
QR VIEWS

By NIQR, Trivandrum Branch

Dr. Yoji Akao : Pioneer of Quality Function Deployment



Dr. Yoji Akao

Passed away at the age of 88
on 24 October 2016

Founder of Quality Function Deployment (QFD)
Professor, Graduate School of Yamagata University
Chairman, International Council for QFD
Honorary President, Hong QFD Association

Education :

Graduated from Tokyo Institute of Technology in 1948
Received Doctorate Phd in 1964

Teaching Experience :

Prof. Yamanashi University, 1974-1981,
Prof. Tamagawa University, 1981 - 1995 (Dean from 1991-1994),
Prof. Asahi University, 1995-2004

Publications :

Prof. Akao is best known for his work of developing Quality Function Deployment methodology that has been widely used all around the world in most sectors of business. He has published many papers and books. Most widely used have been the following :

- ♦ Quality Function Deployment - Integrating Customer Requirements into Product Design published in English in 1990; originally published in Japanese in 1988.
- ♦ QFD : The Customer Driven Approach to Quality Planning and Deployment
- ♦ HoshinKanri-Policy Deployment for Successful TQM published in English in 1991; originally published in Japanese in 1988

Voluntary Activities :

Member Academician of International Academy for Quality (IAQ) since 1989,
President of Japanese Society for Quality

Control - 1990-1991, Chairman of International Council for QFD, since 1997
Honorary consultant of the 'Association for Quality Function Deployment of China' since 2005.

Recognition :

- ♦ Quality Control Literature Prize from the Nippon Keizai, Shinbun-Sha, 1960 and 1978.
- ♦ Deming Prize from committee of Deming Prize in JUSE 1978.
- ♦ Best on Quality Award from International Academy for Quality (IAQ)
- ♦ ASQ Distinguished Service Medal from American Society for Quality (ASQ) in 2001
- ♦ Shainin Medal from ASQ in 2007 and
- ♦ Honorary Member from ASQ in 2010
- ♦ Honorary Member from International Academy for Quality (IAQ) in 2010

Two distinguished awards have been established in recent years in his honour.

- ♦ The Akao Prize® is awarded to individuals around the world who have demonstrated Excellence in their practice and dissemination of QFD for many years.
- ♦ The Akao Scholarship for QFD rewards university students for excellence in their QFD study and research.

Contribution to Asia :

He has influenced quality practices in most countries in Asia through his books originally published in Japanese and that were later translated in English and

widely used for new product development offering better products to the customers in shorter time cycles and at lower cost. QFD has become a universal methodology referred to in all Business Excellence Models; TQM approaches; Six Sigma; Design for Six Sigma and Lean etc.

He has also travelled to many countries of the world including Asia to train and consult people in the field of quality management with particular reference to QFD and Hoshin Kanri which is the precursor to the Balanced Score Card approach.

Quality Function Deployment

KR Mohan Ananthanarayanan & P.Muthuganapathy

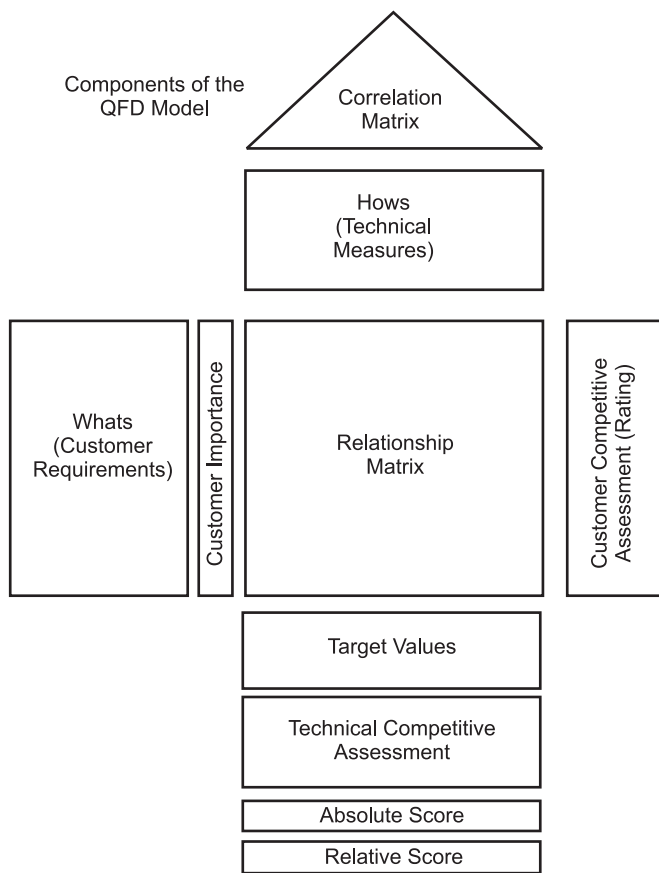
Quality Function Deployment (QFD) is a structured method for listening to the customers and optimizing designs, materials and processes to ensure the customers' expectations are best satisfied. Optimal Thinking® is the core of all activities.

