

Fundamentals of Information Systems, Fifth Edition

Chapter 1 An Introduction to Information Systems in Organizations

Principles and Learning Objectives

- The value of information is directly linked to how it helps decision makers achieve the organization's goals
 - Distinguish data from information and describe the characteristics used to evaluate the value of data

- Knowing the potential impact of information systems and having the ability to put this knowledge to work can result in a successful personal career and organizations that reach their goals
 - Identify the basic types of business information systems and discuss who uses them, how they are used, and what kinds of benefits they deliver

- System users, business managers, and information systems professionals must work together to build a successful information system
 - Identify the major steps of the systems development process and state the goal of each

- The use of information systems to add value to the organization can also give an organization a competitive advantage
 - Identify the value-added processes in the supply chain and describe the role of information systems within them
 - Identify some of the strategies employed to lower costs or improve service
 - Define the term *competitive advantage* and discuss how organizations are using information systems to gain such an advantage

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

Information Concepts

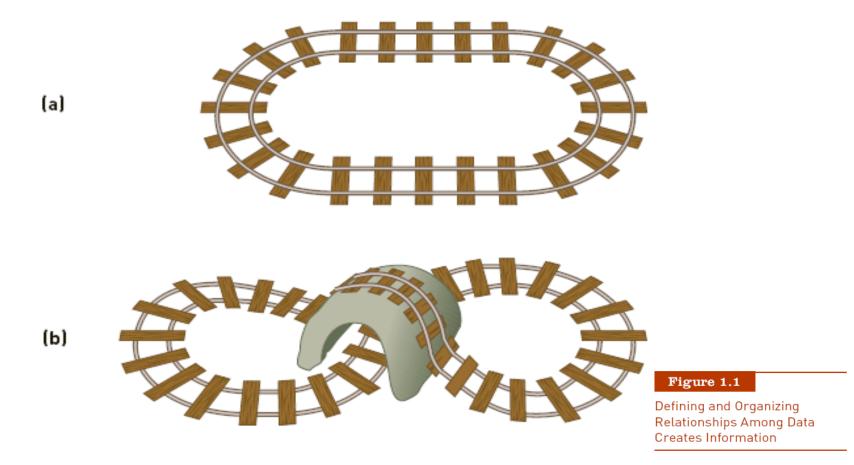
- Data, information, and knowledge
 - Data: Raw facts
 - Information: Collection of facts organized in such a way that they have additional value beyond the value of the facts themselves
 - Process: Set of logically related tasks performed to achieve a defined outcome
 - Knowledge: Awareness and understanding of a set of information

Data, Information, and Knowledge

Data	Represented by
Alphanumeric data	Numbers, letters, and other characters
Image data	Graphic images and pictures
Audio data	Sound, noise, or tones
Video data	Moving images or pictures



Data, Information, and Knowledge (continued)



Data, Information, and Knowledge (continued)



Figure 1.2

The Process of Transforming Data into Information

The Characteristics of Valuable Information

- If information is not accurate or complete
 - People can make poor decisions, costing thousands, or even millions, of dollars
- Information can be of little value to the organization
 - If information is not relevant, not delivered to decision makers in a timely fashion, or too complex to understand

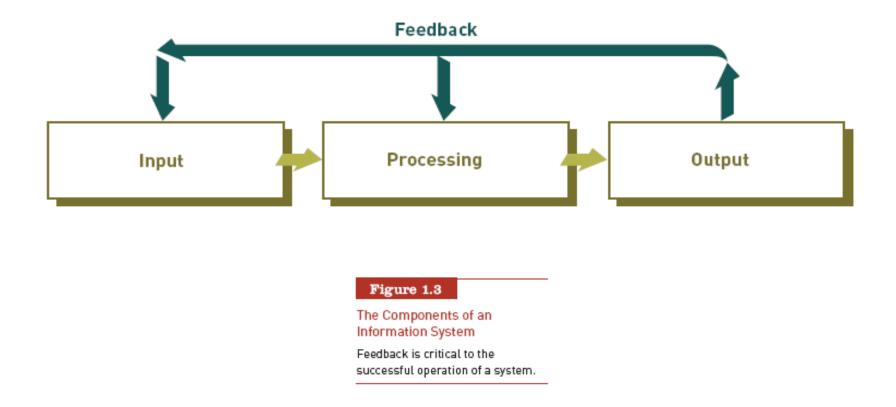
The Value of Information

- Valuable information
 - Can help people and their organizations perform tasks more efficiently and effectively
 - Can help managers decide whether to invest in additional information systems and technology

What Is an Information System?

