Quality Function Deployment

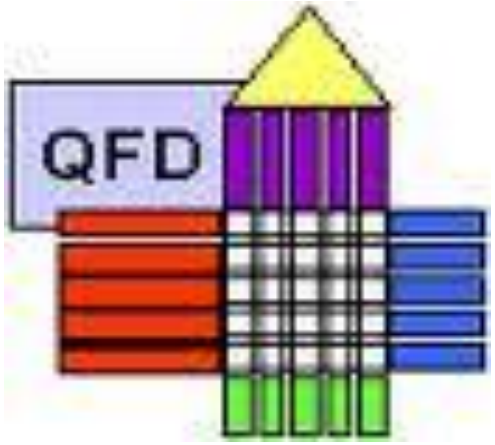
BPF2123 – Quality Management System

Chapter Outline

- Introduction
- QFD Team
- Benefits of QFD
- The Voice of the Customer
- House of Quality
- Building a House of Quality
- QFD Process

Lesson Outcomes

- Understand the basics associated with creating a quality function deployment matrix
- Learn QFD application and advantages of using it



Introduction

- Dr. Mizuno (Professor Emeritus) of the Tokyo Institute of Technology initiate the QFD system
- First application (1972) was at Mitsubishi Heavy Industries and then implemented successfully in the production of mini-vans by Toyota
- QFD is a planning tool used to fulfill customer expectations or requirements
- A disciplined approach that translate voice of the customer into technical information that an organization can use in order to create or improve a product (product design & development, product & process planning, engineering services)

Introduction

- QFD helps identify new quality technology and job functions to carry out operations
- Tool provides a historic reference to enhance future technology and prevent design error
- A set of graphically oriented planning matrices that are used as the basis for decisions affecting any phase of the product development cycle
- Results are measured based on the number of design and engineering changes, time to market, cost and quality
- QFD often referred to as the voice of the customer

QFD Team

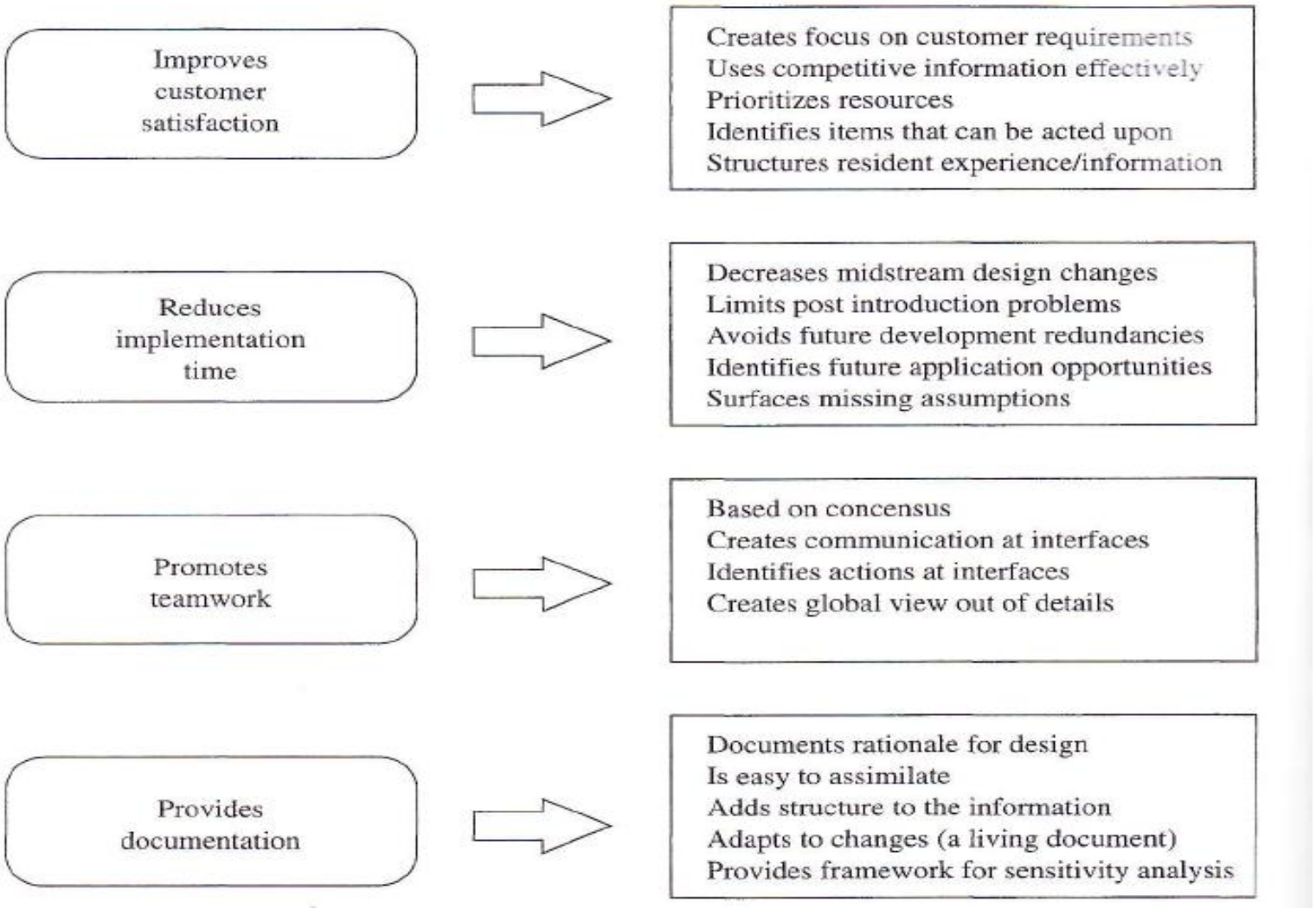
- Two types of teams - designing a new product or improving an existing product
- Teams are composed of members from marketing, design, quality, finance and production
- Each team must utilize time and inter-team communication
- Team meetings are very important in the QFD process – meeting format should have some way of measuring how well the QFD process is working
- Meeting will ensure that the right information is being entered into the QFD matrix

