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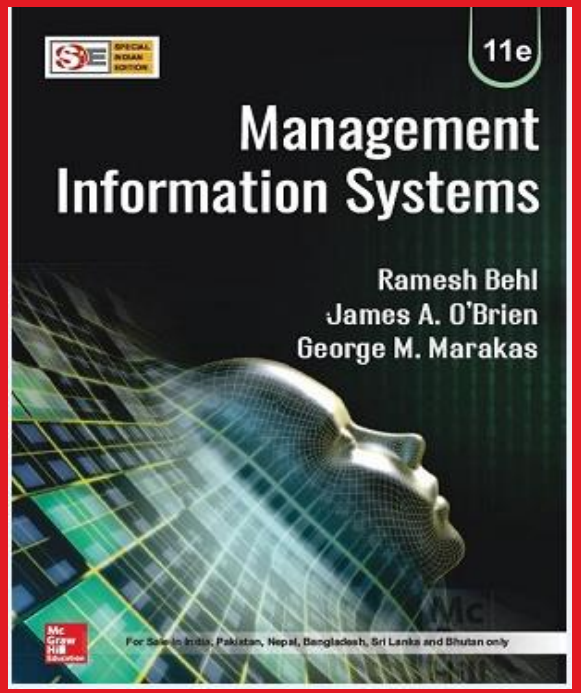
Management Information Systems

Eleventh Edition



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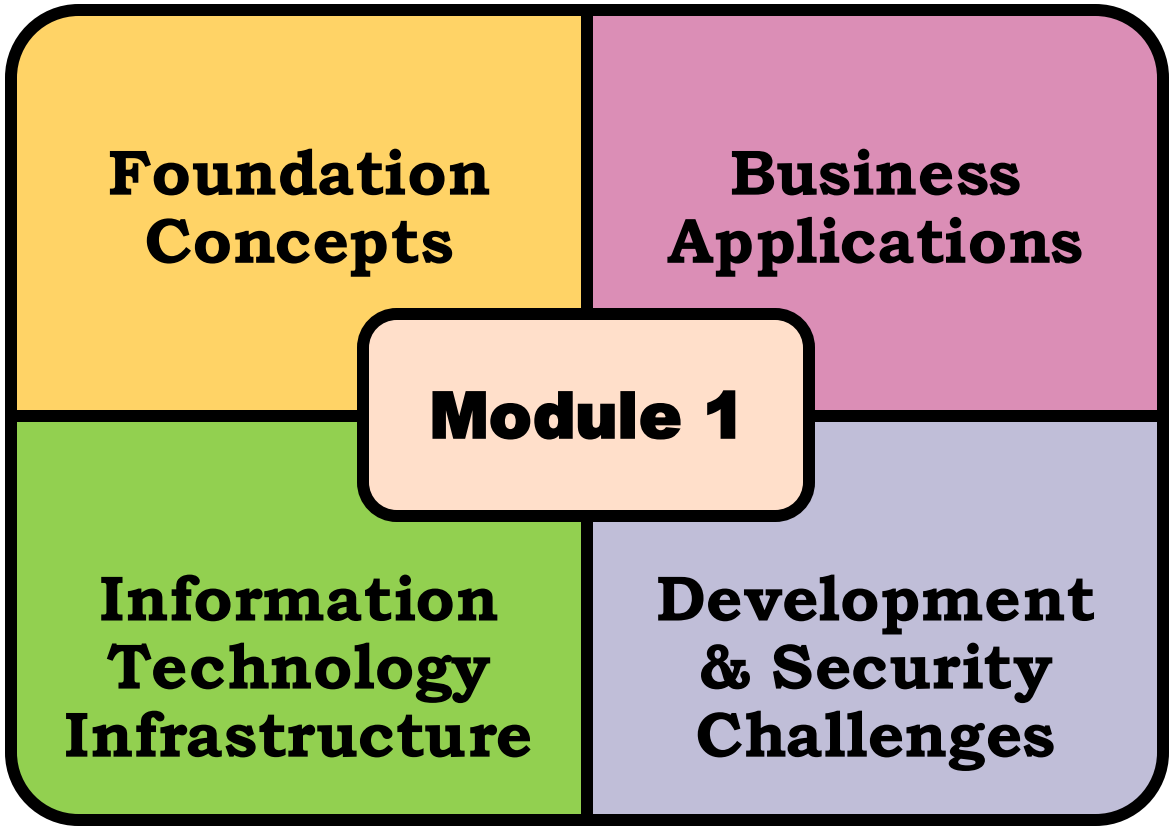
Chapter 1 : Foundations of Information Systems in Business


Foundation Concepts
Business Applications
Module 1
Information Technology Infrastructure
Development & Security Challenges

Learning Objectives

Understand the concept of a system and how it relates to information system.