- Feedback mechanism
 - The component that helps organizations achieve their goals, such as increasing profits or improving customer service

What Is an Information System? (continued)



Input, Processing, Output, Feedback

- Input
 - Gathering and capturing raw data
- Processing
 - Converting or transforming data into useful outputs
- Output
 - Production of useful information, usually in the form of documents and reports
- Feedback
 - Output that is used to make changes to input or processing activities

Manual and Computerized Information Systems

- An information system can be:
 - Manual
 - Example: Developing patterns and trends on graph paper for stock analysis
 - Computerized
 - Example: Using program trading to track the market and trade large blocks of stocks when discrepancies occur

Computer-Based Information Systems

- Single set of hardware, software, databases, telecommunications, people, and procedures configured to collect, manipulate, store, and process data into information
- Information technology (IT)
 - Hardware, software, databases, and telecommunications

Computer-Based Information Systems (continued)

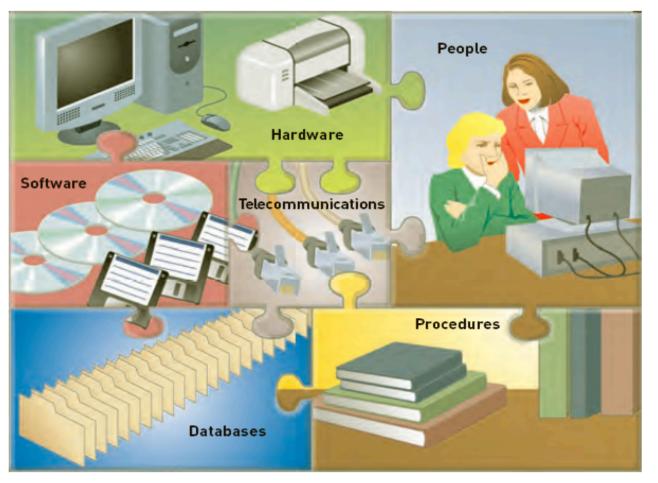


Figure 1.4

The Components of a Computer-Based Information System

Computer-Based Information Systems (continued)

- CBIS components
 - Hardware: Computer equipment used to perform input, processing, and output activities
 - Software: Computer programs that govern the operation of the computer
 - Database: Organized collection of facts and information
 - Telecommunications: Electronic transmission of signals for communications
 - Networks: Connect computers and equipment in a building, around the country, and around the world

Computer-Based Information Systems (continued)

- CBIS components (continued)
 - Internet: World's largest computer network
 - People: Manage, run, program, and maintain the system
 - Procedures: Strategies, policies, methods, and rules for using a CBIS

Business Information Systems

- Most common types of information systems used are those designed for:
 - Electronic and mobile commerce
 - Transaction processing
 - Management information
 - Decision support

Business Information Systems (continued)

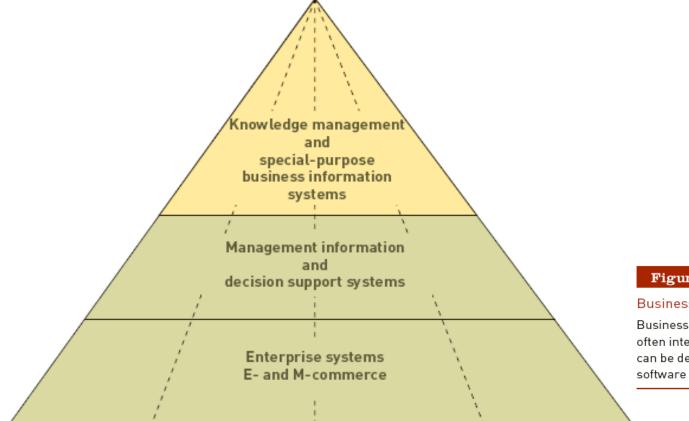


Figure 1.5

Business Information Systems

Business information systems are often integrated in one product and can be delivered by the same software package.

