Introduction to Quality Management

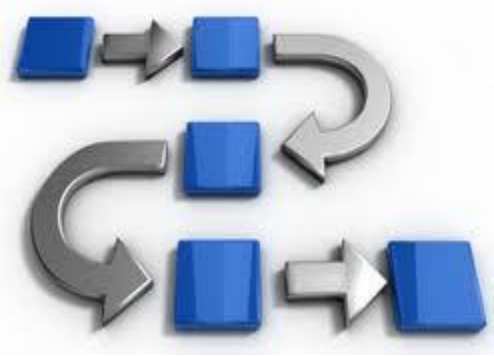
BPF 2123 – Quality Management System

Chapter Outline

- Introduction
- Changes in the Business Culture
- Defining Quality
- Dimensions of Quality
- Gurus of Quality / TQM
- Historical Review
- TQM Framework
- Awareness
- Obstacles
- Benefits of TQM

Lesson 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



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 Cultures

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

Introduction to Quality

What is Quality?

Example : A customer expects a different performance from original and counterfeit product.

OR

When a product / service satisfy or surpasses customers' expectations we consider it QUALITY

- The word **"quality"** is broadly used in many fields and carries numerous definitions.

Quality Definitions

- To a layman, what is meant by quality is probably associated with grade, luxury or degree of "goodness" of a product or service provided.

- From a production perspective, many practitioners, academicians and experts believe that quality is **"fitness for purpose" or "fulfilling the purpose intended"**, which means matching design specifications to function and ensuring that output conforms to specifications, making sure that products are safe to use and appropriate for purpose (Garvin, 1988; Juran, 1988; Besterfield et al., 1995; Dahlgaard et al., 1998).

Quality Definitions (cont..)

- From a customer's perspective, quality is defined as "conformance" to customers' requirements, not elegance, and doing it right the first time (Crosby, 1980; Feigenbaum, 1986; Besterfield et al., 1995).
- In addition, **QUALITY** in the eyes of the customer is always much more than just the quality of the product or the basic service offered.
- In other words, **QUALITY** concerns reliability, consistency, speed of delivery, accuracy of invoice, courtesy of telephone answering, value of information given, reputation of the company and etc." (Oakland, 1993).

Modern Quality Definition

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

  Quality $\propto$ 1/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:

