Unit 1
Introduction to Information Systems

Introduction

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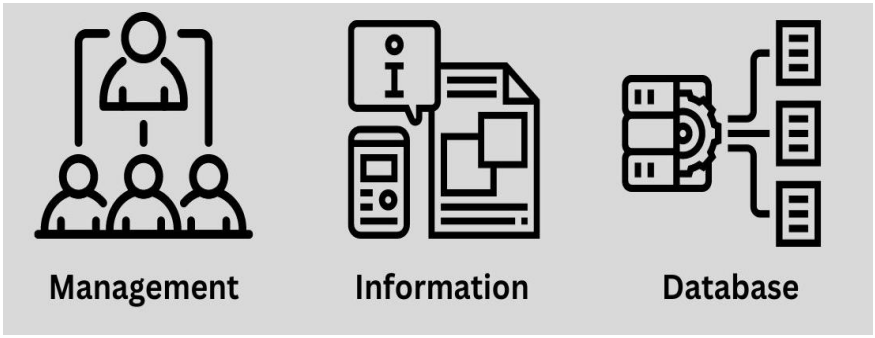
Introduction

- Information systems (IS) are critical to the operation of modern organizations. They are interconnected networks of hardware, software, data, people, and procedures designed to collect, process, store, and disseminate information to aid in decision-making, coordination, and control.
- The rise of digital technologies, as well as the increased use of computers and the internet, has altered how organizations operate and interact with their stakeholders.
- In a rapidly changing business environment, information systems have become critical tools for organizations of all sizes and types to remain competitive, efficient, and effective.
- They assist organizations in achieving their objectives by enhancing internal operations, facilitating communication and collaboration, and assisting in strategic decision-making. Information systems study is multidisciplinary, combining elements of computer science, management, and information technology.

- In today's business, information systems are critical because they allow organizations to collect, store, and process data to make informed decisions. These systems can be used to improve internal and external communication and collaboration, as well as gain insights into customer behavior and market trends.
- Furthermore, by providing real-time data and analysis, they can help businesses become more agile, responsive to market changes, and competitive. Information systems are critical for businesses to operate effectively and efficiently in today's fast-paced and data-driven environment.
- The combination of hardware, software, data, people, and procedures that organizations use to collect, process, store, and disseminate information is referred to as an information system. These systems aid in decision-making, coordination, and control, and they assist organizations in achieving their objectives. Simple manual systems to complex computer-based systems that automate many business processes are examples of information systems.



Definition of Information system (IS)

- "An information system is a set of interrelated components that work together to collect, process, store, and breakdown the information to support decision making."

- "Information system (IS) is the study of complementary networks of hardware and software that people and organizations use to collect, filter, process, create, and distribute data." [1]

- "Information systems are combinations of hardware, software, and telecommunications networks that people build and use to collect, create, and distribute useful data, typically in organizational settings." [2]

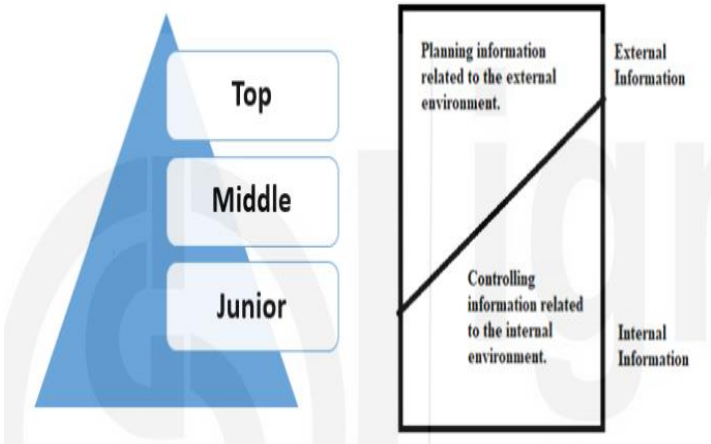
- "Information systems are interrelated components working together to collect, process, store, and disseminate information to support decision making, coordination, control, analysis, and visualization in an organization." [3]

- These definitions focus on two distinct aspects of information systems: the components that comprise an information system and their role in an organization.

Types of Information system (IS)

- ***Internal information and external information*** are the two broad categories of information.
- The illustration below depicts the scope of internal and external information in the context of business organizations.