Benefits of QFD

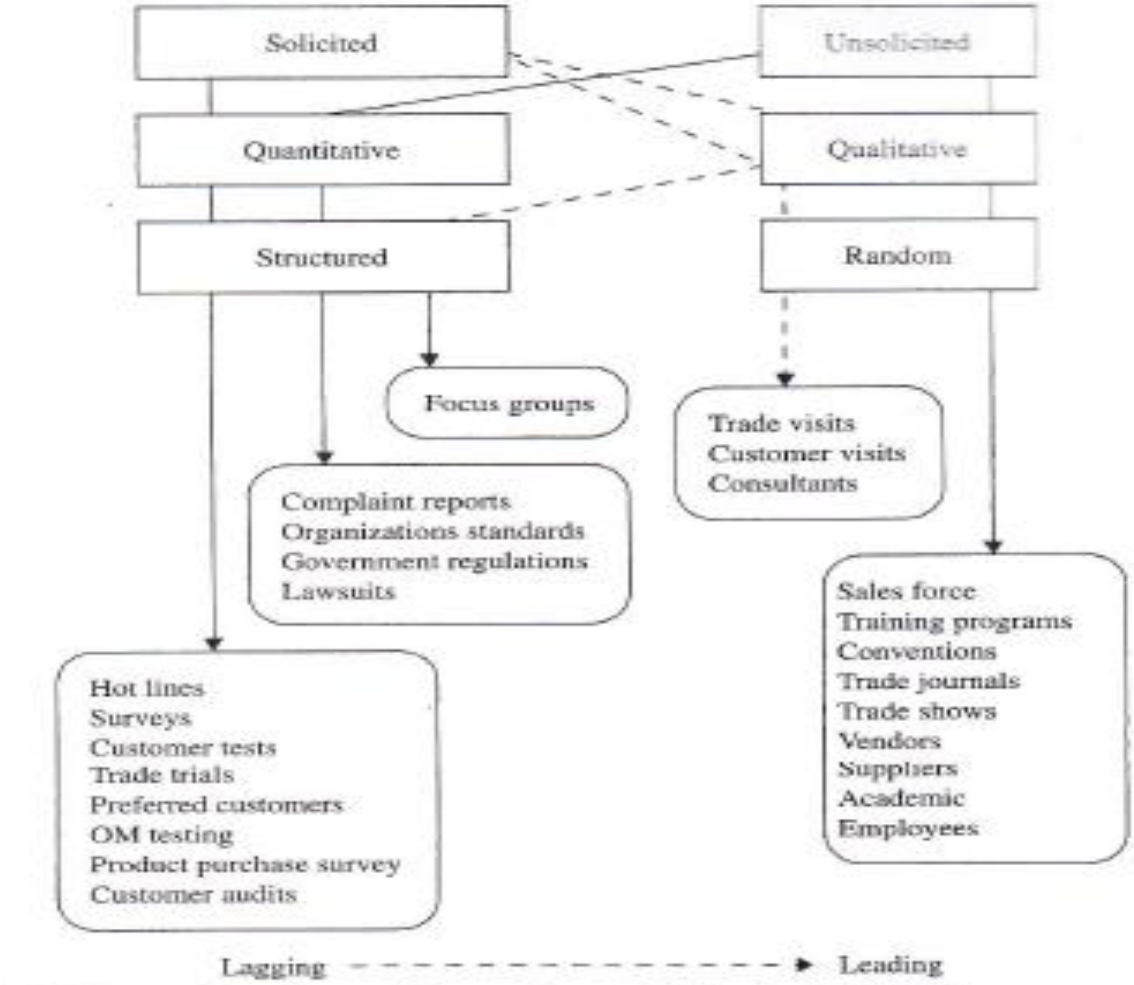
QFDs encourage:

- Team building
- Consensus
- Creativity
- Structure
- Organization
- Development of new ideas
- Remove suggestiveness from the product development process

