The Influence of Dr. Deming in QFD — part 2 of 3

This continues from the previous issue.

System of Profound Knowledge

System of Profound Knowledge is expressed by the "F" in **QFD**. Dr. Shigeru Mizuno, who cofounded QFD with Dr. Yoji Akao, applied function analysis to the product development organization in order to optimize its performance as a system.

This is critical for cross-functional teams because though they may share a common project goal, they are evaluated and rewarded by their functional managers. In other words, a purchasing department goal for 10% cost reduction could conflict with a costly new product feature that delivers the most value to the customer. QFD can deploy customer needs into cost targets to justify the need to spend more on certain components in order to deliver maximum "customer value."

Managing variation requires mathematical precision. While traditional QFD methods from the 1960s relied on ordinal scale numbers, **Modern QFD** has improved precision by converting to ratio scale numbers using Saaty's Analytic Hierarchy Process. Prioritization in multi-criteria decision making was advanced by the research of Dr. Thomas Saaty in the 1970s at the U.S. Department of Defense and later at the Wharton School of Business at the University of Pennsylvania.

Saaty found that decision makers facing a multitude of elements in a complex situation innately organized them into groups sharing common properties, and then organized those groups into higher level groups, and so on until a top element or goal was identified. This is called a hierarchy and when making informed judgments to estimate importance, preference, or likelihood, both tangible and intangible factors may be included and measured. The Analytic Hierarchy Process (AHP) was created to manage this process in a manner that captures the intuitive understanding of the participants and also yields mathematically stable results expressed in a numerical, ratio scale.

Process variation is a natural concern for customer satisfaction. In QFD, production, assembly, and service variation is addressed through statistical quality control, process improvement, and worker training, much as in every quality improvement effort. Function analysis of non-manufacturing processes including marketing, engineering, planning, etc. spread the quality message to all business activities that affect product quality.

Theory of Knowledge

Theory of Knowledge describes management's role in prediction. In QFD, product developers pair data from the market (voice of the customer) with data from company activities (voice of the process) in order to predict which internal processes (design, build, service) are most critical to satisfying the most important needs of the most important customers.

Knowledge of Psychology is also used to invigorate productive development teams by allowing downstream processes a role to play in upfront decision making that improves their work. Also, understanding customers and their work or life by analyzing their processes encourages new products that aim to improve customer and consumer experience. Thus, the demands of the customer become the external authority that aligns developers and builders to do their best.

Fundamentals of QFD

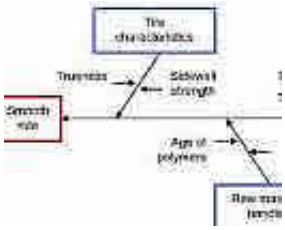
Traditional approaches to assuring quality often focus on solving problems within the work process, whether it is manufacturing, service, or software. However, consistency and an absence of problems are often insufficient to create lasting value for the customer, especially when customers are more demanding.

Quality Function Deployment (QFD) is a comprehensive quality system aimed specifically at satisfying the customer. It concentrates on maximizing customer satisfaction by seeking out both spoken and unspoken needs, translating these into actions and designs, and communicating these throughout the organization end-to-end.

Further, Modern QFD allows customers to prioritize their requirements and benchmark us against competitors, and then directs us to optimize those aspects of our product, process, and organization that will bring the greatest competitive advantage. With budgets, time, and personnel always limited, Modern QFD helps organization get their biggest bang for the buck by enabling a data driven approach to allocating constrained resources. Priorities can be derived using psychologically friendly judgments that can be transformed, based on sound mathematical principles, into proportioned weights they can be used to calculate money, man-hours, and staff.

Tools of QFD

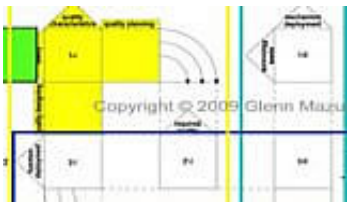
Early QFD models from the 1960s used cause-and-effect analysis diagrams to map customer needs into critical-to-quality characteristics (diagram below). The concept was that if the causes of negative outcomes could be diagrammed, couldn't the design elements that contribute to positive outcomes, such as customer needs, be identified the same way?



The simple diagram (the fishbone diagram, right) was replaced with a more comprehensive series of matrices, the first of which came to be called the **House of Quality** (HOQ, below right), due to its various "rooms" or attached tables. The HOQ matrix, however, remains one of the most misunderstood, misapplied quality tools. This point has been discussed extensively in case studies, lectures, and in this newsletter, so we will skip the topic here.

Other issues with Traditional QFD have also been addressed in the Blitz QFD® including filtering customer needs out of other Voice of Customer statements and using AHP to correct math problems resulting from improper use of ordinal scale numbers.

In **Modern QFD**, the HOQ and downstream matrices are now optional so that a limited scope of customer needs (top priorities) can be analyzed



end-to-end across the organization. In the HOQ and downstream matrices, hundreds of needs are often analyzed.

The diagram on the right illustrates the conceptual framework of the Voice of the Customer analysis using the **Maximum Value table**. It is here that the voice of the customer meets the voice of the engineers and organizational processes.

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