  - **Internal Information**: Internal Information is defined as information generated by the organization's operations at various management levels in various functional areas. Internal information is summarized and processed as it progresses from the lowest to the highest levels of management.
  - Internal information is always about the organization's various operational units. Production figures, sales figures, personnel, account, and material information are all examples of internal information. This type of information is typically consumed by middle and junior management levels. However, top-level management consumes summarized internal in format on.



  - **External Information**: External information is typically gathered from the business organization's surroundings. External information is defined as information that comes from outside the organization and has an impact on its performance.

- External information includes government policies, competition, economic status, and international market conditions. External information is typically required by top management

Dimension of IS:

- The dimensions of information systems can be viewed as a framework for analyzing and designing information systems. They are:

- **Organizational Dimension:**
  - Organizations include information systems. The standard operating procedure and culture of an organization will be embedded in an information system. Functional specialities, business processes, culture, and political interest groups are all part of this.
  - This refers to the people, policies, and procedures that govern how an organization's information system is used and managed. This refers to how the information system fits into the organizational structure and how it supports the organization's goals and objectives.
  - ***A sales management system, for example, is part of the organizational dimension because it helps to improve sales performance***.

- **Management Dimension:**
  - Managers perceive environmental business challenges. Information systems provide managers with the tools and information they need to allocate, coordinate, and monitor their work, make decisions, create new products and services, and make long-term strategic decisions.
  - The policies, procedures, and rules that govern the use of the information system are referred to as this.
  - ***The management dimension includes things like passwords, backup procedures, and data security policies.***

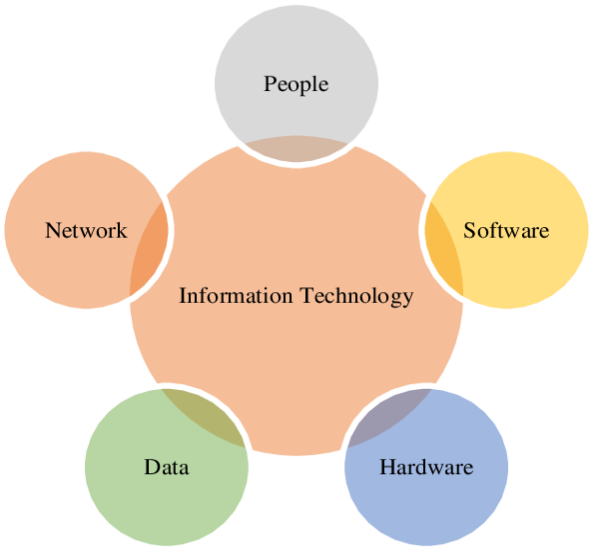
- **Technology Dimension:**
  - Management makes use of technology to carry out their duties. Computer hardware/software, data management technology and networking/telecom technology are all part of it.

- It is one of many tools used by managers to deal with change. This includes the hardware, software, data, and network components that comprise an information system's technical infrastructure.
- ***A server, a personal computer, and database software, for example, are all examples of technical dimensions.***

- **Strategic Dimension:**
  - This entails aligning information systems with an organization's overall goals and strategies.
  - This includes decision-making processes as well as the impact of information systems on the competitiveness and success of the organization.
- **User dimension:**
  - This refers to the information system's end users and how they interact with it.
  - ***An e-commerce website, for example, is part of the user dimension because it allows customers to purchase goods and services.***
  - Each of these dimensions is interconnected and has an impact on an information system's overall performance and effectiveness. To ensure that an information system meets the needs of the organization and its users, it should take into account all three dimensions.

Operating element of Information system (IS)

- The components that allow an information system to function effectively and efficiently are known as its operating elements. They are as follows:
  - **Hardware**: A system's physical components, such as computer equipment, peripheral devices, and other supporting equipment.



  - **Software**: A set of instructions that instructs the hardware on what to do. System software (such as the operating system) and application software are both included.
  - **Data**: Information that the system stores and processes. It can include both structured (like a database) and unstructured data (such as a text document).
  - **Procedures**: The steps and processes that are followed to complete specific tasks such as data entry, information processing, and report generation.

- **People**: Those who use the system as well as those who support and maintain it.
- **Network**: The communication channels that connect the various system components and allow them to work together.
- **Policies and security measures:** The guidelines and measures that ensure the system's information's confidentiality, integrity, and availability. •

➢ The following are the major processing functions in information systems:

- **Business transaction processing:** Capture, collect, record, store, and process events of business interest so that their impact is reflected in organizational performance records.
- **Master file updates:** The effect of these transactions is carried over to the organizational performance status files. At any given time, master files must reflect the status of any entity after incorporating the impact of current transactions.
- **Information report generation:** After processing transactions and updating master files, information reports are generated to assist managers in making decisions.
- **Processing of interactive inquiries:** Online information processing systems allow managers to respond to business queries raised on data files, both master and transaction files.
- **Providing interactive analytical support:** Key decision makers require not only interaction with data files for data extraction using scientific and planning models but also online processing support to analyze the impact of some potential actions. A Decision Support System is created when the system can extract data from relevant files and address it to the models selected by the user.