QFD Benefits	History of QFD
Shortest Cycle Time Best Quality Lowest Cost Best Customer Satisfaction	1996 - Yogi Akao proposes concept 1969 - First magazine article 1972 - Concept of deployment is developed 1972 - KOBE Shipyard using Quality Tables 1977 - Toyota uses QFD in their design process 1984 - Dr. Clausing (Xerox to Ford) begins advocating QFD 1987 - Bob King's book "Better Designs in Half the Time" 1988 - Clausing & Hauser QFD article published in Harvard

'Customer is king' is a familiar phrase we often hear. It means that the needs of the customers are well understood in product or service realization organization. Quality Function Deployment (QFD) is a quality tool to understand and achieve better customer satisfaction. It is known in different names like decision matrices, matrix product planning and customer driven engineering. It is the ability of an industry to understand the voice of the customer, his needs and then to translate

it into technical specifications and features that will fetch a 'wow' response from the customer. It is applicable for internal customers also in an organization. Historically in India, when kings built monuments and temples, requirements were more than well understood by the workmen who translated King's voice into everlasting pieces of excellence with utmost commitment and involvement. These pieces' delight visitors even today. Customer was literally the king.

The method used in QFD to translate the voice of customer into technical specifications comprises of matrices starting from the house of quality matrix. Figure.1 & 2 gives the house of quality template, its benefits and QFD phases for product development.



The house of Quality provides

- ♦ A requirements planning capability
- ♦ A tool for graphic and integrated thinking
- ♦ A means to capture and preserve the engineering thought process
- ♦ A means to communicate the thought process to the new members of the QFD team
- ♦ A means to inform the management regarding inconsistencies between requirements, risks and needs of the customer.

Figure 1 : The house of quality template and benefits

Key elements of QFD:

- ♦ WHAT----- the output that we seek
- ♦ HOW-----that which causes the WHAT to happen.
- ♦ RELATIONSHIP-----How much each HOW relates to each WHAT
- ♦ HOW MUCH -----The measure of HOW.

Features of QFD :

QFD is concerned with systematic collection of customers' likes, dislikes, views, opinions, etc. in either precise or vague forms. Converting these into technical requirements must have to pass through the development of the following:

1. Planning matrix
2. Deployment matrix
3. Process plan and quality control charts
4. Operating instructions

The features of the above documents are briefly discussed in the following section.

QFD is a systematic approach to incorporate the "voice of the customer" into total product cycle involving

- ♦ Product planning
- ♦ Product Design
- ♦ Manufacturing
- ♦ Assembly
- ♦ Service

Sample Applications

- ♦ Design of new or existing products
- ♦ Design of new or existing services
- ♦ Development of design requirements
- ♦ Selection of decision alternatives
- ♦ Selection of points of manufacturing
- ♦ Selection of points of service
- ♦ Selection of key suppliers
- ♦ Trade studies

