MANGALAYATAN UNIVERSITY
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BACHELOR OF COMPUTER APPLICATION (BCA)

CSB-1111 (Management Information System)

Block 1: Introduction to Management Information Systems

Unit 1: Overview of Management Information Systems

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1.0 Introduction

In today's dynamic and rapidly evolving business environment, the ability to manage information efficiently is paramount for organizational success. Management Information Systems (MIS) play a crucial role in facilitating this process by integrating technology, people, and processes to collect, store, process, and disseminate information. MIS supports decision-making, coordination, control, analysis, and visualization within an organization, thus providing a competitive edge in the marketplace.

This document aims to provide a comprehensive overview of MIS, exploring its objectives, components, historical development, functions, benefits, and challenges. By understanding the fundamental aspects of MIS, organizations can harness the power of information to drive efficiency, innovation, and strategic decision-making.

The following sections will delve deeper into the objectives of MIS, its core components, and its historical evolution. We will also examine the various functions MIS performs within an organization, as well as the benefits and challenges associated with its implementation. Finally, a summary will consolidate the key points discussed, and a set of questions will be provided to test your understanding of the material.

Understanding MIS is crucial for anyone involved in the management and operation of modern organizations. This introduction sets the stage for a detailed exploration of how MIS can be leveraged to improve organizational performance and achieve strategic goals.

1.1 Objectives

After completion of this unit, you will be able to understand,

- Understand the Fundamentals of MIS
- Identify and Analyze Components of MIS
- Explore the Historical Development and Evolution of MIS
- Examine the Functions and Purposes of MIS
- Evaluate the Benefits and Challenges of MIS

1.2 Management Information System (MIS)

It describes how information is processed by computers and other smart devices to support and manage administrative choices made by a company.

The study of people, technology, organizations, and their interactions is known as management information systems, or MIS. MIS specialists assist businesses in getting the most out of their investments in people, machinery, and operational procedures. MIS is a people-focused field that prioritizes using technology to provide services. A degree in MIS might be right for you if you're interested in technology and want to utilize it to make people's lives better. An automated system made to give management status and progress data to help with decision-making.

Management information system is referred to as MIS. Reports from these systems are used by business managers at all levels of the company, from assistant managers to executives, to assess daily operations and emerging issues, make choices, and monitor developments.

Three words make up the term Management Information System, or MIS for short. These are management, information, and systems. It is simple to define Management Information Systems as those that give management information by looking at these three words.

This concise description of MIS encapsulates the essence of a Management Information System and its intended functions. Its importance and influence on a business's ability to run smoothly, however, cannot be overstated. For this reason, these techniques are used in one form or another by all prosperous businesses.

The fact that management information systems deal with people, organizations, technology, and the relationships between the people and organizations that impact the company makes them crucial to the daily operations of businesses.

MIS Importance:

A structured approach to gathering information in a consolidated style is the management information system. It is a network set up within a company to give management access to information. It offers the analytical and methodical information required by managers at every level. It supports managers in making the best decisions when they need to.

This is How the Importance of MIS is Explained:

1. Management Information Systems are constantly focused on management, considering all management levels and obtaining the needed data.
2. Integrated: describes the real connections between various parts (subsystems). for instance, connections between various organizational departments.

3. Helpful for planning – management can readily plan since every firm creates long-term and short-term plans with the aid of data on sales and production, capital investments, stocks, etc.
4. An efficient management information system enables management to monitor and adjust for variations between actual performance and predetermined targets.
5. It's critical for boosting productivity.
6. MIS gives management access to the most recent departmental results.
7. Because MIS is heavily automated, accurate results are produced.
8. By giving managers access to information in the form of progress and review reports of an ongoing activity, MIS enhances their intelligence, attentiveness, and awareness.
9. Facilitates decision-making for management.

You must utilize every feature of your company's information system if you want to reap the greatest benefits from it. The processing of data from corporate inputs to provide information that is helpful for managing your operations gives information systems their significance.

You can either use the information in new ways or add more data to make it more accurate in order to boost the usefulness of the information system.

In addition to software systems, management information systems (MIS) refer to the full suite of business procedures and tools utilized to aggregate data from tactical or functional systems. After that, data is provided in a timely and user-friendly way so that managers at the mid- and upper-levels may use it to make the best decisions. The system as a whole is built with the company's strategic and tactical objectives in mind.