Why should we study information systems?

Studying **Information Systems (IS)** is crucial due to its pervasive role in modern society and organizations. Here are key reasons why understanding IS is important:

1. Organizational Relevance

- **Core to Business Operations**: Almost all businesses rely on information systems for daily operations, from managing inventory and processing transactions to customer relationship management.

- **Understanding Processes**: Knowledge of IS helps in understanding how processes function within an organization, enabling better integration and process improvement.

2. Enhanced Career Opportunities

- **Skill Development**: Proficiency in IS equips individuals with skills that are in high demand across industries, such as data analysis, system management, and project coordination.
- **Cross-Functional Roles**: Many roles in business, from marketing and finance to logistics and HR, require a solid understanding of IS to optimize strategies and operations.

3. Gaining Competitive Advantage

- **Strategic Edge**: Businesses use IS to gain competitive advantage by improving products, services, and processes. Familiarity with IS helps in identifying opportunities for innovation and strategic growth.
- **Efficiency and Productivity**: Knowledge of IS supports the use of automation tools and data-driven decision-making to enhance productivity and reduce costs.

4. Adaptation to Technological Change

- **Rapid Technological Advances**: The pace of technological development means that understanding IS is essential for staying current with emerging tools and platforms.
- **Flexible Adaptation**: Those knowledgeable in IS can adapt quickly to new technologies and help organizations implement them effectively.

5. Data-Driven Decision Making

- **Informed Decisions**: Information systems provide managers and decision-makers with timely and accurate data to make informed choices.
- **Analytics and Insight**: IS supports business analytics, enabling the analysis of vast amounts of data to uncover trends, forecast outcomes, and guide strategic planning.

6. Improving Communication and Collaboration

- **Connectivity**: IS enhances internal and external communication through platforms like email, instant messaging, and collaborative tools, leading to more efficient workflows.
- **Team Collaboration**: Advanced IS facilitate teamwork, allowing employees to work together on projects from different locations.

7. Supporting Innovation and Growth

- **Product Development**: Information systems play a crucial role in designing and bringing new products and services to market.

- **Market Expansion**: IS enables organizations to reach new customers and expand into global markets through e-commerce and online services.

8. Understanding Societal Impact

- **Social and Ethical Considerations**: Studying IS provides insight into how technology affects society, including issues related to privacy, security, and ethical use of information.
- **Sustainability and Efficiency**: IS can contribute to sustainable practices by optimizing resource use and reducing waste through better data management.

9. Preparation for the Future

- **Continuous Learning**: As IS evolves, continuous learning in this field ensures that professionals remain equipped to handle new challenges and opportunities.
- **Strategic Thinking**: Understanding IS helps develop a mindset that embraces technology's potential for creating strategic solutions in business and society.

Computer-Based Information System and Types

- A **Computer-Based Information System (CBIS)** uses computer technology to carry out its functions. These systems can vary in complexity, from simple applications to complex enterprise-wide systems.
- Information systems can be classified into several types based on their functions, organizational level, and nature of data processed:
  - Transaction Processing Systems (TPS)
  - Management Information Systems (MIS)
  - Decision Support Systems (DSS)
  - Executive Information Systems (EIS)
  - Expert Systems (ES)
  - Artificial Intelligence Systems (AI)
  - Enterprise Resource Planning Systems (ERP)
  - Supply Chain Management Systems (SCM)
  - Customer Relationship Management Systems (CRM)
  - Knowledge Management Systems (KMS)

- **Transaction Processing System (TPS):**
  - A transaction processing system is an information system that processes data resulting from business transactions. Their goals are to provide transactions so that records can be updated, and reports can be generated, i.e., to perform storekeeping functions.

- The transaction is carried out in two stages: batch processing and online transaction processing.
- ***Examples: Bill system, payroll system, Stock control system***.