Benefits of QFD



The Voice of the Customer



12-2 **Types of Customer Information and How to Collect It**

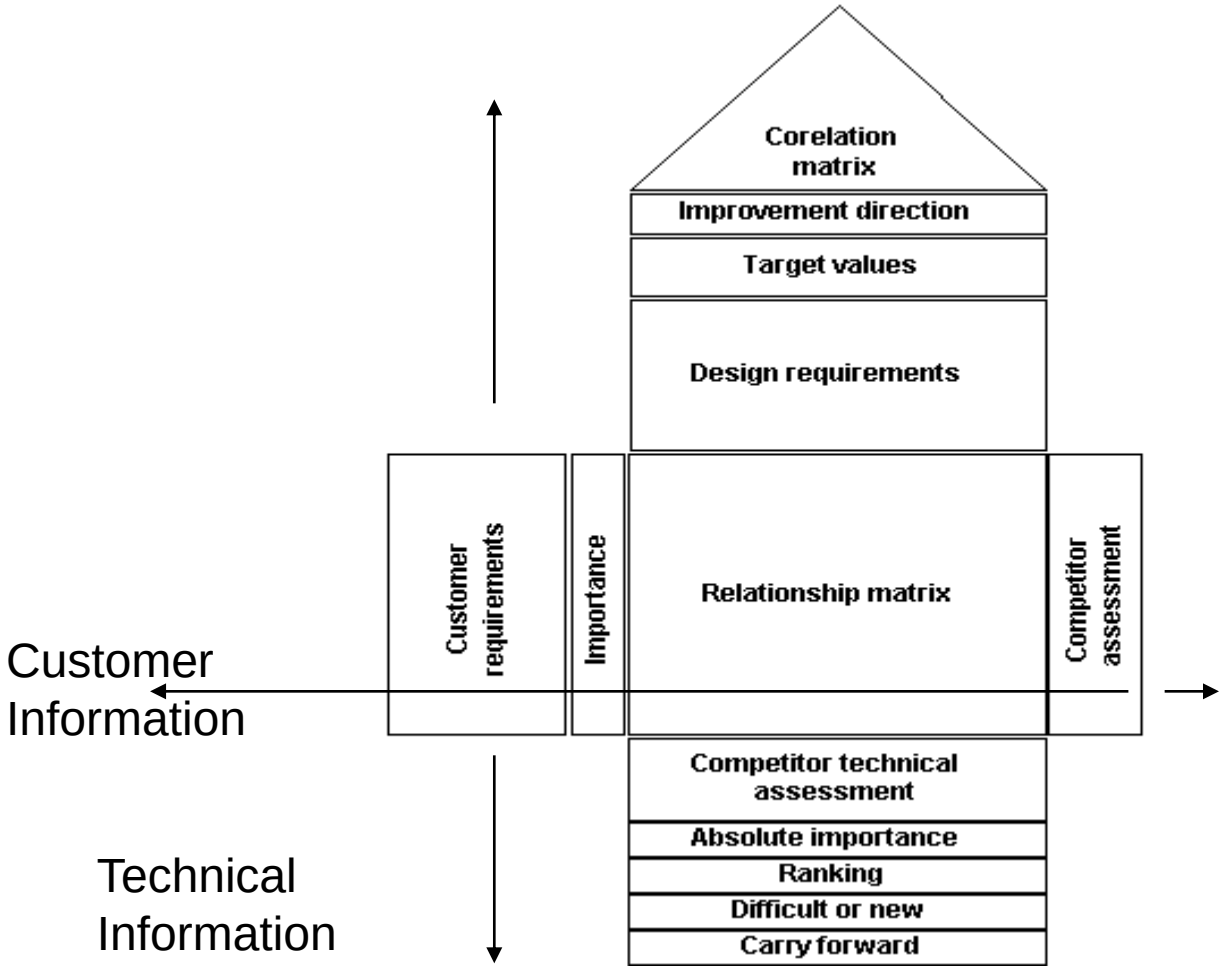
The Voice of the Customer

Four types of customers:

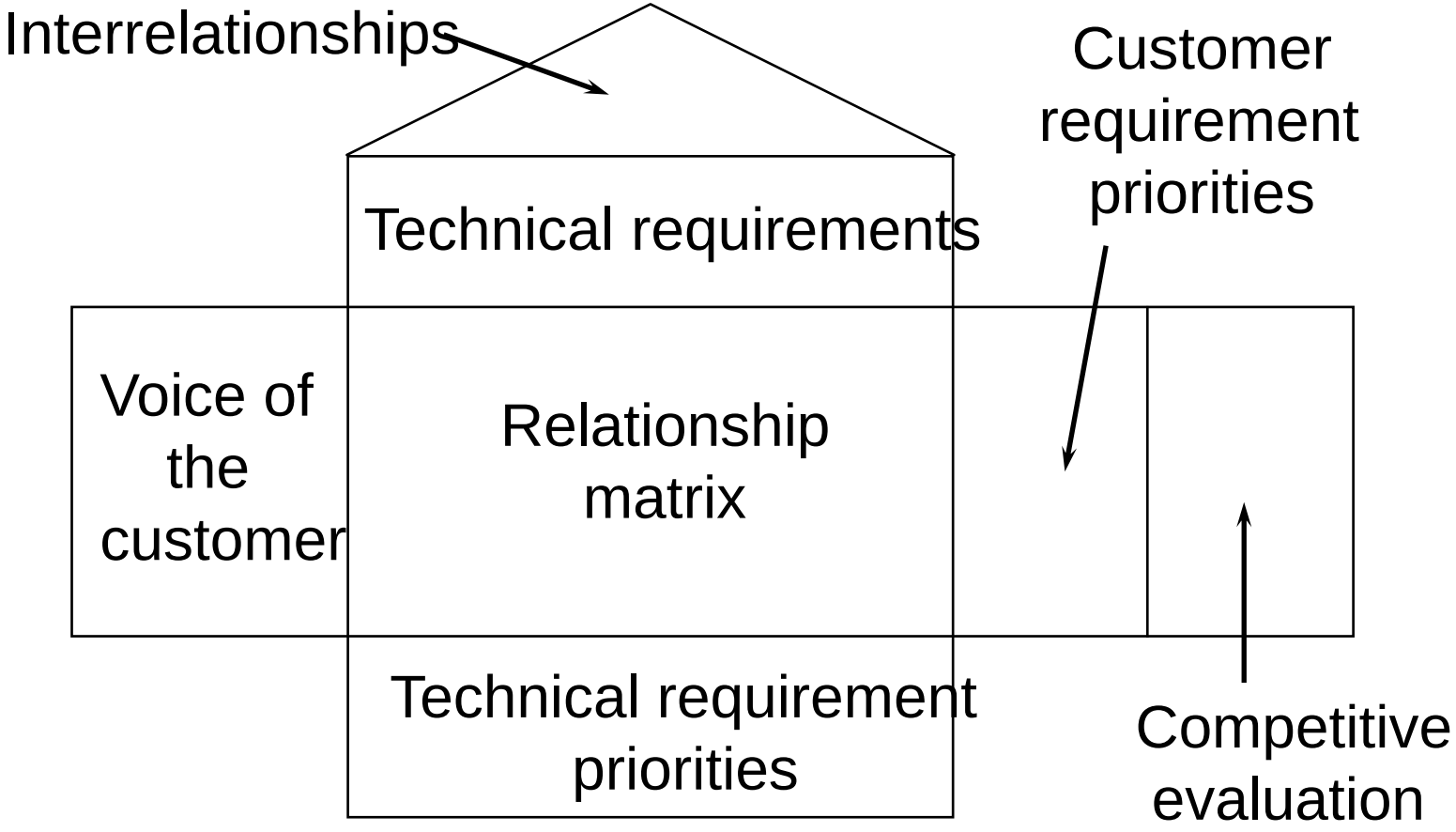
- Those customers we already have and can't lose
- Those customers we could lose easily
- Those customers we could gain with minor product changes
- Those customers we can't get.

