

# Quality: Getting the Basics Right

# Lecture outline

- What is quality?
- Evolution of quality management
- Focus of quality management—customers
- Role of employees in quality improvement
- Quality in service companies
- Effect of quality management on productivity
- Quality awards

# What Is Quality?

- Oxford American Dictionary
  - a degree or level of excellence
- American Society for Quality
  - totality of features and characteristics that satisfy needs without deficiencies
- Consumer's and producer's perspective

# What Is Quality: Customer's Perspective

- Fitness for use
  - how well product or service does what it is supposed to
- Quality of design
  - designing quality characteristics into a product or service
- A Mercedes and a Ford are equally “fit for use,” but with different design dimensions.



# Dimensions of Quality: Manufactured Products

- Performance
  - basic operating characteristics of a product; how well a car handles or its gas mileage
- Features
  - “extra” items added to basic features, such as a stereo CD or a leather interior in a car
- Reliability
  - probability that a product will operate properly within an expected time frame; that is, a TV will work without repair for about seven years

# Dimensions of Quality: Manufactured Products (cont.)

- Conformance
  - degree to which a product meets pre-established standards
- Durability
  - how long product lasts before replacement; with care, L.L.Bean boots may last a lifetime
- Serviceability
  - ease of getting repairs, speed of repairs, courtesy and competence of repair person

# Dimensions of Quality: Manufactured Products (cont.)

- Aesthetics
  - how a product looks, feels, sounds, smells, or tastes
- Safety
  - assurance that customer will not suffer injury or harm from a product; an especially important consideration for automobiles
- Perceptions
  - subjective perceptions based on brand name, advertising, and like

# Dimensions of Quality: Services

- Time and timeliness
  - how long must a customer wait for service, and is it completed on time?
  - is an overnight package delivered overnight?
- Completeness:
  - is everything customer asked for provided?
  - is a mail order from a catalogue company complete when delivered?



# Dimensions of Quality: Services (cont.)

- **Courtesy:**
  - how are customers treated by employees?
  - are catalogue phone operators nice and are their voices pleasant?
- **Consistency**
  - is same level of service provided to each customer each time?
  - is your newspaper delivered on time every morning?

# Dimensions of Quality: Services (cont.)

- Accessibility and convenience
  - how easy is it to obtain service?
  - does service representative answer you calls quickly?
- Accuracy
  - is service performed right every time?
  - is your bank or credit card statement correct every month?
- Responsiveness
  - how well does company react to unusual situations?
  - how well is a telephone operator able to respond to a customer's questions?



Complete the dimensions of quality for a cellphone

|                |  |
|----------------|--|
| Performance    |  |
| Features       |  |
| Reliability    |  |
| Conformance    |  |
| Durability     |  |
| Serviceability |  |
| Aesthetics     |  |
| Safety         |  |

## Complete the dimensions of quality for a hospital

|                             |  |
|-----------------------------|--|
| Timeliness                  |  |
| Completeness                |  |
| Courtesy                    |  |
| Consistency                 |  |
| Accessibility & Convenience |  |
| Accuracy                    |  |
| Responsiveness              |  |
| Other                       |  |

# What Is Quality: Producer's Perspective

- Quality of conformance
  - making sure product or service is produced according to design
    - if new tires do not conform to specifications, they wobble
    - if a hotel room is not clean when a guest checks in, hotel is not functioning according to specifications of its design



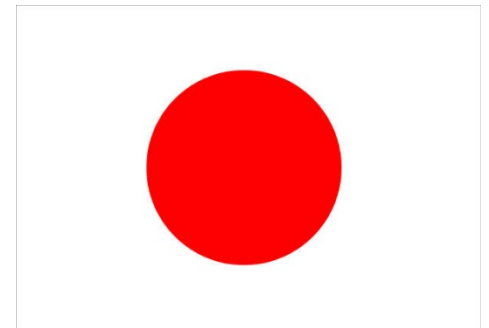
# What Is Quality: A Final Perspective

- Customer's and producer's perspectives depend on each other
- Producer's perspective:
  - production process and COST
- Customer's perspective:
  - fitness for use and PRICE
- Customer's view must dominate



# Japanese Approaches to Quality

- In 1950 the Japanese government invited W. Edwards Deming (then a professor at New York University) to give a series of lectures on quality control to help Japanese engineers reindustrialize the country.