Business Information Systems (continued)

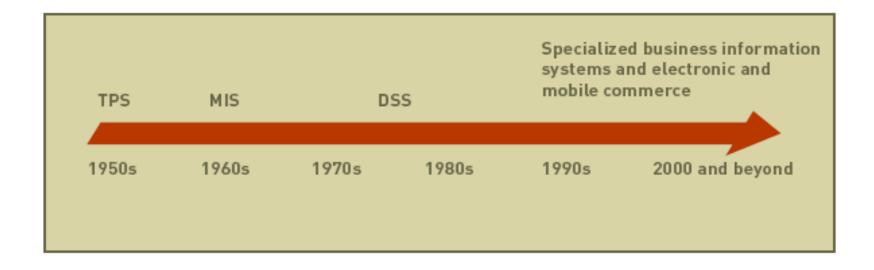


Figure 1.6

The Development of Important Business Information Systems

Electronic and Mobile Commerce

- E-commerce
 - Any business transaction executed electronically between:
 - Companies (B2B)
 - Companies and consumers (B2C)
 - Consumers and other consumers (C2C)
 - Business and the public sector
 - Consumers and the public sector

Electronic and Mobile Commerce (continued)

- Mobile commerce (m-commerce)
 - Transactions conducted anywhere, anytime
- Electronic business (e-business)
 - Uses information systems and the Internet to perform all business-related tasks and functions

Electronic and Mobile Commerce (continued)