Objectives of MIS

Implementing the enterprise's dynamics and organizational structure is the aim of a management information system (MIS), which also aims to leverage the information system's potential for competitive advantage.
The fundamental goals of a MIS are as follows –

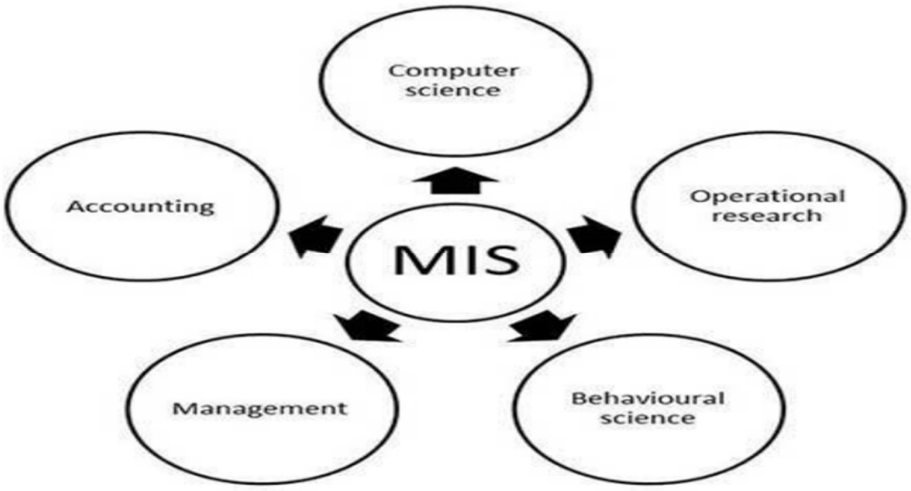
- Capturing Data − Capturing contextual data, or operational information that will contribute in decision making from various internal and external sources of organization.
- Processing Data − The captured data is processed into information needed for planning, organizing, coordinating, directing and controlling functionalities at strategic, tactical and operational level. Processing data means:
  - Making calculations with the data
  - Sorting data
  - Classifying data and
  - Summarizing data
- Information Storage − Information or processed data need to be stored for future use.
- Information Retrieval − The system should be able to retrieve this information from the storage as and when required by various users.
- Information Propagation − Information or the finished product of the MIS should be circulated to its users periodically using the organizational network.

1.3 Purpose

MIS serve the primary purpose of providing decision-makers at all levels of an organization with timely, accurate, and relevant information. This information aids in strategic planning, operational decision-making, performance monitoring, and problem-solving.

Nature and Scope of MIS:

Because of its interdisciplinary character, the notion of management information systems (MIS) draws inspiration from a wide range of fields, including accounting, computers, organizations, management, operations research, and behavioural sciences. It is acknowledged that management information system (MIS) is a hybrid of science and art. A physical system, which is the process itself and is concerned with the content or "what" is happening, can be distinguished from an information system, which is a logical system that is concerned with "how" something is being accomplished. In actuality, information and physical systems are included in MIS. The question of whether MIS is more computer- or management-oriented has been hotly debated. MIS should be regarded more as a management subject than a computer subject, despite the fact that both sides have supporters. This is due of its straightforward logic that for managers, computers are merely tools. Computers are employed because of their ability to manage vast amounts of data, precision, and speed. These days, MIS is used at all levels and in all functional domains of all kinds of commercial enterprises. Because MIS is designed to meet the information needs of managers inside an organization, it encompasses both structured and unstructured data that can be obtained from both internal and external sources. Furthermore, the scope of MIS has expanded greatly with the development of computers and communication technologies.



The Systems Approach to Problem Solving Characteristics of the Systems Approach:

1. A top-down approach. The well-done systems analysis starts with an analysis of the strategy and goals of the project and then proceeds to the specific.
2. A rational, objective basis for analysis. Decisions are based on carefully gathered evidence and analysed using a logical procedure.
3. Considers a generalized problem including the problem setting. A properly done systems analysis always includes consideration of the problem environment including all stakeholders.
4. Client orientation
5. Index of performance and goals/objectives
6. Importance of Alternatives –"What do you mean you didn't consider any alternatives?"