# Evolution of Quality Management: Quality Gurus



- Walter Shewart
  - In 1920s, developed control charts
  - Introduced term “quality assurance”
- W. Edwards Deming
  - Developed courses during World War II to teach statistical quality-control techniques to engineers and executives of companies that were military suppliers
  - After war, began teaching statistical quality control to Japanese companies
- Joseph M. Juran
  - Followed Deming to Japan in 1954
  - Focused on strategic quality planning
  - Quality improvement achieved by focusing on projects to solve problems and securing breakthrough solutions



# Evolution of Quality Management: Quality Gurus

- Armand V. Feigenbaum
  - In 1951, introduced concepts of total quality control and continuous quality improvement
- Philip Crosby
  - In 1979, emphasized that costs of poor quality far outweigh cost of preventing poor quality
  - In 1984, defined absolutes of quality management—conformance to requirements, prevention, and “zero defects”
- Kaoru Ishikawa
  - Promoted use of quality circles
  - Developed “fishbone” diagram
  - Emphasized importance of internal customer

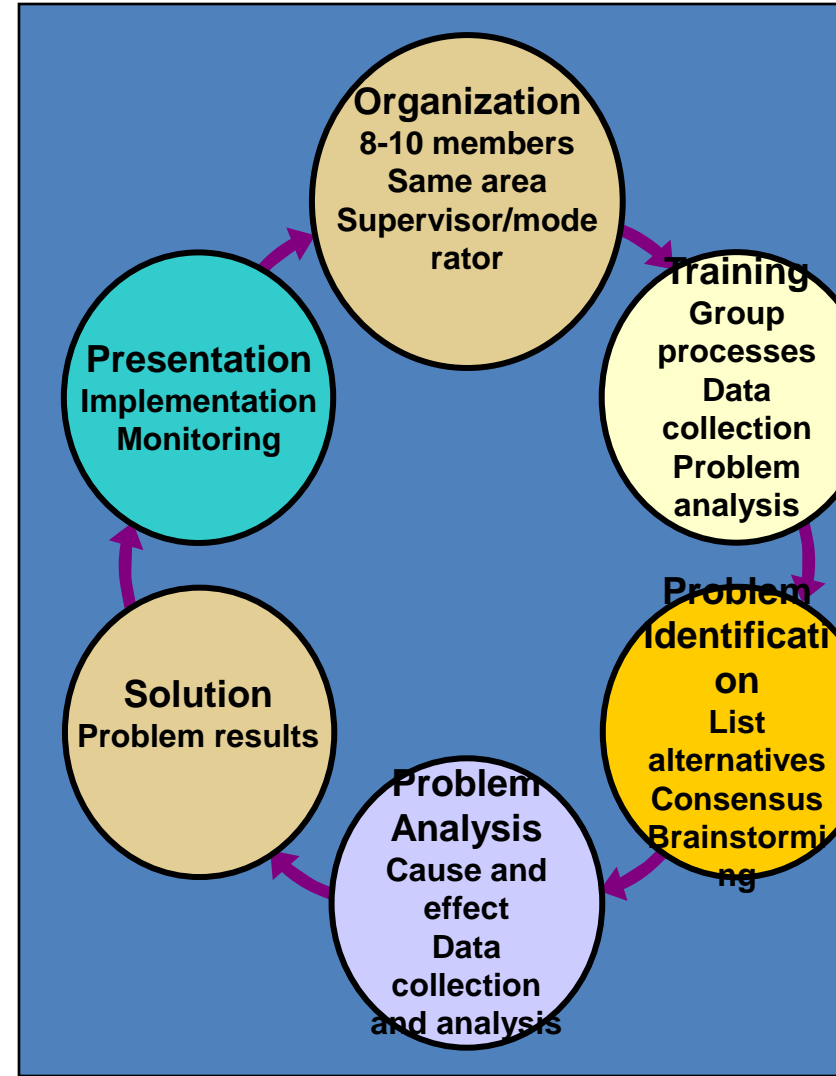
# Role of Employees in Quality Improvement

