CHAPTER 1

# INTRODUCTION TO QUALITY MANAGEMENT

**Expected Outcomes**

Understand the complexities of defining quality
Explain the philosophies of quality management and continuous improvement
Recognize that processes perform value-added activities and variation is present in any natural process
To gain insight into the evolution of Total Quality Management (TQM) concepts

# Chapter Outline

- Introduction
- Defining Quality
- Quality aspect
- Dimensions of Quality
- Three sphere of Quality
- Evolution of Quality
- TQM
  - Framework
  - Obstacles
  - Benefits of TQM
- Gurus of Quality / TQM

# What is Quality?

# Quality Definition

- Definition of quality are:
  - ❖Meet the specification
  - ❖Satisfying customer need
  - ❖Fitness for purpose

* Quality of a product or services is its ability to satisfy the needs and expectations of the customer

# Quality Definition

Some of the definitions of the term ‘Quality', provided by quality gurus are as follows:

- Quality is fitness for use (JURAN)
- Quality is conformance to requirements (CROSBY)
- The efficient production of the quality that the market expects (DEMING)
- Quality is what the customer says, it is (FEIGENBAUM)

# Quality Definition

- Quality is the loss that a product costs to the society after being shipped to the customer (TAGUCHI)
- The totality of features and characteristics of a product or services that bear on its ability to satisfy stated or implied needs of the customers (ASQC)
- A quality system is the agreed on company wide and plant wide operating work structure, documented in effective, integrated, technical and managerial procedures for guiding the co-coordinated actions of people, the machines, or the information of company in the best and most practical ways to assume customer quality satisfaction and economical costs of quality. (FEIGENBAUM)

# Modern Quality Definition

- **"Quality is inversely proportional to variability"**

$$\text{Quality} \propto 1/\text{Variability}$$

- **This definition acknowledges that variability is present in all processes. Sources of variability include:**
  1. **Process variability includes raw materials, machines, operators and environmental conditions**
  2. **Measurement variability**
  3. **Sampling variability**

- **Given that quality is inversely proportional to variability, so it means by improving quality, we will reducing variability.**