OFD PHASES FOR PRODUCT DEVELOPMENT

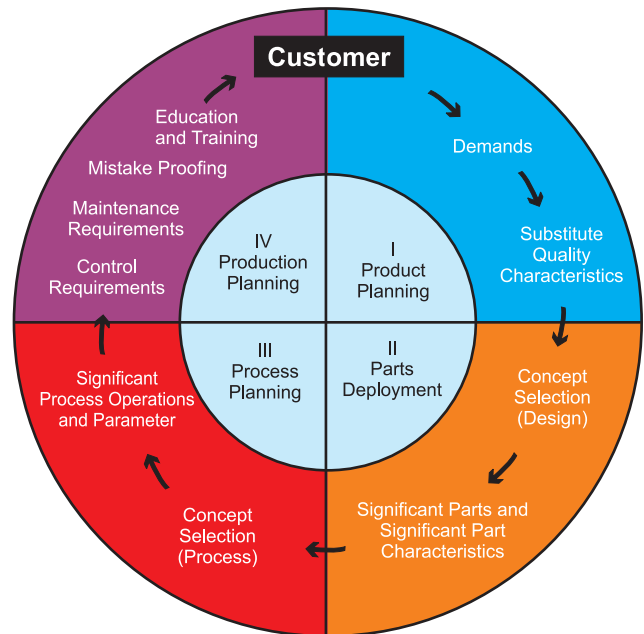
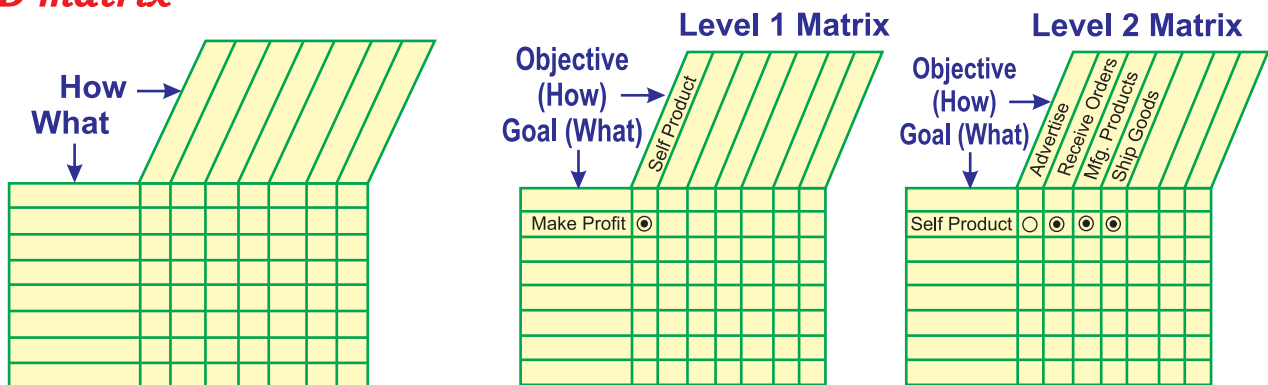


Figure 2: QFD phases for product development

Planning matrix

It translates the voice of the customer into counterpart control characteristics; i.e. it provides a way of turning general customer requirements drawn from market evaluations; comparisons with competition, and marketing plans into specified final product control characteristics.

QFD matrix



Once this matrix is made and then comes what is known as waterfall relationship of QFD matrices as shown below in figure 3.

Deployment matrix

It translates the output of planning matrix i.e., the final product control characteristics into critical component characteristics. Thus it moves one step farther back in the design and assembly process.