Explain fundamental role and importance of information system in business.

What are the new trends in information systems?

Provide examples of several major types of information systems from business organizations in the real world.

Learning Objectives

Demonstrate familiarity with the myriad of career opportunities existing in information systems.

Classify components of information systems and provide real world examples.

Data?

Definition:

Data refers to raw and unprocessed facts, figures, symbols, or representations of values. It can be in the form of numbers, text, images, or any other format that doesn't have context or meaning on its own.

Characteristics:

- Data is often considered the building blocks of information.
- It lacks context or interpretation until it is processed or organized.

Information?

Definition:

Information is data that has been processed, organized, structured, or given context to make it meaningful, useful, and relevant for decision-making or understanding.

Characteristics:

- Information provides meaning, context, and relevance to data, making it understandable and valuable to users.
- It results from analyzing, interpreting, or manipulating data to derive insights or knowledge.

What is Information System?

Defination

An Information System (IS) is a combination of components including people, hardware, software, data resources, communication networks, and policies/procedures designed to collect, store, process, transform, and disseminate information within an organization

Characteristics:

- An IS facilitates the management and processing of data to produce meaningful information for decision-making and organizational operations.
- It includes various components working together to ensure the effective and efficient flow of information within an organization.

Information Technology vs Information System

Aspect	Information Technology (IT)	Information Systems (IS)
Definition	IT involves the use of computer systems, hardware, software, networks, and digital technology for managing information.	involves an organized combination of people, hardware, software, data, networks, and processes for collecting, processing, storing, and disseminating information within an organization.
Focus	Primarily concentrates on the technical aspects of technology infrastructure, software applications, cybersecurity, networks, and hardware maintenance.	Emphasizes integrating technology, people, processes, and data to manage information effectively, supporting decision-making and organizational operations.
Scope	Encompasses a wide range of technical expertise and resources used to support and manage technology-related services and resources.	Encompasses the entire system managing information, including technology (IT), organizational processes, and human factors.
Examples	Includes network administration, system maintenance, software development, cybersecurity, database management, and technical support.	Examples of IS include Enterprise Resource Planning (ERP) systems, Customer Relationship Management (CRM) systems, decision support systems, and knowledge management systems.

Components of Information System

People: Users, stakeholders, IT professionals, developers, administrators, and other individuals involved in utilizing, managing, or maintaining the IS.

Hardware: Physical equipment such as servers, computers, network devices (routers, switches), storage devices (hard drives, SSDs), and peripheral devices required for data processing and storage.

Software: Programs, applications, operating systems, and software tools utilized to perform various functions, including data processing, management, analysis, security, and user interaction.

Data: Raw facts, figures, records, documents, databases, and other forms of information that serve as inputs to the Information System. This includes structured and unstructured data.

Networks:Communication infrastructures, such as local area networks (LANs), wide area networks (WANs), the internet, and intranets, facilitating data transmission and connectivity among devices and users.

Policies and Procedures: Organizational guidelines, protocols, standards, and rules governing the use, access, security, sharing, and management of information within the IS.

IS Activities

- Input of data resources
- Processing of data into information
- Output of information products
- Storage of data resources
- Control of system performance

IS Resources

Data Resources

- Data resources refer to the raw facts, figures, records, or information collected and stored within an Information System. These resources are the foundation upon which information is generated.
- Product descriptions, customer records, employee files

Network Resources

- Network resources encompass the communication infrastructure and tools utilized to facilitate data transmission, connectivity, and control within an Information System.
- communication media, communication processors, communication devices

Information Products

- Information products refer to the final outputs or results generated by an Information System that convey meaningful information to users or stakeholders.
- management reports, business documents

Fundamental Roles of IS

Three fundamental roles of Information Systems for a business enterprise:

- **Support of business processes and operations.**
  - eg: ERP System: Integrates core business processes, like finance and supply chain, for streamlined workflows and improved operational efficiency.
- **Support of decision making by employees and managers.**
  - eg: BI and Analytics Tools: Provides data analysis, visualization, and insights for informed decision-making at different organizational levels.
- **Support of strategies for competitive advantage.**
  - eg:CRM System: Manages customer interactions, enhances relationships, and tailors services for improved customer satisfaction and loyalty.