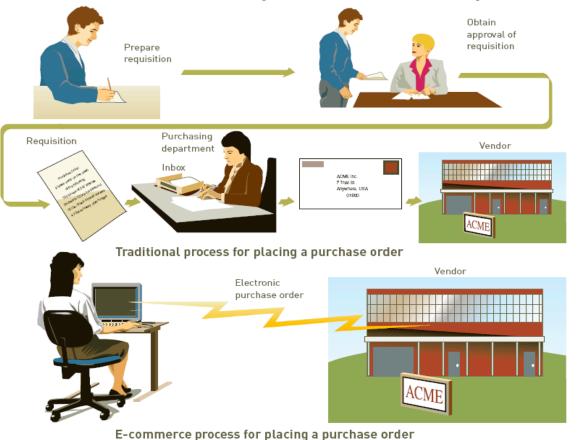


Figure 1.7

E-Commerce Greatly Simplifies Purchasing

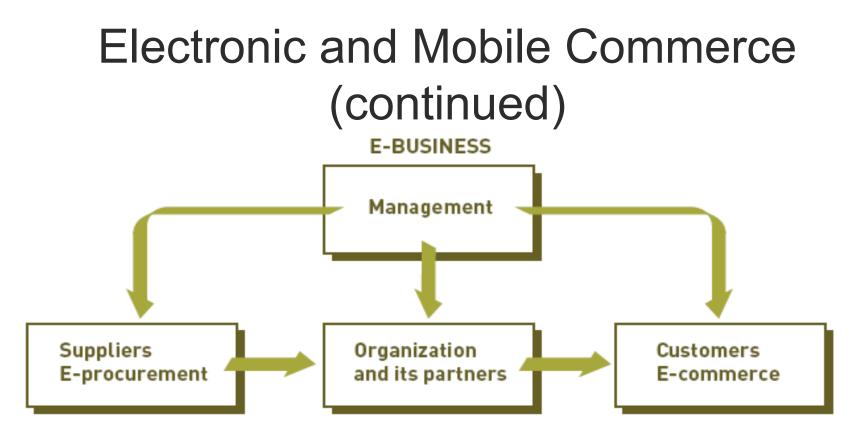


Figure 1.8

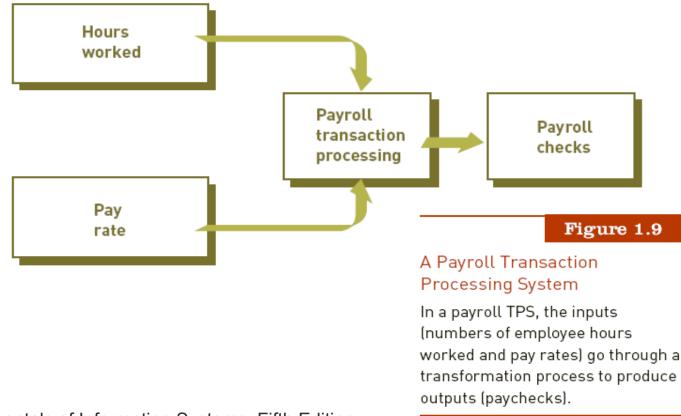
Electronic Business

E-business goes beyond ecommerce to include using information systems and the Internet to perform all businessrelated tasks and functions, such as accounting, finance, marketing, manufacturing, and human resources activities.

Enterprise Systems: Transaction Processing Systems and Enterprise Resource Planning

- Transaction
 - Any business-related exchange
- Transaction processing system (TPS)
 - Organized collection of people, procedures, software, databases, and devices used to record completed business transactions
- Enterprise resource planning
 - Programs that manage the vital business operations for an entire multisite, global organization

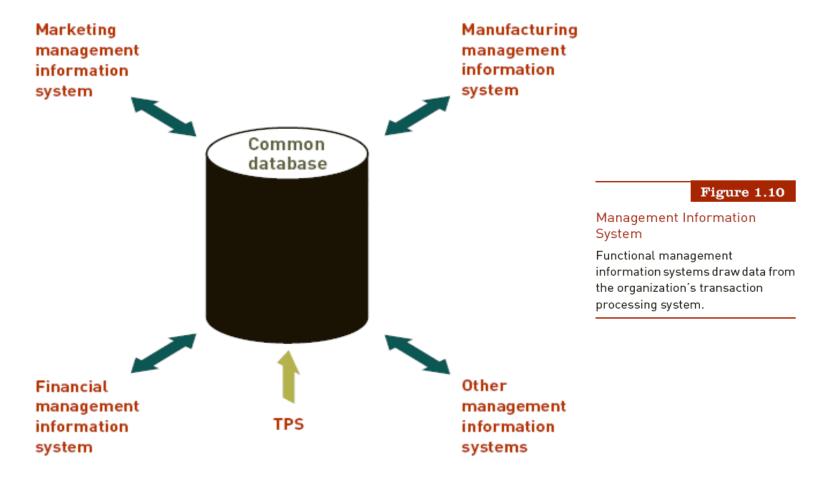
Enterprise Systems: Transaction Processing Systems and Enterprise Resource Planning (continued)



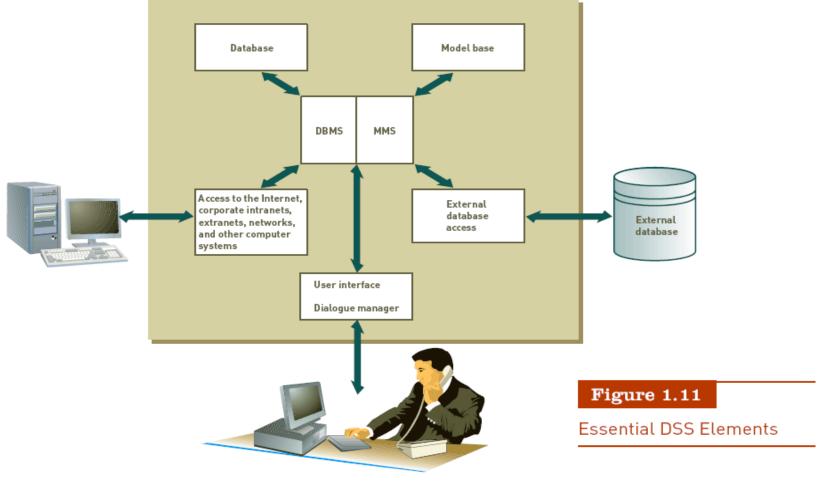
Information and Decision Support Systems