- Participative problem solving
  - employees involved in quality-management
  - every employee has undergone extensive training to provide quality service to Disney's guests
- Kaizen
  - involves everyone in process of continuous improvement



# Quality Circles and QITs

- Quality circle
  - group of workers and supervisors from same area who address quality problems
- Process/Quality improvement teams (QITs)
  - focus attention on business processes rather than separate company functions



# Need for a New Strategy

- Foreign markets have grown
  - Import barriers and protection are not the answer.
- Consumers are offered more choices
  - They have become more discriminating.
- Consumers are more sophisticated
  - They demand new and better products.

# Why Quality Improvement?

- Global Competition
  - Economic and political boundaries are slowly vanishing
  - The 1950's slogan “Built by Americans for Americans” is very far from reality in the 2000's.

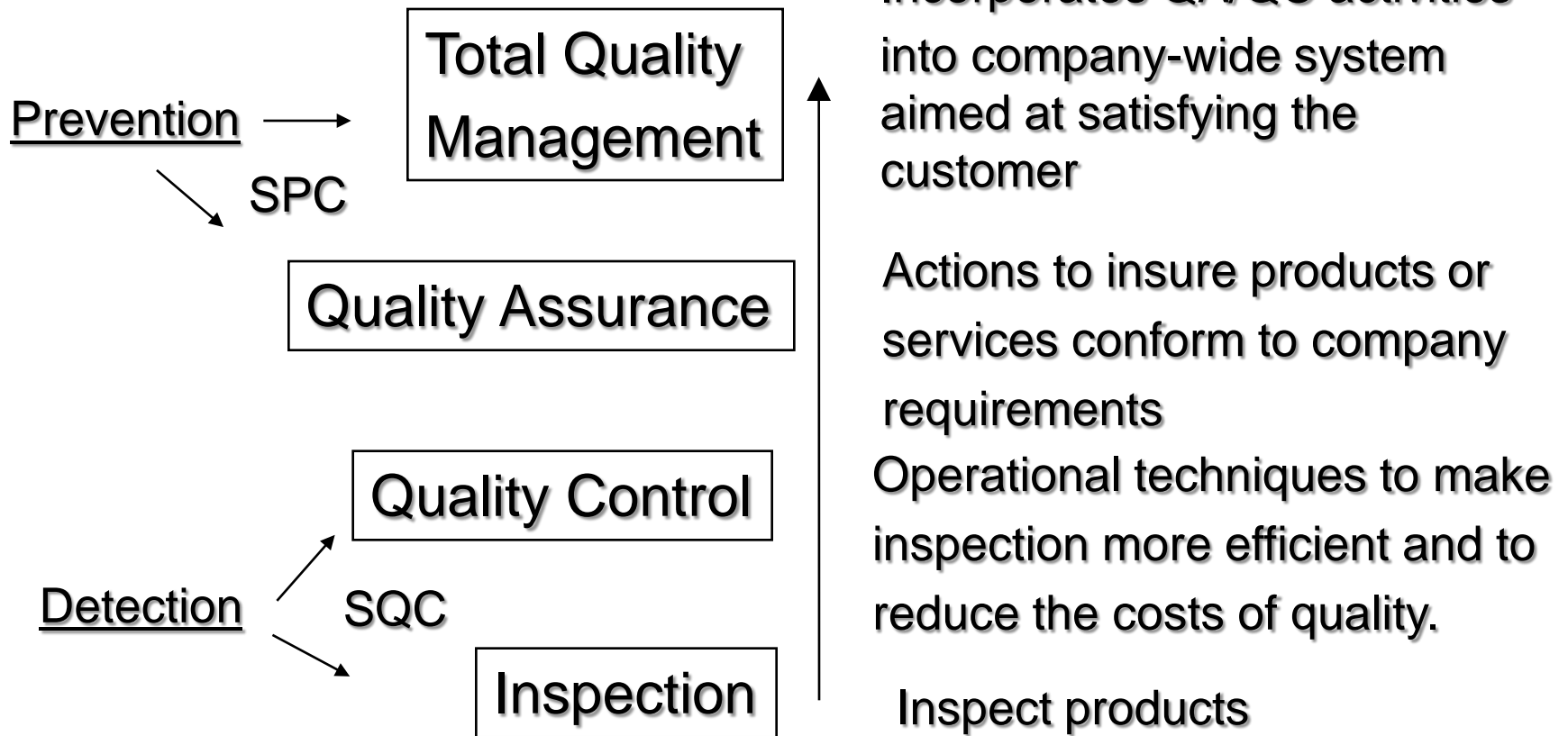
# How Do Organizations Compete?

