Unit 1
Introduction to Information Systems

Introduction

Why should we study information systems?

Computer-Based Information System and Types

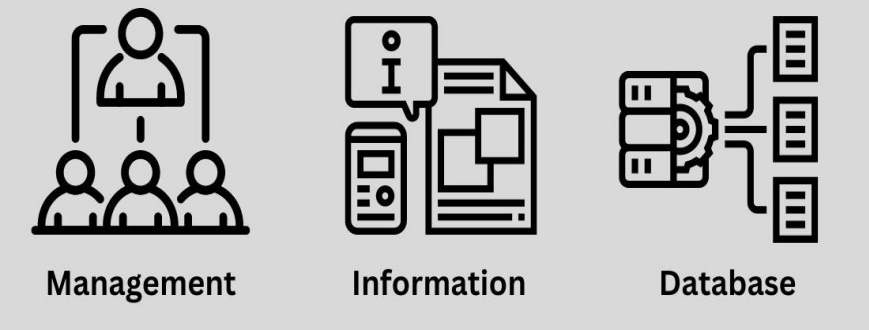
Impact of IT on Organizations

Importance of Information Systems to Society

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]

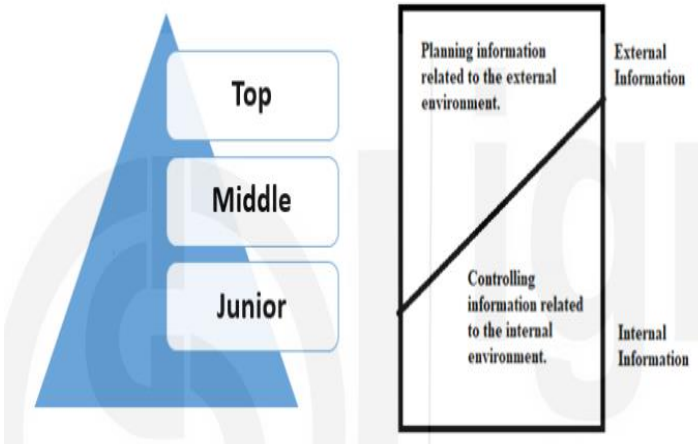
- "Information systems are interrelated components working together to collect, process, store, and disseminate information to support decision making, coordination, control, analysis, and visualization in an organization." [3]

- 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.***

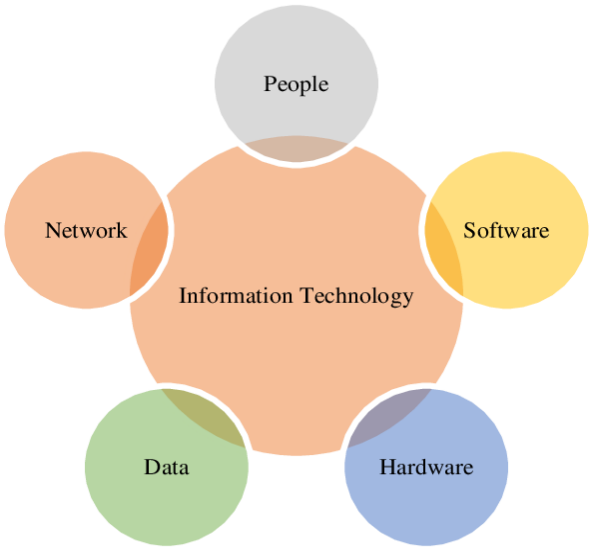
- **Technology Dimension:**
  - Management makes use of technology to carry out their duties. Computer hardware/software, data management technology and networking/telecom technology are all part of it.

- 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.
- **Example**:
  In Nepal, many small and medium enterprises (SMEs) use IS for daily operations. For instance, **Daraz Nepal**, an online shopping platform, uses information systems to manage inventory, process transactions, and track customer preferences. By studying IS, professionals can understand these systems and improve the efficiency of such businesses.

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.
- **Example**:
  In India, the IT sector contributes significantly to GDP. Companies like **Tata Consultancy Services (TCS)** and **Infosys** actively seek IS professionals for roles in data analytics, system development, and project management. Understanding IS can help individuals access diverse career paths in this booming industry.

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.
- **Example**:
  Asian start-ups such as **Paytm** in India and **eSewa** in Nepal have disrupted traditional payment systems by leveraging IS. Their ability to use IS for digital wallets and online payments gives them a competitive edge in the financial services sector.

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.
- **Example**:
  The rapid adoption of mobile banking in rural India through platforms like **UPI (Unified Payments Interface)** shows how organizations adapt to changing technology. IS knowledge enables professionals to implement such systems and bring innovation to underserved regions.