- Management information systems
 - Organized collection of people, procedures, software, databases, and devices
 - Provides routine information to managers/decision makers
- Decision support systems
 - Organized collection of people, procedures, software, databases, and devices that support problem-specific decision making

Information and Decision Support Systems (continued)



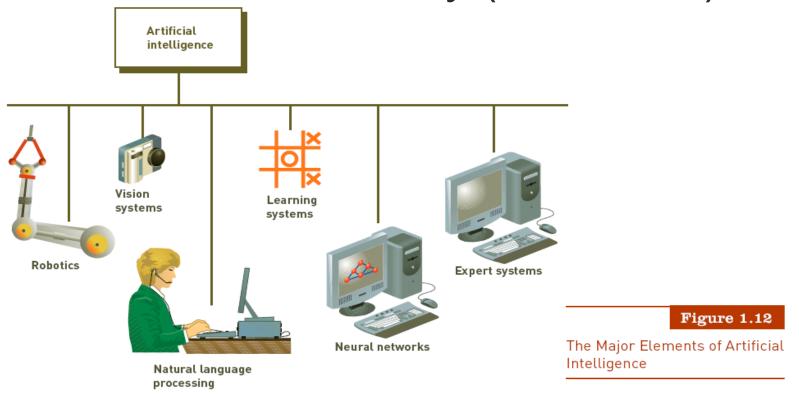
Information and Decision Support Systems (continued)



Specialized Business Information Systems: Knowledge Management, Artificial Intelligence, Expert Systems, and Virtual Reality

- Knowledge management systems (KMSs)
 - Organized collection of people, procedures, software, databases, and devices
- Artificial intelligence (AI)
 - Field in which the computer system takes on the characteristics of human intelligence
 - Robotics, vision systems, and natural language processing

Specialized Business Information Systems: Knowledge Management, Artificial Intelligence, Expert Systems, and Virtual Reality (continued)



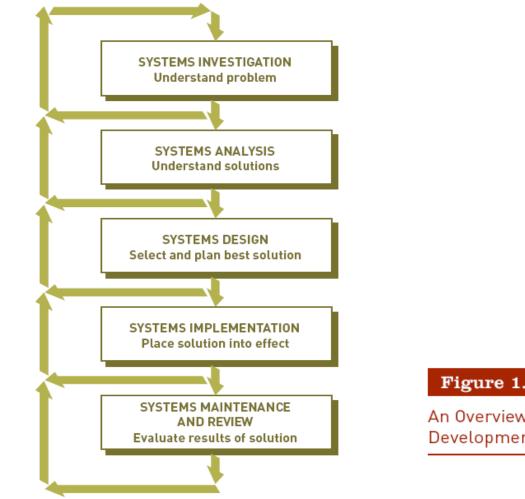
Specialized Business Information Systems: Knowledge Management, Artificial Intelligence, Expert Systems, and Virtual Reality (continued)

- Expert systems
 - Give the computer the ability to make suggestions and act like an expert in a particular field
- Virtual reality
 - The simulation of a real or imagined environment that can be experienced visually in three dimensions

Systems Development

- Creating or modifying existing business systems
- Systems development failures can be a result of:
 - Poor planning and scheduling
 - Insufficient management of risk
 - Poor requirements determination
 - Lack of user involvement
- Outsourcing
 - Allows a company to focus on what it does best and delegate other functions

Systems Development (continued)



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Figure 1.14

An Overview of Systems Development

Systems Investigation and Analysis

- Systems investigation
 - Goal is to gain understanding of the problem to be solved or opportunity to be addressed
- Systems analysis
 - Defines problems and opportunities of the existing system

Systems Design, Implementation, and Maintenance and Review

- Systems design
 - Determines how the new system will work to meet the business needs defined during systems analysis
- Systems implementation
 - Creating or acquiring the system components defined in the design step, assembling them, and putting the new system into operation
- Systems maintenance and review
 - Checking and modifying the system so that it continues to meet changing business needs

Organizations and Information Systems

- Organization
 - Collection of people and other resources established to accomplish a set of goals
 - Has inputs, processing mechanisms, outputs, and feedback

