Learning Objectives
- Define the term quality.
- Explain why quality is important and describe the consequences of poor quality.
- Identify the determinants of quality.
- Describe the costs associated with quality.
- Describe some of the current quality awards.

Learning Objectives (Cont.)
- Discuss the philosophies of quality gurus.
- Describe TQM.
- Give an overview of problem solving.
- Give an overview of process improvement.
- Describe and use various quality tools.

Quality Gurus/Contributors
- Walter Shewhart
  - “father of statistical quality control”
  - Control charts
  - Variance reduction
- W. Edwards Deming
  - Special vs. common cause variation
  - The 14 points
- Joseph Juran
  - Quality Control Handbook, 1951
  - Viewed quality as fitness-for-use
  - Quality trilogy– quality planning, quality control, quality improvement
- Armand Feigenbaum
  - Quality is a “total field”
  - The customer defines quality
- Philip B. Crosby
  - Zero defects
  - Quality is Free, 1979
- Kaoru Ishikawa
  - Cause-and-effect diagram
  - Quality circles
  - Recognized the internal customer
- Genichi Taguchi
  - Taguchi loss function
- Taiichi Ohno and Shigeo Shingo
  - Developed philosophy and methods of kaizen
Dimensions of Product Quality

- Performance: main characteristics of the product
- Aesthetics: appearance, feel, smell, taste
- Special features: extra characteristics
- Conformance: how well the product conforms to design specifications
- Reliability: consistency of performance
- Durability: the useful life of the product
- Perceived quality: indirect evaluation of quality
- Serviceability: handling of complaints or repairs

Dimensions of Service Quality

- Convenience: the availability and accessibility of the service
- Reliability: ability to perform a service dependably, consistently, and accurately
- Responsiveness: willingness to help customers in unusual situations and to deal with problems
- Time: the speed with which the service is delivered

Dimensions of Service Quality

- Assurance: knowledge exhibited by personnel and their ability to convey trust and confidence
- Courtesy: the way customers are treated by employees
- Tangibles: the physical appearance of facilities, equipment, personnel, and communication materials
- Consistency: the ability to provide the same level of good quality repeatedly

Determinants of Quality

- Quality of design
  - Intention of designers to include or exclude features in a product or service
- Quality of conformance
  - The degree to which goods or services conform to the intent of the designers

Determinants of Quality (Cont.)

- Ease-of-Use and user instructions
  - Increase the likelihood that a product will be used for its intended purpose and in such a way that it will continue to function properly and safely
- After-the-sale service
  - Taking care of issues and problems that arise after the sale

The Consequences of Poor Quality

- Loss of business
- Liability
- Productivity
- Costs
Benefits of Good Quality

- Enhanced reputation for quality
- Ability to command higher prices
- Increased market share
- Greater customer loyalty
- Lower liability costs
- Fewer production or service problems
- Higher profits

Responsibility for Quality

- **Everyone** in the organization has some responsibility for quality, but certain areas of the organization are involved in activities that make them key areas of responsibility.
  - Top management
  - Design
  - Procurement
  - Production/operations
  - Quality assurance
  - Packaging and shipping
  - Marketing and sales
  - Customer service

Costs of Quality

- **Failure Costs** - costs incurred by defective parts/products or faulty services.
- **Internal Failure Costs**
  - Costs incurred to fix problems that are detected before the product/service is delivered to the customer.
- **External Failure Costs**
  - All costs incurred to fix problems that are detected after the product/service is delivered to the customer

Costs of Quality (Cont.)

- **Appraisal Costs**
  - Costs of activities designed to ensure quality or uncover defects
- **Prevention Costs**
  - All TQ training, TQ planning, customer assessment, process control, and quality improvement costs to prevent defects from occurring

Ethics and Quality

- **Substandard work**
  - Defective products
  - Substandard service
  - Poor designs
  - Shoddy workmanship
  - Substandard parts and materials

Having knowledge of this and failing to correct and report it in a timely manner is unethical.

Quality Certification

International Organization for Standardization
- ISO 9000
- Set of international standards on quality management and quality assurance, critical to international business
- ISO 14000
- A set of international standards for assessing a company's environmental performance
Total Quality Management
• A philosophy that involves everyone in an organization in a continual effort to improve quality and achieve customer satisfaction.

TQM Approach
1. Find out what the customer wants
2. Design a product or service that meets or exceeds customer wants
3. Design processes that facilitate doing the job right the first time
4. Keep track of results
5. Extend these concepts throughout the supply chain

TQM Elements
1. Continuous improvement
2. Competitive benchmarking
3. Employee empowerment
4. Team approach
5. Decision based on fact, not opinion
6. Knowledge of tools
7. Supplier quality
8. Champion
9. Quality at the source
10. Suppliers are partners in the process

Obstacles to Implementing TQM
• Obstacles include:
  • Lack of company-wide definition of quality
  • Lack of strategic plan for change
  • Lack of customer focus
  • Poor inter-organizational communication
  • Lack of employee empowerment
  • View of quality as a “quick fix”
  • Emphasis on short-term financial results
  • Inordinate presence of internal politics and “turf” issues
  • Lack of strong motivation–
  • Lack of time to devote to quality initiatives
  • Lack of leadership

Continuous Improvement
• Continuous Improvement
• Philosophy that seeks to make never-ending improvements to the process of converting inputs into outputs
• Kaizen
• Japanese word for continuous improvement.

Quality at the Source
• The philosophy of making each worker responsible for the quality of his or her work
  • “Do it right” and “If it isn’t right, fix it”
Six Sigma

- **Six Sigma**
  - A business process for improving quality, reducing costs, and increasing customer satisfaction
  - **Statistically**
    - Having no more than 3.4 defects per million
  - **Conceptually**
    - Program designed to reduce defects
    - Requires the use of certain tools and techniques

PDSA Cycle

- **Plan-Do-Study-Act (PDSA) Cycle**
  - **Plan**
    - Begin by studying and documenting the current process.
    - Collect data on the process or problem
    - Analyze the data and develop a plan for improvement
    - Specify measures for evaluating the plan
  - **Do**
    - Implement the plan, document any changes made, collect data for analysis
  - **Study**
    - Evaluate the data collection during the do phase
    - Check results against goals formulated during the plan phase
  - **Act**
    - If the results are successful, standardize the new method and communicate it to the relevant personnel
    - Implement training for the new method
    - If unsuccessful, revise the plan and repeat the process

Process Improvement

- **Process Improvement**
  - A systematic approach to improving a process

Basic Quality Tools

- **Seven basic quality tools**
  - [Figure 9.4](#) The Seven basic quality tools
  - [Check sheet](#) The Seven basic quality tools
  - [A lined graph in the process](#) A tool for organizing and analyzing data, a list of problems or other events by category
**Basic Quality Tools**

**Figure 9.4 The Seven basic quality tools**

- **Pareto Chart**
- **Histogram**
- **Scatter Diagram**
- **Flowchart**
- **Cause-and-Effect Diagram**
- **Check Sheet**
- **Control Chart**

**Benchmarking Process**

- **Identify** a critical process that needs improving
- **Identify** an organization that excels in this process
- **Contact** that organization
- **Analyze** the data
- **Improve** the critical process

**5W2H**

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