

# HOLISTIC REQUIREMENT MODEL FOR Q.F.D. IN INTEGRATED PRODUCT DESIGN

Mahesh Krishna Shukla  
 Gyan Ganga College of Technology Jabalpur (M.P)

**Abstract:** *The Holistic requirement model provide a complete and consistent model. That model illustrates sets of requirement of a system through their classification. This integrated form of model is a simple, easy to understand various components of the system requirement built therein. The Quality Function Deployment approach helps to understand the needs of customer comprehensively. Thus the voice of the customer can be transformed in to design characteristic of the product in order to achieve the optimum satisfaction of user. The present paper aims to explore practical approach by dealing with Holistic requirement model to support systematic design process of a product and sustaining product development platform.*

## I. INTRODUCTION

The quality function deployment in requirement Engg. Quality Function Deployment is a methodology in the form of the certain process - method for design and development of a product. The quality of product maximum depends on satisfaction of the customer. The concept of Quality Function Deployment was first introduced by Dr. Yogi Akav in 1966. Thereafter, it was developed and adopted by Japanese Industries & extended to USA by 1983. Quality Function Deployment approach a prime facie concepts provide a tool to translate vague, imprecise customer needs into well defined, measurable technical specification. The first steps starts with capturing the basic needs of the customer i.e. What the customer wants in product and what is the return of its value to him. On gathering the requirements of customer, a comparative evaluation with respect to level of its importance is compiled and rated. This helps how essential a requirement to fulfil. The voice of the customer thus translated to technical specification of the product, the voque, embiqous needs desired by the customer is refined and well defined by way of customers "WHAT" is related with 'How'. That develops a relationship between "WHAT" and "HOW" known as relationship matrix which indicates presence and strength of relationship. The last steps is "How Much" which hold good in product design decision making strategies. It leads to design target and affix various design parameter of the product to achieve optimum satisfaction of the customer.

### 1.1 Q.F.D. MATRIX

Q.F.D. matrix comprise two major components i.e. Horizontal components related with customer information and another is vertical components i.e. for technical information. Apart from those, in order to balance resources, priorities of each requirement are determined in Q.F.D. matrix.

Therefore, the main components of matrix are -

- (1) Customer Voice
- (2) Technical attributes
- (3) Priorities

The customer requirement is developed based on their voice & competative valuation carried out through graphical presentation. Through technical details, the customer voice are translated into technical attributes of the product. As per Day (1993), "each technical requirement should be waved on to satisfy a voice, be measurable and global in nature and should not imply any specific design indent".

The priorities are worked out by summing an relationship with each technical specification. The analysis of customer need is determined by calculating weightage of each.

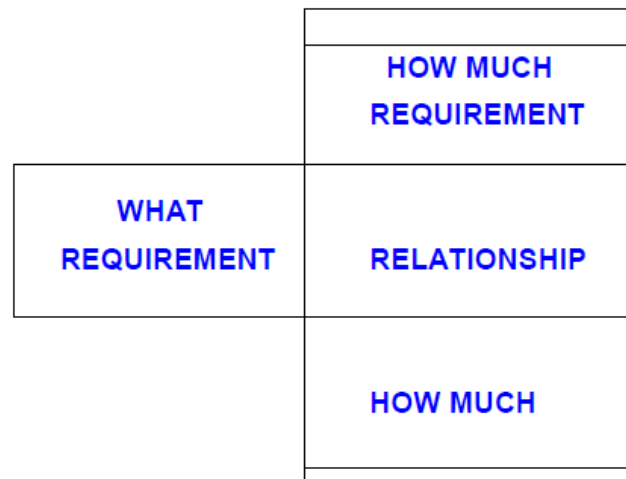


Fig. 1.1 Q.F.D. Basic Structure Matrix

## II. REVIEW OF HOLISTIC REQUIREMENT MODEL

According to Dr. ShratBrige "Q.F.D. provide &logical and systematic methodology for computing and organizing the requirement translation necessary for effective and efficient new system introduction. However the difficulties expressed are often due to -

- (1) Type of Market in which Q.F.D. in practiced
- (2) Confusion over requirement of category
- (3) Problem complexity

In such circumstances, Holistic requirement model helps in exploring effective ways towards application of Q.F.D. methodology. Set of requirement present in the system can be simply classified and illustrated through this model.