Organizations and Information Systems (continued)

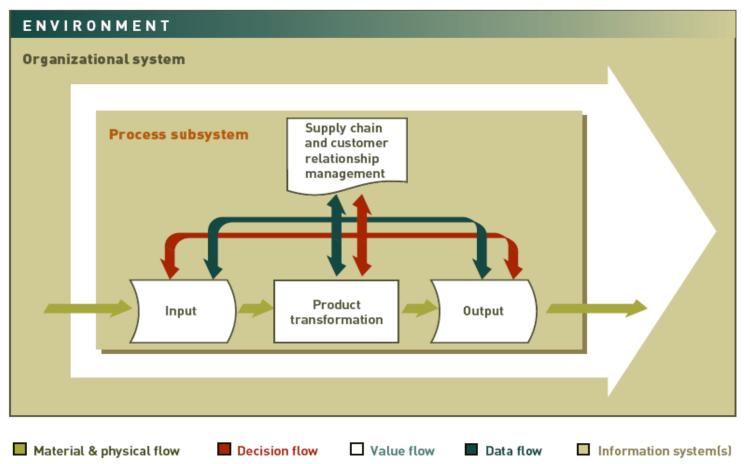


Figure 1.15

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.

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Organizations and Information Systems (continued)

- Value chain
 - Series of activities that includes inbound logistics, warehouse and storage, and production
- Supply chain management (SCM)
 - Helps determine what supplies are required for the value chain and what quantities are needed to meet customer demand
- Customer relationship management (CRM)
 - Helps companies manage all aspects of customer encounters, including marketing and advertising

Organizations and Information Systems (continued)

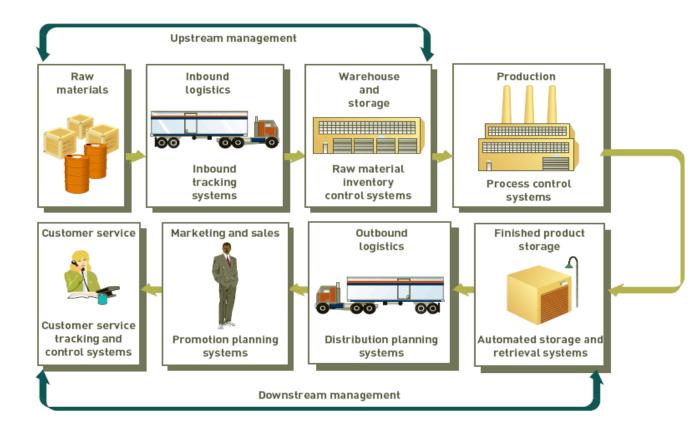


Figure 1.16

The Value Chain of a Manufacturing Company

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

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Organizational Culture and Change

- Organizational culture
 - Major understandings and assumptions
 - The understandings are often not stated or documented as goals or formal policies
- Organizational change
 - How organizations plan for, implement, and handle change
 - Can be sustaining or disruptive

User Satisfaction and Technology Acceptance

- Technology acceptance model (TAM)
 - Specifies factors that can lead to higher acceptance and usage of technology
- Technology diffusion
 - Measure of widespread use of technology
- Technology infusion
 - Extent to which technology permeates a department

Competitive Advantage

- Significant, long-term benefit to a company over its competition
- An organization often uses its information system to help achieve a competitive advantage

Factors That Lead Firms to Seek Competitive Advantage

- Five-forces model identifies key factors
 - Rivalry among existing competitors
 - Threat of new entrants
 - Threat of substitute products and services
 - Bargaining power of buyers
 - Bargaining power of suppliers

Strategic Planning for Competitive Advantage

- Cost leadership
 - Deliver the lowest possible products and services
- Differentiation
 - Deliver different products and services
- Niche strategy
 - Deliver to a small, niche market
- Altering the industry structure
 - Change the industry to become more favorable to organization