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.
- **Example**:
  In Nepal, agricultural initiatives like **Kisankalagi Unnat Biu-Bijan Karyakram (KUBK)** use IS to collect and analyze data on crop yields and weather patterns. This helps farmers make informed decisions, improving productivity and food security.

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.
- **Example**:
  During the COVID-19 pandemic, tools like **Zoom** and **Microsoft Teams** were widely adopted in India and Nepal for remote work and education. Studying IS ensures people understand these tools and use them effectively for communication and collaboration.

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.

- **Example**:
  Indian companies like **Ola** and **Zomato** use IS for app-based services, connecting drivers with passengers or customers with restaurants. These systems foster innovation, allowing businesses to scale rapidly in competitive markets.

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.
- **Example**:
  Nepal's introduction of **digital land registration systems** shows how IS can streamline public services. Studying IS highlights the ethical considerations and societal benefits of such innovations, ensuring transparency and accountability.

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.
- **Example**:
  In South Asia, the rapid integration of AI and machine learning into industries like healthcare and education underscores the importance of IS. Platforms like **BYJU's** in India use IS to personalize learning, demonstrating the future potential of technology-driven solutions.

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)

Types of Computer-Based Information Systems

1. Transaction Processing Systems (TPS)

- **Function**: Handles day-to-day business transactions by collecting, storing, and processing data.
- **Key Features**: Batch processing and online transaction processing (OLTP).
- **Examples**: Billing systems, payroll systems, stock control systems.

Example
In Nepal, telecom providers like **Nepal Telecom** use TPS to handle mobile recharge and call record transactions.

2. Management Information Systems (MIS)

- **Function**: Converts raw data from TPS into summarized reports for middle management.
- **Key Features**: Generates various reports, such as summary, exception, and ad-hoc reports.
- **Examples**: Sales management systems, human resource management systems.

Example:
Indian retail chains like **Big Bazaar** use MIS to monitor daily sales performance and inventory levels.

3. Decision Support Systems (DSS)

- **Function**: Assists in decision-making by providing interactive tools, models, and data analysis.
- **Key Features**: Useful for semi-structured and unstructured decisions.
- **Examples**: Financial planning systems, bank loan management systems.

Example
Banks like **Himalayan Bank Limited** in Nepal utilize DSS for evaluating loan applications and financial forecasting.

4. Expert Systems (ES)

- **Function**: Mimics human expertise to solve specific problems in a knowledge-driven manner.
- **Key Features**: Includes a knowledge base and inference engine.
- **Examples**: Medical diagnosis systems, troubleshooting systems.

Example
India's **Apollo Hospitals** uses expert systems to assist doctors in diagnosing diseases based on patient symptoms.

5. Artificial Intelligence Systems (AI)

- **Function**: Emulates human intelligence to automate tasks, learn from data, and improve over time.
- **Examples**: Chatbots, recommendation systems.

Example
E-commerce platforms like **Flipkart** in India use AI systems for personalized product recommendations.

6. Enterprise Resource Planning Systems (ERP)

- **Function**: Integrates core business processes into a unified system.
- **Key Features**: Real-time data processing, scalability.
- **Examples**: SAP, Oracle ERP.

Example
Nepal's manufacturing companies use **SAP ERP** for inventory and production management.

7. Supply Chain Management Systems (SCM)

- **Function**: Optimizes supply chain activities, including procurement, logistics, and distribution.
- **Examples**: Inventory tracking systems, logistics management systems.

Example
DHL Express uses SCM systems to streamline its logistics operations in South Asia.

8. Customer Relationship Management Systems (CRM)

- **Function**: Manages customer data to improve relationships and enhance customer satisfaction.
- **Examples**: Salesforce, Zoho CRM.

Example

Telecom operators like **Airtel India** use CRM systems for customer support and marketing campaigns.

9. Knowledge Management Systems (KMS)

- **Function**: Captures and organizes knowledge for easy retrieval and use within the organization.
- **Examples**: Document management systems, collaborative platforms.

Example:
IT companies like **Infosys** use KMS to manage project documentation and employee expertise.

10. Office Automation Systems (OAS)

- **Function**: Automates administrative processes such as document creation and communication.
- **Examples**: Email systems, word processors, scheduling tools.

Example:
Nepalese government offices use OAS tools like **Google Workspace** for internal communication and documentation.

11. Executive Support Systems (ESS)

- **Function**: Provides top-level executives with critical information for strategic decisions.
- **Key Features**: Real-time data, advanced visualization tools.
- **Examples**: Business performance dashboards, trend forecasting tools.

Example:
Tata Group in India uses ESS to monitor company performance and market trends.

Impact of IT on Organizations

Information Technology (IT) has significantly reshaped the way organizations operate.

