Introduction to Information Systems

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Principles and Learning Objectives

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

Principles and Learning Objectives (continued)

- Computers and information systems are constantly making it possible for organizations to improve the way they conduct business
  - Name the components of an information system and describe several system characteristics

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
  - List the components of a computer-based information system
  - 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)

- Information systems must be applied thoughtfully and carefully so that society, business, and industry can reap their enormous benefits
  - Describe some of the threats to security and privacy that information systems and the Internet can pose
  - Discuss the expanding role and benefits of information systems in business and industry

Why Learn About Information Systems?

- Information systems used in most professions
  - Sales reps
  - Managers
  - Corporate lawyers
- Indispensable for achieving career goals

Introduction

- **Information system (IS)**
  - A set of interrelated components that collect, manipulate, and disseminate data and information, and provide feedback to meet an objective
  - Examples: ATMs, airline reservation systems, course reservation systems

Information Concepts

- Information is one of an organization's most valuable resources
- *Information* is different from *data*

Data, Information, and Knowledge

- **Data:** raw facts
- **Information:** collection of facts organized in such a way that they have value beyond the facts themselves
- **Knowledge:** awareness and understanding of a set of information and ways that information can be made useful to support a specific task or reach a decision

Data, Information, and Knowledge (continued)

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

Table 1.1: Types of Data

Data, Information, and Knowledge (continued)

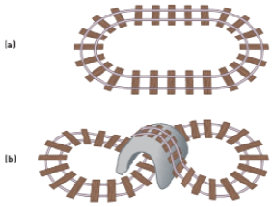

Figure 1.1: Defining and Organizing Relationships Among Data Creates Information

Data, Information, and Knowledge (continued)

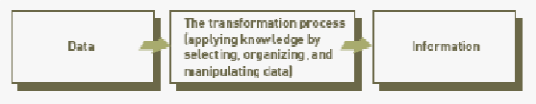

Figure 1.2: The Process of Transforming Data into Information

The Characteristics of Valuable 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.

Table 1.2: Characteristics of Valuable Information

The Characteristics of Valuable Information (continued)

Reliable	Reliable information can be depended on. 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 (continued)

The Value of Information

- Value of information is directly linked to how it helps decision makers achieve their organization's goals
- For example, value of information might be measured in:
  - Time required to make a decision
  - Increased profits to company

System Concepts

- **System**
  - A set of elements or components that interact to accomplish goals
- Components of a system
  - Input
  - Processing
  - Output
  - Feedback

System Concepts (continued)

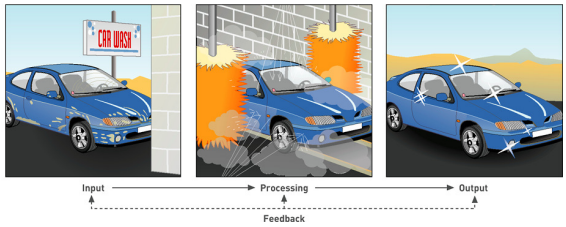

Figure 1.3: Components of a System

System Performance and Standards

- **Efficiency:** measure of what is produced divided by what is consumed
- **Effectiveness:** extent to which system attains its goals
- **System performance standard:** a specific objective of the system

What Is An Information System?

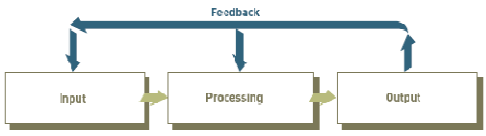

Figure 1.5: The Components of an Information System

Input, Processing, Output, Feedback

- **Input:** activity of 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
  - Computerized

Computer-Based Information Systems

- **Computer-based information system (CBIS)**
  - A single set of hardware, software, databases, telecommunications, people, and procedures that are configured to collect, manipulate, store, and process data into information

Computer-Based Information Systems (continued)

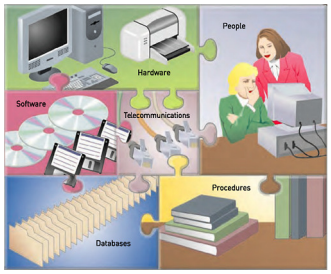

Figure 1.6: The Components of a Computer-Based Information System

Business Information Systems

- Most common types of information systems used in business organizations
  - Electronic and mobile commerce systems
  - Transaction processing systems
  - Management information systems
  - Decision support systems

Electronic and Mobile Commerce

- **E-commerce:** any business transaction executed electronically between parties such as:
  - 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

Enterprise Systems: Transaction Processing Systems and Enterprise Resource Planning

- **Transaction:** any business-related exchange, such as payments to employees, sales to customers, and payments to suppliers
- **Transaction processing system (TPS):** an organized collection of people, procedures, software, databases, and devices used to record completed business transactions