Potential Risks of IS in business

- Security Threats:
  - Vulnerabilities to cyber threats like hacking, malware, data breaches, and ransomware attacks can compromise sensitive business data.
- Data Loss or Corruption:
  - Accidental deletion, hardware failures, or software glitches may result in the loss or corruption of critical business data.
- System Downtime:
  - Unplanned outages or system failures can disrupt operations, causing productivity losses and affecting customer service.
- Lack of Compatibility and Integration:
  - Incompatibility issues between different systems or software may hinder seamless data sharing and integration across departments.

Potential Risks of IS in business

- Privacy Concerns:
  - Mishandling or improper management of customer or employee data may lead to privacy breaches, violating regulations and damaging reputation.

- Dependency on Technology:
  - Over-reliance on IS may lead to vulnerabilities, making businesses susceptible to disruptions in case of technological failures or issues.

- Cost Overruns:
  - Implementing and maintaining complex IS may lead to unexpected expenses, exceeding budget allocations.

Potential Risks of IS in business

- Resistance to Change:
  - Employee resistance or inadequate training during IS implementation can hinder user adoption, affecting system effectiveness.
- Regulatory Compliance Risks:
  - Non-compliance with industry regulations or data protection laws may result in legal penalties and reputational damage.
- Ethical and Social Implications:
  - Improper use or unethical behavior concerning IS can result in public backlash, affecting brand image and trust

Managerial Challenges of IS

Security Management: Ensuring robust cybersecurity measures to protect sensitive data from cyber threats, breaches, and unauthorized access.

Data Management and Governance: Handling the vast amounts of data generated, ensuring its quality, integrity, and compliance with regulations (like GDPR, HIPAA).

Technology Integration: Managing the integration of new IS with existing systems, ensuring compatibility and smooth functioning across departments.

Resource Allocation: Properly allocating resources (financial, human, and technological) for IS implementation, maintenance, and upgrades.

Managerial Challenges of IS

- **Change Management:**

  Addressing resistance to change among employees during IS implementation, ensuring successful adoption and usage.

- **Strategic Alignment:**

  Aligning IS strategies with overall business goals and objectives to ensure they contribute effectively to organizational success.

- **User Training and Education:**

  Providing adequate training and education to users to maximize the potential of IS and ensure optimal utilization.

- **Vendor Management:**

  Managing relationships with external vendors or suppliers of IS solutions, negotiating contracts, and ensuring service level agreements.