➢ **Management Information System (MIS):**

- A Management Information System is intended to take relatively raw data available through a Transaction Processing System and summarize and aggregate it for the manager, usually in the form of a report. Middle management and operational supervisors are likely to use its reports. MIS generates a wide range of report types.
- A summary report, an on-demand report, an ad-hoc report, and an exception report are among the reports available.
- ***Examples: Sales management systems, Human resource management systems.***

➢ **Decision Support System (DSS):**

- A Decision Support System (DSS) is an interactive information system that provides information, models, and data manipulation tools to assist decisionmaking in semi-structured and unstructured situations.
- The end user is more involved in creating DSS than an MIS because DSS includes tools and techniques to assist in gathering relevant information and analyzing options and alternatives.
- ***Examples: Financial planning systems, Bank loan management systems.***

➢ **Experts System:**

- Experts systems include expertise to assist managers in diagnosing and solving problems. These systems are based on artificial intelligence research principles. Experts Systems is a data-driven information system.
- It acts as an expert consultant to users by applying its knowledge of a specific area. An expert system's components are a knowledge base and software modules. These modules perform knowledge inference and provide answers to user questions.

➢ **Office Automation System:**

- An office automation system is a type of information system that automates various administrative processes such as documenting, data recording, and office transactions.
- The administrative and clerical activities are separated in the office automation system. Email, voice mail, and word processing are Introduction to Information System some of the business activities performed by this type of information system

- **Executive Support System:**
  - An Executive Support System (ESS) assists top-level executives in planning and controlling workflow as well as making business decisions. It is similar to the Management Information System (MIS).
    - It provides great telecommunication, better computing capabilities, and effective display options to executives, among other things.
    - It provides information to them in the form of static reports, graphs, and textual information on demand.
    - It helps monitor performance, track competitor strategies, and forecast future trends, among other things.

Impact of IT on Organizations

Information Technology (IT) has significantly reshaped the way organizations operate. Its impact can be analyzed through various dimensions:

- **Operational Efficiency**: Automation of repetitive tasks reduces labor costs and increases productivity.
- **Decision-Making Support**: Real-time access to data and advanced analytics helps managers make informed decisions.
- **Improved Communication**: IT facilitates seamless communication within and outside the organization through platforms like email, instant messaging, and video conferencing.
- **Cost Reduction**: IT solutions help streamline processes, optimize resource use, and reduce operational expenses.
- **Innovation and Product Development**: IT enables organizations to develop new products and services rapidly, stay ahead of market trends, and respond to customer needs.
- **Global Reach**: The Internet and IT systems enable businesses to expand their market reach and collaborate with global partners.
- **Job Redefinition**: IT has led to the evolution of job roles, necessitating new skills and competencies.

Importance of Information Systems to Society

The influence of information systems extends beyond organizations and affects society as a whole in several key ways:

- **Improved Quality of Life**: IS has transformed how people work, communicate, learn, and manage their daily lives. From online shopping and banking to remote work and telemedicine, IS plays a crucial role in enhancing convenience and quality of life.
- **Access to Information**: Information systems democratize access to information, allowing people to stay informed and educated on a wide array of topics.
- **Economic Growth**: IS contributes to economic growth by enabling new business models, fostering innovation, and creating job opportunities in various sectors.
- **Increased Connectivity**: Social media, collaborative platforms, and networking tools allow people to connect, share ideas, and participate in communities worldwide.
- **Ethical and Security Challenges**: With the growth of IS, society faces challenges like data privacy, cyber threats, and ethical concerns around data usage.

Q/A

Fill-in-the-Blanks Questions

1. An information system consists of hardware, software, people, data, and _____.
2. _____ is defined as an integrated set of components for collecting, storing, processing, and disseminating information.
3. _____ are the physical components of a computer-based information system.
4. A _____ system helps in routine business transactions such as payroll and order processing.
5. _____ systems are designed for senior managers to help them monitor organizational performance.
6. The main goal of studying information systems is to understand their _____ on organizations.
7. Information systems help organizations to gain _____ over competitors.
8. _____ systems help middle management with decision-making by providing summarized data.
9. Decision support systems provide managers with _____ to make semi-structured decisions.
10. The use of IS in business helps reduce _____ by automating processes.
11. _____ systems facilitate communication within and outside organizations.
12. IT has allowed for the _____ of jobs, requiring new skill sets.
13. Information systems allow for real-time access to _____, improving decision-making.
14. _____ systems integrate various organizational processes into one unified system.
15. _____ is an ethical concern associated with the widespread use of information systems.
16. _____ refers to the raw facts processed to generate information.
17. The components of information systems include hardware, software, people, data, and _____.
18. Information systems have allowed businesses to expand their market _____.
19. A computer-based information system that manages customer interactions is called _____.
20. Studying IS is essential for adapting to rapid _____ changes.

