

Fundamentals of Information Systems, Seventh 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 quality of data

Principles and Learning Objectives (continued)

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

Principles and Learning Objectives (continued)

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

Principles and Learning Objectives (continued)

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

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 information systems

Why Learn About Information Systems in Organizations?

- Information systems used by almost every imaginable profession
 - Entrepreneurs and small business owners
 - Sales representatives
 - Managers
 - Financial advisors
- Information systems:
 - Indispensable tools to help you achieve your career goals

Introduction

- Information system (IS):
 - A set of interrelated components that collect, manipulate, store, and disseminate data and information and provide feedback to meet an objective
- Businesses:
 - Can use information systems to increase revenues, improve customer service and reduce costs

Data, Information, and Knowledge

- Data:
 - Raw facts
- Information:
 - Collection of facts organized and processed in such a way that they have value beyond the individual facts
- Process:
 - Set of logically related tasks performed to achieve a defined outcome
- Knowledge:
 - Awareness and understanding of a set of information and the ways information can be made useful

Data, Information, and Knowledge (continued)

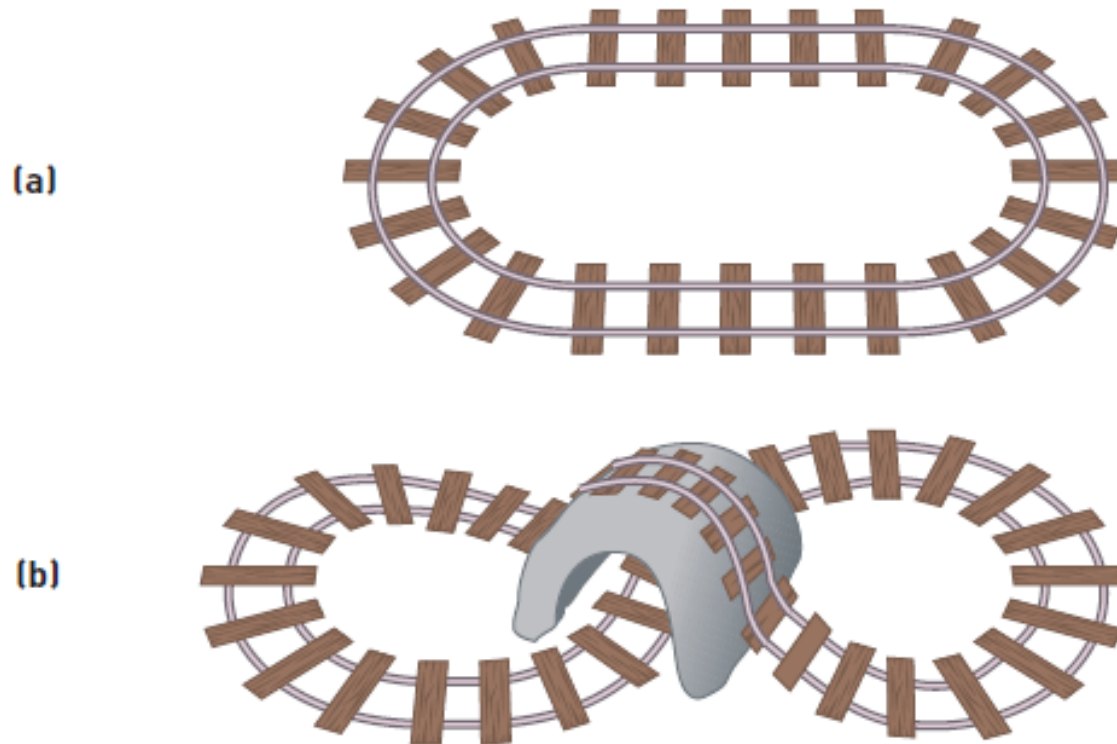


Figure 1.1

Defining and Organizing
Relationships Among Data
Creates Information

Data, Information, and Knowledge (continued)

