Principles of Information Systems, Tenth Edition

Chapter 2

Information Systems in Organizations

Principles and Learning Objectives

- The use of information systems to add value to the organization is strongly influenced by organizational structure, culture, and change

  - Identify the value-added processes in the supply chain and describe the role of information systems within them

  - Provide a clear definition of the terms "organizational structure," "culture," and "change" and discuss how they affect the type of information systems that the organization implements

Principles and Learning Objectives (continued)

- Because information systems are so important, businesses need to be sure that improvements or completely new systems help lower costs, increase profits, improve service, or achieve a competitive advantage

  – Define the term "competitive advantage" and identify the factors that lead firms to seek competitive advantage

  – Discuss strategic planning for competitive advantage

  – Describe how the performance of an information system can be measured

Principles and Learning Objectives (continued)

- IS personnel is a key to unlocking the potential of any new or modified system
  - Define the types of roles, functions, and careers available in the field of information systems

Why Learn About Information Systems in Organizations?

- Organizations of all types use information systems to cut costs and increase profits

- Although your career might be different from your classmates':

  - You will almost certainly work with computers and information systems

Organizations and Information Systems

- Organization:
  - Formal collection of people and other resources established to accomplish a set of goals
  - A system
  - Constantly uses money, people, materials, machines and other equipment, data, information, and decisions

Organizations and Information Systems (continued)
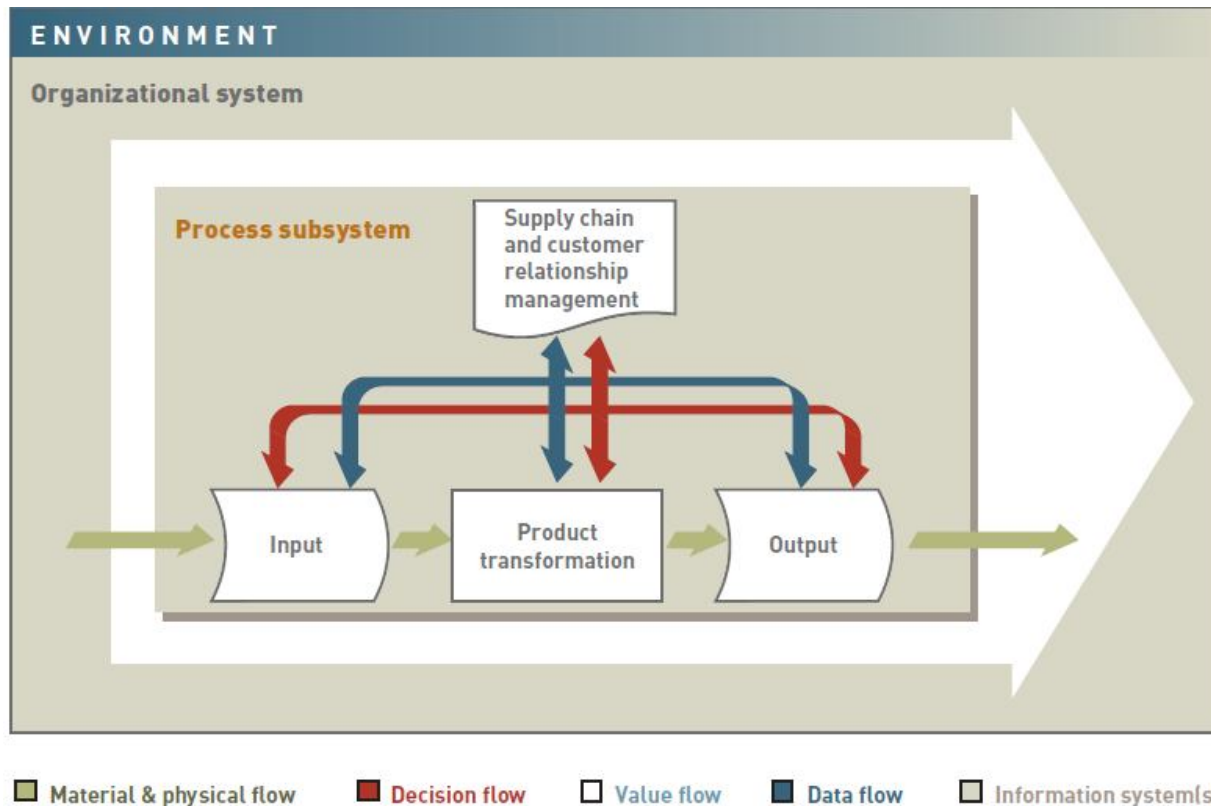
Figure 2.1

**A General Model of an Organization**

Information systems support and work within all parts of an organizational process. Although not shown in this simple model, input to the process subsystem can come from internal and external sources. Just prior to entering the subsystem, data is external. After it enters the subsystem, it becomes internal. Likewise, goods and services can be output to either internal or external systems.

Organizations and Information Systems (continued)

- Value chain:
  - Series (chain) of activities that includes inbound logistics and warehouse and storage
- Supply chain management (SCM)
  - Determines:
    - What supplies are required for value chain
    - What quantities are needed to meet customer demand
    - How supplies should be processed into finished goods and services
    - How shipment of supplies and products to customers should be scheduled, monitored, and controlled