7. Problem decomposition
8. Normative

1.4 Components

The physical parts of an organization's information system can be used to understand the structure of management information systems (MIS). An organizational information system's physical component can include operating personnel, manual procedures, databases, hardware, and software. These elements have been briefly described in the paragraphs that follow:

- **Hardware:** The term "hardware" describes the actual peripherals and data processing equipment, such as the CPU, monitor, keyboard, printer, disks, tapes, communication devices, etc.
- **Software:** The term "software" refers broadly to the programs or instructions that control how hardware operates. System software and application software are the two categories of software.
- **Database:** Every piece of information used by application software is contained in the database. Files are used to store data.
- **Procedures:** Required manuals or other formal operating procedures that are necessary to run a system are recognized as physical components as well.
- **Information: S**ystems are operated by a workforce of individuals such as computer operators, programmers, system analysts, managers, and so on.
- **Input and Output:** The information system's various physical inputs and outputs, which take the shape of reports, printouts, etc.

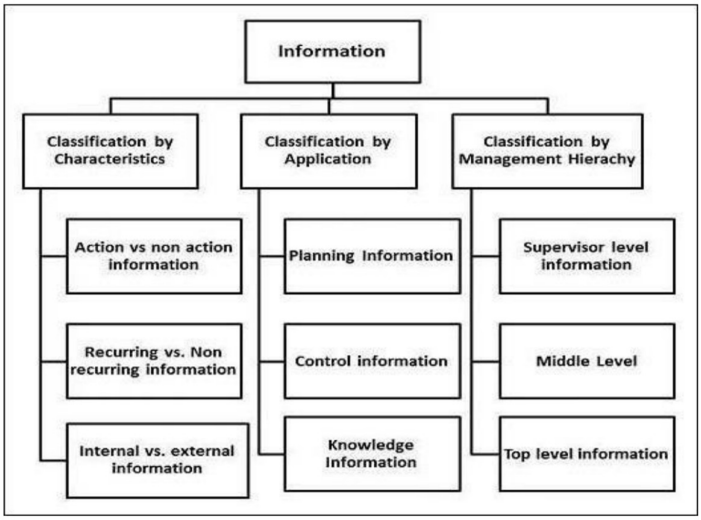
MIS - Classification of Information:

Information can be Classified in a Number of Ways:

1. **Categorization based on Features:** According to Anthony's management classification, there are three main categories into which business information utilized for decision-making can be divided:
    - **Strategic Information:** Long-term policy decisions that define a business's objectives and assess how well they are met are the focus of strategic information. Strategic information includes things like buying a new facility, a new product, diversifying your firm, etc.

- **Tactical Information:** This category includes data on budgeting, quality assurance, service level, inventory level, productivity level, and other topics required to exert control over company resources.
- **Operational Information:** It pertains to data at the plant or business level and is utilized to guarantee that particular operational duties are carried out as intended or planned. This category includes a variety of operator-, machine-, and shift-specific tasks for quality control inspections.

2. **Classification by Application** In terms of applications, information can be categorized as:
   - **Planning Information:** It is what an organization needs to set standard operating procedures and requirements. Any activity's operational, tactical, and strategic planning all make use of this information. Time standards and design standards are two instances of this kind of data.
   - **Control Information:** Using a feedback mechanism, this information is required to establish control over all company activities. Controlling the accomplishment, type, and utilization of significant processes within a system is done using this information. When such data indicates a departure from the accepted norms, the system ought to trigger a choice or take an action that brings about control.
   - **Knowledge Information:** Information about information is the definition of knowledge. Knowledge is gathered via research studies and historical data, as well as from experience and learning.
   - **Organizational Information:** This pertains to the surroundings and culture of an organization in relation to its goals. According to Karl Weick's Organizational Information Theory, an organization can decrease its ambiguity or uncertainty by gathering, utilizing, and managing information carefully. Employee and payroll data are two examples of the kind of information that is used by every individual in the company.
   - **Operational or Functional Information:** It pertains to details related to a certain operation. Daily schedules in a manufacturing plant, for instance, refer to the precise assignment of tasks to machines or operators to equipment. It would be the roster of different employees at a business that provides services. Most of this information is kept within the corporation.
   - **Database Information:** Database information interprets vast amounts of data with various applications and uses. Such data is kept on file,



1.5 Historical Development and Evolution of MIS

Electronic Data Processing (EDP) systems were MIS's predecessor. Record keeping inside an organization's accounting department was the primary function of EDP. The payroll software program that is utilized by every organization is an illustration of EDP. The idea of MIS was formed as a result of the philosophical move from data to information. EDP's primary goal was to gather data, whereas MIS assumed responsibility for processing that data and producing accurate information.

The management could now access the information base directly rather than relying on the MIS or EDP departments thanks to the revolution in personal computing. As a result, management's ability to make decisions was improved, and Keen's invention of Decision Support Systems (DSS) was born. With the use of contemporary software programs like Spreadsheets, Word Processors, Database Management Systems (DBMS), etc., the direct usage of information bases enabled the "What-if" analytical capacity.