- Most common competitive measures:
  - Quality (both real and perceived)
  - Cost
  - Delivery (lead time and accuracy)
- Other measures
  - safety,
  - employee morale,
  - product development (time-to-market, innovative products)

# Contrasting Approaches

- Passive / Reactive
  - Setting acceptable quality levels
  - Inspecting to measure compliance
- Proactive / Preventive
  - Design quality in products and processes
  - Identify sources of variation (processes and materials)
  - Monitor process performance

# The Quality Hierarchy





# Quality–Productivity Ratio

## QPR

- productivity index that includes productivity and quality costs

$$\text{QPR} = \frac{(\text{good-quality units})}{(\text{input}) (\text{processing cost}) + (\text{reworked units}) (\text{rework cost})} (100)$$

# Effect of Quality Management on Productivity

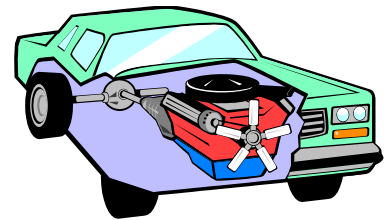
- Productivity
  - ratio of output to input
- Quality impact on productivity
  - fewer defects increase output, and quality improvement reduces inputs
- Yield- a measure of productivity

$$\text{Yield} = (\text{total input})(\% \text{ good units}) + (\text{total input})(1 - \% \text{ good units})(\% \text{ reworked})$$

or

$$Y = (I)(\%G) + (I)(1 - \%G)(\%R)$$

HS Motors plans to produce 100 motors per day. The percentage of good motors averages 80% & the percentage of poor quality motors that can be reworked is 50%. The company wants to know the daily product yield and the effect on productivity if the daily percentage of good quality motors is increased to 90%.



# Computing Product Cost per Unit

$$\text{Product Cost} = \frac{(K_d)(I) + (K_r)(R)}{Y}$$

*where:*

$K_d$  = direct manufacturing cost per unit

$I$  = input

$K_r$  = rework cost per unit

$R$  = reworked units

$Y$  = yield

HS Motors has a direct manufacturing cost of R30 per unit & the motors that are of inferior quality can be reworked for R12 per unit. If the company succeeds in improving its quality levels to 90%, assess the impact on the direct cost per unit.

## Example 2



Temba Appliances plans to produce 650 tv sets per day of which 85% are of good quality. Of the defectives 70% can be reworked at a cost of R420 per unit. Direct manufacturing cost is R550 per tv. Through it's TQM program the company wants to improve it's quality level to 92%.

1. Calculate the daily product yield and the effect on productivity.
2. Assess the impact of direct cost per unit of improvement in product quality.