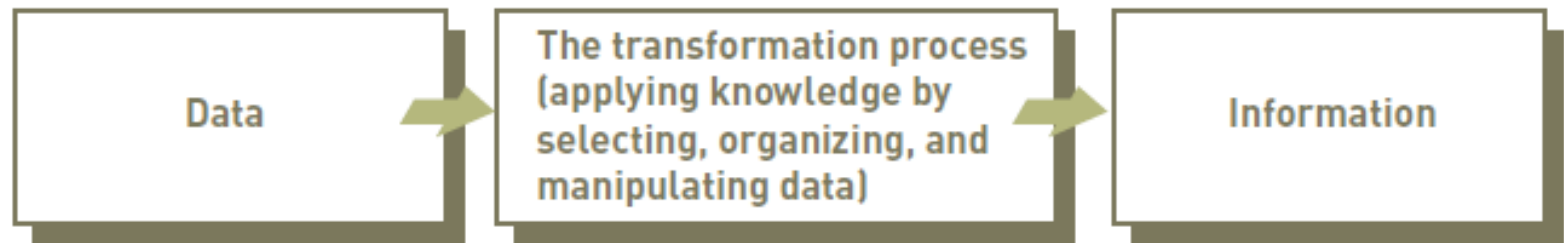


Figure 1.2

The Process of Transforming
Data into Information

Characteristics	Definitions
Accessible	Information should be easily accessible by authorized users so they can obtain it in the right format and at the right time to meet their needs.
Accurate	Accurate information is error free. In some cases, inaccurate information is generated because inaccurate data is fed into the transformation process. (This is commonly called garbage in, garbage out [GIGO].)
Complete	Complete information contains all the important facts. For example, an investment report that does not include all important costs is not complete.
Economical	Information should also be relatively economical to produce. Decision makers must always balance the value of information with the cost of producing it.
Flexible	Flexible information can be used for a variety of purposes. For example, information on how much inventory is on hand for a particular part can be used by a sales representative in closing a sale, by a production manager to determine whether more inventory is needed, and by a financial executive to determine the total value the company has invested in inventory.
Relevant	Relevant information is important to the decision maker. Information showing that lumber prices might drop might not be relevant to a computer chip manufacturer.
Reliable	Reliable information can be trusted by users. In many cases, the reliability of the information depends on the reliability of the data-collection method. In other instances, reliability depends on the source of the information. A rumor from an unknown source that oil prices might go up might not be reliable.
Secure	Information should be secure from access by unauthorized users.
Simple	Information should be simple, not overly complex. Sophisticated and detailed information might not be needed. In fact, too much information can cause information overload, whereby a decision maker has too much information and is unable to determine what is really important.
Timely	Timely information is delivered when it is needed. Knowing last week's weather conditions will not help when trying to decide what coat to wear today.
Verifiable	Information should be verifiable. This means that you can check it to make sure it is correct, perhaps by checking many sources for the same information.

Table 1.2

Characteristics of Valuable
Information

The Value of Information

- Directly linked to how it helps decision makers achieve their organization's goals
- Valuable information:
 - Can help people and their organizations perform tasks more efficiently and effectively

What Is an Information System?

- Information system (IS) is a set of interrelated elements that:
 - Collect (input)
 - Manipulate (process)
 - Store
 - Disseminate (output) data and information
 - Provide a corrective reaction (feedback mechanism) to meet an objective

Input, Processing, Output, Feedback

- Input:
 - Activity of gathering and capturing raw data
- Processing:
 - Converting data into useful outputs
- Output:
 - Producing useful information
- Feedback:
 - Information from the system that is used to make changes to input or processing activities

Computer-Based Information Systems

- Single set of hardware, software, databases, telecommunications, people, and procedures:
 - That are configured to collect, manipulate, store, and process data into information
- Technology infrastructure:
 - Includes all hardware, software, databases, telecommunications, people, and procedures configured to collect, manipulate, store, and process data into information

Computer-Based Information Systems (continued)

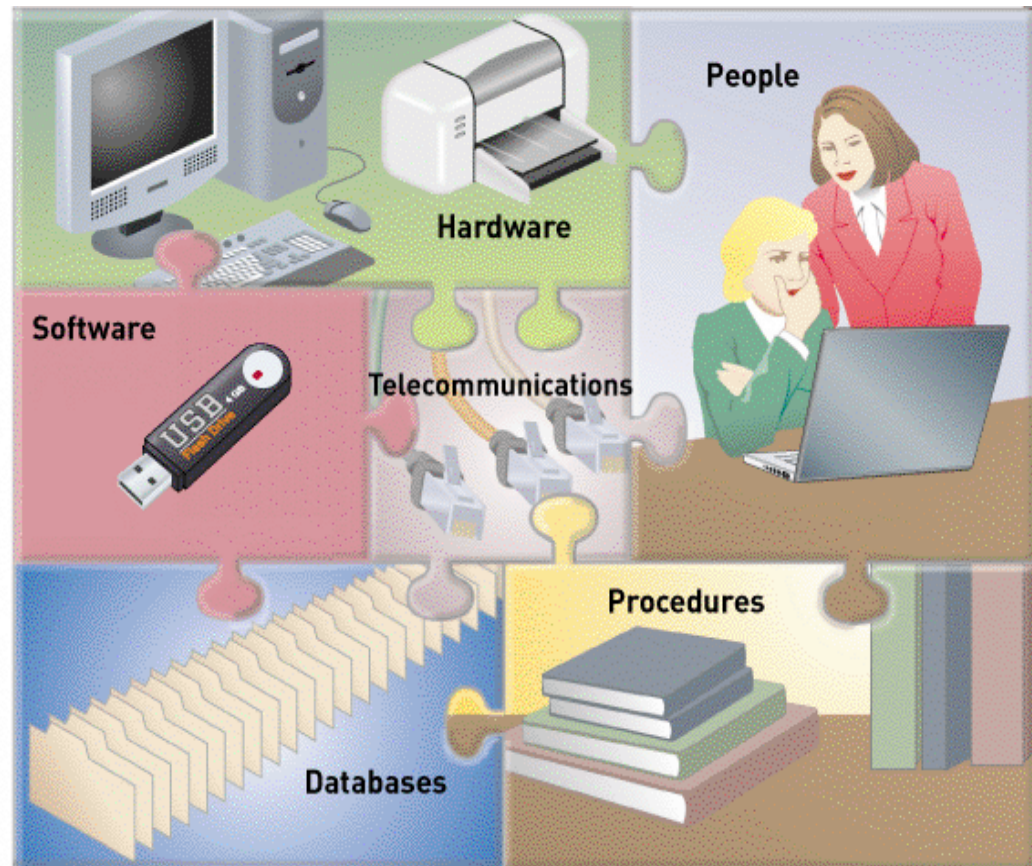


FIGURE 1.4
**Components of a computer-
based information system**

Computer-Based Information Systems (continued)