Organizations and Information Systems (continued)
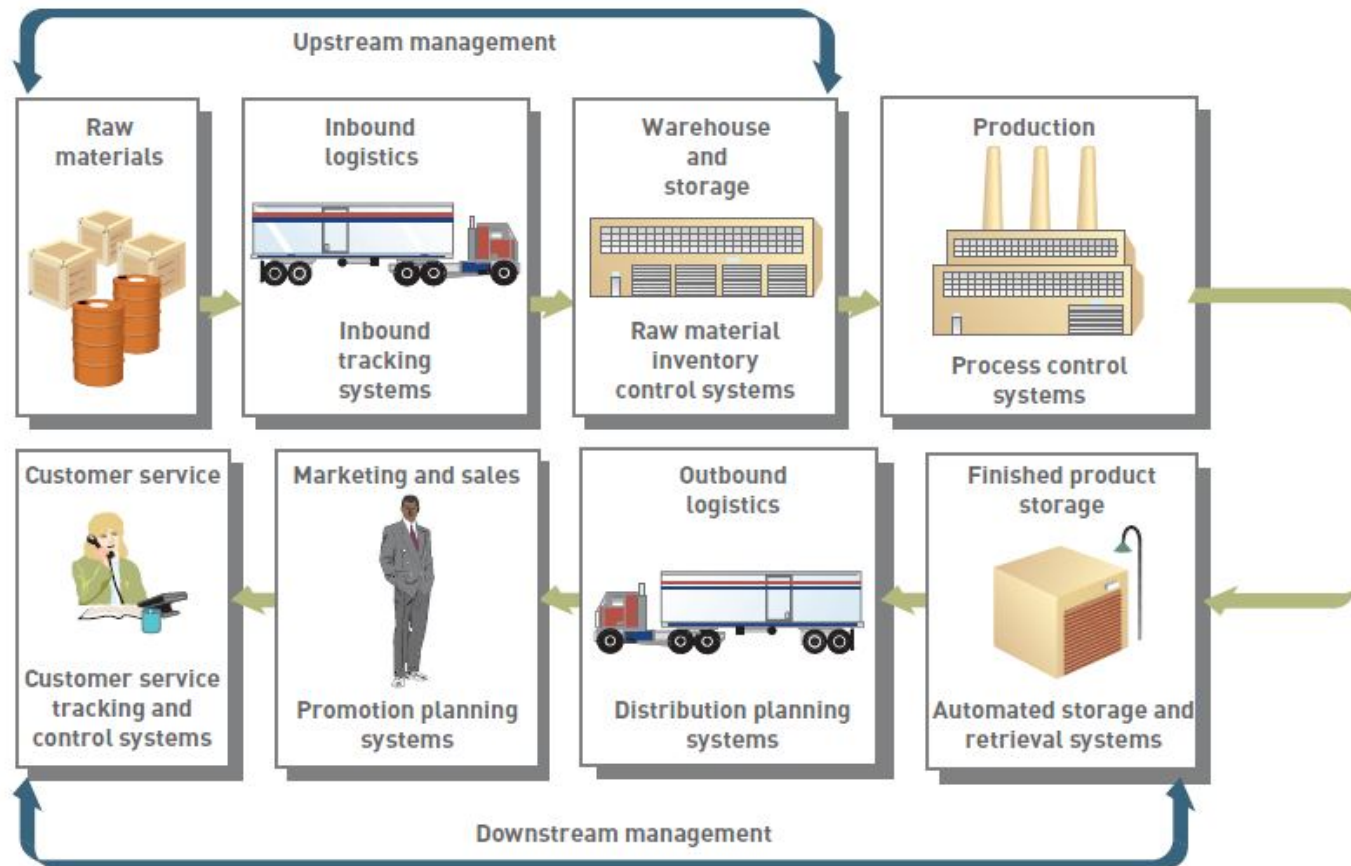
Figure 2.2

The Value Chain of a Manufacturing Company

Managing raw materials, inbound logistics, and warehouse and storage facilities is called *upstream management*. Managing finished product storage, outbound logistics, marketing and sales, and customer service is called *downstream management*.

Organizations and Information Systems (continued)

- Customer relationship management (CRM) programs:
  - Help companies manage all aspects of customer encounters
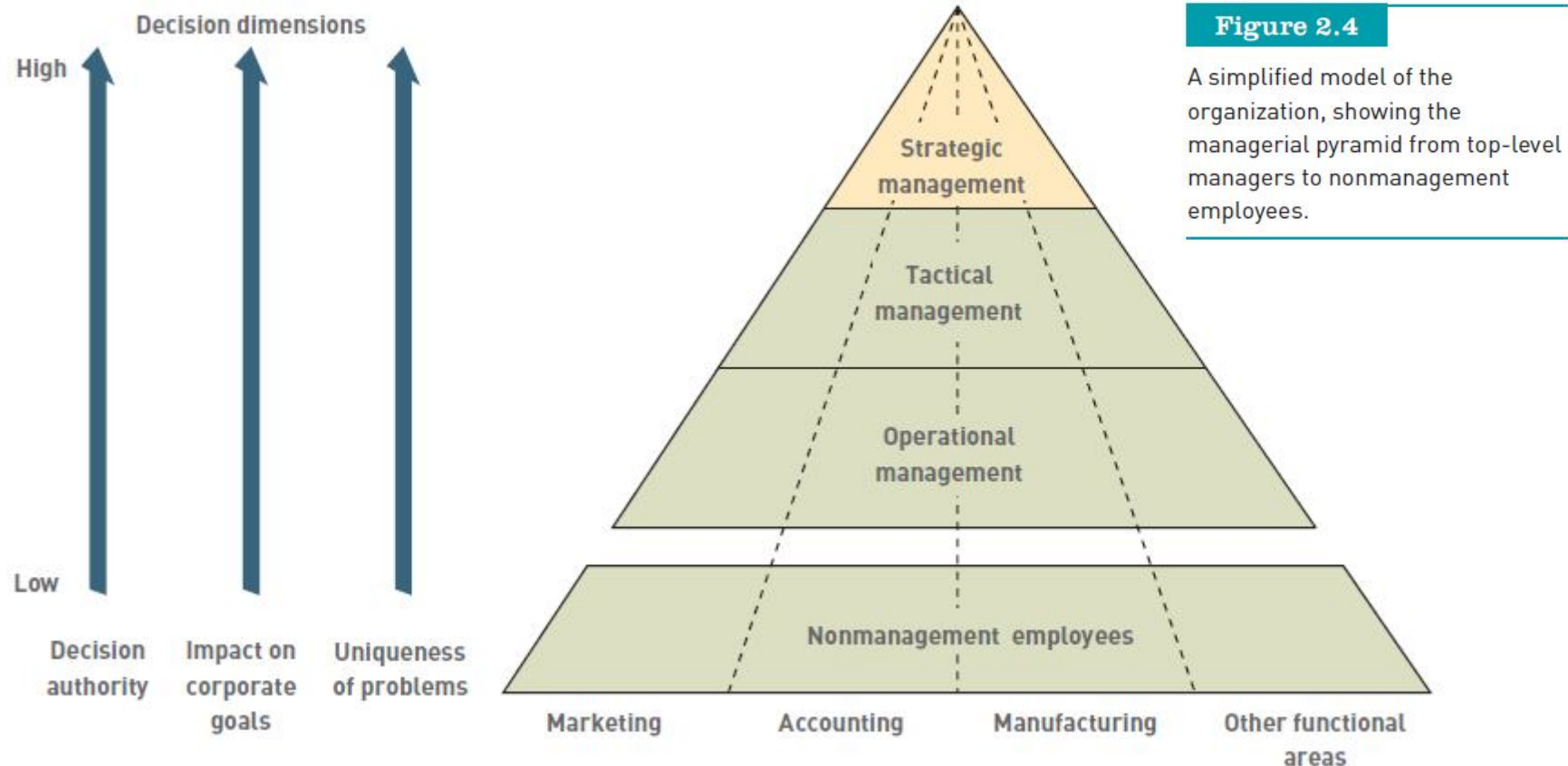 - Can get customer feedback to help design new products and services