Managerial Challenges of IS

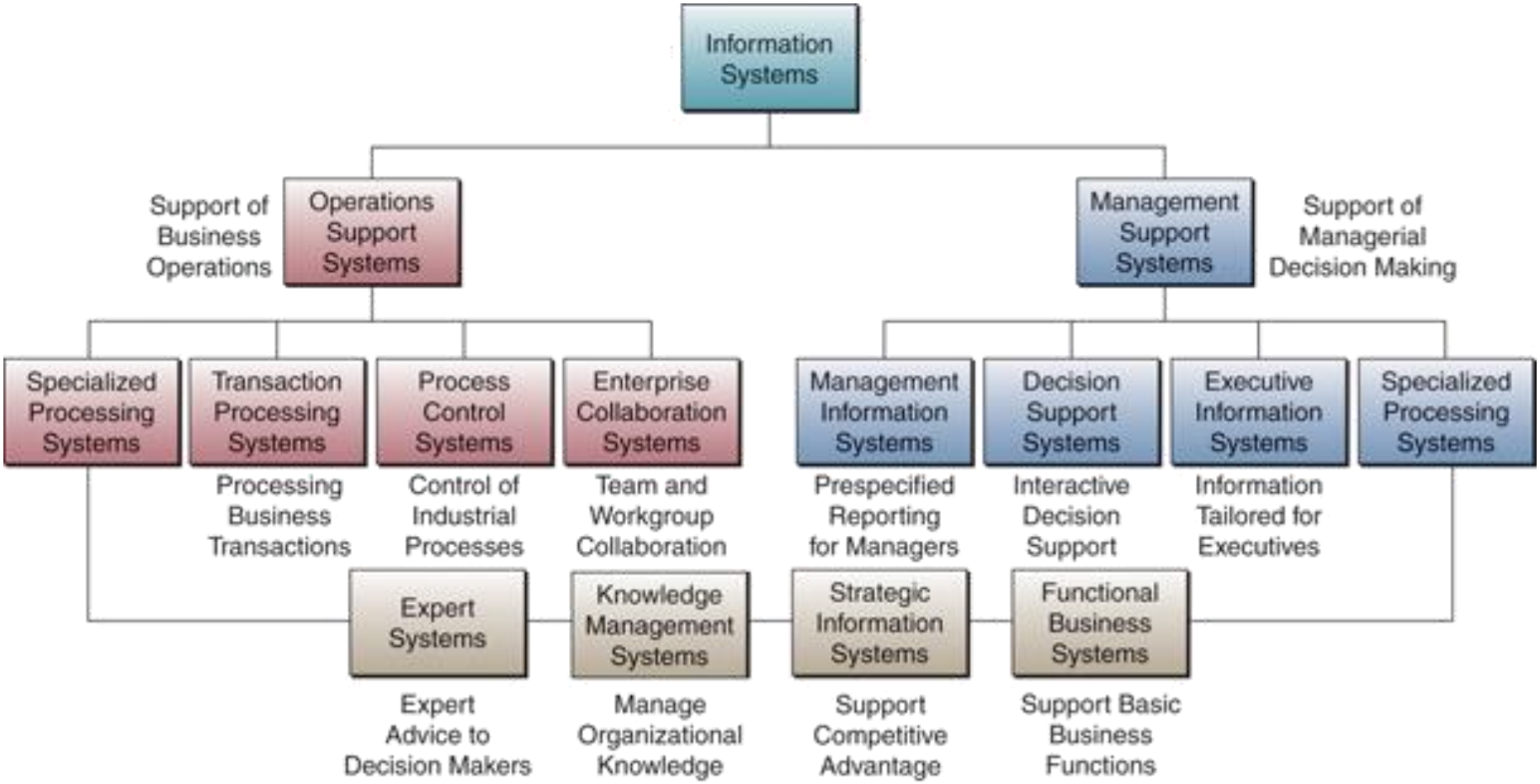
- **Regulatory Compliance:**

  Staying abreast of changing regulations and ensuring that IS comply with industry standards and legal requirements.

- **IT Governance:**

  Developing and implementing effective governance structures to oversee IS investments, projects, and operations in line with business objectives.

Types of Information Systems



- **Operations Support Systems (OSS)** encompass various computer systems and applications that play a vital role in supporting and managing the day-to-day operations of an organization.
- Key components commonly found within OSS are
  - Transaction Processing Systems (TPS),
  - Process Control Systems and
  - Enterprise Collaboration system.

Transaction Processing Systems (TPS):

- TPS are designed to handle and process large volumes of routine transactions efficiently and accurately.
- These transactions can include sales, inventory management, order processing, billing, and more.
- The primary goal of TPS is to ensure that these transactions are processed promptly, reliably, and accurately.
- They are crucial in maintaining the operational flow of an organization by automating and managing these routine transactions.
- Example: Point of Sale(POS)

Process Control System

- These systems are specifically focused on monitoring and managing industrial processes and equipment in real-time.
- They play a critical role in industries like manufacturing, chemical processing, and others where precise control and monitoring of machinery and processes are essential.
- Process Control Systems help in optimizing production processes, maintaining quality standards, ensuring safety, and maximizing efficiency by continuously monitoring and adjusting various parameters within the production environment.
- (eg: In a chemical manufacturing company a process control system can do temperature control,pressure monitoring and control,chemical composition control, automated alarm and shutdowns)

Enterprise Collaboration Systems

- Enterprise Collaboration Systems (ECS) are a type of information system that fosters collaboration and communication among employees within an organization.
- While ECS primarily focus on facilitating teamwork, sharing knowledge, and enhancing communication
- They can also serve as a component of Operations Support Systems (OSS) by contributing to the efficiency and effectiveness of daily operations within an enterprise
- Example: Microsoft Teams, Slack, Google WorkSpace

Management Support System

- Management Support Systems (MSS) encompass various information systems designed to assist management in decision-making and planning.
- MSS offer tools and resources to support managerial functions at different levels within an organization.
- This category includes various systems that aid management in different aspects of their roles.
- Three primary types of Management Support Systems are:
  - Management Information System
  - Decision Support System
  - Executive Information System

Management Information System

- MIS provide structured reports and data summaries derived from transactional and operational data within an organization.
- These systems gather, process, and present data in a structured format, offering managers the information needed for routine decision-making and operational control.
- MIS typically summarize data and present it in the form of reports or dashboards.
- Example:
  - ERP systems like SAP, Oracle ERP, Microsoft Dynamics
  - Customer Relationship Management (CRM) software, such as Salesforce, HubSpot CRM, or Zoho CRM.

Decision Support System

- A Decision Support System (DSS) is an information system designed to assist managers and decision-makers in making well-informed decisions, particularly in **complex or semi-structured situations**.
- "Complex or semi-structured situations" refer to scenarios or problems that are not entirely straightforward and may involve various factors, uncertainties, or elements that are not clearly defined.
- DSS provides interactive tools and analytical capabilities to support decision-making processes by analyzing data, generating insights, and evaluating various alternatives

Executive Information System(EIS)

- Executive Information System (EIS) is crafted for top-level executives and senior management.
- It grants easy access to condensed and vital information crucial for strategic decision-making within the organization.
- EIS is specifically designed to cater to the distinct requirements of top-level management.
- It furnishes strategic insights and real-time data, aiding high-stakes decision-making.
- EIS empowers executives by providing them with the information necessary to guide the organization toward its objectives and maintain a competitive edge.