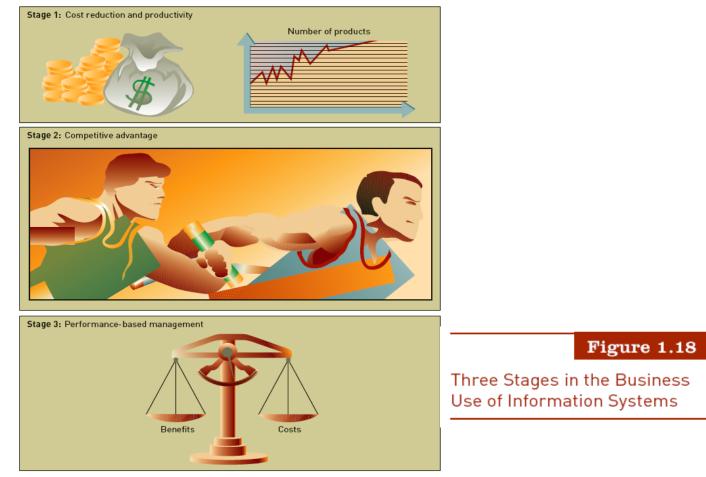
Strategic Planning for Competitive Advantage (continued)

- Creating new products and services
 - Introduce periodically or frequently
- Improving existing product lines and service
 - Make real or perceived improvements
- Other strategies
 - Growth in sales
 - First to market
 - Customizing products and services
 - Hiring the best people

Performance-Based Information Systems

- Three major stages
 - Organizations focused on using information systems to reduce costs and improve productivity
 - Companies generally ignored revenue potential, not looking for opportunities to use information systems to increase sales
 - Companies carefully consider both strategic advantage and costs

Performance-Based Information Systems (continued)



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Productivity

- 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

Return on Investment and the Value of Information Systems

- Earnings growth
 - Increase in profits
- Market share
 - Percentage of sales in relation to total market
- Customer awareness and satisfaction
 - Based on feedback from internal and external users
- Total cost of ownership
 - Sum of all costs over the life of the information system

Risk

- Managers must consider the risks of:
 - Designing, developing, and implementing new or modified information systems
- Information systems can be costly failures
- Costs of development and implementation can be greater than the returns from the new system

Careers In Information Systems

- Knowledge workers (KWs)
 - People who create, use, and disseminate knowledge
- Students are increasingly completing business degrees with a global or international orientation

Roles, Functions, and Careers in IS

- Primary responsibilities in information systems
 - Operations: Focuses on the efficiency of IS functions
 - Systems development: Focuses on development projects and ongoing maintenance and review
 - Support: Provides user assistance, data administration, user training, and Web administration
 - Information service units: 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 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
- Internet careers
 - Opportunities are found in both traditional companies and those that specialize in the Internet

Other IS Careers

- New and exciting careers have developed in security and fraud detection and prevention
 - Chief information security officer
 - Chief privacy officer
- IS career opportunities include being employed by:
 - Microsoft (www.microsoft.com), Google
 (www.google.com), and Dell (www.dell.com)

Finding a Job in IS

- Sources
 - On-campus visits from recruiters and referrals from professors, friends, and family members
 - The Internet

Global Challenges in Information Systems

- Cultural challenges
- Language challenges
- Time and distance challenges
- Infrastructure challenges
- Currency challenges

Global Challenges in Information Systems (continued)

- Product and service challenges
- Technology transfer issues
- State, regional, and national laws
- Trade agreements

Summary

- Data consists of raw facts
- Information
 - Data transformed into a meaningful form
- Types of systems include:
 - E-commerce and m-commerce
 - TPS and ERP
 - MIS and DSS
 - Specialized business information systems

Summary (continued)

- Systems development
 - Creating or modifying existing business systems
- Organization
 - Formal collection of people and various other resources established to accomplish a set of goals
- Supply chain management (SCM) helps determine:
 - What supplies are required
 - What quantities are needed to meet customer demand
 - How the supplies are to be processed

Summary (continued)

- Five-forces model covers:
 - Rivalry among existing competitors
 - Threat of new market entrants
 - Threat of substitute products and services
 - Bargaining power of buyers and suppliers
- Information systems personnel typically work in an IS department that employs:
 - A chief information officer
 - Systems analysts
 - Computer programmers and operators