Expert systems and artificial intelligence have grown dramatically, leading to the creation of knowledge-based systems (KBS). When used in conjunction with DSS, expert systems can offer a better class of MIS through the provision of self-learning software packages.

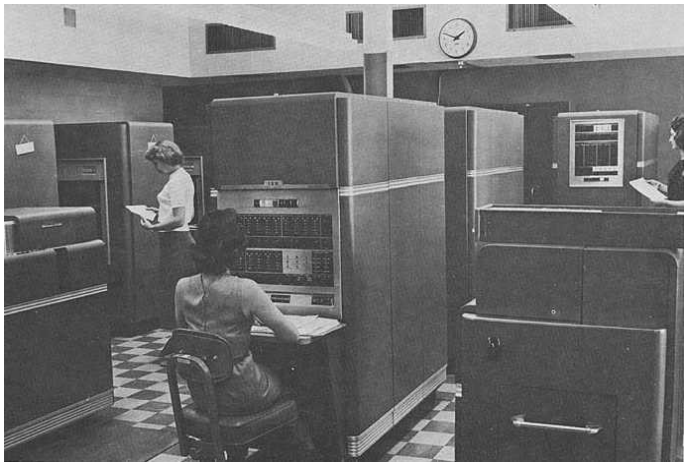
What-if capability was replaced with "What-is-best" by the DSS concept, the strength of Operation Research models, and Management Science. This led to the development of Model Management Systems (MMS), which assist management in selecting the best option from a range of accessible options. Lower management was the aim of the EDP. The middle management level was the focus of the MIS, DSS, and MMS. High-value time is served by the Executive Information System (EIS) or Executive Support System (ESS) at the top of the management hierarchy. In this case, the user interface—such as the voice processing and response, natural language interface, and multimedia (graphics, sound, and video)—must be excellent.

Historical Development and Evolution of MIS

The evolution of Management Information Systems (MIS) reflects the broader advancements in technology and changes in organizational needs over the decades. Here is a detailed explanation of the historical development of MIS:

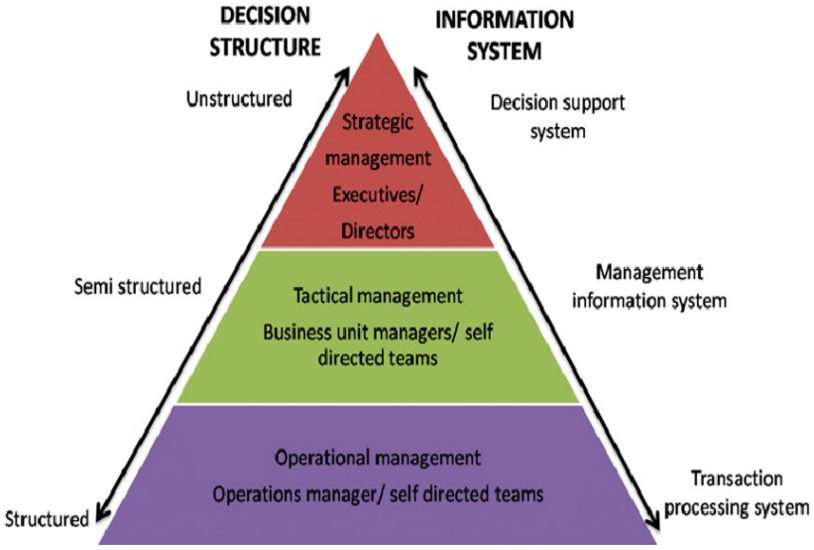
Early Developments (1950s-1960s)

- **1950s: The Birth of Data Processing Systems**
- During the 1950s, the use of computers for business purposes began with the advent of large mainframe computers. Early data processing systems focused on automating repetitive tasks such as payroll and inventory management.



The IBM 650 was one of the first computers used for business data processing.