Organizational Structures

- Organizational structure:
  - Organizational subunits and the way they relate to the overall organization

- Types of organizational structures:
  - Traditional
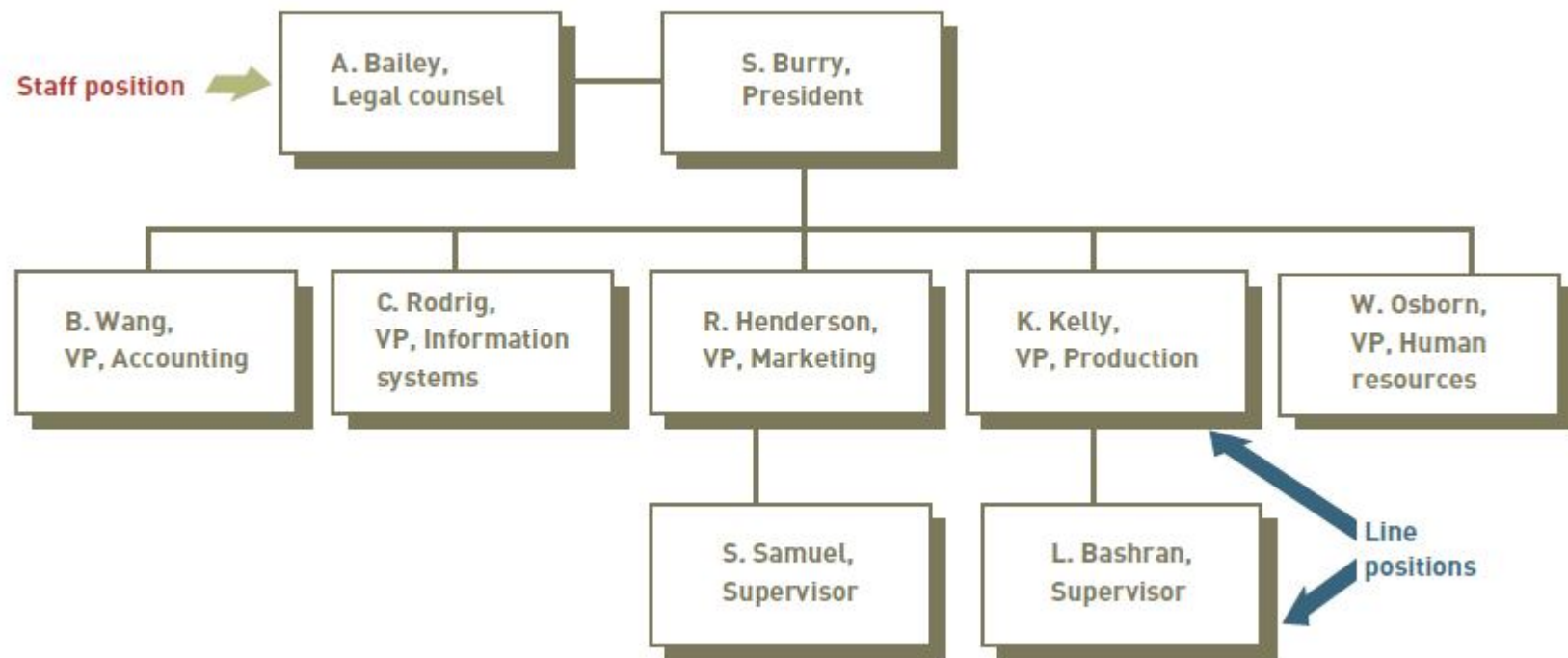 - Project
  - Team
  - Virtual

Organizational Structures (continued)

- Traditional organizational structure:
  - Hierarchy of decision making and authority flows:
    - From the strategic management at the top down to operational management and nonmanagement employees
  - Flat organizational structure:
    - Empowers employees at lower levels
  - Empowerment:
    - Gives employees and their managers more responsibility and authority to make decisions

Organizational Structures (continued)

Decision dimensions

High

Low

Decision authority | Impact on corporate goals | Uniqueness of problems

Figure 2.4

A simplified model of the organization, showing the managerial pyramid from top-level managers to nonmanagement employees.