QFD

It is often called a House of Quality



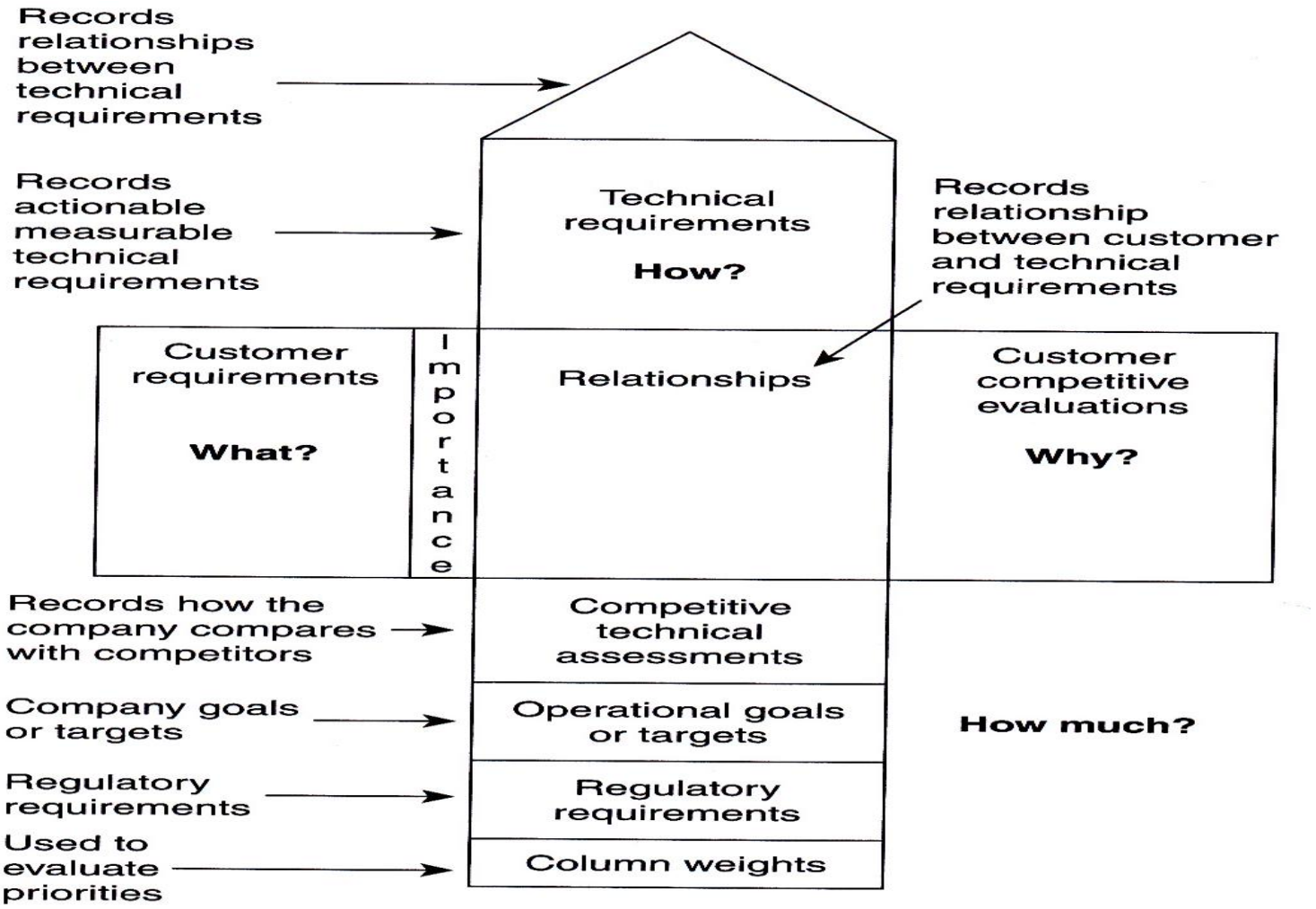
House of Quality



Building a House of Quality

1. List customer requirements (WHATs)
2. List Technical Descriptors (HOWs)
3. Develop a Relationship Matrix Between WHATs and HOWs
4. Develop an Interrelationship Matrix Between HOWs
5. Competitive Assessments (Customer and Technical)
6. Develop Prioritized Customer Requirements
7. Develop Prioritized Technical Descriptors

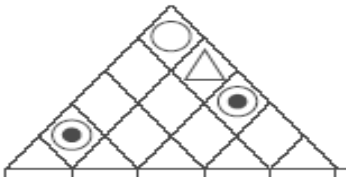
Building a House of Quality



Building a House of Quality

1. Identify customer requirements.
2. Identify technical requirements.
3. Relate the customer requirements to the technical requirements.
4. Conduct an evaluation of competing products or services.
5. Evaluate technical requirements and develop targets.
6. Determine which technical requirements to deploy in the remainder of the production / delivery process.

Example



	Price	Size	Calories	Sodium	Fat	Customer Importance	Competitive Evaluation		
							Us	A	B
Taste			△	◉	○	4	3	4	5
Nutrition			◉	○	◉	4	3	2	3
Visual appeal	△	◉			△	3	3	5	4
Good value	◉	○				5	4	3	4
Our priority	5	4	4	4	5				
Competitor A	2	5	3	2	4				
Competitor B	3	4	4	3	3				
Deployment	*	*			*				