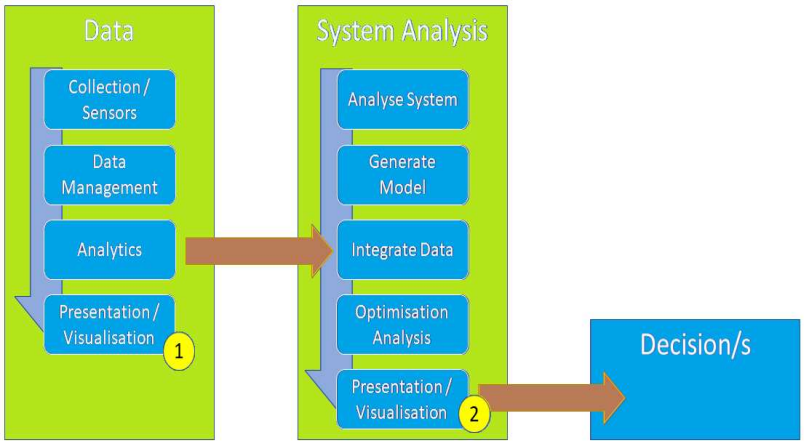
- **1960s: Emergence of Management Information Systems**
- The 1960s saw the introduction of MIS, which expanded beyond mere data processing to include management reporting systems. These systems provided managers with periodic reports based on data from transaction processing systems (TPS).



Early management information systems provided basic reporting capabilities.

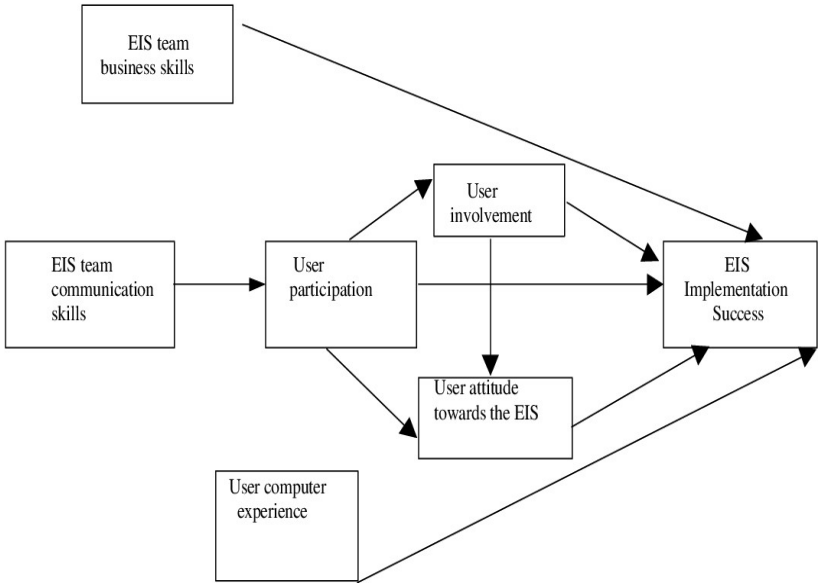
Growth and Expansion (1970s-1980s)

- **1970s: Development of Decision Support Systems (DSS)**
- The concept of Decision Support Systems (DSS) emerged, focusing on providing managers with tools to analyze data and support decision-making. DSS combined data from internal and external sources to provide analytical capabilities.



Early DSS helped managers with data analysis and decision-making.

- **1980s: Introduction of Executive Information Systems (EIS)**
- Executive Information Systems (EIS) were developed to provide top-level executives with easy access to key performance indicators (KPIs) and other critical information. EIS focused on high-level data summarization and visualization.



System ***EIS provided executives with high-level overviews of organizational performance (image Source - semanticscholar.org).***

Integration and Sophistication (1990s-2000s)

- **1990s: Rise of Enterprise Resource Planning (ERP) Systems**
- ERP systems integrated various organizational functions into a single system, improving data accuracy and consistency. ERP systems covered areas such as finance, human resources, supply chain management, and more.

ERP systems integrated multiple business processes into a single platform (Image Source – Medium.com).

- **2000s: Emergence of Business Intelligence (BI)**

- Business Intelligence (BI) systems emerged, utilizing data warehousing, data mining, and advanced analytics to provide deeper insights into business performance. BI tools enabled real-time reporting and more sophisticated data analysis.