Transaction Processing Systems

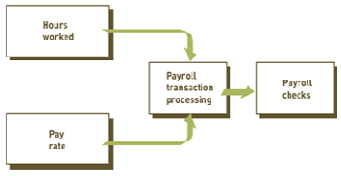

Figure 1.11: A Payroll Transaction Processing System

Enterprise Resource Planning

- A set of integrated programs that manages the vital business operations for an entire multisite, global organization
- Can replace many applications with one unified set of programs, making the system easier to use and more effective

Information and Decision Support Systems

- An effective TPS provides a number of benefits to a company
- A TPS can speed business activities and reduce clerical costs
- Data stored in TPSs is used to help managers make better decisions

Management Information Systems

- **Management information system (MIS):** an organized collection of people, procedures, software, databases, and devices that provides routine information to managers and decision makers
- Primary focus of an MIS is operational efficiency

Management Information Systems (continued)

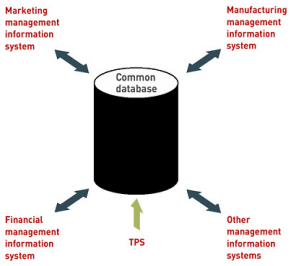

Figure 1.12: Management Information System

Decision Support Systems

- **Decision support system (DSS):** an organized collection of people, procedures, software, databases, and devices used to support problem-specific decision making
- Focus of a DSS is on decision-making effectiveness

Decision Support Systems (continued)

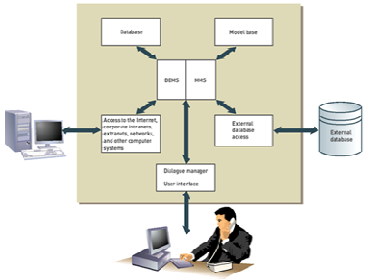

Figure 1.13: Essential DSS Elements

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

- **Knowledge management systems (KMSs):** an organized collection of people, procedures, software, databases, and devices to create, store, share, and use the organization's knowledge and experience
- **Artificial intelligence (AI):** field in which the computer system takes on the characteristics of human intelligence

Artificial Intelligence

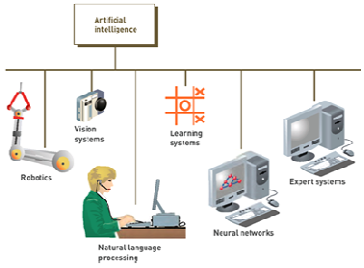

Figure 1.14: The Major Elements of Artificial Intelligence

Expert Systems

- Give the computer the ability to make suggestions and act like an expert in a particular field
- Allow organizations to capture and use the wisdom of experts and specialists
- The knowledge base contains the collection of data, rules, procedures, and relationships that must be followed to achieve value or the proper outcome

Virtual Reality

- Simulation of a real or imagined environment that can be experienced visually in three dimensions
- Immersive virtual reality
- Applications that are not fully immersive
- Can be a powerful medium for communication, entertainment, and learning

Systems Development

- **Systems development:** the activity of creating or modifying existing business systems
- A systems development project can be:
  - Done by people within the company
  - Outsourced
- To improve results of a systems development project, it is divided into several steps

Systems Development (continued)

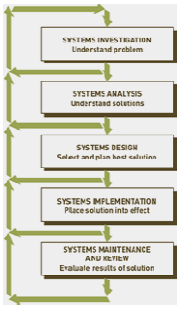

Figure 1.16: An Overview of Systems Development

Systems Investigation and Analysis

- Systems investigation: gain a clear understanding of the problem to be solved or opportunity to be addressed
- Systems analysis: defines the problems and opportunities of the existing system

Systems Design, Implementation, and Maintenance and Review

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

Information Systems in Society, Business, and Industry

- Information systems must be implemented thoughtfully and carefully
- Information systems face a variety of threats from unethical people

Security, Privacy, and Ethical Issues in Information Systems and the Internet

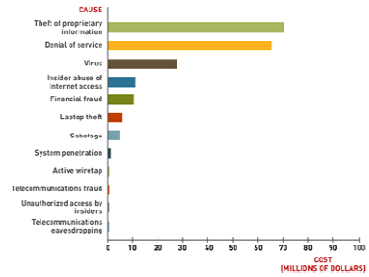

Figure 1.17: The Cost and Cause of Computer Attacks

Computer and Information Systems Literacy

- **Computer literacy:** knowledge of computer systems and equipment and the ways they function
- **Information systems literacy:** knowledge of how data and information are used by individuals, groups, and organizations

Information Systems in the Functional Areas of Business

- Finance and accounting
- Sales and marketing
- Manufacturing
- Human resource management
- Legal information systems

Information Systems in Industry

- Airline industry
- Investment firms
- Banks
- Transportation industry
- Publishing companies

Information Systems in Industry (continued)

- Healthcare organizations
- Retail companies
- Power management and utility companies
- Professional services

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: raw facts
- Information: collection of facts organized in such a way that they have value beyond the facts themselves
- System: a set of elements that interact to accomplish a goal
- Components of an information system: input, processing, output, and feedback

Summary (continued)

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- Systems development: creating or modifying existing business systems