- Hardware:
 - Computer equipment used to perform input, processing, storage, and output activities
- Software:
 - Computer programs that govern the operation of the computer
 - System software controls basic computer operations
 - Application software allows you to accomplish specific tasks
- Database:
 - Organized collection of facts and information, typically consisting of two or more related data files

Computer-Based Information Systems (continued)

- Telecommunications, networks, and the Internet:
 - The electronic transmission of signals for communications
- Networks:
 - Connect computers and equipment to enable electronic communication
- Internet:
 - World's largest computer network, consisting of thousands of interconnected networks, all freely exchanging information

Computer-Based Information Systems (continued)

- Web:
 - Network of links on the Internet to documents containing text, graphics, video, and sound
- Intranet:
 - Internal network that allows people within an organization to exchange information and work on projects
- Extranet:
 - Network that allows selected outsiders, such as business partners and customers, to access authorized resources of a company's intranet

Computer-Based Information Systems (continued)

- People:
 - The most important element in most computer-based information systems
- Procedures:
 - Include strategies, policies, methods, and rules for using the CBIS

Business Information Systems

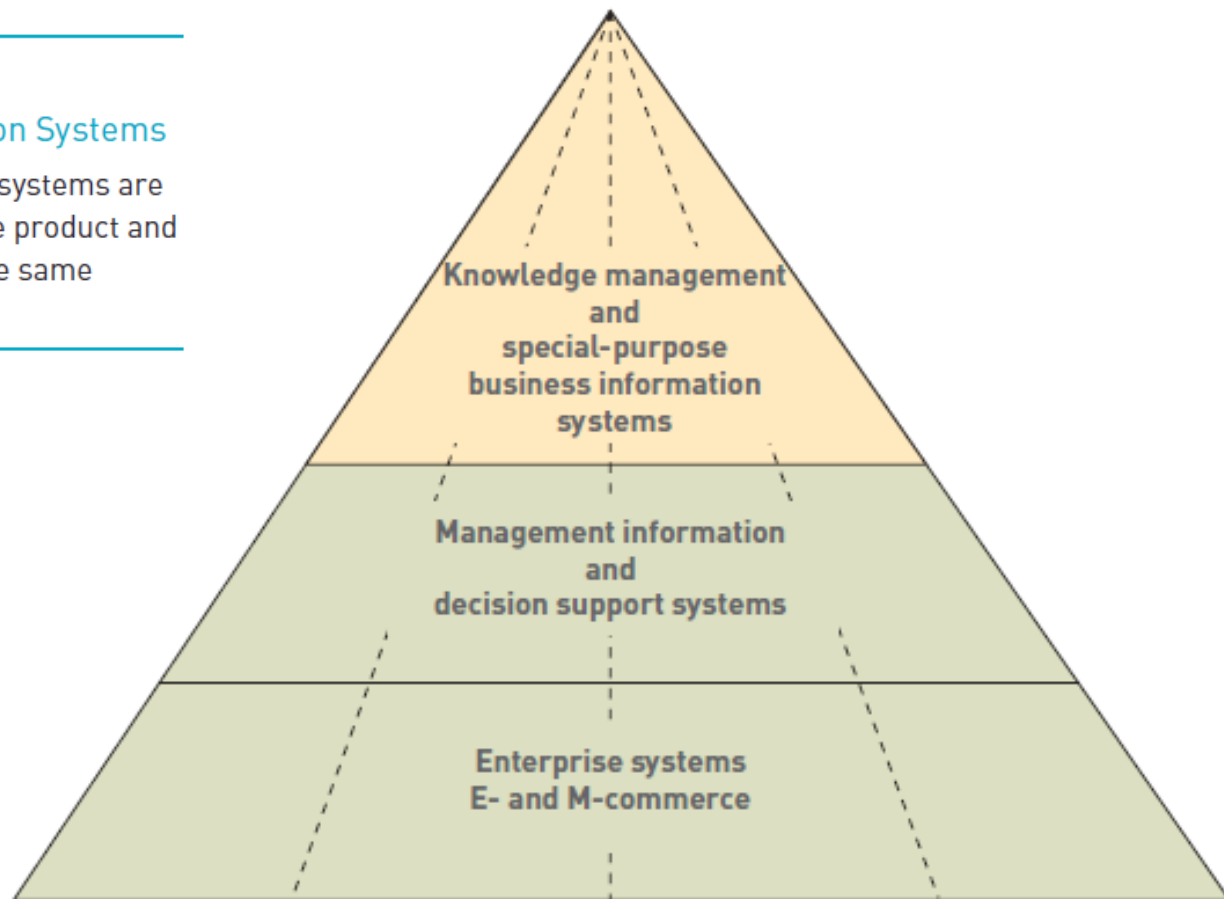
- Most common types of information systems:
 - Those designed for electronic and mobile commerce, transaction processing, management information, and decision support
- Some organizations employ:
 - Special-purpose systems, such as virtual reality, that not every organization uses

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.