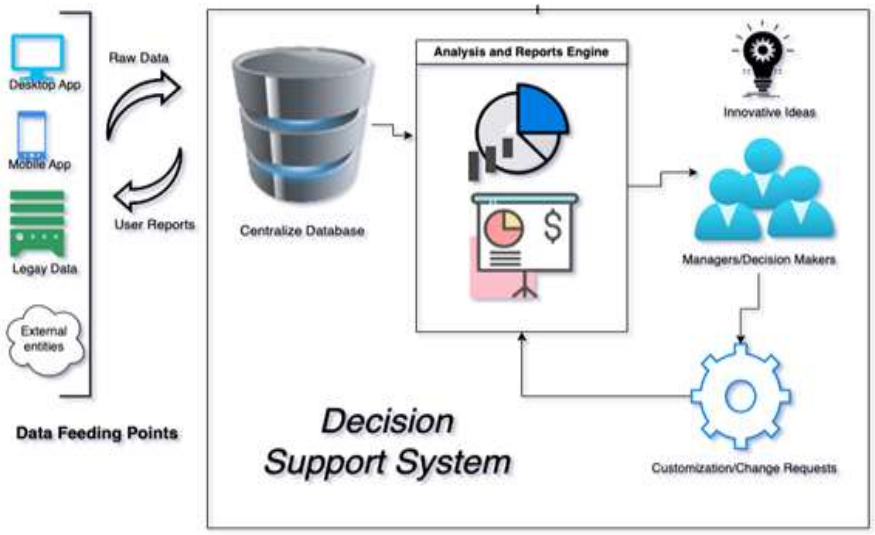
BI dashboards provided detailed insights and real-time reporting capabilities (Image Source – Datapine).

Modern Developments (2010s-Present)

- **2010s: Adoption of Cloud Computing and Big Data**
- The 2010s saw widespread adoption of cloud computing, making MIS more scalable and accessible. Big data technologies enabled the processing and analysis of vast amounts of data, providing more granular insights.

Cloud computing revolutionized data storage and processing capabilities (Image Source- Wikipedia).

- **2020s: Integration of Artificial Intelligence and Machine Learning**
- Artificial Intelligence (AI) and Machine Learning (ML) are being integrated into MIS, enhancing predictive analytics and automating decision-making processes. These technologies help in identifying patterns and making more accurate forecasts.



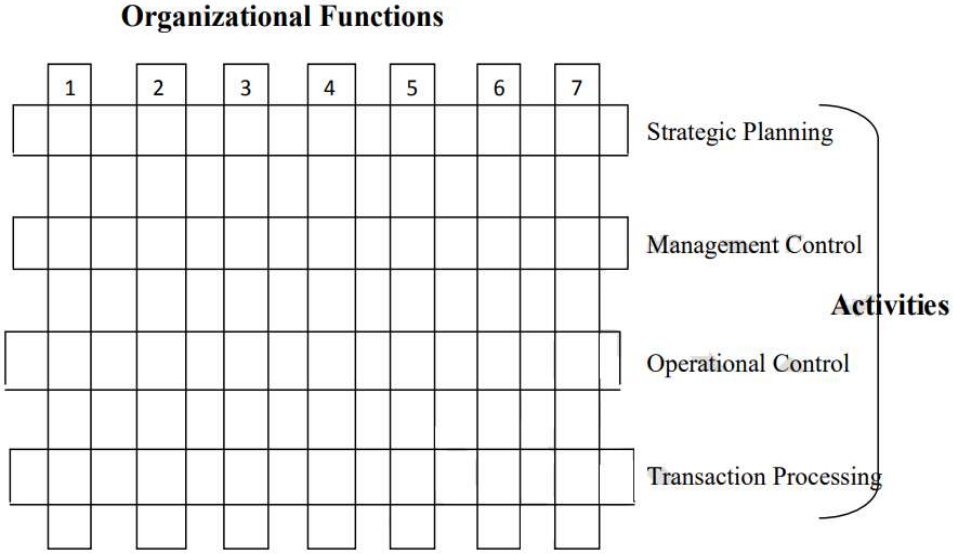
MIS by enabling predictive analytics and automation (image Source – Encora.com).

1.6 Functions

MIS Function in an Organization:

Organizational functions that rely on information can also be used to characterize the structure of an information system. A manufacturing organization's conventional set of functions comprises production, sales and marketing, finance and accounting, logistics, personnel, and information systems. However, there is no defined classification for functions. Additionally, regarded as a distinct management is top management.

The definition of the conceptual framework of MIS is a federation of functional subsystems, each of which is separated into four main information processing components: management control information, transaction processing, operational control information system, and strategic planning.



Organizational Functions:

1. Sales & Marketing
2. Production
3. Logistics

4. Personnel
5. Finance & Accounting
6. Information Processing
7. Top Management

1. **Marketing and Sales Subsystem:**

Sales and Marketing comprises all operations pertaining to the advertising and selling of goods and services.

- Sales orders, promotion orders, and so forth are the transactions.
- The recruiting and training of the sales staff, the daily planning of sales and marketing campaigns, and other tasks are examples of operational control activities.
- Management control pertains to evaluating overall performance in relation to a marketing plan. Sales force requirements, competitive products, and customer and competitor data are examples of information that can be used for management control.
- New markets and marketing tactics are considered in the marketing function's strategic planning.