Strategic management

Tactical management

Operational management

Nonmanagement employees

Marketing | Accounting | Manufacturing | Other functional areas
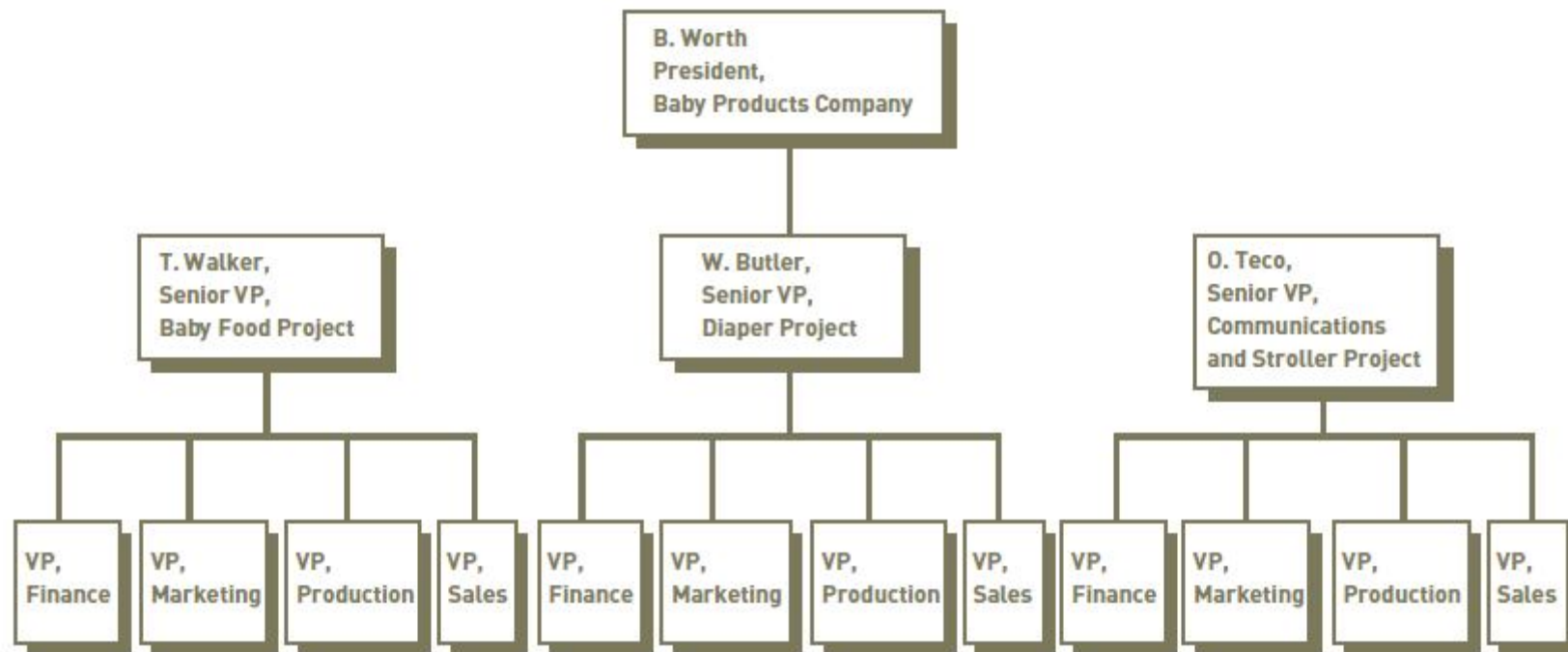
Organizational Structures (continued)

Figure 2.5

A Traditional Organizational Structure

Organizational Structures (continued)

- Project and team organizational structures:
  - Project organizational structure:
    - Centered on major products or services
    - Many project teams are temporary
  - Team organizational structure:
    - Centered on work teams or groups
    - Team can be temporary or permanent, depending on tasks

Organizational Structures (continued)

Figure 2.6

A Project Organizational Structure

Organizational Structures (continued)

- Virtual organizational structure and collaborative work:
  - Virtual organizational structure:
    - Uses individuals, groups, or complete business units in geographically dispersed areas
    - Can reduce costs for an organization
  - Allows collaborative work:
    - Managers and employees can effectively work in groups, even those composed of members from around the world

Organizational Culture and Change

- Culture:
  - Set of major understandings and assumptions shared by a group

- Organizational culture:
  - Major understandings and assumptions
  - Influences information systems

- Organizational change:
 - How organizations plan for, implement, and handle change

Organizational Culture and Change (continued)

- Change model:
  - Represents change theories by identifying phases of change and the best way to implement them

- Unfreezing:
  - Ceasing old habits and creating a climate that is receptive to change

- Moving:
  - Learning new work methods, behaviors, and systems

Organizational Culture and Change (continued)

- Refreezing:
  - Involves reinforcing changes to make the new process second nature, accepted, and part of the job
- Organizational learning:
  - The adaptations to new conditions or adjustments based on experience and ideas over time
  - Very difficult to make work smoothly

Organizational Culture and Change (continued)

