

REQUIREMENTS OF QFD FOR SMEs

Mr.Sujit Kumar Garai

¹Lecturer , Dept. of Mechanical Engineering, Technique Polytechnic Institute,
Dist-Hoogly, West Bengal,India
Email: garaisks@gmail.com

Dr. Abhijit Chakraborty

²Principal, Technique Polytechnic Institute,
Dist-Hoogly, West Bengal,India
Email: chakrabortyabhijit100@gmail.com

Mrs. Nabanita Bhowmik

³Technical Assistant, Dept. of Mechanical Engineering, Technique Polytechnic Institute,
Dist-Hoogly, West Bengal, India
Email: nabanita_bhowmik2005@yahoo.co.in

Abstract

Conventional Quality Function Deployment (QFD) is technically one-sided. Prioritization of technical attributes, if carried out at all, attempts to maximize customer satisfaction without considering the costs incurred. Product and process design is usually a hi-tech process; hence there are always correlation between quality goals and limited budgets. This paper integrates customer requirement, market competition, designing and manufacturing processes into the QFD framework. This stated activity enables producers to optimize product development resources towards customer satisfaction and conduct analytical investigations to facilitate decision making in product design, manufacturing process and development.

Although first used by the Japanese, experiences from “Western” companies support the results of better products and production planning. Key factor for success is the Cross Functional Management approach.

Keywords: Target, Costing, Estimation, Product, Development

I. INTRODUCTION

The term quality is used in every field of work. The QFD is a process of achieving the target of a project. In SMEs this process is used to enhance the product quality according to requirement by designing the product and production process. It is a scientific and systematic approach on every activity. It helps to solve the problems of production planning and control (PPC). So QFD helps to enrich the SMEs by increasing sales revenue.

International Journal Of Core Engineering & Management (IJCEM)
Volume 3, Issue 6, September 2016

Broadly it can be said that quality function deployment (QFD) is a planning tool used to fulfil customer expectations. It is a disciplined approach to product design, engineering, and production and provides in-depth evaluation of a product. An organization that correctly implements QFD can improve engineering knowledge, productivity, and quality and reduce costs, product development time, and engineering changes.

Product planning → Part development → Process planning → Production planning → Service

II. LITERATURE REVIEW

In a study by Fung et al.(1998) ,the authors proposed a novel approach for analyzing customers attributes and projecting them into the relevant design, engineering and product attributes in order to facilitate decision-making and to guide downstream manufacturing planning and control activities. The proposed hybrid system incorporates the principles of QFD, AHP and fuzzy set theory to tackle the complex and often imprecise problem domain encountered in customer requirement management. It offers an analytical and intelligent tool for decoding prioritizing and inferring the qualitative, sometimes vague and imprecise voice of customer Franceschini and Rupil (1999) worked on the use of rating scales in QFD, focusing the critical aspects and consequences resulting from an incorrect use of rating scales. The paper illustrated how the priority rank of design characteristics can change depending on the type of scale used. Practical effects of these issues were finally shown on a real case concerning the design of a climatic control system for commercial vehicles.

Another significant application of QFD is in ergonomics. Guedez et al. (2001), who improved the ergonomics, design of containers, which are used in flexible manufacturing systems (FMS) & championed this. QFD was used to analyze the customer desires and to generate high quality and competitive ergonomic products and processes.

Prasad (1995) introduced a set of JIT house of matrices and a matrix-based procedure to analyze the results of strategic planning and implementation. The rating system is derived from the same principles on which QFD was based. This enables the planning team to sustain a series of successful planning activities throughout the strategic implementation process and the manufacturing and strategic teams from unknowingly making any possible implementation mistakes.