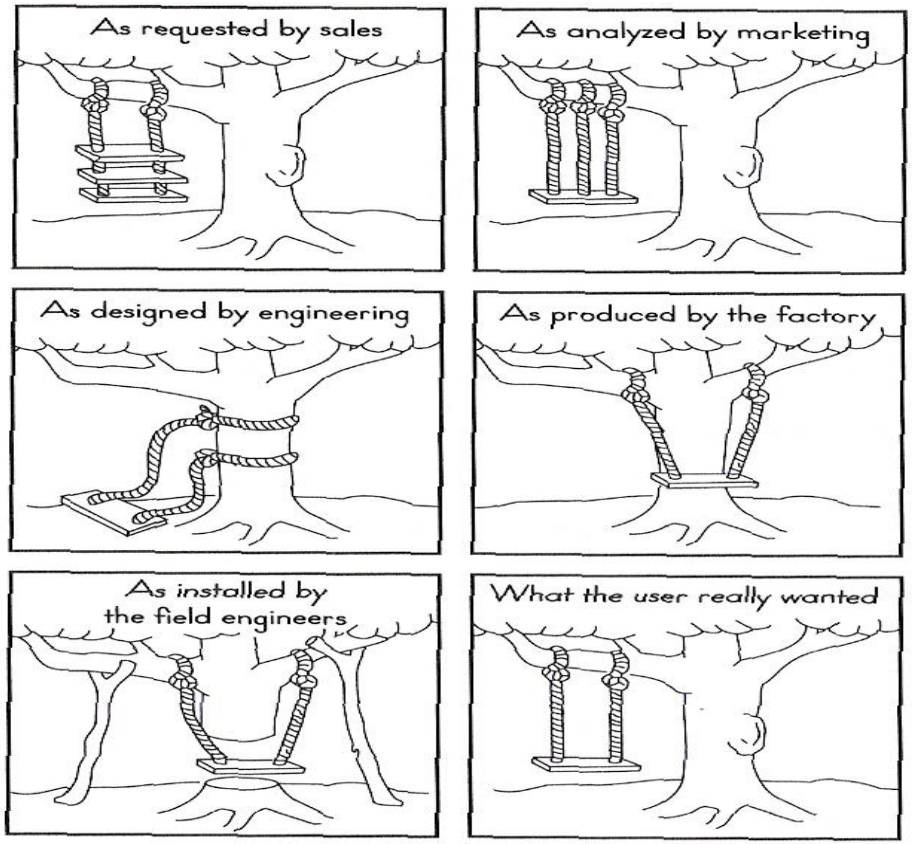
# Quality Can be Quantified as

$$Q = P/E$$

where Q = quality;
P = performance
E = expectations

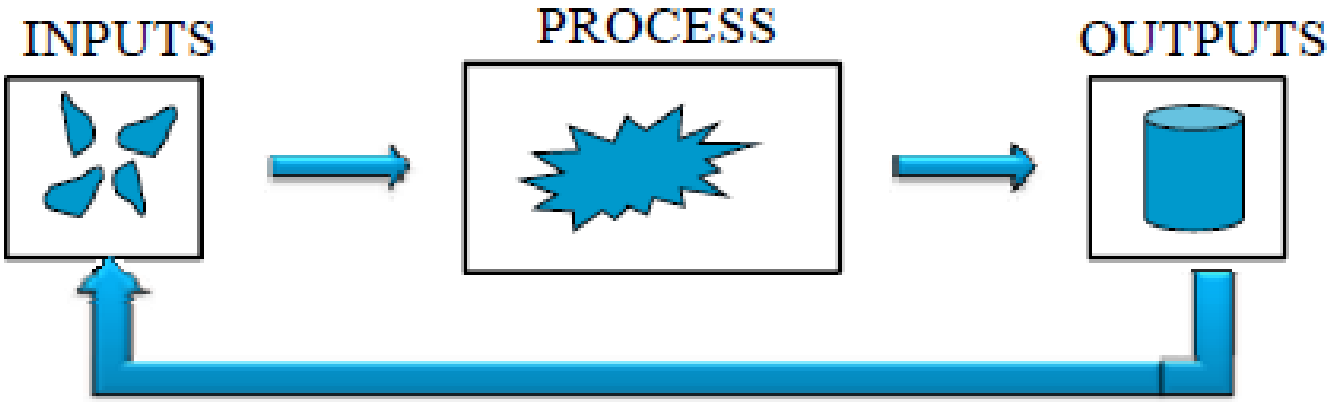
- If Q > 1.0 : then the customer has a good feeling about the product/service.
- P and E are determined based on perception.
- P is determined by the organization and E by the customers.
- Customer expectations are becoming more demanding from day-to-day.

# Essence of Quality



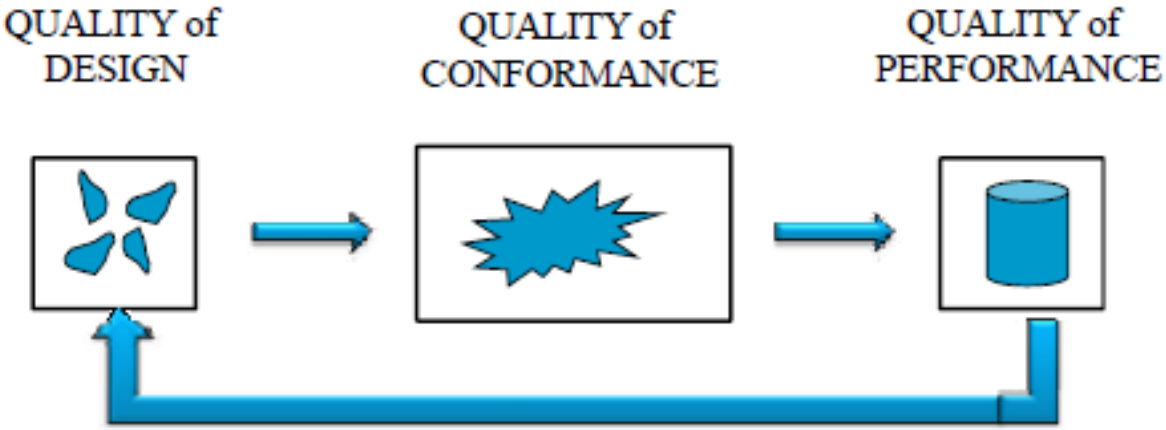

SOURCE: Don Kite, *Parts Pups,* Nov. 1971, and *Reader's Digest,* October 1973.