REQUIREMENTS MATRIX

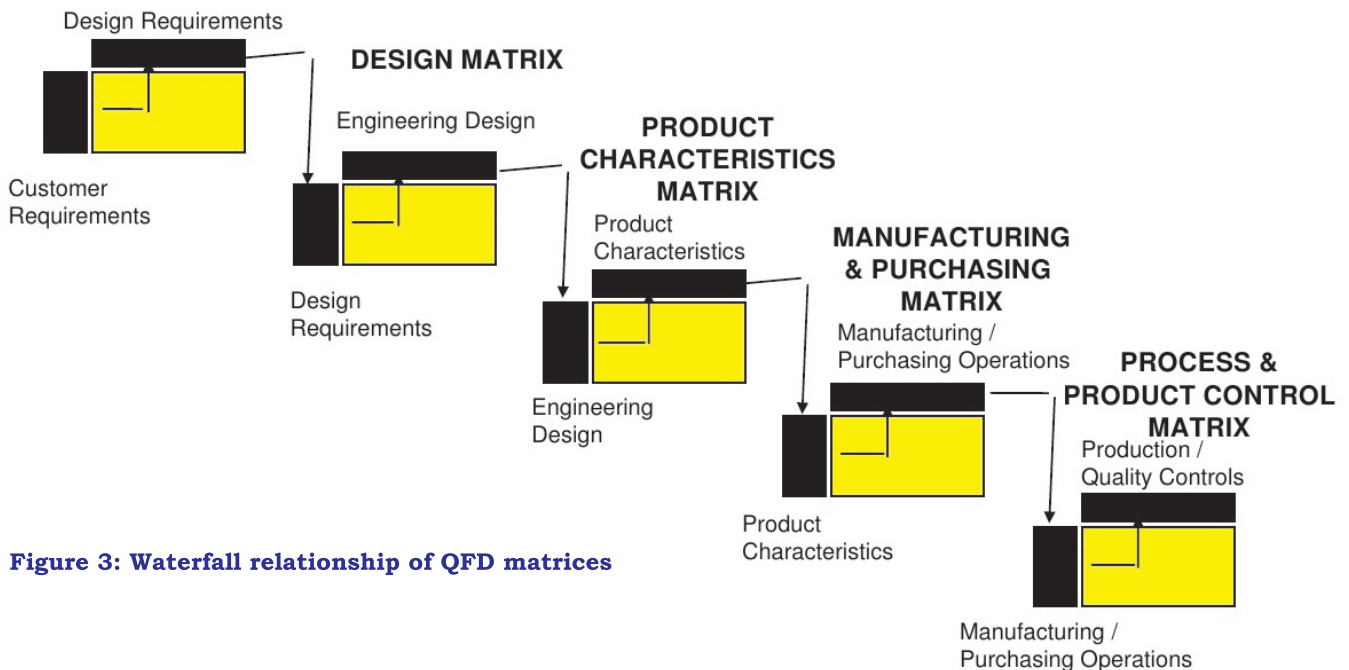


Figure 3: Waterfall relationship of QFD matrices

We see many automobiles introduce new features as an improvement in their new version. Most of them are worked out from the voice of customer. Same feature appears differently in automobiles of different companies as in the case of dash boards, seats and the bumpers which are essentially due to the interaction of basic design of the vehicle and product manufacturing mix.

QFD works well as long as customer knows what he wants and are able to express it proficiently. Here comes the hitch. Many know what they want but are not proficient enough to put it right words. Requirement for a coconut scrapper is well understood in our kitchen but voice of customer in this regard can be naïve leading to not many safe models in the market.

Process plan and Quality control charts:

These two documents identify critical product and process parameters,

as well as control or checkpoints for each of those parameters.

Operating Instructions:

These are based on the critical product and process parameters; these instructions identify operations to be performed by plant personnel to assure that important parameters are achieved.

Thus QFD envisages the systematic translation of customers' needs which are expressed in non-technical terms into technical language at different levels and positions.

Major Steps in Product Improvement Using QFD Approach:

1. Market research- collection of customers' requirements.
 - a) Identifying customer needs
 - b) Identifying the potential market.

The information regarding the product

requirements in customer terms comes from a variety of sources:

- i) Market research data
 - ii) Dealers input
 - iii) Sales department wants
 - iv) Special customer opinion surveys.
2. This is the most critical part of the process and it is usually the most difficult, because it requires obtaining and expressing what the customer

truly wants and not what we think he/she expects.

3. Finalizing the customer requirements.
4. Prioritizing the product design requirements.
5. Establishing critical part/process characteristics.
6. Prediction of potential failures and improvements action.
7. Product evaluation at different stages.

The Systems Assembly Europe Business System QFD is shown in figure 4.