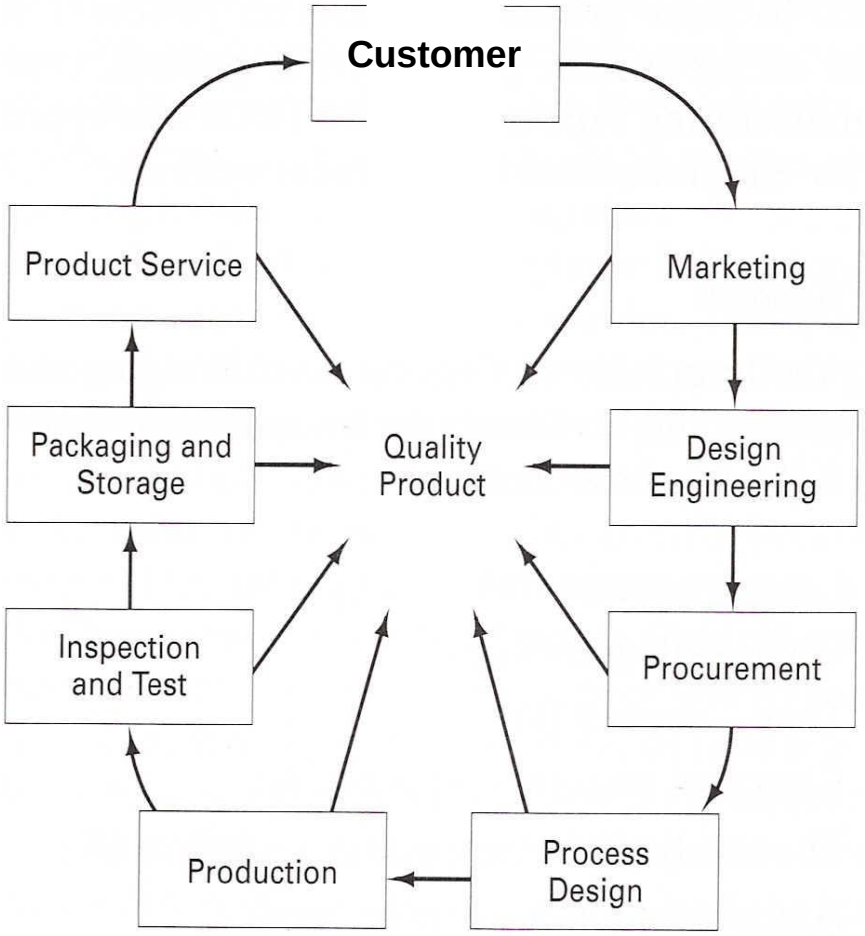
$$Q = P/E$$

where Q = quality;
P = performance
E = expectations

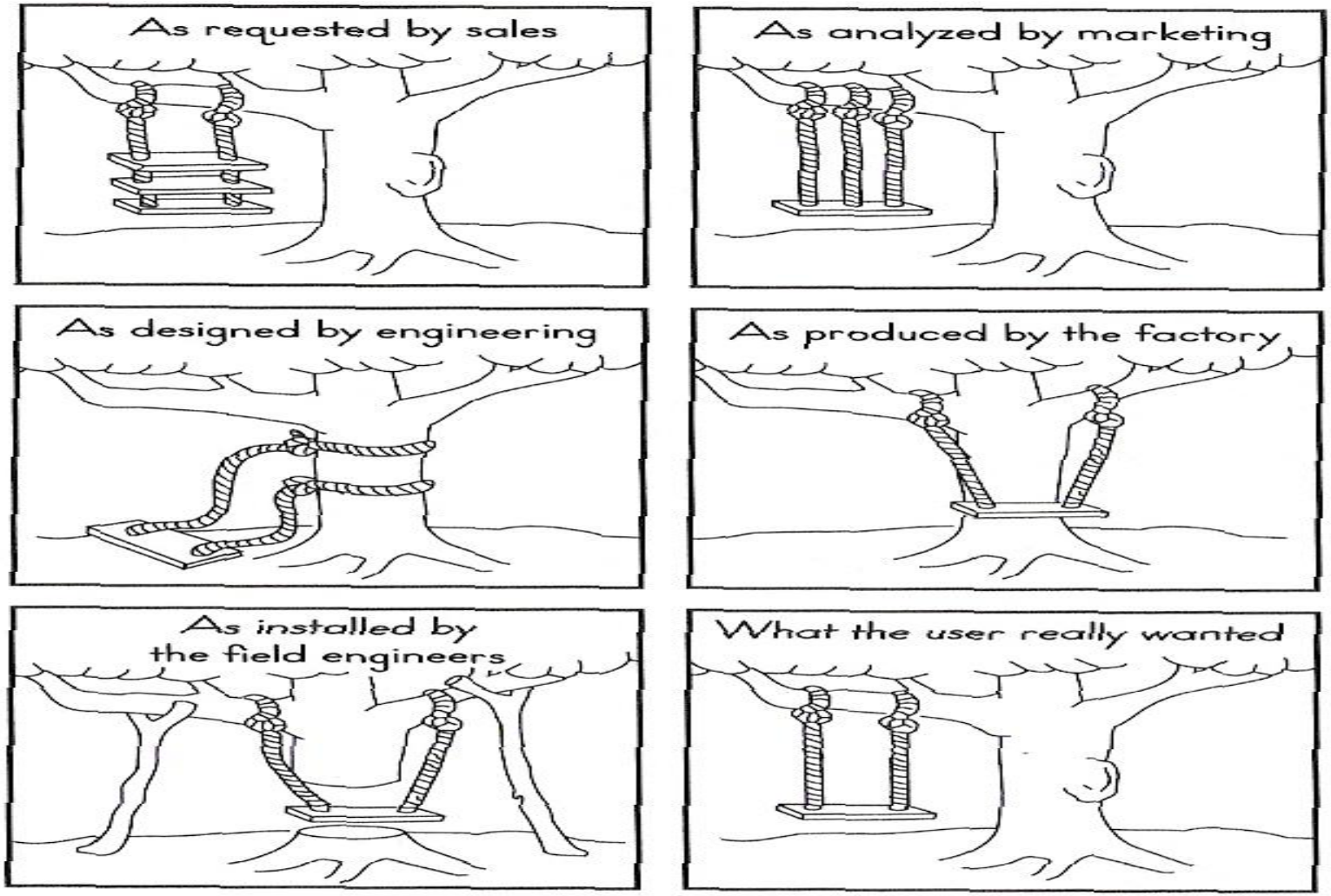
- If Q > 1.0 : then the customer has a good feeling about the product/service.
- P and E are determined based on perception.
- P is determined by the organization and E by the customers.
- Customer expectations are becoming more demanding from day-to-day.