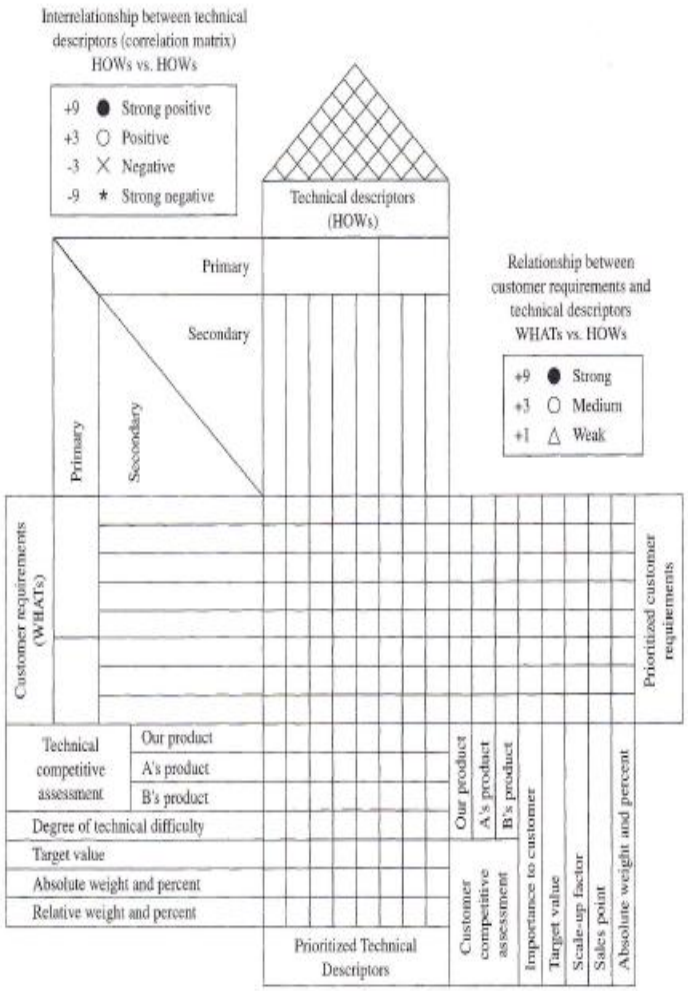
Legend: 1 = low, 5 = high

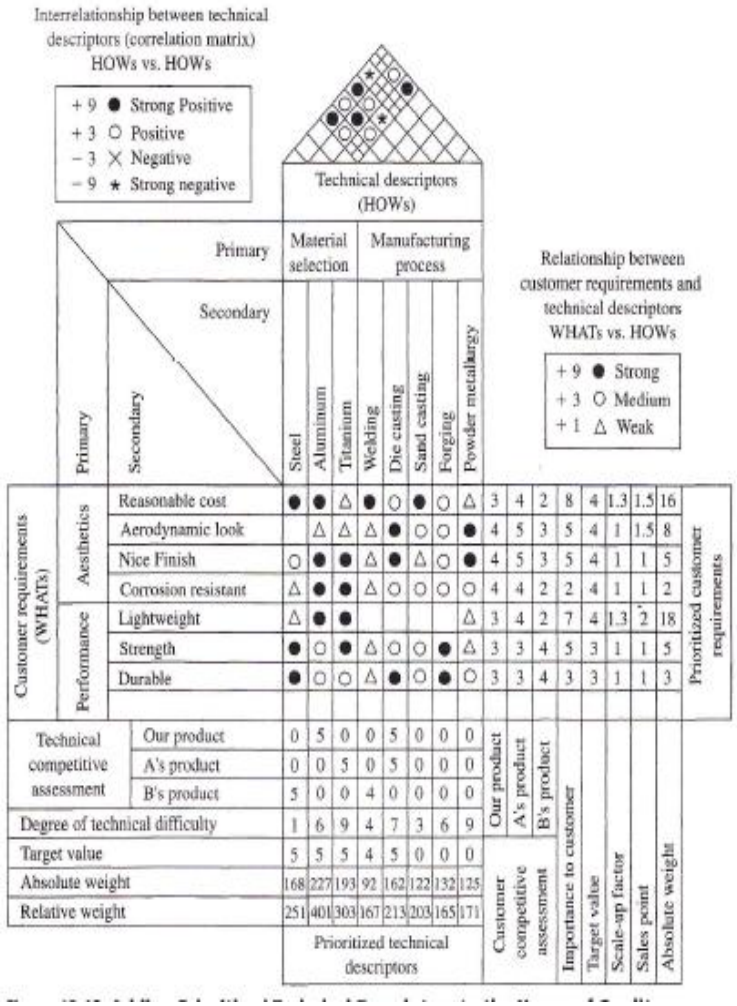
◉ Very strong relationship

○ Strong relationship

△ Weak relationship

Example


Interrelationship between technical descriptors (correlation matrix)
HOWs vs. HOWs
+9 Strong positive
+3 Positive
-3 Negative
-9 Strong negative
Technical descriptors (HOWs)
Primary
Secondary
Relationship between customer requirements and technical descriptors
WHATs vs. HOWs
+9 Strong
+3 Medium
+1 Weak
Customer requirements (WHATs)
Prioritized customer requirements
Technical competitive assessment
Our product
A's product
B's product
Degree of technical difficulty
Target value
Absolute weight and percent
Relative weight and percent
Prioritized Technical Descriptors
Customer competitive assessment
Importance to customer
Target value
Scale-up factor
Sales point
Absolute weight and percent


Interrelationship between technical descriptors (correlation matrix)
HOWs vs. HOWs
+9 Strong Positive
+3 Positive
-3 Negative
-9 Strong negative
Technical descriptors (HOWs)
Primary
Material selection
Manufacturing process
Secondary
Steel
Aluminum
Titanium
Welding
Die casting
Sand casting
Forging
Powder metallurgy
Relationship between customer requirements and technical descriptors
WHATs vs. HOWs
+9 Strong
+3 Medium
+1 Weak
Customer requirements (WHATs)
Aesthetics
Performance
Reasonable cost
Aerodynamic look
Nice Finish
Corrosion resistant
Lightweight
Strength
Durable
Prioritized customer requirements
Technical competitive assessment
Our product
A's product
B's product
Degree of technical difficulty
Target value
Absolute weight
Relative weight
Prioritized technical descriptors
Importance to customer
Target value
Scale-up factor
Sales point
Absolute weight