2. **Production Subsystem:**

Product engineering, facility planning, scheduling, and operation, hiring and training of production staff, and quality control and inspection are all included in the production functions.

- Production orders, assembly orders, finished parts tickets, scarp tickets, and timekeeping tickets are the usual transactions to be processed.
- Comprehensive reports that emphasize areas and compare actual performance to the production schedule are necessary for operational control.
- Summary reports that compare overall planned performance to actual performance are necessary for management control.
- Planning strategically for alternate approaches to automation and production techniques.

3. **Logistics Subsystem:**

Purchasing, receiving, inventory control, and distribution are all included in the logistics function.

- Buy orders, manufacture orders, and buy requisitions are among the transactions that need to be processed.
- Data from reports, such as past due shipments to clients and past due purchases, is used by the operational control function.
- Plans and actual inventory levels are generally compared to provide managerial control information for logistics.
- Analyzing new vendor requirements and distribution methods is part of strategic control.

4. **Personnel Subsystem:**

The personnel subsystem deals with hiring, training, keeping records, paying employees, and terminating employees.

- Documents detailing employment requisitions, job descriptions, training, and personal data are the outcome of the transaction.

- Decision-making processes for actions like hiring, training, firing, adjusting pay rates, and providing benefits are necessary for operational control over personnel.
- Reports and analysis highlighting the differences between actual and planned performance help management control of the people function decision.
- To guarantee that the company hires and keeps employees, strategic planning for personnel entails assessing options for hiring, compensation, benefits, training, and building location.

5. **Finance & Accounting Subsystem:**

Finance function includes financing agreements, cash management, consumer credit approval, and the collection process. Accounting includes budget planning as well as the classification of financial transactions and their summarizing into standard financial reports.

- Files related to accounting and finance include payment vouchers, sales, credit applications, billing, and collection papers.
- Daily error and exception reports, processing delay logs, and other documentation are necessary for operational control over the function itself.
- Data on the actual and budgeted costs of financial resources as well as error rates are used at the managerial control level in accounting and finance.
- Long-term planning to guarantee sufficient funding and long-term tax accounting guidelines to reduce tax effects are part of the accounting finance strategic planning level.

6. **Information Processing Subsystem:**

The information processing function is in charge of making sure that the resources and services required for information processing are made available to the other functions.,

- Standard information processing service and resource transactions, requests for program and data repairs or modifications, hardware and program performance reports, and project proposals.
- Information on mistake rates, equipment failures, and daily job schedules is necessary for operational control of information processing operations. Daily or weekly schedules are also needed for the development of new projects.
- Information on planned vs actual utilization, equipment cost, and overall programmer performance and progress are necessary for managerial control over information processing.
- Organization of the function, general information system plan, strategic information usage selection, and general hardware and software environment structure are all included in information system strategic planning.

1.7 Benefits & Challenges

Information System for Competitive Advantage

Getting a competitive edge is essential for businesses. Competitive advantage is defined as "a product or service that an organization's customers value more highly than similar offerings from its competitors" by Baltzan and Phillips (2010, p. 16). Put another way, this means that you have something valuable (i.e., products, services, or capabilities) that your rivals do not. Since rivals frequently look for ways to replicate a competitive advantage, advantages are usually only fleeting (Baltzan & Phillips 2010, p. 16). Organizations must constantly create new competitive advantages if they want to stay ahead of the

competition. This section covers the analysis, identification, and development of competitive advantages by an organization through the use of value chains, Porter's Five Forces, and three generic strategies.

The Five Forces Model developed by Michael Porter is a helpful tool for evaluating industry competitiveness and estimating the industry's relative attractiveness. Porter claims that a company must examine five competing forces in order to do an industry analysis (Baltzan & Phillips 2010, p. 17):

- Rivalry of competitors within its industry
- Threat of new entrants into an industry and its markets
- Threat posed by substitute products which might capture market share
- Bargaining power of customers
- Bargaining power of suppliers.