Electronic and Mobile Commerce

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

Electronic and Mobile Commerce (continued)

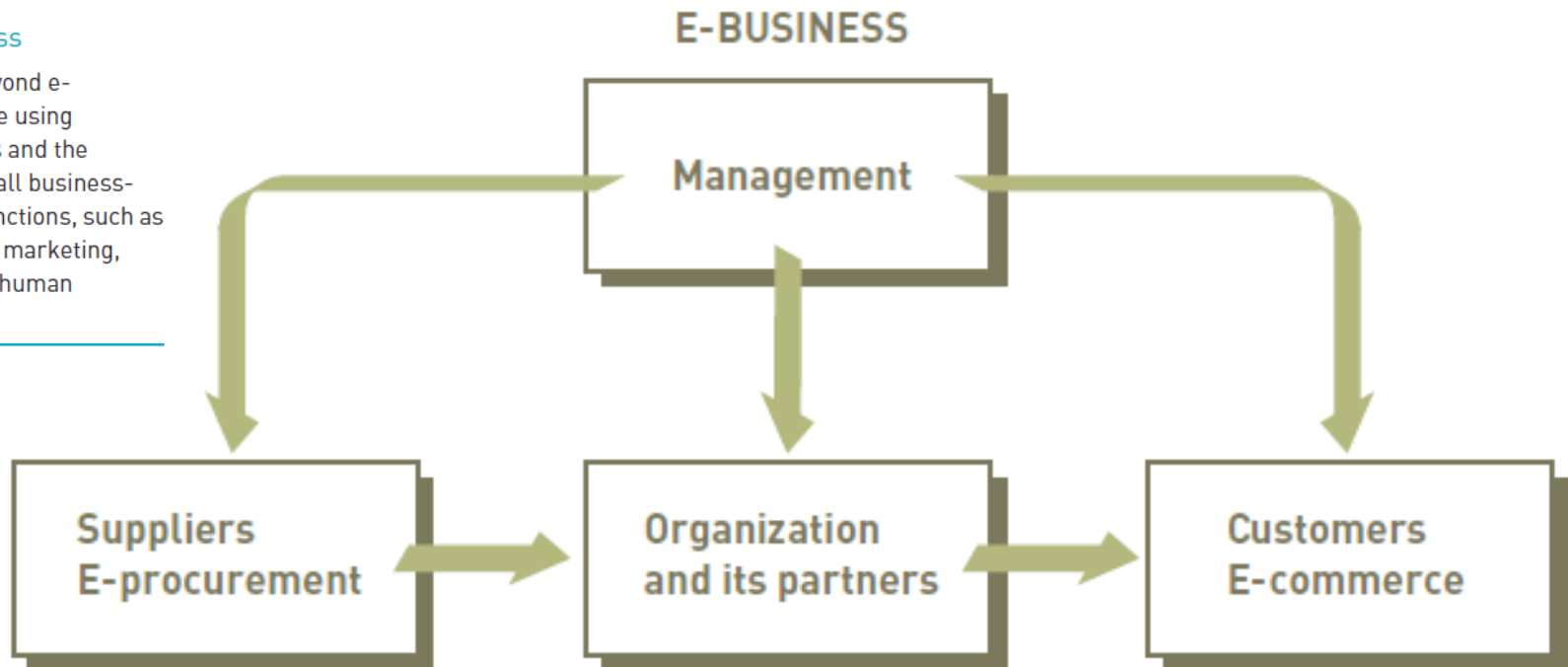
- Mobile commerce (m-commerce):
 - The use of mobile, wireless devices to place orders and conduct business
- E-commerce:
 - Offers many opportunities for streamlining work activities
- Electronic business (e-business):
 - Uses information systems and the Internet to perform all business-related tasks and functions

Electronic and Mobile Commerce (continued)

Figure 1.8

Electronic Business

E-business goes beyond e-commerce to include using information systems and the Internet to perform all business-related 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, such as payments to employees and sales to customers
- Transaction processing system (TPS):
 - Organized collection of people, procedures, software, databases, and devices used to perform and record completed business transactions

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

- Enterprise resource planning:
 - Set of integrated programs that manages the vital business operations for an entire multisite, global organization

Information and Decision Support Systems

- Management information system (MIS):
 - Organized collection of people, procedures, software, databases, and devices that provides routine information to managers and decision makers
 - Manufacturing, marketing, production, finance, and other functional areas are supported by MISs and are linked through a common database

Information and Decision Support Systems (continued)