# Where does QUALITY apply?




Understanding the Basics Process

# Aspect of Quality




Understanding the Basics Process

# Aspect of Quality

1) Quality of design (consumer's perspective)
   - determine the Q characteristics of products that suited to the needs & wants of a market at a given cost.

2) Quality of conformance (manufacturer's perspective)
   - ability of firms and it's supplier to produce the product with predictable degree of uniformity & dependability as in Q of design.

3) Quality of performance
   - studies focus on determining how the Q characteristics identified in Q of design & improved and innovated in Q of conformance

# Product Quality Dimensions

| Dimension | Meaning and Example | |
|---|---|---|
| 1. Performance | Primary product characteristics, such as brightness of the picture | will the product do the intended job? |
| 2. Features | Secondary characteristics (i.e. added features), such as remote control | what does the product do? |
| 3. Conformance | Meeting specifications or industry standards, workmanship | Did the product match with the preestablished standard? |
| 4. Reliability | Consistence performance over time, average time for the product/unit to fail | how often the product fails? |
| 5. Durability | Useful life, includes repair | how long the product lasts? |
| 6. Service | Resolution of problems and complaints, ease of repair | how easy is to repair the product? |
| 7. Response | Human-to-human interface, such as courtesy of the dealer | |
| 8. Aesthetics | Sensory characteristics, such as exterior finish | what does the product look like? |
| 9. Reputation | Past performance and other intangibles, such as being ranked first/best | what is the reputation of a company or its products? |

**Source: Garvin, 1988*

# Product Quality Dimensions

- These 9 dimensions are independent, therefore a product may be excellent in one dimension and average or poor in another.

- Very few products excel in all 9 dimensions.

- **Example:** In 1970s, the Japanese were cited for high quality cars based only on the dimensions of RELIABILITY,CONFORMANCE and AESTHETICS.

- These dimensions been translated into the requirements for the development of a new product or the improvement of an existing one.