QFD Process

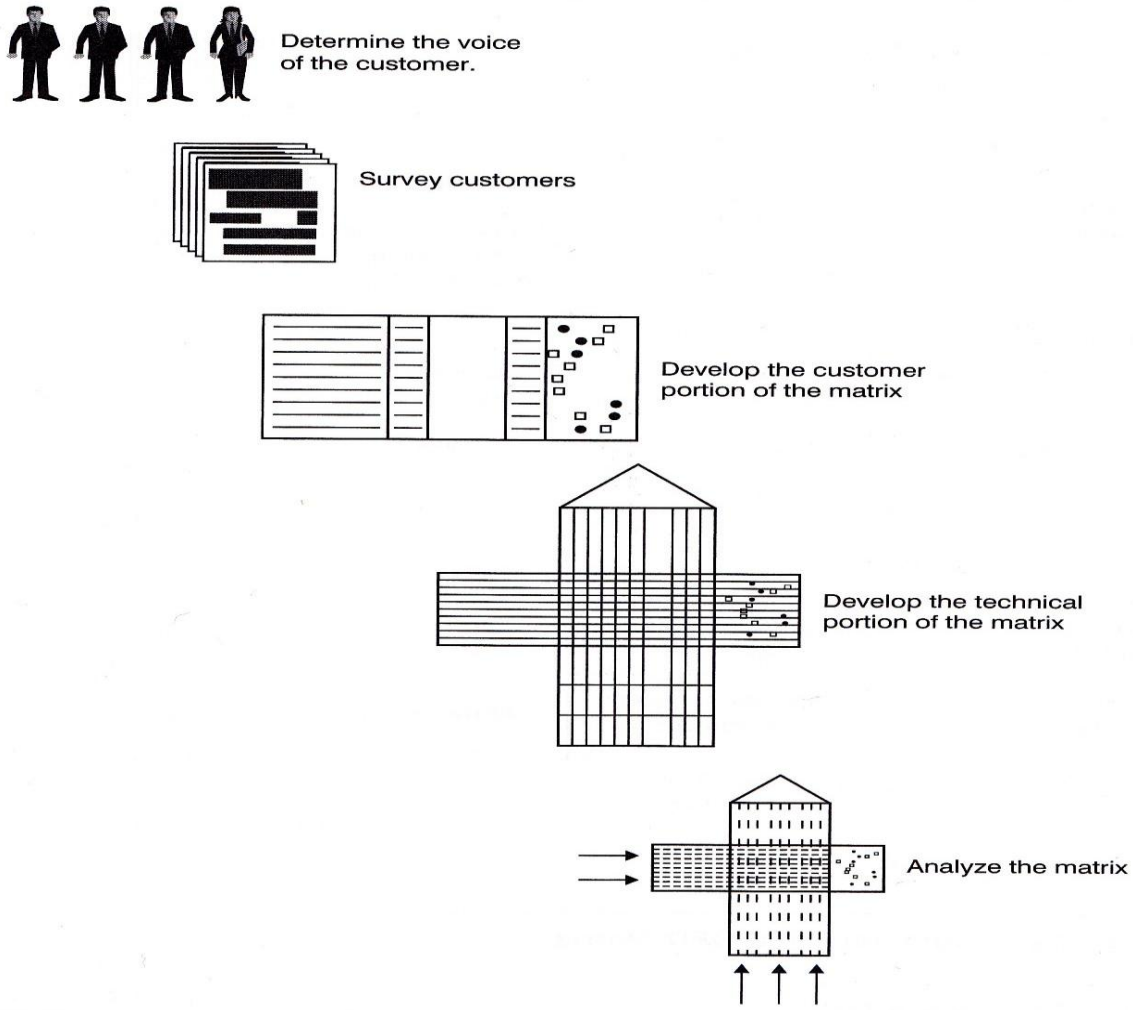
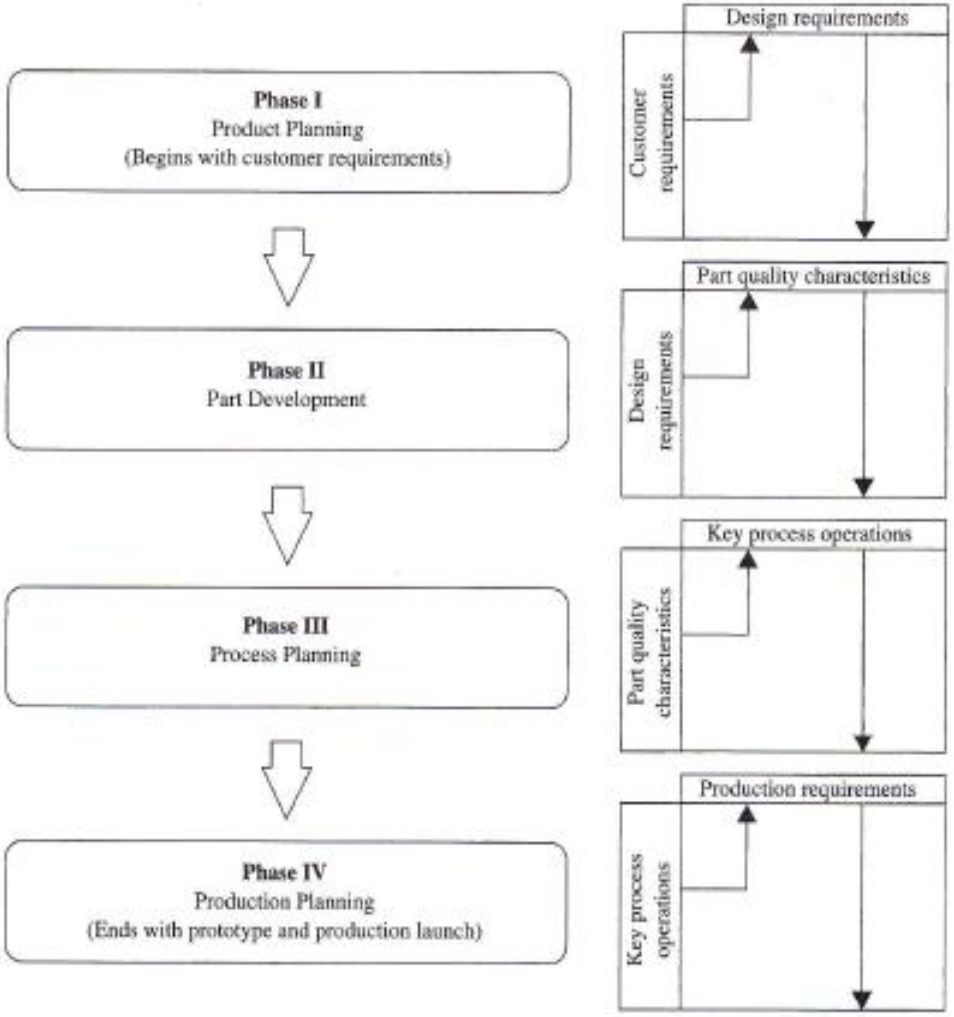