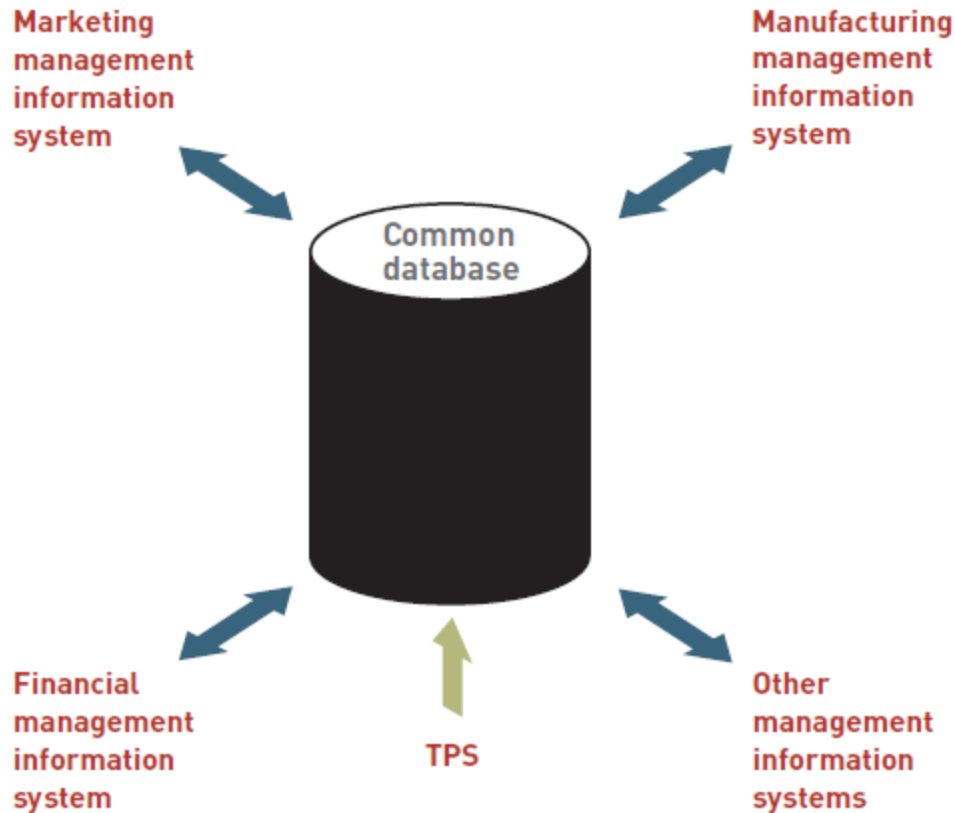


Figure 1.10

Management Information System

Functional management information systems draw data from the organization's transaction processing system.

Information and Decision Support Systems (continued)

- Decision support system (DSS):
 - Organized collection of people, procedures, software, databases, and devices that support problem-specific decision making
 - Can include:
 - A collection of models used to support a decision maker or user (model base)
 - A collection of facts and information to assist in decision making (database)
 - Systems and procedures (user interface or dialogue manager) that help decision makers and other users interact with the DSS

Information and Decision Support Systems (continued)

- Decision support system (DSS) can include:
 - Can include:
 - A collection of models used to support a decision maker or user (model base)
 - A collection of facts and information to assist in decision making (database)
 - Systems and procedures (user interface or dialogue manager) that help decision makers and other users interact with the DSS
 - Database management system to manage database
 - Model management system to manage the model

Information and Decision Support Systems (continued)