Information Technology (IT) has become a transformative force, reshaping the structure, processes, and strategies of organizations.

Below are key areas where IT has made a significant impact: Its impact can be analyzed through various dimensions:

1. Operational Efficiency

IT automates repetitive and labor-intensive tasks, reducing errors and increasing speed and productivity.

- **Examples**:

- Automation of payroll systems using software like **Tally** in small businesses.
- Implementation of robotics in manufacturing industries such as **Hero MotoCorp** in India to streamline production.

2. Decision-Making Support

IT provides tools and systems that enable real-time data analysis, supporting informed and strategic decision-making.

- **Examples**:
  - Banks in Nepal, such as **Nepal SBI Bank**, use **business intelligence tools** to analyze customer data and forecast financial trends.
  - Indian conglomerates like **Reliance Industries** employ predictive analytics for market trend analysis.

3. Improved Communication

IT enhances internal and external communication through platforms like email, instant messaging, and video conferencing, enabling collaboration across geographical boundaries.

- **Examples**:
  - The widespread use of platforms like **Microsoft Teams** and **Zoom** by Indian IT companies such as **Wipro** during the COVID-19 pandemic.
  - Government agencies in Nepal adopting email-based communication for interdepartmental correspondence.

4. Cost Reduction

By optimizing processes and automating workflows, IT reduces operational expenses and resource wastage.

- **Examples**:
  - Indian e-commerce platforms like **Flipkart** use IT-driven supply chain management systems to cut logistics costs.
  - Nepalese hydropower companies utilize IT for monitoring and controlling power generation processes, reducing manual intervention.

Example (Regional Context)

Example 1: Impact of IT on Banking
In Nepal, banks like **Himalayan Bank** and **Nabil Bank** leverage IT for core banking solutions. IT has enabled:

- Faster transactions through online banking.
- Customer support via chatbots and CRM systems.
- Data security and compliance through advanced cybersecurity tools.

Example 2: IT in Agriculture
In India, platforms like **e-Choupal** use IT to provide farmers with real-time market information, weather updates, and farming best practices. This empowers farmers to make better decisions and improve their income.

Importance of Information Systems to Society

Information Systems (IS) are deeply integrated into modern life, influencing various aspects of society. Below are the key ways in which IS impacts society:

1. Improved Quality of Life

IS has revolutionized daily life, enhancing convenience and accessibility in areas such as:

- **Work**: Remote working facilitated by tools like **Microsoft Teams** and **Slack**.
- **Healthcare**: Telemedicine platforms like **Practo** in India allow patients to consult doctors remotely.
- **Education**: E-learning platforms such as **Khan Academy** and **Byju's** provide quality education to learners worldwide.

2. Access to Information

IS democratizes access to information, enabling individuals to stay informed, educated, and aware of global events and opportunities.

- **Examples**:

- Platforms like **Wikipedia** provide free access to knowledge.
- In Nepal, educational initiatives like **E-Pustakalaya** offer digital books to underserved communities.

3. Economic Growth

IS fosters innovation and creates new business models, contributing significantly to economic growth.

- **Examples**:
  - E-commerce platforms like **Daraz Nepal** and **Flipkart India** create jobs and bring convenience to shopping.
  - Startups in Asia, such as ride-sharing service **Grab** in Southeast Asia, leverage IS to scale operations and expand markets.

4. Increased Connectivity

Social and professional networking platforms enhance connectivity, allowing people to collaborate, share ideas, and participate in global communities.

- **Examples**:
  - Platforms like **Facebook**, **LinkedIn**, and **WeChat** connect individuals across borders.
  - During the COVID-19 pandemic, applications like **Zoom** enabled virtual gatherings and conferences.

5. Ethical and Security Challenges

While IS offers numerous benefits, it also poses challenges related to data privacy, cybersecurity, and ethical concerns.

- **Examples**:
  - **Cybersecurity threats**: Cases of phishing and ransomware attacks are on the rise globally.
  - **Ethical concerns**: Companies like **Cambridge Analytica** raised awareness of how user data could be misused.

Case Studies Relevant to Society

Case Study 1: E-Governance in India (Digital India Initiative)

The **Digital India Initiative** leverages IS to provide citizens access to government services online. Platforms like **Aadhaar** and **DigiLocker** simplify identity verification and document storage, transforming how people interact with public services.

Case Study 2: Remote Healthcare in Nepal

Organizations like **HealthNet Nepal** use IS to provide remote healthcare services in rural areas, improving access to medical care where infrastructure is limited.

Case Study 3: Economic Empowerment through IS

Platforms like **Alibaba** in China enable small businesses to reach international markets, fostering entrepreneurship and reducing economic disparities.

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*