Olhager and West (2002) used the methodology from QFD for linking manufacturing flexibility to market requirements. This approach creates a framework for modeling the deployment of the need for flexibility

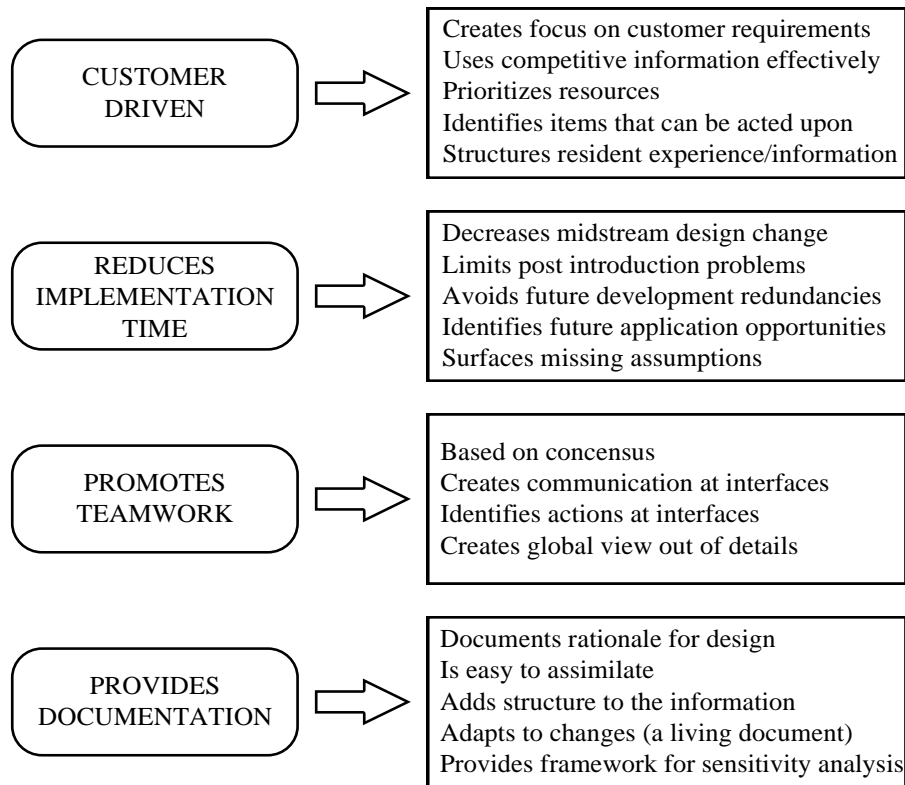


Fig. 1 (key factors of QFD)

The above figure shows the different process of QFD. According to planning to achieve the goal a systematic and scientific approach is required. QFD helps to develop every activity in the system. Above activities may be developed by suitably applying QFD.

III. CASE STUDY

A company that manufactures bicycle components such as cranks, hubs, rims, etc., wants to expand their product line by also producing handlebar stems for mountain bikes. Begin the development process of designing a handlebar stem for a mountain bike by first listing the customer requirements or WHAT the customer needs or expects in a handlebar stem.

IV. METHODOLOGY

Two primary customer requirements might be aesthetics and performance. Secondary customers requirements under aesthetics might be reasonable cost, aerodynamic look, nice finish and corrosion resistant. Although reasonable cost is not considered aesthetics, it will be placed under that category for the sake of this example. Secondary customer requirements under performance might be lightweight, strength and durability. Many other customer requirements could be listed, however, for simplicity only the aforementioned ones will be used.

V. ANALYSIS

Quality management and quality culture, use of information and analysis, strategic planning, management of process quality, quality and operational result. Customer focus is a competitive benchmarking and performance measurement system of flatter organizational structure and the pursuit of new technology for strategic advantage.