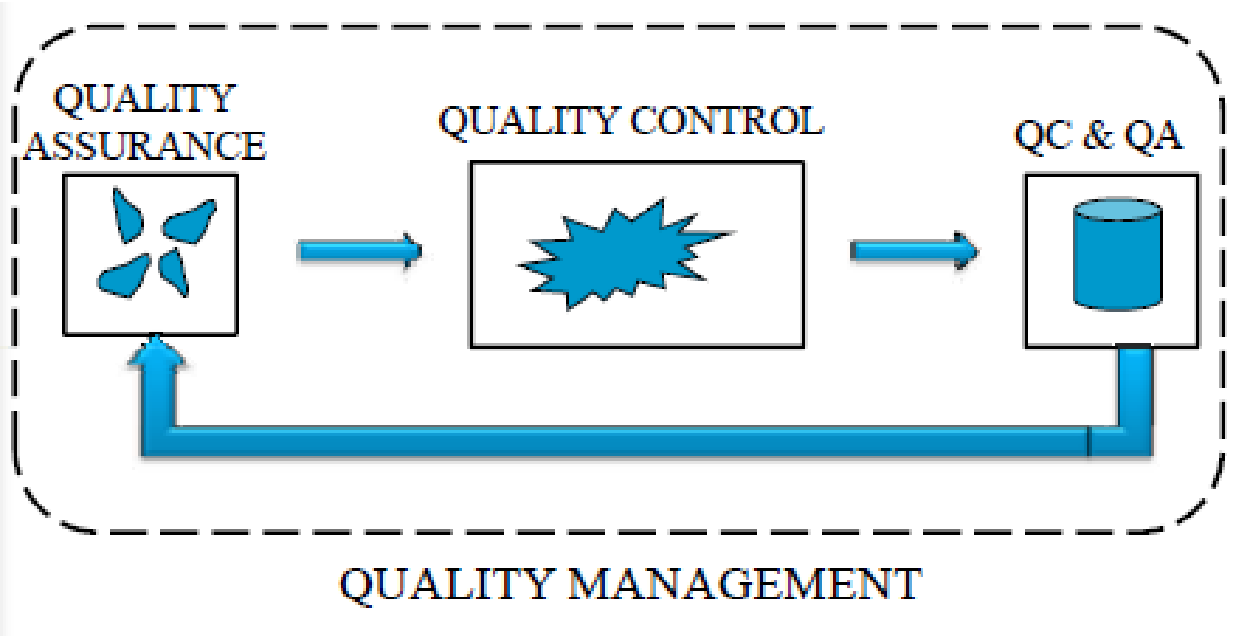
# Service Quality Dimensions

| Dimension | Meaning and Example | |
|---|---|---|
| 1. Timeliness | Delivery of service within the agreed lead time | Will a service be performed when promised? |
| 2. Completeness | Addresses the delivery of the order in full | Are all items in order included? |
| 3. Availability | Ability to provide service at the right time and place | Is the service easy to obtain? |
| 4. Pleasantness/ Courtesy | The good manners and politeness of the service provider | Do frontline employees greet each customer cheerfully? |
| 5. Responsiveness | Willingness of the service provider to be prompt in delivering the service | Can service personnel react quickly and resolve unexpected problems? |
| 6. Empathy | Ability of the service provider to demonstrate care and individual attention to the customer | |
| 7. Tangibles | The physical appearance of the service facility and people | |
| 8. Assurance | Ability of the service provider to inspire trust and confidence | |
| 9. Reliability | The consistency of performance and dependability | Is the service performed right the first time? |

**Source: Parasuraman et.al, 1988*

# Three Sphere of Quality

# Three Sphere of Quality



# QA vs QC

| QUALITY | PRINCIPLE | PURPOSE | WHEN |
|---|---|---|---|
| ASSURANCE | Prevention of problem | To avoid the same problem repeated and provide the assurance to customer | Before product starts to process or before product deliver to customer |
| CONTROL | Detection of problem | To verify whether the process is carried out correctly | At the stage of critical |

# Activities of QA, QC and QM

## QA

- Provide effective training to operators.
- Implement preventive maintenance on machine
- Conduct supplier rating to ensure quality of materials
- Establish procedures and work instructions
- Machine/process upgrade (manual to auto @ semi-auto)
- Establish product or design specification

## QC

- QC testing
- Incoming material inspection
- Finished goods inspection
- Process testing / monitoring
- Operating parameters monitoring
- Repairing of machines

## QM

- Planning for quality improvement
- Creating a quality organizational culture
- Providing training and retraining
- Designing and organizational system that reinforce quality ideas
- Facilitating organizational communication