Figure 11.1 The QFD Process

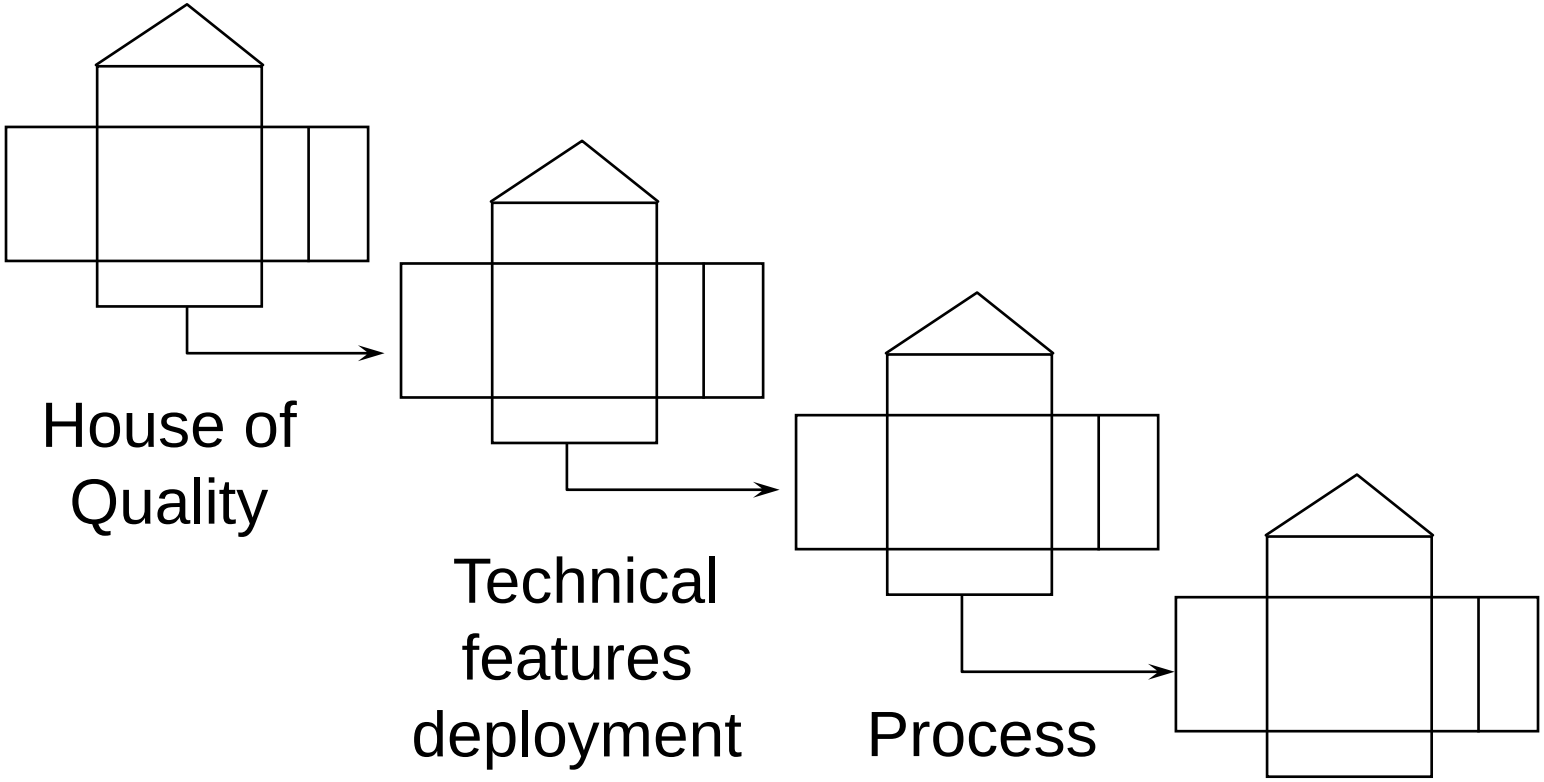
QFD Process



Often, more than one matrix will be needed, depending on the complexity of the project

The process is accomplished by creating a new chart in which the HOWs of the previous chart became the WHATs of the new chart

QFD Process



House of Quality

Technical features deployment matrix

Process Plan and QC charts matrix

Operating Instructions matrix

Summary

- An effective management tool in which customer expectations are used to drive the design process or to drive improvement in the service industries
- Some of the advantages of implementing QFD are:
  - An orderly way of obtaining information and presenting it
  - Shorter product development cycle
  - Considerably reduced start-up costs
  - Fewer engineering changes
  - Reduced chance of oversights during the design process
  - An environment of teamwork
  - Consensus decisions
  - Everything is preserved in writing