Essence of Quality

- Assuring and ensuring that all products and services will ultimately be able to satisfy the needs of customers.
- Thus, vital for everyone in the organisation to understand the role of quality for the survival of the organisation and embed it in his/her work culture.



Essence of Quality



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

The Dimensions of Quality

(Garvin, 1988)

Dimension	Meaning and Example
Performance	Primary product characteristics, such as brightness of the picture
Features	Secondary characteristics (i.e. added features), such as remote control
Conformance	Meeting specifications or industry standards, workmanship
Reliability	Consistence performance over time, average time for the product/unit to fail
Durability	Useful life, includes repair
Service	Resolution of problems and complaints, ease of repair
Response	Human-to-human interface, such as courtesy of the dealer
Aesthetics	Sensory characteristics, such as exterior finish
Reputation	Past performance and other intangibles, such as being ranked first/best

The Dimensions of Quality

- 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.

Gurus Of Quality / 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

Historical Review

- Middle Ages – quality controlled by long period of training to instilled pride in workers for quality of a product.
- Industrial revolution – introduce concept of specialization.
- Taylor (1875) – pioneered division of labour. Workers have narrow view of the product (i.e. component). Initially created increases in productivity, but eventually led to losses in pride of workmanship (and hence quality) and, as a consequence, the need to improve productivity.

  Established work standards, time studies and wage incentive plans, which raised productivity but tended to stifle the pursuit of quality beyond the standards.

Historical Review (cont.)

- Shewhart (1924) at Bell Labs - developed a statistical chart (SQC) for controlling product variables.
- He noted the positive relationship between consistency and quality. Detect a “lack of control" in processes through continual monitoring of variability
- Deming (1950) - Helped in the reconstruction of Japanese industry; teach Japanese engineers SQC techniques and quality responsibility to Japanese CEOs.

Historical Review (cont.)

