineering characteristics on the top). The rows and columns form a matrix in the middle where numerical values are applied and then totaled and prioritized on the bottom. The roof is used to understand which engineering support each other and which characteristics are at odds. The right side is used as input showing information for each row (customer requirements) such as the relative importance, and a check if the feature is a part of competitive products.

The information in the charts is collected from different sources (customer, engineering personnel, and production team among others), so it represents a very broad range of information. All this information, when put together, can help the organization to make the right decisions in terms of product features while at the same time realistically meeting customer requirements.

### **Benefits of QFD**

Some of the benefits of implementing QFD include:

- A better cross-functional understanding of product development and increased interaction between different departments.
- Easy conversion of customer requirements into the appropriate technical requirements for every aspect of product/service development and production. These include marketing strategies, planning, product design and engineering, prototype evaluation, production process development, production, and sales.
- Identification of holes in the product development team’s understanding of the product requirements.
- The ability to create a comprehensive collection of information within a few charts. This format helps the organization to make the right choices and appropriate trade-offs.
- The ease of using the information to make continuous improvements in product quality in the future.
- Reduced cycle times and development costs along with an increase in productivity.



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- Preventing the organization from incorporating unnecessary features into the product.
- Increasing the chances of product success when it is introduced into the market.

### Summary

Industry experiences reveal that short-term benefits of Quality Functional Deployment (QFD) include reduction in cross-functional barriers associated with product development teams and increased inter-departmental interactions. Long-term tangible benefits include reduction in cycle times and development costs along with increased productivity. The most important benefit of QFD has been its effectiveness in capturing, prioritizing and stabilizing customer requirements into the appropriate technical requirements for every stage of product/service development and production. These include marketing strategies, planning, product design and engineering, prototype evaluation, production process development, production and sales.