Figure 2.7

A Change Model

Unfreezing

Moving

Refreezing
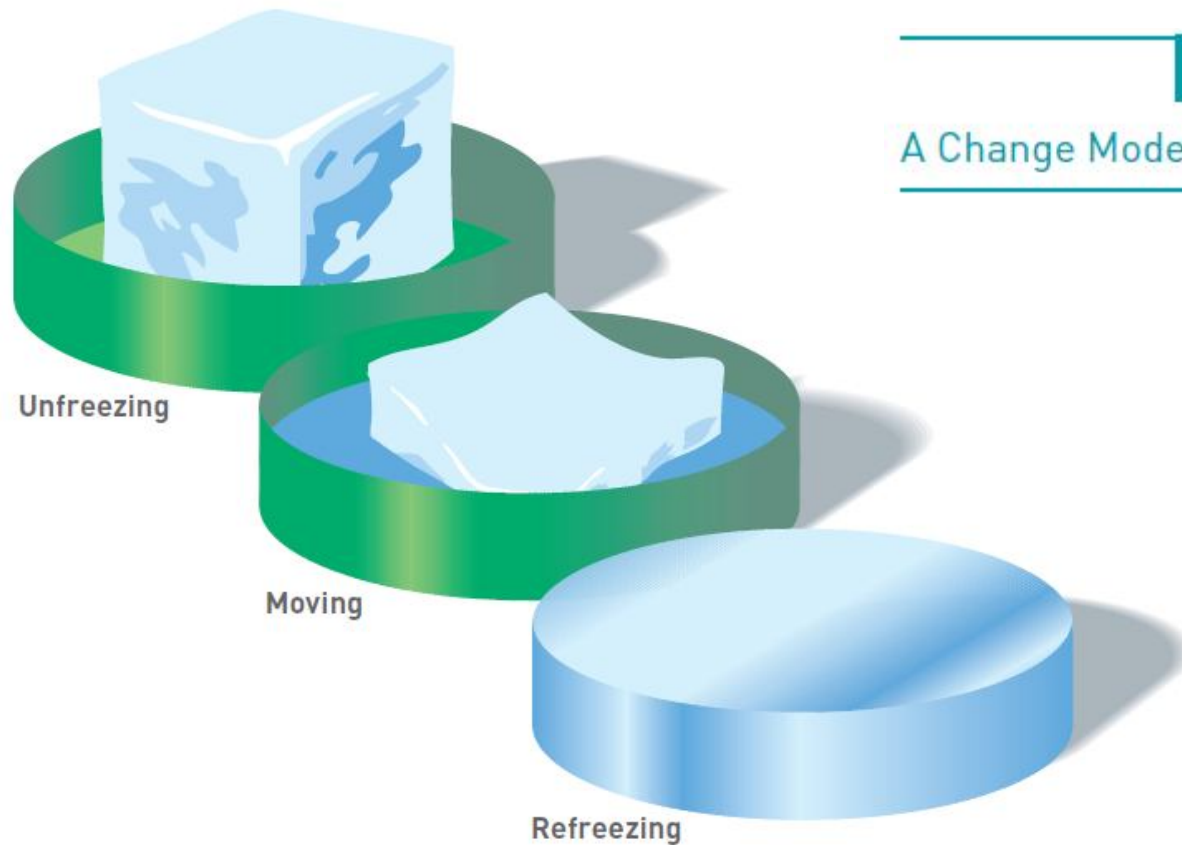
Reengineering and Continuous Improvement

- **Reengineering**:
  - Process redesign
  - Radical redesign of business processes, organizational structures, information systems, and values of the organization to achieve a breakthrough in business results

- **Continuous improvement**:
  - Constantly seeking ways to improve business processes and add value to products and services

Reengineering and Continuous Improvement (continued)

Reengineering—
Business process redesign

Changes to organizational structure

Changes to organizational values

Changes to information systems
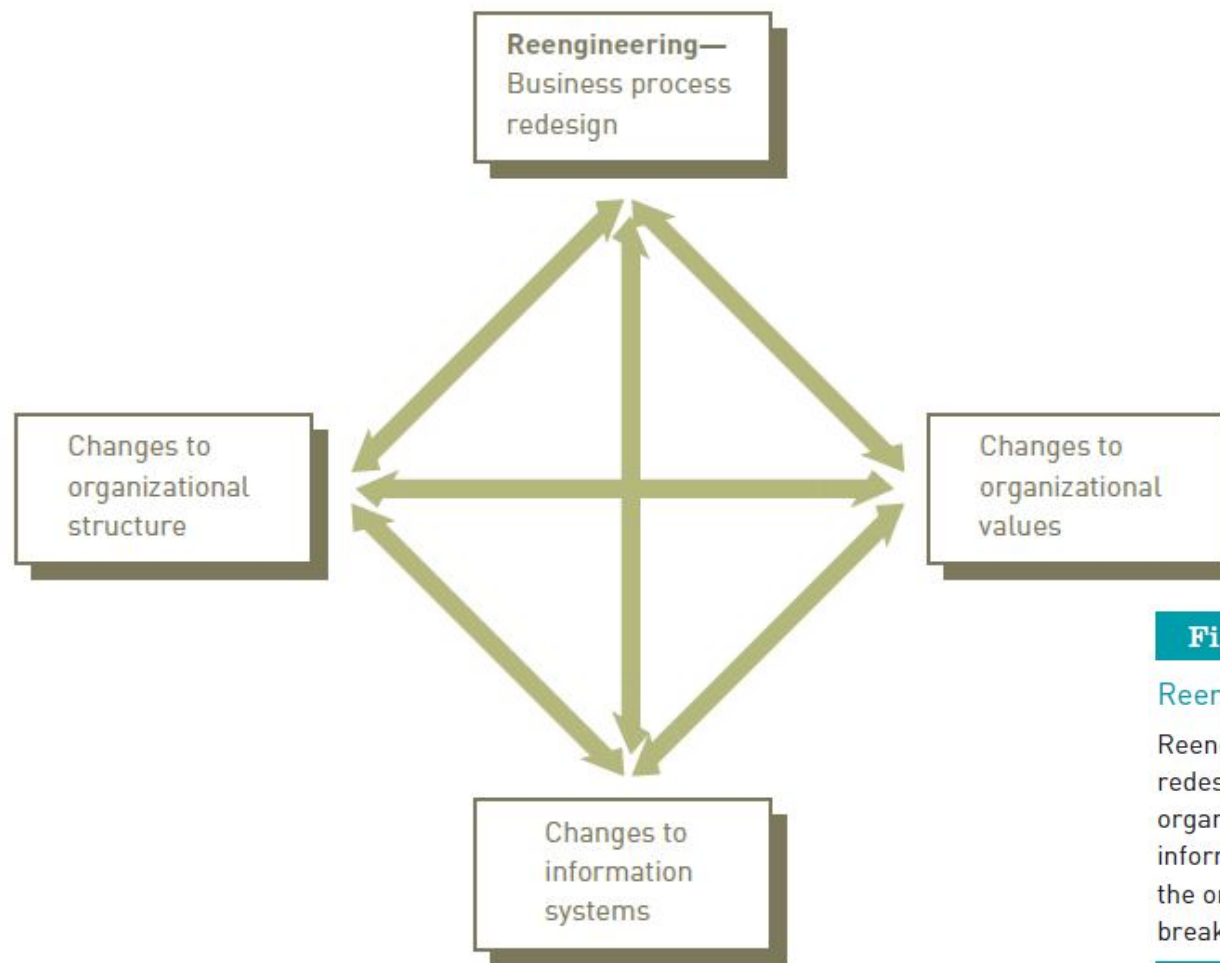
Figure 2.8

