

The House of Quality for Product Service Design

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The House of Quality (HOQ) maps the WHATs representing desired customer product attributes (the customer's voice) into the HOWs – that is, technical characteristics as viewed by the development team. Unlike the classical HOQ recommended in the Quality Function Deployment methodology, in this work an enhanced HOQ is developed for the product and service design. An illustrative example for building an enhanced HOQ in a food processing company is presented. The enhanced HOQ was carried out by multidisciplinary representatives from the entire food supply chain.

1. Introduction

Service design is a form of conceptual design, which involves the activity of planning and organizing people, infrastructure, communication and material components of a service in order to improve its performances.

Edvardsson (1996) distinguished three main types of development: the development of the service concept, the development of the service system (resource structure) and the development of the service process.

Goldstein et al. (2002) defined the service concept as the 'how' and the 'what' of service design that helps mediate between customer needs and an organisation's strategic intent.

Bullinger et al. (2003) define Service engineering as a technical discipline concerned with the systematic development and design of services using suitable models, methods and tools. In contrast with new service development, which is strictly marketing-oriented, service engineering adopts a more technical-methodological approach, attempting to efficiently utilize existing engineering know-how in the area of traditional product development to develop innovative services.

Leading companies around the world have been using QFD since 1966. Its two-fold purpose is to assure that true customer needs are properly deployed throughout the design, building and delivery of a new product, and to improve the product development process itself (Akao and Mazur, 2003). Typically, the approach is described in terms of a four-phase model consisting of four successive stages or matrices: (1) an overall customer requirement planning matrix (also called the HOQ); (2) a final product characteristic deployment matrix; (3) a process plan and quality control charts; and (4) operating instructions. An HOQ maps the WHATs representing desired customer product attributes define VOC Voice of Customer (VOC) into the HOWs, the technical characteristics as viewed by the R&D staff; see (Chan, 2002) for an extensive review of the QFD literature.

Unlike the classical House of Quality (HOQ) recommended in the Quality Function Deployment methodology, in this work an enhanced HOQ is developed for the product and service design. An illustrative example for building an enhanced HOQ in a food processing company is presented.

2. Methodology

The enhanced HOQ plays here the role of the traditional HOQ but it is presented in a simplified format, i.e. without the typical benchmark comparisons with respect to the competitors' products and without its roof. The roof of the HOQ expresses the strength of the mutual relationships among the technical characteristics. These can be positive or negative and have an impact on the target values of the product characteristics, the bottom row of a classical HOQ matrix. Here no target values are considered, but only their relative importance.

An illustrative example (Figure 1) for building an enhanced HOQ using the QFD methodology in a food processing company is now presented. QFD is typically carried out by teams of multidisciplinary representatives from all stages of product development and manufacturing. For improving the understanding of the logical relationships in the enhanced HOQ in the investigated enterprise, a cross functional team was established. It included finance, market oriented, information systems and human resource members as well as industrial engineers and R&D representatives. Among its other tasks, the team organized the process of extracting input information from customers for the enhanced HOQ. Enhanced HOQ is related here to a major product of the company, whose design had to be improved. Typically, the work of the QFD team consisted in suggesting relevant performance measures as well as in assigning realistic values to the strengths of the relationships between the HOW and the WHAT performance measures within the enhanced HOQ matrix. A 5 points Likert scale was used for that purpose in the enhanced HOQ.

There are two inputs to this matrix. The first input (from top management) assigns relative weights to the two customer types (retailers and users). The second input (from customers) details the customers' desired product/service attributes (the WHATs) and their respective importance, assessed on a five points Likert scale. It is seen that the importance attributed by the customers to each desired performance is multiplied by the sales point. A high sales point (1.5) emphasizes the company's strategy with respect to selected product/service performances. The HOWs, i.e. the product/service technical performances are suggested by the R&D and IE representatives. They appear at two levels of detail. At the more abstract level it is seen that the product technical performances are quality oriented (design quality and process quality) while the service technical performances are time oriented and flexibility oriented. The output (bottom row) is the normalized importance of each product/service detailed technical characteristic, such as fat % or order modification.

3. Conclusions

Here are some implications of the methodology:

- The enhanced HOQ ensure that every product/service requirement defined by the customers is linked to a set of product/service technical performances that may eventually influence its future results.
- Through enhanced HOQ, priorities for improving product/service technical performances are determined.
- The enhanced HOQ matrix warrant that proposed learning actions are consistent with eventual customer desires.
- The enhanced HOQ systematic approach assists in organizing the quality of the design efforts thus promoting continuous improvement for customer satisfaction.

4. References

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Figure 1: The Enhanced House of Quality

		Product and service technical performances							Importance	Sales Point	Weighted Importance	
		Product characteristics (Quality)					Service characteristics					
		variation of % Solids	Calcium content	Fat %	Additives	Life length	(Time)	(Flexibility)				
							Delivery time	Package size variety				Order modification
Customer Perspective	Users (0.45)	Nutritious		4						3	1.16	
		Not fatty			5	2					5	1.38
		Fresh					5				2	0.9
		Delectable	3		4	5					4	1.27
		Consistent	4			1					5	1.38
	Retailers (0.20)	Handling Cost						4	3	4	1	0.8
		Cost of Stock						5		4	5	1.15
		Low Risk							1	4	5	1.15
		Importance	24	7	30	26	5	8	5	15	120	
		Normalized Importance	0.20	0.06	0.25	0.22	0.04	0.07	0.04	0.12	1	