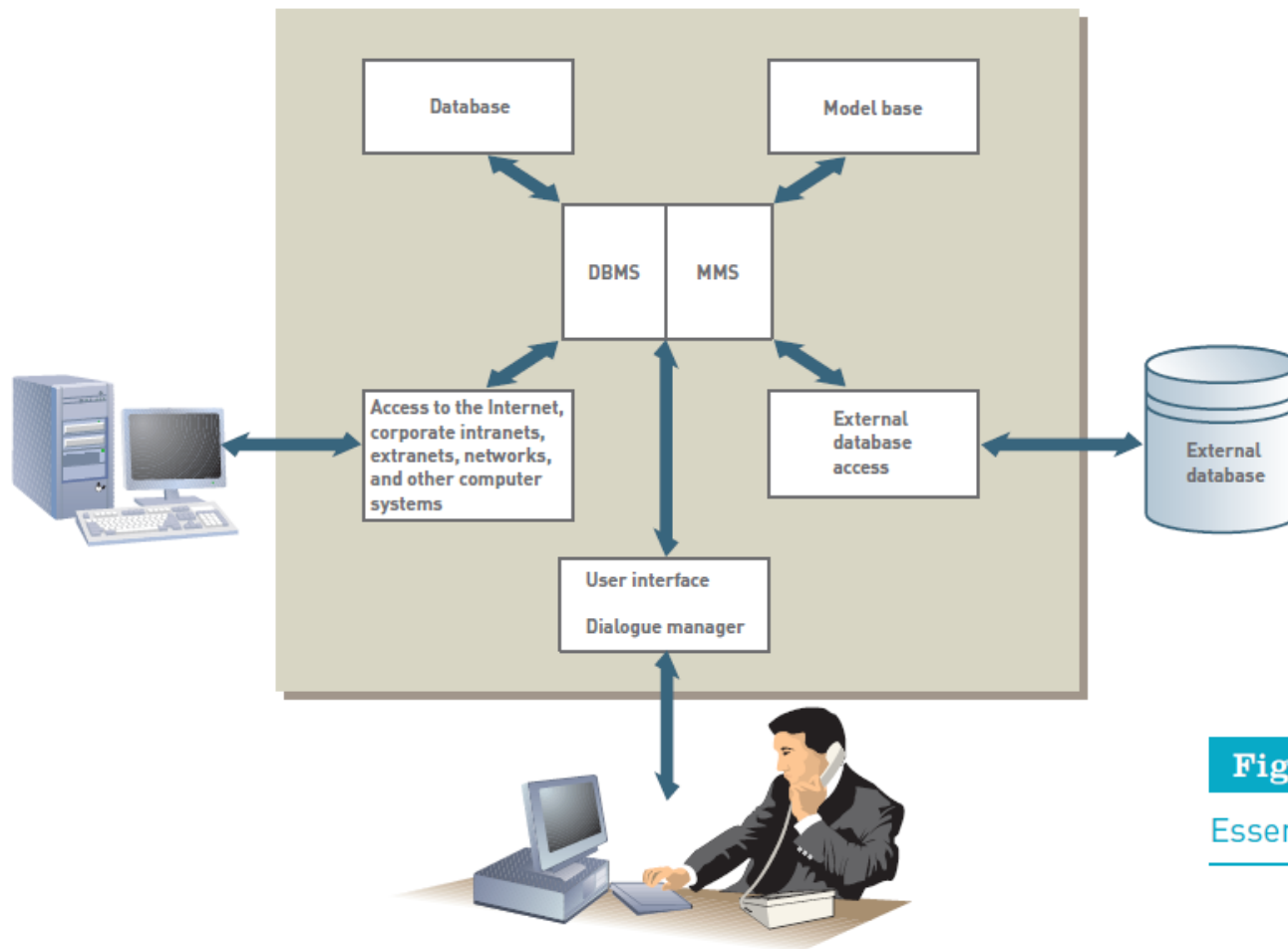


Figure 1.11

Essential DSS Elements

Specialized Business Information Systems:

- Knowledge management systems (KMSs):
 - Organized collection of people, procedures, software, databases, and devices to:
 - Create, store, share, and use the organization's knowledge and experience
- Artificial intelligence (AI):
 - Computer system takes on characteristics of human intelligence

Specialized Business Information Systems (continued)

- Artificial intelligence (AI):
 - Computer system takes on characteristics of human intelligence
 - Robotics and nanobots
 - Vision systems
 - Natural language processing
 - Learning systems
 - Neural networks

Specialized Business Information Systems (continued)

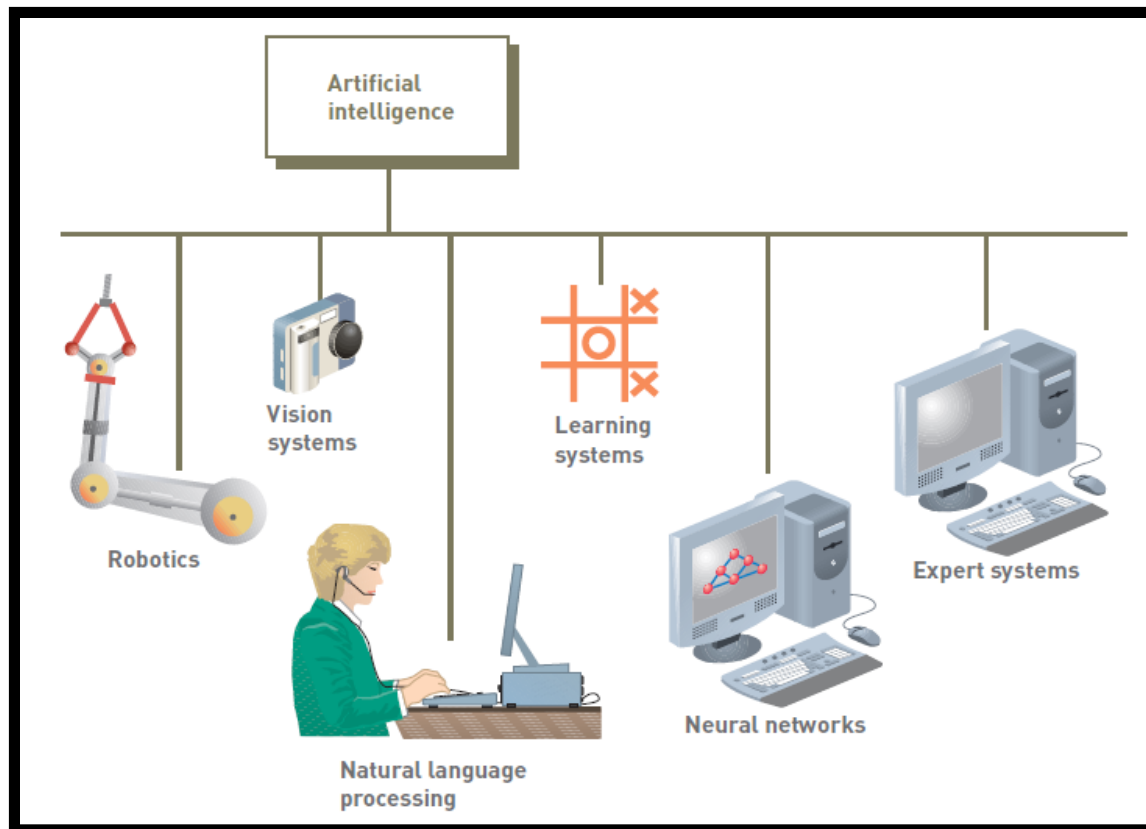


Figure 1.12

The Major Elements of Artificial Intelligence

Specialized Business Information Systems (continued)