Expert System

- Expert Systems aims to simulate the problem-solving and decision-making processes that a knowledgeable human expert would typically employ when faced with similar situations or tasks within that specialized area
- Creating an Expert System involves:
  - Gathering expert knowledge in a specific field.
  - Structuring this knowledge in a format understandable by computers.
  - Developing a reasoning mechanism (inference engine) to make decisions based on this knowledge.
  - Integrating, testing, and deploying the system for practical use, followed by regular updates to maintain accuracy.

Knowledge Management System

- A Knowledge Management System (KMS) is a computer-based system or software designed to facilitate the collection, organization, sharing, and utilization of knowledge and information within an organization.
- Implementing a Knowledge Management System (KMS) involves:
  - Planning objectives and assessing knowledge needs.
  - Capturing, organizing, and storing diverse knowledge sources.
  - Facilitating sharing, collaboration, and efficient access to information.
  - Training users, gathering feedback, and evaluating system effectiveness.
  - Cultivating a culture of knowledge-sharing and managing change effectively.

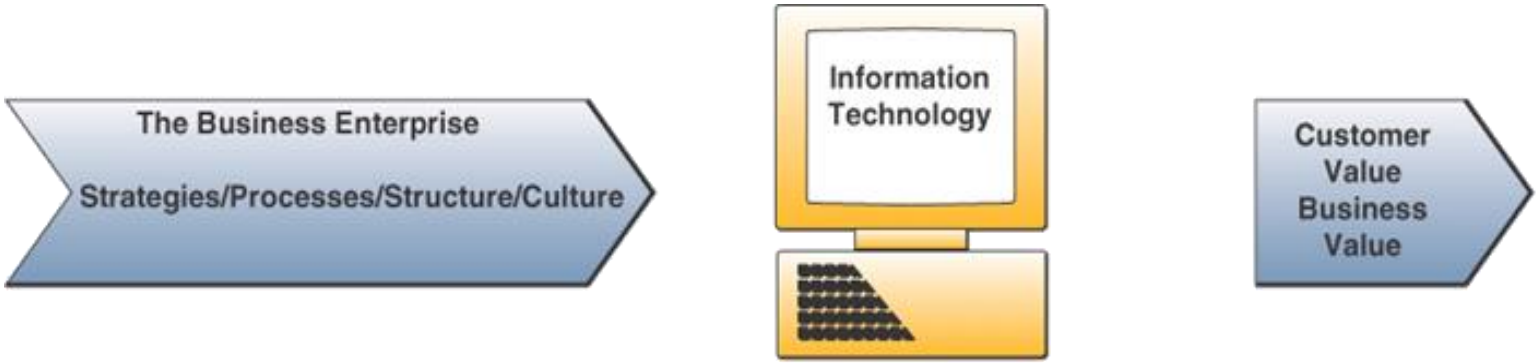
Strategic Information Systems

- Strategic Information Systems are information systems that help organizations gain a competitive advantage by utilizing information technology to support or shape their strategic goals.
- These systems are specifically designed to provide information crucial for an organization's strategic planning and decision-making
- **ESS vs SIS**: .ESS provides comprehensive decision-making tools and data integration, while EIS offers condensed critical information for rapid strategic decisions without extensive analytical capabilities.

Functional Business System

- Functional Business Systems are systems within an organization that cater to specific business functions such as finance, human resources, marketing, operations, etc.
- Each system supports a particular area of business operations and is designed to streamline and optimize processes within that function.

IT Challenges and Opportunities



Business / IT Challenges

- Speed and flexibility requirements of product development, manufacturing, and delivery cycles.
- Reengineering and cross-functional integration of business processes using Internet technologies.
- Integration of e-business and e-commerce into the organization's strategies, processes, structure, and culture.

Business / IT Developments

- Use of the Internet, intranets, extranets, and the Web as the primary IT infrastructure.
- Diffusion of Web technology to internetwork employees, customers, and suppliers.
- Global networked computing, collaboration, and decision support systems.

Business / IT Goals

- Give customers what they want, when and how they want it, at the lowest cost.
- Coordination of manufacturing and business processes with suppliers and customers.
- Marketing channel partnerships with suppliers and distributors.

Developing IS Solutions