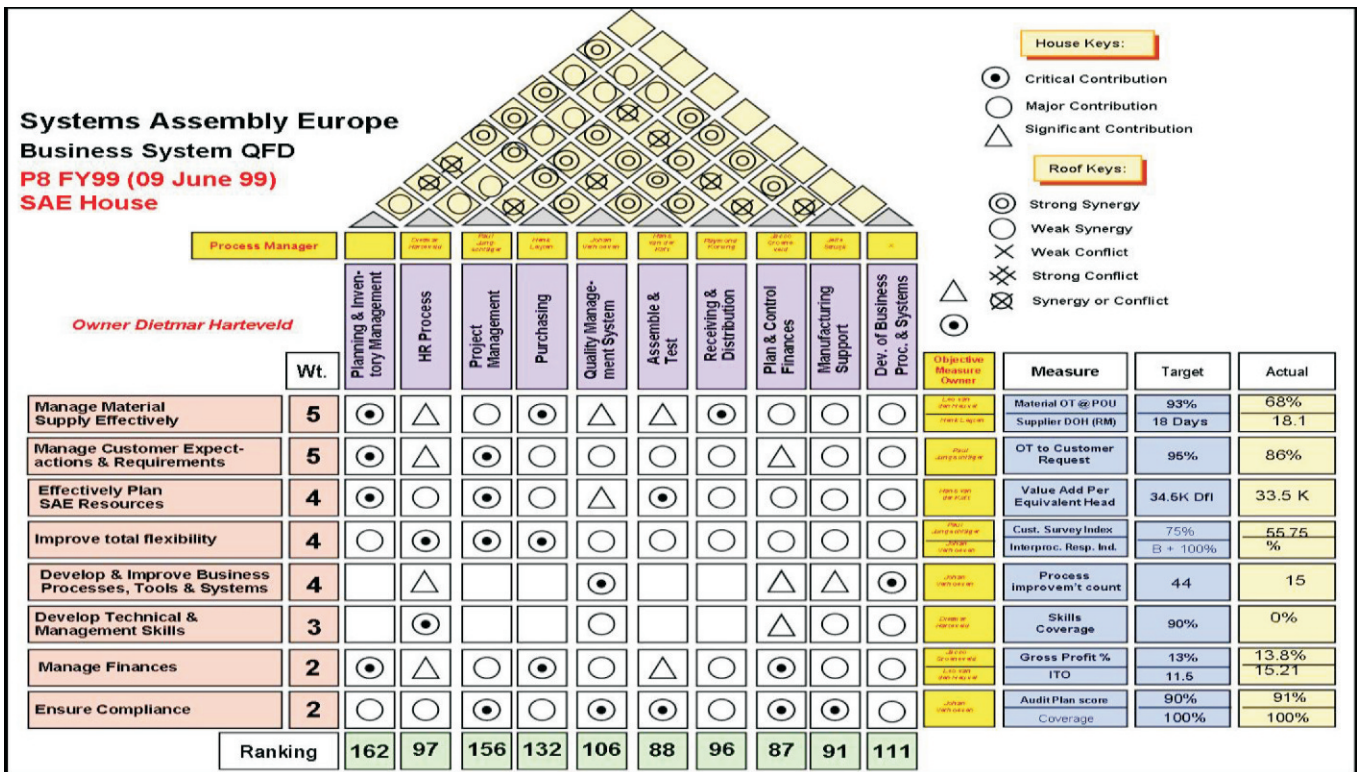


Figure 4: SAE Business System QFD

Kano model is the one that helps to understand customer needs better. Dr. Noriaki Kano isolated and identified three levels of customer expectations. They are (i) Expected needs – a must available requirements, fully satisfying the customer at this level simply gets a supplier into the market (ii) Normal needs - These are the qualities, attributes, and characteristics that keep a supplier in the market (iii) Exciting needs - These are features and properties that make a supplier a leader in the market. QFD and Kano model goes together to provide an

exciting product with features you may not even recognize as in the case of our mobile phones.

Conclusion:

QFD serves, as a best tool for incorporating customer needs in the design of the product for quality improvement and long term survival of the organization.

Published on behalf of NIQR Trivandrum Branch: Editorial Board: P.Muthuganapathy & AR Muralisankar