VI. PROPOSED MODEL

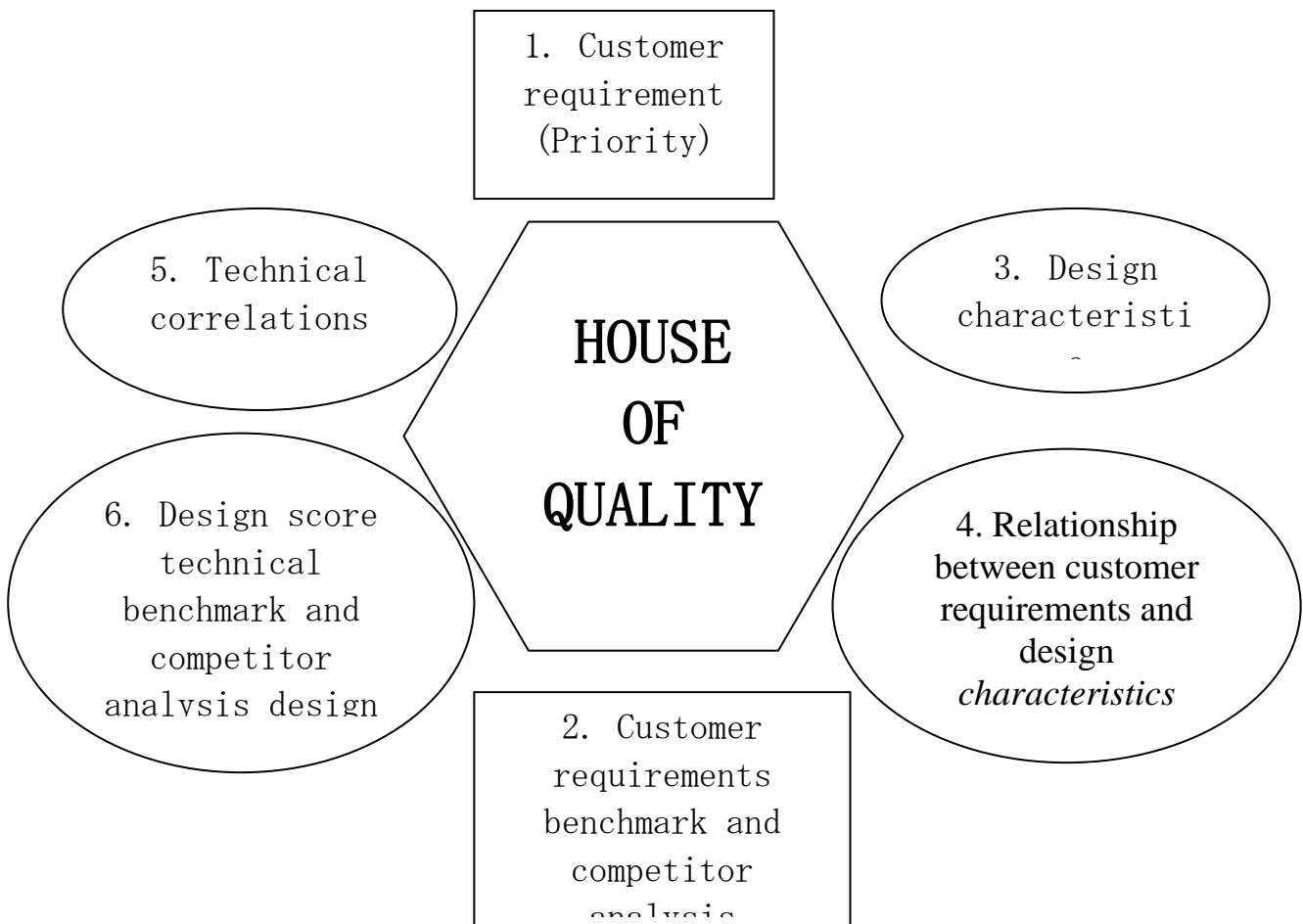


Fig. 2 (Activities of QFD)

The house of quality shown above various factor of production planning according to requirement. Customer choice is first priority and will be a benchmark and comparison between the competitors in the market. By applying QFD create relation between customer requirement and design characteristics. Create correlation in different technical activities to achieve the goal. Finally analyze the different activities to get the result

International Journal Of Core Engineering & Management (IJCEM)
Volume 3, Issue 6, September 2016

according to planning. In the competitive market product optimisation is essential. At present all SMEs are trying to applying QFD in their production process by optimising their product in the competitive environment. SMEs are using new technology and best material considering cost factor, durability and aesthetics of the product in the framework of QFD.