21. IS helps improve _____ by providing tools for analysis and forecasting.
22. The _____ of IT on organizations includes improved productivity and job redefinition.
23. A system that supports managers by analyzing data and forecasting is called a _____.
24. The use of _____ helps businesses innovate and develop new products faster.
25. Information systems are essential for supporting _____ in society, such as telemedicine and e-learning.

Multiple-Choice Questions (MCQs)

1. Which of the following is NOT a component of an information system?
    - a) Hardware
    - b) Software
    - c) People
    - d) Marketing
2. Which type of system is used for day-to-day business operations?
    - a) DSS
    - b) MIS
    - c) TPS
    - d) ERP
3. A system designed to support executive-level decision-making is called:
    - a) MIS
    - b) DSS
    - c) TPS
    - d) EIS
4. The main reason to study information systems is to:
    - a) Learn coding
    - b) Understand their impact on organizations
    - c) Understand marketing

- d) Learn hardware repair

5. Which type of system helps middle management with decision-making?
   - a) ERP
   - b) MIS
   - c) CRM
   - d) TPS
6. What is the primary goal of a Transaction Processing System (TPS)?
   - a) Support strategic decisions
   - b) Automate day-to-day transactions
   - c) Create complex models
   - d) None of the above
7. The acronym ERP stands for:
   - a) Enterprise Relationship Planning
   - b) Executive Resource Planning
   - c) Enterprise Resource Planning
   - d) Enterprise Resource Protocol
8. Which type of system is most likely to include predictive analytics?
   - a) TPS
   - b) OAS
   - c) DSS
   - d) EIS
9. The impact of IT on job roles often leads to:
   - a) Job elimination only
   - b) Job redefinition and new skills
   - c) Increased manual work
   - d) Less efficiency
10. Which system is typically used to facilitate communication within organizations?
    - a) CRM

- b) OAS
- c) DSS
- d) EIS

Short Answer Questions

1. What are the main components of an information system?
2. Why is it important to study information systems in business?
3. What is a computer-based information system?
4. Describe the role of a Transaction Processing System (TPS).
5. How do information systems impact decision-making?
6. What are the advantages of using ERP systems in organizations?
7. What is the role of a Decision Support System (DSS)?
8. Explain the importance of information systems in society.
9. What is the impact of IT on job roles within an organization?
10. What challenges are associated with data privacy in information systems?
11. How does IT contribute to cost reduction in businesses?
12. Define the term 'competitive advantage' in the context of IS.
13. What is knowledge management in information systems?
14. Describe how mobile commerce relies on information systems.
15. What are some common types of computer-based information systems?

Comprehensive Questions

1. Explain the importance of studying information systems and how they impact organizations.
2. Discuss the different types of computer-based information systems and their functions.
3. How do information systems contribute to gaining a competitive advantage in businesses?
4. Describe the impact of IT on organizational structures and job roles.

5. Discuss the importance of data in information systems and how it is transformed into useful information.
6. What is the role of information systems in improving communication and collaboration in an organization?
7. How do information systems support decision-making at different management levels?
8. Explain the significance of information systems in society, providing examples of their influence.
9. What are some ethical and security challenges associated with the use of information systems?
10. Analyze the benefits and limitations of implementing an Enterprise Resource Planning (ERP) system.

Answers to Fill-in-the-Blanks

1. *processes*
2. *Information system*
3. *Hardware*
4. *Transaction Processing System (TPS)*
5. *Executive Information Systems (EIS)*
6. *impact*
7. *competitive advantage*
8. *Management Information Systems (MIS)*
9. *analysis tools*
10. *operational costs*
11. *Office Automation Systems (OAS)*
12. *redefinition*
13. *data*
14. *Enterprise Resource Planning (ERP)*
15. *Data privacy*
16. *Data*

17.processes

18.reach

19.Customer Relationship Management (CRM)

20.technological

21.business analytics

22.impact

23.Decision Support System (DSS)

24.IT

25.services

Answers to Multiple-Choice Questions (MCQs)

1. *d) Marketing*
2. *c) TPS*
3. *d) EIS*
4. *b) Understand their impact on organizations*
5. *b) MIS*
6. *b) Automate day-to-day transactions*
7. *c) Enterprise Resource Planning*
8. *c) DSS*
9. *b) Job redefinition and new skills*
10. *b) OAS*