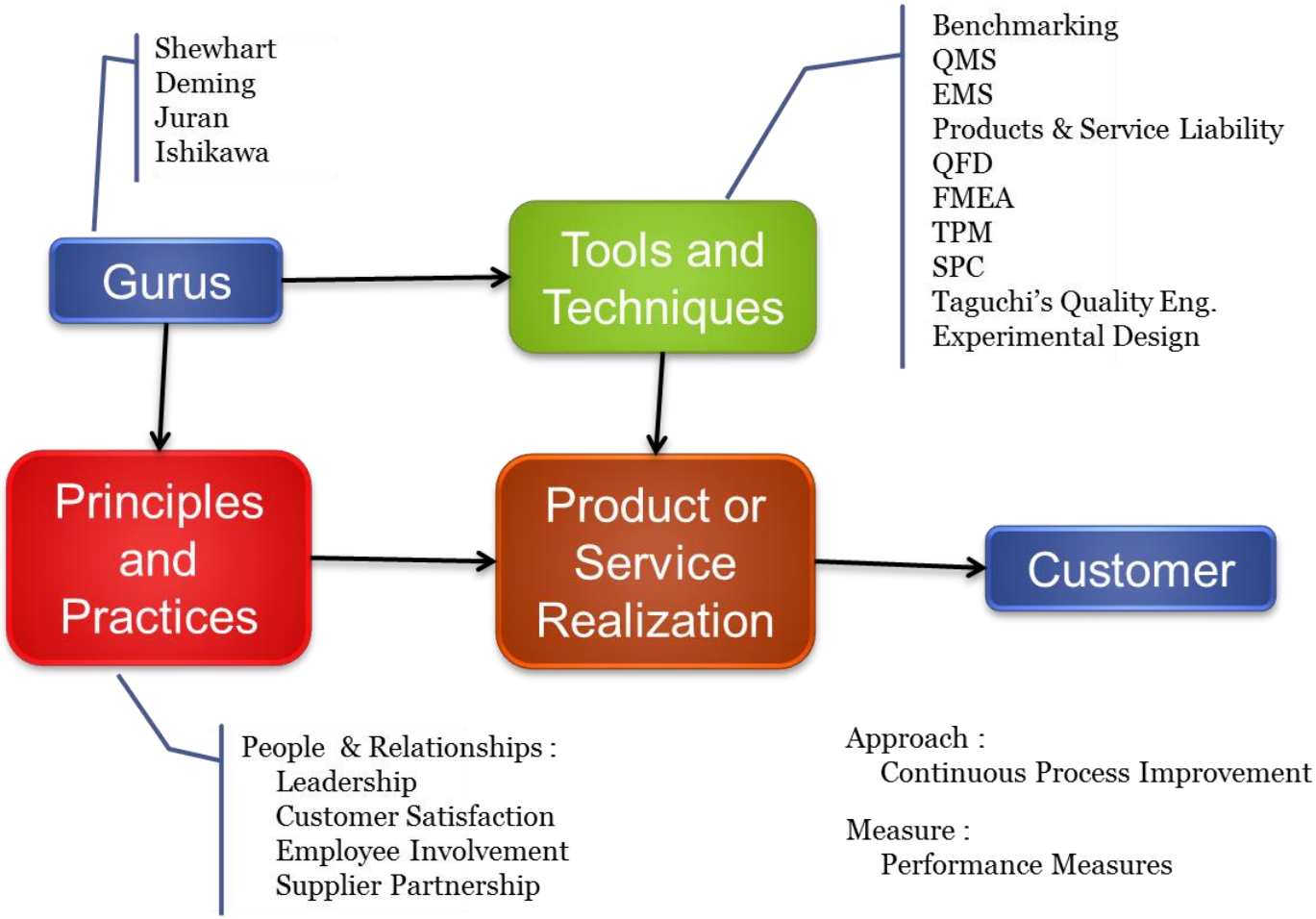
# Total Quality Management

- Total Quality Management (TQM) is an enhancement to the traditional way of doing business.
- It's a proven technique to guarantee survival in world-class competition
- TQM integrates fundamental management techniques, existing improvement efforts and technical tools under a disciplined approach
- It is the application of quantitative methods and human resources to improve all the processes within an organization and exceed customer needs now and in the future.

# New and Old Culture

| Quality Element | Previous State | TQM |
|---|---|---|
| Definition | Product-oriented | Customer-oriented |
| Priorities | Second to service and cost | First among equals of service and cost |
| Decisions | Short-term | Long-term |
| Emphasis | Detection | Prevention |
| Errors | Operations | System |
| Responsibility | Quality Control | Everyone |
| Problem Solving | Managers | Teams |
| Procurement | Price | Life-cycle costs, partnership |
| Manager's Role | Plan, assign, control and enforce | Delegate, coach, facilitate and mentor |

# New and Old Culture



# Obstacles of TQM

- Lack of Management Commitment
- Inability to Change Organizational Culture
- Improper Planning
- Lack of Continuous Training and Education
- Incompatible Organizational Structure and Isolated Individuals and Departments
- Ineffective Measurement Techniques and Lack of Access to Data and Results
- Paying Inadequate Attention to Internal and External Customers
- Inadequate Use of Empowerment and Teamwork
- Failure to Continually Improve

# Benefits of TQM

The benefits of TQM are improved:

Quality

Employee Participation

Teamwork

Working Relationships

Customer Satisfaction

Employee Satisfaction

Productivity

Communication

Profitability

Market Share

# Gurus of TQM

| Gurus | Known For |
|---|---|
| Walter A. Shewhart | Statistical Process Control Chart and PDSA Cycle |
| W. Edwards Deming | Provide a theory for management to improve quality, productivity and competitive position (14 points) |
| Joseph M. Juran | Processes for Managing Quality |
| Armand V. Feigenbaum | Authored Total Quality Control |
| Kaoru Ishikawa | Development of the Cause and Effect Diagram, Quality Circle Concept (QCC) |
| Philip B. Crosby | Authored Quality Without Tears |
| Genichi Taguchi | Developed Loss Function Concept |