An Introduction to Information Systems

Chapter 1
Reference


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
- 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

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

Table 1.1: Types of Data

<table>
<thead>
<tr>
<th>Data</th>
<th>Represented by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alphanumeric data</td>
<td>Numbers, letters, and other characters</td>
</tr>
<tr>
<td>Image data</td>
<td>Graphic images and pictures</td>
</tr>
<tr>
<td>Audio data</td>
<td>Sound, noise, or tones</td>
</tr>
<tr>
<td>Video data</td>
<td>Moving images or pictures</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessible</td>
<td>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.</td>
</tr>
<tr>
<td>Accurate</td>
<td>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).)</td>
</tr>
<tr>
<td>Complete</td>
<td>Complete information contains all the important facts. For example, an investment report that does not include all important costs is not complete.</td>
</tr>
<tr>
<td>Economical</td>
<td>Information should also be relatively economical to produce. Decision makers must always balance the value of information with the cost of producing it.</td>
</tr>
<tr>
<td>Flexible</td>
<td>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.</td>
</tr>
<tr>
<td>Relevant</td>
<td>Relevant information is important to the decision maker. Information showing that lumber prices might drop might not be relevant to a computer chip manufacturer.</td>
</tr>
</tbody>
</table>

Table 1.2: 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
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?

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


- **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
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)

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

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