- Expert systems:
 - Give computer ability to make suggestions and function like an expert in a particular field
- Virtual reality and multimedia:
 - Virtual reality:
 - Simulation of a real or imagined environment that can be experienced visually in three dimensions
 - Augmented reality superimposes digital data over photos or images

Specialized Business Information Systems (continued)

- Virtual reality and multimedia (continued):
 - Multimedia:
 - Can include photos and images, the manipulation of sound, and special 3D effects

Systems Development

- Systems development:
 - The activity of creating or modifying existing business systems
- Outsourcing:
 - Allows a company to focus on what it does best and delegate other functions to companies with expertise in systems development
 - System development often outsourced

Systems Development (continued)

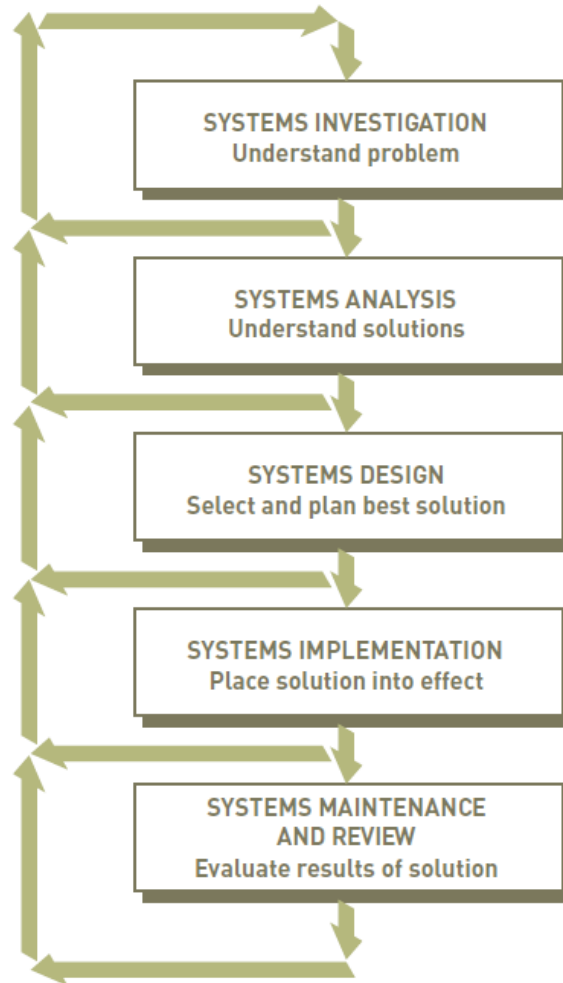


Figure 1.14

An Overview of Systems Development

Organizations and Information Systems

- Organization:
 - Formal collection of people and other resources established to accomplish a set of goals
 - Constantly uses money, people, materials, machines and other equipment, data, information, and decisions
 - Providing value to a stakeholder is the primary goal of any organization

Organizations and Information Systems (continued)

- Value chain:
 - Series (chain) of activities that includes inbound logistics and warehouse and storage, production and manufacturing, finished product storage, outbound logistics, marketing and sales, and customer service

Organizations and Information Systems (continued)

- 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)