Reengineering

Reengineering involves the radical redesign of business processes, organizational structure, information systems, and values of the organization to achieve a breakthrough in business results.

Reengineering and Continuous Improvement (continued)

Rule	Original Rationale	Potential Problem
Hold small orders until full-truckload shipments can be assembled.	Reduce delivery costs.	Customer delivery is slow— lost sales.
Do not accept an order until customer credit is approved.	Reduce potential for bad debt.	Customer service is poor— lost sales.
Let headquarters make all merchandising decisions.	Reduce number of items carried in inventory.	Customers perceive organization has limited product selection— lost sales.

Table 2.1

Selected Business Rules That Affect Business Processes

Reengineering and Continuous Improvement (continued)

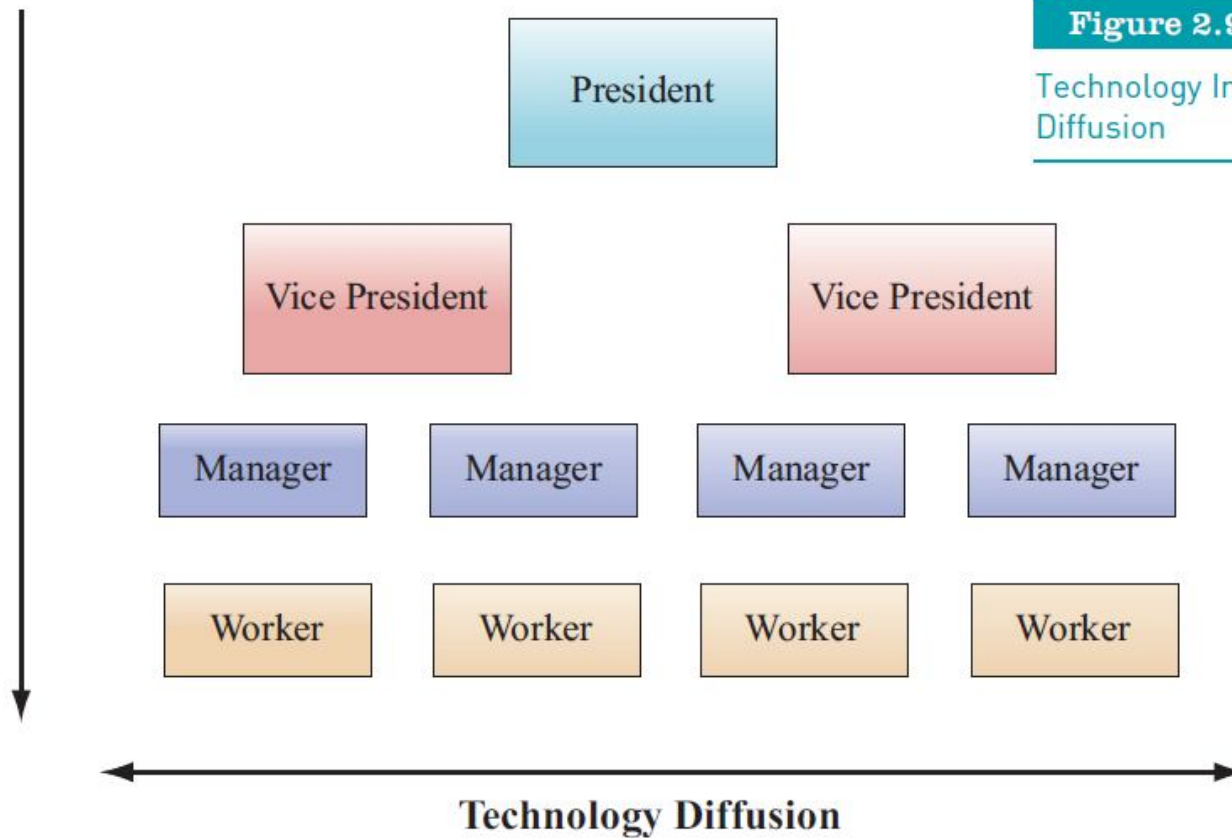| Business Process Reengineering	Continuous Improvement
Strong action taken to solve serious problem	Routine action taken to make minor improvements
Top-down change driven by senior executives	Bottom-up change driven by workers
Broad in scope; cuts across departments	Narrow in scope; focus is on tasks in a given area
Goal is to achieve a major breakthrough	Goal is continuous, gradual improvements
Often led by outsiders	Usually led by workers close to the business
Information system integral to the solution	Information systems provide data to guide the improvement team

