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# QFD not just a tool but a way of quality management

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## Abstract

Implementing QFD needs understanding of the “philosophy” behind the tool. Discrepancies in points of view and culture lead to different approaches of the methodology. Most attention in literature relates to the benefits of QFD or to the more or less “technical” aspects of the method. Mostly comments on implementation and use are mentioned quite summarily. QFD in fact is a method of continuous product improvement, emphasising the impact of organisational learning on innovation. It must not be seen as just an “ad hoc” tool for the development of a particular product neither will it lead to “perfect” products. QFD has to become part of a company’s culture. From that perspective it should belong to the management process. Because of that “cultural change” we will encounter quite specific implementation problems. Implementation problems can be categorised into three groups: methodological problems, organisational problems and problems concerning product policy. Besides the problem of information gathering, the biggest problems are of an organisational nature. Characteristics of western management can limit the effectiveness of the technique. Special attention must be paid to product policy and cross-functional project approach to make this tool a valuable technological and organisational aid for innovation projects. Based on document and case studies from the USA and the Netherlands we will reflect upon differences between the Japanese and “Western” practices and resulting implementation problems. © 2001 Elsevier Science B.V. All rights reserved.

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## 1. Introduction

Quality function deployment QFD is based on the concept of company wide quality control (CWQC). The CWQC philosophy is characterised by customer orientation, cross functional management and *process* rather than *product* orientation. It refers to quality of management and the quality of work being done (Japan Industrial Standard

Z8101,1981). From that point of view QFD becomes a management tool to model the dynamics of the design process.

The roots of Japanese CWQC are the same concepts of statistical quality control (SQC) and total quality control (TQC) as originated in the USA, but there are also fundamental differences. After World War II the quality concepts were brought over by Deming and Juran who found a keen audience among the Japanese captains of industry [1]. At that time, notably, they could communicate directly because of their knowledge of a foreign language. So the ideas of “Quality is fitness for

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Use” and the statistical approach were put forward top down into the company. The cultural orientation of Japan on community and social harmony became a foundation for a strong market approach based on customer orientation and product quality. Horizontally and vertically customer desires were deployed by process development and product policy. The Japanese industry became more *result-oriented* and achieved competitive advantages in world markets by a strategy of continuous incremental improvements, called Kaizen [2].

In many “Western” companies the influence of scientific management is still fairly strong and sometimes the executive’s or engineer’s ideas in product development still predominate [3]. Because of that orientation the TQC concept is too often exclusively directed to the quality of product or service and usually limited to manufacturing and assembly activities. The (former!) TQC concept is strongly efficiency oriented. A lot of American and European companies still maintain a quite strong functional organisation structure and put great emphasis on problem solving and efficiency improvement during the implementation and production stage of new products. A functional organisation structure usually leads to classical transition problems from research and development to manufacturing [2,3].

The Japanese are strong with respect to a philosophical tendency, intuition, tacit knowledge and community spirit. In the West, people attach high importance to logic, codified knowledge and the contribution of the individual. These cultural dissimilarities also lead to differences in the application and appreciation of QFD.

## 2. QFD methodology

Customer’s requirements and their relationships with design characteristics are the driving forces of QFD methodology. For this moment, the methodology as such is assumed to be known. For details we refer to the literature like the “standard” works of Akao [4] and King [5] or an outline in a previous issue of the Journal of Production Economics [3].

The quality and reliability of a product are predominantly determined in the early phases of the development process. QFD enables an organisation to “build” quality into the product and to control the development process from concept to the commencement of manufacturing operations. In the “House of Quality” as it was named by Hauser and Clausing [6], the different steps of the planning phase for a new product are summarised. During this phase the customer requirements (WHAT) are translated into design characteristics (HOW) on the basis of market research and past experiences (the WHY scores). In Fig. 1 we depict the different steps of the product planning phase. Of all the steps in the total product development process, non deserves more (but often receives less) attention than the definition of the *right product* for the *right customer*. This means that management has to establish a clear product policy that should provide specific guides for intended product quality and market penetration. The quality to be worked out in the development phase is not just the quality of the product but also that of the after-sales services and even recycling or re-use. The product planning phase in the QFD sequence serves especially to identify the customer requirements. It is not sufficient to respond to the customer’s requests (expressed quality) but it is in fact necessary to study the whole area of so-called implicit quality (quality which is not asked for but is assumed to be there) and of attractive quality (quality which is not asked for because the customer does not even imagine that it can exist). This was explained by the Kano-model [3,5].

The wants and needs provided by the customer have to be translated into measurable scale units to be susceptible for market research. Because the statements of the customer are not always clear and comprehensible, they must be interpreted and explained. For that the QFD-approach provides a rare opportunity to work on cross-functional teams, employee involvement and participating management by discussing the meaning and importance of the “WHAT”s. These strategic issues already indicates that starting a QFD project needs all support and commitment of top management.

Principally, the product planning phase is meant to define the strategy for the new product to be

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