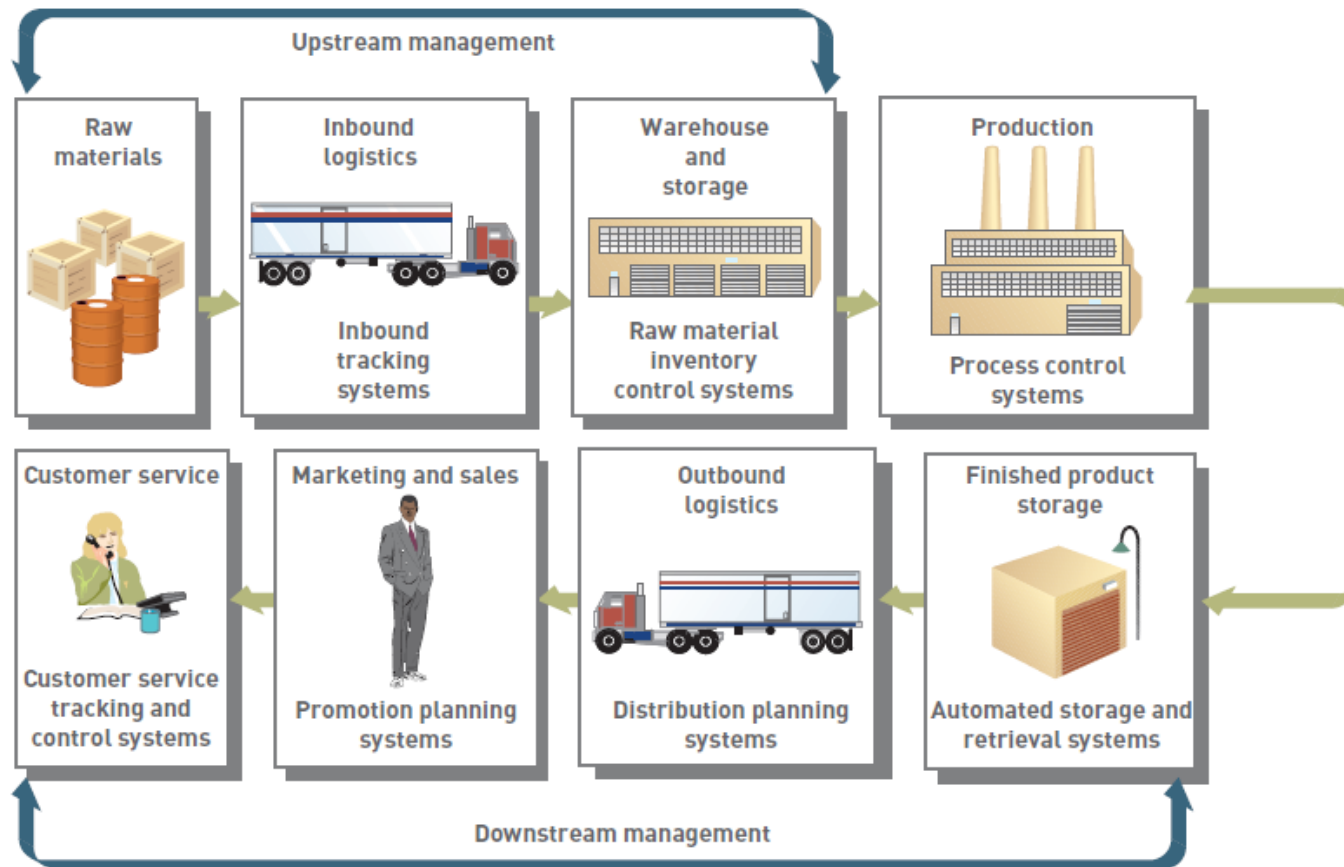


Figure 1.16

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 including marketing and advertising, sales, customer service after the sale, and programs to retain loyal customers
 - CRM software can be purchased as a service and delivered over the Internet or can be installed on corporate computers

Organizations and Information Systems (continued)

- Innovation:
 - Organizations continuously improving their operations by looking for fresh, new ideas
 - Can bring cutting-edge products and services that create new revenue streams
 - Can explore new markets and business approaches
 - Some IS departments are creating separate groups to explore new, innovative ideas

Organizational Culture and Change

- Culture:
 - Set of major understandings and assumptions shared by a group
- Organizational culture:
 - Major understandings and assumptions
 - May not be formally stated or documented
- Organizational change:
 - How organizations plan for, implement, and handle change

User Satisfaction and Technology Acceptance

- Technology acceptance model (TAM):
 - Specifies the factors that can lead to better attitudes about the information system, along with higher acceptance and usage
 - Factors include:
 - Perceived usefulness
 - Ease of use
 - Quality
 - Degree to which organization supports its use

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
- Organization often uses its information systems to help gain a competitive advantage

Factors That Lead Firms to Seek Competitive Advantage

- Porter's competitive forces model:
 - Rivalry among existing competitors
 - Threat of new entrants
 - Threat of substitute products and services
 - Bargaining power of buyers
 - Bargaining power of suppliers
- The more these forces combine in any instance, the more likely firms will seek competitive advantage

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

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

- Career opportunities in IS are expected to increase and IS budgets expected to surge
- Mobile applications will be a key factor in this surge
- IS workers need communication skills, detailed knowledge of the organization, and understanding of how information systems can help the organization achieve its goals

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

Other IS Careers

- New and exciting careers have developed in IS consulting, training, sales, repair, IS customer service, and IS entrepreneurs
- 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

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 and company Web sites
 - Social networking sites and blogs

Global Challenges in Information Systems

- Cultural and language challenges
- Time and distance challenges
- Infrastructure challenges
- Currency challenges
- Product and service challenges
- Technology transfer issues
- State, regional, and national laws
- Trade agreements

Summary

- The value of information is directly linked to how it helps people achieve organizational To be valuable, information must have several characteristics
- Four basic types of information systems: E-commerce and m-commerce, TPS and ERP, MIS and DSS, and specialized business information systems

Summary (continued)

- Systems development is the activity of creating or modifying existing business systems
- Organization is a formal collection of people and various other resources established to accomplish a set of goals
- Value-added processes increase the relative worth of the combined inputs on their way to becoming final outputs of the organization

Summary (continued)

- Information systems personnel typically work in an IS department that employs:
 - A chief information officer, systems analysts, computer programmers, computer operators, and LAN administrators