Challenges in the Development of MIS:

The main disadvantages and the causes of MIS failure in public companies can be broken down into the following categories if all current hurdles are categorized into humanistic, organizational, and environmental factors:

Humanistic Factors

- The managers' and users' lack of knowledge since they are unsure of their precise demands and desires in terms of information.
- The lack of knowledge that managers and users have regarding the process of working with the design team.
- The designers' ignorance of the needs of the users (incorrect definition and analysis of the demands).
- The managers' and users' lack of involvement in the system design process.
- The majority of analysts and programmers (designers) with new software lack knowledge.
- The administrators of software and information systems lack comprehension.
- Opposition to the modification and the system executors' lack of acceptance.
- The incompleteness of the information gathered Organizational elements
- The unfavorable environment for managers, users, and system directors to participate and collaborate.
- The manual systems that are already in place are inconsistent and complex.
- Not analyzing current systems and procedures prior to system design; • Not assessing current power
- The state of the specialized forces' education
- Insufficient people resources in management, computer science, and other necessary specializations (the challenges associated with absorbing human resources);

Environmental Factors

- Insufficient access to qualified consultants for system and software design.
- The absence of methods, processes, and phases in the system's creation;
- The inability of management information systems to assess environmental factors
- An inappropriate use of mass media to foster an information- and computer-literate culture.
- Not offering appropriate MA training programs in universities and not providing adequate human resource education in this area.
- The serious issue with the Islamic council parliament and government board not having ratified the appropriate regulations.

- The absence of sufficient funding and thoughtful thought given to this.

1.8 Summary

Management Information Systems (MIS) are integral to modern organizational operations, providing the infrastructure for effective information management and decision-making. This document has explored the multifaceted nature of MIS, beginning with its foundational concepts and extending through its practical applications and challenges.

We began by defining MIS and outlining its primary objectives, which include enhancing decision-making, improving organizational efficiency, and providing strategic advantages. The core components of MIS—hardware, software, data resources, procedures, and personnel—were examined, illustrating how each element contributes to the overall system's functionality.

The historical development and evolution of MIS were traced, highlighting significant technological advancements and trends that have shaped contemporary MIS practices. Understanding this evolution is crucial for appreciating the current capabilities and future potential of MIS.

The document detailed the various functions of MIS, such as data collection, processing, storage, retrieval, analysis, dissemination, and decision support. Each function plays a vital role in transforming raw data into valuable information that supports various organizational activities.

We also discussed the benefits of implementing effective MIS, including improved decision-making, enhanced performance, increased efficiency, and competitive advantage. However, these benefits come with challenges, such as data security concerns, integration issues, complexity, and the need for ongoing maintenance and training.

Finally, the course objectives were outlined, emphasizing the importance of understanding MIS fundamentals, analyzing its components, exploring its historical context, examining its functions, evaluating its benefits and challenges, applying knowledge in real-world contexts, and fostering critical thinking skills.

By mastering the content covered in this document, individuals will be better equipped to leverage MIS for organizational success, driving efficiency, innovation, and strategic decision-making. This comprehensive understanding of MIS is essential for navigating the complexities of today's information-driven business environment.

1.9 Questions

1. **What is the primary purpose of Management Information Systems (MIS)?**
   - The primary purpose of MIS is to provide timely, accurate, and relevant information to decision-makers at all levels of an organization. This facilitates strategic planning, operational decision-making, performance monitoring, and problem-solving.
2. **Identify and describe the core components of MIS.**
   - **Hardware**: Physical devices like computers, servers, and networking equipment.
   - **Software**: Applications, databases, and analytical tools used to process data.
   - **Data Resources**: Internal and external data sources including structured and unstructured data.
   - **Procedures**: Methods and protocols for collecting, processing, storing, and disseminating information.

- **Personnel**: IT professionals and end-users who manage and utilize the MIS.

3. **How has MIS evolved over time?**
    - MIS has evolved from basic data processing systems in the mid-20th century to sophisticated, integrated systems that utilize advanced technologies like artificial intelligence, big data analytics, and cloud computing. This evolution has been driven by technological advancements, increasing data availability, and the growing complexity of business operations.
4. **What are the main functions performed by MIS?**
    - **Data Collection**: Gathering raw data from various sources.
    - **Data Processing**: Organizing and transforming raw data into meaningful information.
    - **Data Storage**: Storing information in databases or data warehouses.
    - **Information Retrieval**: Accessing and retrieving relevant information.
    - **Information Analysis**: Analyzing data to identify trends and insights.
    - **Information Dissemination**: Distributing information to relevant stakeholders.
    - **Decision Support**: Providing tools and techniques to aid decision-making.
5. **Discuss some benefits of implementing an effective MIS.**
    - Improved decision-making, enhanced organizational performance, increased efficiency and productivity, better customer service, and a competitive advantage in the marketplace.

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