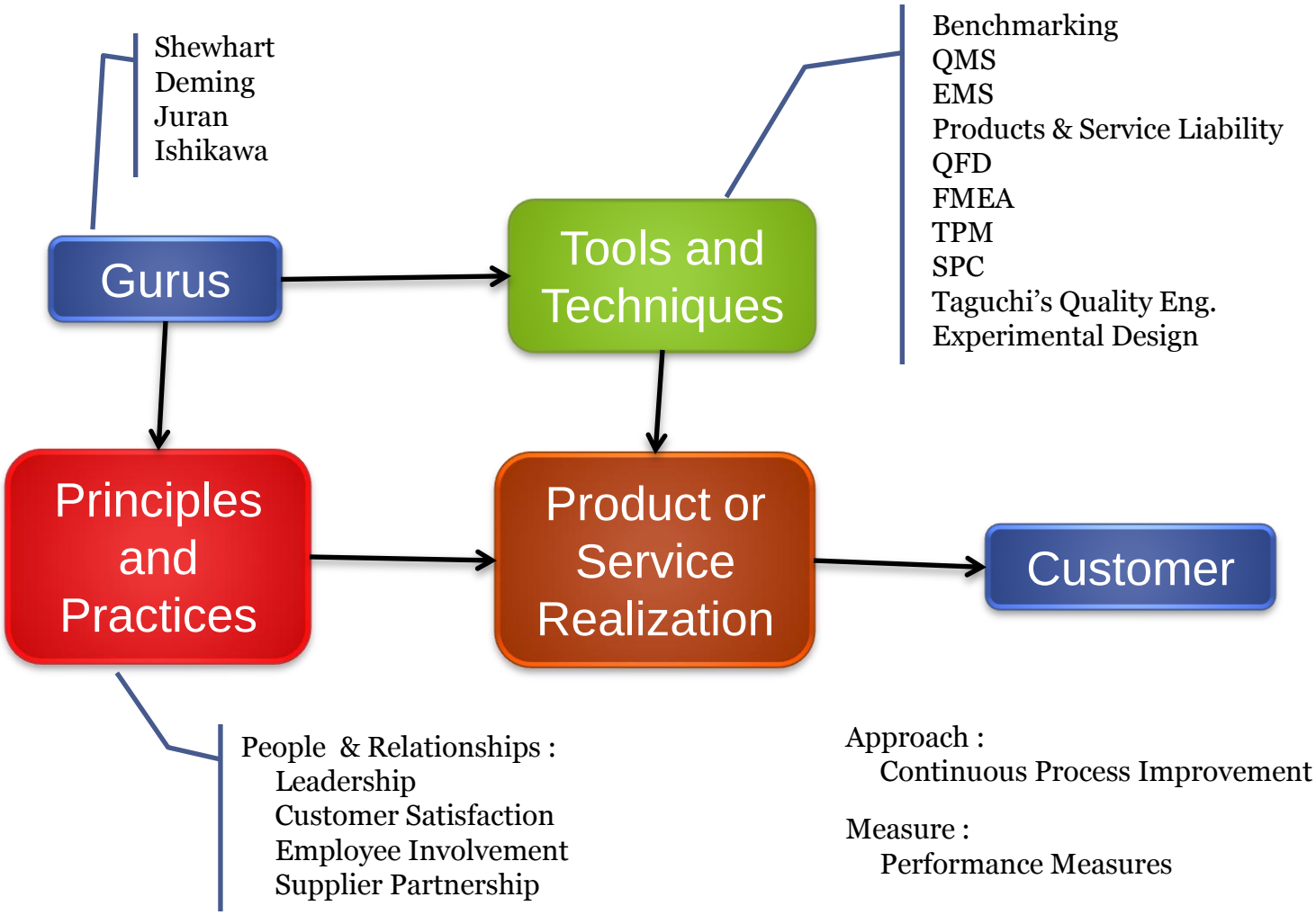
- Juran (1940s-50s) - emphasized the role of top management for achieving quality. According to Juran - organizational change, need management participation – “managerial breakthrough"
- Feigenbaum (1951) - *Total Quality Control* : company-wide involvement
- Halpin (1960s) - *Zero Defects* : emphasized prevention of defects, but focus on improving the workforce rather than on management
- Crosby (1979) - *Quality is Free.* He argued that quality programs save money (see for quality and costs – prevention costs, appraisal costs, internal costs & external costs)

Historical Review (cont.)

- Ishikawa (1960s) - Professor of engineering at Univ. of Tokyo. Quality circles (QC): participative management; a team of workers forms and brainstorms on problems of productivity and quality. Use simple tools including histograms, pie charts, pareto diagrams, cause-and-effect diagrams.

- Taguchi (1960s) - Emphasize offline QC, quality of design of processes and product. Don't wait until production to do QC. Idea : design product to withstand variations in quality of materials, labour, environment, etc. Find out what factors are critical (experimental design) and change design so that the product is more tolerant→minimize the transmission of variance throughout the process (also called robust design).

TQM Framework



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