Table 2.2

Comparing Business Process Reengineering to Continuous Improvement

User Satisfaction and Technology Acceptance

- Technology acceptance model (TAM):
  - Specifies the factors that can lead to better attitudes about the information system

- Technology diffusion:
  - Measure of how widely technology is spread throughout an organization

- Technology infusion:
  - Extent to which technology permeates a department

User Satisfaction and Technology Acceptance (continued)

Technology Infusion

President

Vice President   Vice President

Manager   Manager   Manager   Manager

Worker   Worker   Worker   Worker

Technology Diffusion

Figure 2.9

Technology Infusion and Diffusion

Quality

- Ability of a product or service to meet or exceed customer expectations

- Techniques used to ensure quality:
  - Total quality management
  - Six Sigma

Quality (continued)

Technique	Description	Examples
Total Quality Management (TQM)	Involves developing a keen awareness of customer needs, adopting a strategic vision for quality, empowering employees, and rewarding employees and managers for producing high-quality products.[43]	The Ghana Investment Promotion Center, an organization that promotes investment and businesses in Ghana, South Africa, won a world quality award based on TQM. MAA Bozell, a communications company in India, used TQM to improve the quality for all of its business processes.
Six Sigma	A statistical term that means products and services will meet quality standards 99.9997% of the time. In a normal distribution curve used in statistics, six standard deviations (Six Sigma) is 99.9997% of the area under the curve. Six Sigma was developed at Motorola, Inc. in the mid–1980s.[45]	Transplace, a $57 million trucking and logistics company, uses Six Sigma to improve quality by eliminating waste and unneeded steps. There are a number of training and certification programs for Six Sigma.[46]

Table 2.3

Total Quality Management and Six Sigma

Outsourcing, On-Demand Computing, and Downsizing

- Outsourcing:
  - Contracting with outside professional services

- On-demand computing:
  - Also called on-demand business or utility computing
  - Rapidly responding to the organization's flow of work as the need for computer resources varies

- Downsizing:
  - Reducing number of employees to cut costs

Competitive Advantage

- Significant and (ideally) long-term benefit to a company over its competition

- Can result in higher-quality products, better customer service, and lower costs

Factors That Lead Firms to Seek Competitive Advantage

- The five forces model:
    - Rivalry among existing competitors
    - Threat of new entrants
    - Threat of substitute products and services
    - The bargaining power of buyers
    - The bargaining power of suppliers

Factors That Lead Firms to Seek Competitive Advantage (continued)

- Rivalry among existing competitors:
  - Industries with stronger rivalries tend to have more firms seeking competitive advantage

- Threat of new entrants:
  - Threat appears when:
    - Entry and exit costs to an industry are low
    - Technology needed to start and maintain a business is commonly available

Factors That Lead Firms to Seek Competitive Advantage (continued)

- Threat of substitute products and services:
  - The more consumers can obtain similar products and services that satisfy their needs, the more likely firms are to try to establish competitive advantage

- Bargaining power of customers and suppliers:
  - When customers have a lot of bargaining power, companies increase their competitive advantage to retain their customers

# Strategic Planning for Competitive Advantage

- Strategies:
  - Cost leadership
  - Differentiation
  - Niche strategy
  - Altering the industry structure
  - Creating new products and services
  - Improving existing product lines and service

Strategic Planning for Competitive Advantage (continued)

- Other strategies:
  - Growth in sales
  - First to market
  - Customizing products and services
  - Hiring the best people
  - Innovation

Performance-Based Information Systems

- Major stages in the use of information systems:
  - Cost reduction and productivity
  - Competitive advantage
  - Performance-based management