VII. CONCLUSION

QFD is a unique tool for SMEs for their work in competitive market. It helps to develop product and production process according to requirement. It helps to apply modern technique and design in the system. So it helps to achieve the market requirement. Quality function deployment is a process by which a product can be developed according to customer requirement. To achieve this quality all system should be rearranged to get the quality product at minimum cost in the competitive market. At present SMEs are used QFD for their product. Researchers have scope to do more work in the field of QFD.

REFERENCES

1. Akao Yoji, Ohfuji Tadashi, Naoi Tomoyoshi. 1987. “*Survey and Reviews on Quality Function Deployment in Japan.*” Proceedings of the International Conference for Quality Control –1987. Tokyo: JUSE and IAQ. pp. 171-176.
2. ASI Quality Systems., (1996) ‘Improving Quality and Reducing Costs’, Catalogue of
3. Services, American Suppliers Institute 1996.
4. Barad M , and Gien D. , “Linking improvement models to manufacturing strategies - A methodology for SMEs and other enterprises,” *International Journal of Production Research*, vol. 39, no. 12, pp. 2675-2695, 2001.
5. Bergeon, S. (1996) ‘ Strategic CDI and Parent Process with Quick QFD’ , A Presentation by SSO (Strategic Standards Office), QFD/MRO (Market Research Office) Conference, FAO, Fairlane Training & Development Centres, Dearborn, Michigan, USA, March 11-15 1996.
6. Boone& Kurtz (1999),Contemporary marketing U.S.,The Dryden Press.
7. Bouchereau Vivianne and Rowlands Hefin (2000), Methods and techniques to help quality function deployment (QFD) Benchmarking: An International Journal, Vol. 7 No. 1, 2000, pp. 8-19 ,University of Wales College, Newport, South Wales, UK.
8. Chen, L. H., Weng, M. C., (2006), An evaluation approach to engineering design in QFD processes using fuzzy goal programming models, *European Journal of Operational Research*, Vol. 172, pp. 230–248.
9. Franceschini F. , and Rupil A. “Rating scales and prioritization in QFD,” *International Journal of Quality and Reliability Management*, vol. 16, no. 1, pp. 85-97, 1999.
10. Ford Motor Company Limited., (1983) Module 7, Customer Focused Engineering, Level 2,QFD Manual, EQUIP (Engineering Quality Improvement Programme), Ford Motor Company Ltd, Published by Education and Training, EQUIP Centre, GB-26/500, Boreham Airfield, Essex, England, 1983.
11. Ford Motor Company Limited., (1994) Quick QFD, The Marketing – Engineering Interface, Automotive Safety & Engineering Standards Office, Ford Motor Company Limited, Fairlane Plaza, Dearborn, USA, (Restricted access).Version 3.0, 1994.

International Journal Of Core Engineering & Management (IJCEM)
Volume 3, Issue 6, September 2016

12. Fung R. Y. K. , Popplewell K. and Xie J. ,“An intelligent hybrid system for customer requirements analysis and product attribute targets determination,” *International Journal of Production Research*, vol. 36, no. 1, pp. 13-34, 1998.
13. Guedez V., Mondelo P, Hernandez A., and Mosquera L., “Ergonomic design of small containers using the Quality Function Deployment (QFD),” *Proceedings of International Conference on CAE and Safety, Hawaii, USA*, Jul. 29-Aug. 1, 2001.
14. Olhager J., and West B.M., “The house of flexibility: using the QFD approach to deploy manufacturing flexibility,” *International Journal of Operations and Production Management*, vol. 22, no. 1, pp. 50-79, 2002.
15. Prasad B., “ JIT quality matrices for strategic planning and implementation,” *International Journal of Operations and Production Management*, vol. 15, no. 9, pp. 116-142, 1995.
16. Verduyn, D.M. and Wu, A., (1995) ‘Integration of QFD, TRIZ & Robust Design Overview “Mountain Bike” Case Study’, ASI Total Product Development Symposium, Novi, Michigan, USA, November 1-3, 1995.