"Specific needs" of a customer is known as requirement. These may be general, embiqous which are not at all

measurable. The product design is supposed to be transformed those attributes by specifying, precise and in measurable form in order to satisfy the customer.

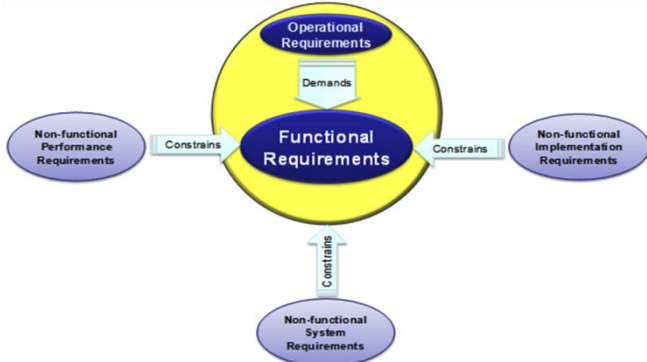


Fig. 2.1 Components of Holistic Requirement Model  
 Holistic requirement model consist, three basic needs -  
 (1) Operational (2) Functional (3) Non functional  
 Operational requirement specifies major purpose and is unambiguous. It demands certain systematic acts. Functional requirements are meant to support operational requirement to achieve the purpose. According to Dr. Stuart Burge "A functional requirement define what has to be done - not how it is done or how well it is done".

A functional requirement is a function of a system. Non functional requirement are built in with corresponding functional requirement. It consist physical attribute like colour, style, look, size etc.  
 Holistic requirement model is driven by operational requirement and contains the functional requirement at its centre. Therefore, non functional requirement indicates the expectations of the customer.

As per Dr. Stuart Burge

- (1) "The appropriate function requirement of the system becomes the purpose element of operational requirement of the Sub system.
- (2) The Non functional requirement of function of the system become non function system.

III. APPLICATION

For implementation of Q.F.D. methodology, we have to correlate two types of requirement towards product design process.

(1) Customer requirement in Technical request Both customer and technical attributes align with holistic requirement model. It classifies and describes sets of requirement in a systematic form.

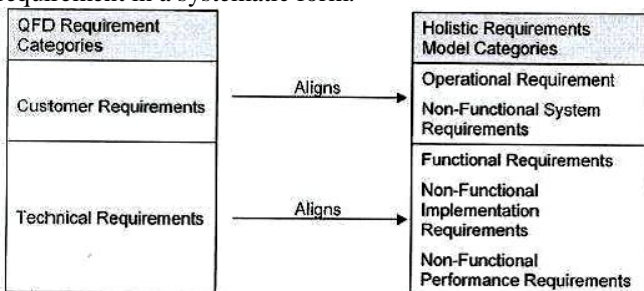


Fig. 2.2 QFD and HRM Alignment

The application of HRM is effective and applicable to any system and at any level. Under QFD requirement customer requirement and technical requirement are aligne with Holistic requirement model categories i.e operational requirement and Non Functional System Requirement. Similarly technical requirement are aligned with functional requirement. Non functional performance requirement. In this model, the "What" requirement are considered as operational and non functional requirement of the system. How requirement are transformed in to what requirement being specific measurable needs. Further how much requirement are indicated are Non Functional Performance Requirement.

IV. CONCLUSION

This paper has indented to simplify Quality Function Development process comprising systems - of - system. Holistic requirement model insight better ways to translate vague and ambiguous customer requirement to precise as well as technical specification in measurable form. Moreover, Holistic requirement model provides a logical and sound approach to handle complex system.

REFERENCES

- [1] JonkoKaski (2003). Quality Function Deployment in Requirements engg : A Review and case studies (Master Thesis) Helsinki University of Technology.
- [2] Day, R.G (1993). Quality function Deployment : Linking a Company with its customer, ASQC Press, Miwankee, Wiscost.
- [3] Revelle, J.B. Moron, J.W. & Cox, C.A. (1998). The Q.F.D. Hand Book, John Wiley & Sons, INC, New York. Dr. Stuart Burge (2007). A functional approach to Quality Function Deployment, System Engg., Burge Hughe Walsh.
- [4] Akao Y. (1990). "Quality Function Deployment" Productivity Press, Cambridge, Massachussets.