Stage 1: Cost reduction and productivity

Number of products

Stage 2: Competitive advantage

Stage 3: Performance-based management

Benefits   Costs
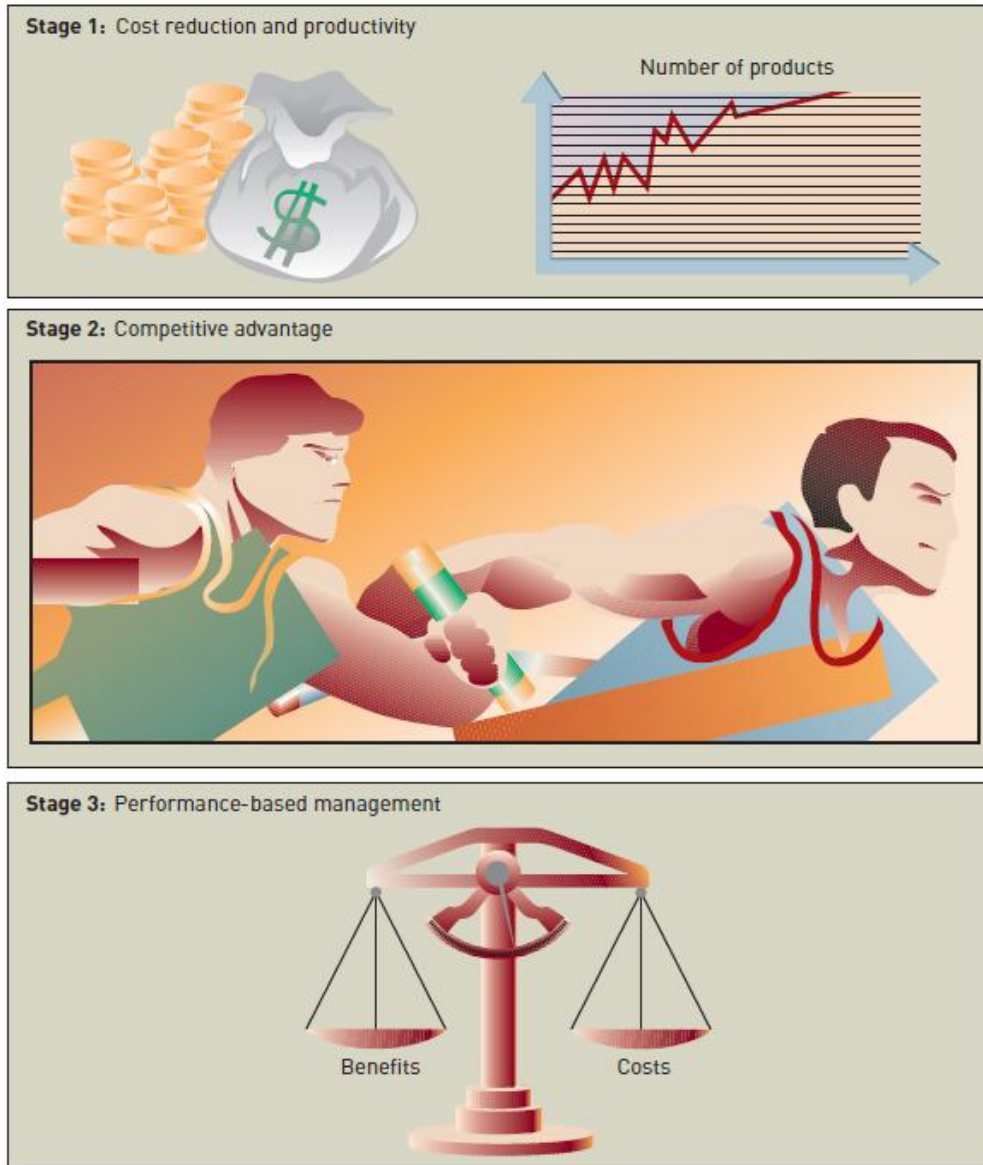
Figure 2.10

Three Stages in the Business Use of Information Systems

Productivity

- A measure of output achieved divided by input required

- Higher level of output for a given level of input means greater productivity

- Lower level of output for a given level of input means lower productivity

- Productivity = (Output / Input) × 100%

Return on Investment and the Value of Information Systems

- **Return on investment** (ROI):
  - One measure of IS value
  - Investigates the additional profits or benefits that are generated as a percentage of the investment in IS technology

- **Earnings growth**
  - The increase in profit that the system brings

Return on Investment and the Value of Information Systems (continued)

- Market share and speed to market:
  - The percentage of sales that a product or service has in relation to the total market

- Customer awareness and satisfaction:
  - Performance measurement is based on feedback from internal and external users

- Total cost of ownership:
  - The sum of all costs over the life of the information system

Risk

- Managers must consider the risks of designing, developing, and implementing systems
- Information systems can sometimes be costly failures

Careers in Information Systems

- Degree programs:
  - Information systems
  - Computer information systems
  - Management information systems
- U.S. Department of Labor's Bureau of Labor Statistics (www.bls.gov):
  - Predicts that many technology jobs will increase through 2012 or beyond

Roles, Functions, and Careers in IS

- Primary responsibilities in information systems:
  - Operations:
    - System operators primarily run and maintain IS equipment
  - Systems development:
    - Focuses on specific development projects and ongoing maintenance and review

Roles, Functions, and Careers in IS

- Primary responsibilities in information systems (continued):
  - Support:
    - Provides user assistance in hardware and software acquisition and use, data administration, user training and assistance, and Web administration
  - Information service units:
    - A miniature IS department attached and directly reporting to a functional area in a large organization

Typical IS Titles and Functions

- Chief information officer (CIO)
  - Employs the IS department's equipment and personnel to help the organization attain its goals

- LAN administrators
  - Set up and manage the network hardware, software, and security processes

Typical IS Titles and Functions (continued)

- Internet careers:
  - Internet strategists and administrators
  - Internet systems developers
  - Internet programmers
  - Internet or Web site operators
- Certification:
  - Process for testing skills and knowledge resulting in an endorsement by the certifying authority

Other IS Careers

- New and exciting careers have developed in security and fraud detection and prevention
- Other IS career opportunities include being employed by technology companies, such as:
  - Microsoft (*www.microsoft.com*), Google (*www.google.com*), Dell (*www.dell.com*), and many others

Working in Teams

- It is always good for IS professionals to:
  - Have good communications skills and the ability to work with other people
- Getting the best team of IS personnel to work on important projects is:
  - Critical in successfully developing new information systems or modifying existing ones

Finding a Job in IS

- Developing an online résumé can be critical to finding a good job
- Job search approaches:
  - On campus visits
  - Referrals from professors, friends, and family members
  - The Internet:
    - Online job sites
    - Company Web sites
    - Social networking sites
    - Blogs

Summary

- Organizations:
  - Systems with inputs, transformation mechanisms, and outputs

- Categories of organizational structure:
  - Traditional, project, team, and virtual

- Organizational culture:
  - Major understandings and assumptions

- Reengineering:
  - Radical redesign of business processes, organizational structures, information systems, and values of the organization

Summary (continued)

- Total quality management:
  - A collection of approaches, tools, and techniques that fosters a commitment to quality

- Outsourcing:
  - Contracting with outside professional services

- Downsizing:
  - Reducing number of employees

- Competitive advantage:
  - Usually embodied in either a product or service that has the most added value to consumers

Summary (continued)

- Return on investment (ROI):
  - Investigates the additional profits or benefits that are generated as a percentage of the investment in IS technology
- Information systems personnel:
  - Typically work in an IS department
- IS personnel:
  - Need skills in written and verbal communication