
UNIT 10 INTRODUCTION TO ENTERPRISE INFORMATION SYSTEM

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10.0 OBJECTIVES

After studying this unit, you should be able to:

- define information system with scope and characteristics;
- describe the various types of information systems;
- identify the elements and functional decomposition of the information system;
- discuss information system as a socio-technical system;
- classify the information according to sensitivity; and
- understand the functions, structure, and role of EIS;

10.1 INTRODUCTION

Computers play an essential role in organizational information processing. Enterprise information system (EIS) is a group of systems that provides information and support for effective and efficient decision-making by

policymakers. EIS dynamically enhances the organization's capability. EIS shows certain characteristics such as integrated, flexible, accurate, effective, complete, and predictor. It helps to perform various processing and enterprise-level functions. Conceptual and physical structures of EIS define the way an EIS is planned and implemented. Enterprise information systems fulfill the diverse needs of different users. Information systems play an important role in making a business organization successful. Organizations use several types of information systems to suit their needs. An information system can be decomposed into various functional systems according to the functional requirements of an organization. Hardware, software, database, human, and network are essential elements of an information system. The information must be classified according to the level of sensitivity to protect it from unauthorized access. This unit introduces the fundamental concepts and importance of information systems in organizations.

10.2 ENTERPRISE INFORMATION SYSTEM (EIS)

10.2.1 Definition

An Enterprise Information System (EIS) is a type of information system that by integration improves the functions of an enterprise's business processes. This means typically offering higher service quality, dealing with voluminous data, and is capable of supporting some large and complex organizations/enterprises.

An EIS can be helpful to increase the business productivity, reducing services cycles, product development cycle, and marketing life cycle and thus must be used by all parts and all levels of an enterprise. It can also be used to amalgamate existing applications. Having a proper EIS enables enterprises and organizations to gain higher operational efficiencies and cost reductions. Whereas, financial value is not a generally direct outcome of implementing an EIS.

10.2.2 Nature and Scope of EIS

The EIS is dynamic in nature. EIS adopts changes with a change in the business management process. It provides a corrective method in the system to control change needs of information efficiently by constantly interacting with the internal and the external environment of the business.

Human and computer-based resources in combined form define a enterprise information system. EIS delivers significant information to organizational members from low-level workers to top-level management. EIS provides support for collecting, storing, retrieving, transferring, and use of data to plan, perform, and manage business operations efficiently. Most organizations can use EIS to make their business processes efficient.

10.2.3 Characteristics of EIS

EIS is an integrated system and enables the maintenance of a common database. EIS has the following significant characteristics:

- Integrated- EIS combines vital elements of enterprise and information.
- Flexible- EIS can provide results according to the user queries.

- Effective- EIS enables an organization to make effective assessments and decisions to fulfill the short-term and long-term goals of the organization.
- Accurate- EIS provides the latest and most accurate information based on truthful data.
- Complete- EIS can provide absolute and relevant information in a summarized form.
- Predictor- EIS makes available the summarized reports on the organization's present performance. Decision makers use these reports to observe and direct the business activities and predict future performance and opportunities.

10.2.4 Functions of EIS

The important functions of EIS are following:

Accounting and Finance: The accounting and finance function keeps track of the organization's finances which includes allocations, planning, accounting, revenue control, tax management, etc.

Customer Relationship Management (CRM): The CRM function helps businesses to manage client operations, such as marketing, sales, and customer service. This helps employees monitor sales probabilities and customer channels. CRM can also be employed in marketing operation management, including advertisements and lead generation campaigns.

Supply Chain: Supply chain functions of EIS keep a check on products from the point of manufacturing to distribution. Notable features of it include inventory purchasing, shipping, tracking, refunds, claim processing, supplier scheduling, etc.

Inventory Management: The inventory management function of EIS makes it easy for businesses to track resources and supplies through purchase orders, automatic ordering, inventory control, and scanning.

Manufacturing: Manufacturers and other production-oriented amenities can execute the manufacturing to control the quality control, work orders, planning, manufacturing operations, bill of resources, and the overall production cycle of the organization.

Human Resources: The human resources offer hands from the very initial i.e., hiring process till the recruitment through succession. Human resources facilities services such as payroll, time management, learning management, performance management, and applicant tracking.

Business Intelligence: Business intelligence accumulates and inspects data from various sources and helps users define a better organization's solution. Some of its main features are scheduled reporting, visualization tools, customizable dashboards, and real-time data access.

10.2.5 Structure of EIS

The structure of EIS represents the overall design of information flow for enterprise decisions.

Conceptual Structure

It describes an existing or planned information system. Every functional

sub-system is partitioned into four information processing parts: Transaction processing, Operational control, Managerial Control, and Strategic planning.

Each functional subsystem stores and uses some unique data files. Some common files are also there that can be shared by subsystems. A general database management system is used to structure these files.

Special application programs are written for each functional subsystem. Functional subsystems have a link to some common applications which provide many functions. Many analytical and decision-making models can be used by many applications. This makes the base for the information system.

Physical Structure

The physical structure of an Enterprise Information System represents the integrated processing and use of shared modules. Integrated processing refers to the process of designing numerous interrelated applications as a distinct system such that interconnections in a system are simplified and the duplication of input is minimized. An integrated system always crosses functional restrictions.

The design of an information system is often called Modular because it consists of different types of modules. The module is a small set of processing instructions. A few modules are used one time in a particular application whereas some are used in many applications. The modules used in the information system can be written and tested independently. That allows a more effective approach for maintenance by recognizing the functional boundaries of the module being altered. The physical structure of EIS gets affected by using common modules each time for several processing operations as an input data validation module may be used for every application.

Following are the issues related to EIS structure:

- Organizations are focusing on the use of formal public systems. Formal public systems are well documented known to relevant persons and available to all authorized persons in the organization. Since systems are public thus development costs are shared among many users. If a new person at a position joins the organization, formal public systems provide required information support to function properly in that position.
- It is impractical to develop a completely integrated system and maintenance of such a system is also difficult. Therefore, Enterprise Information System is designed in a modular way with integration only where it is essential.
- The structure of the Enterprise Information System does not give detail about the online interaction of the user with the system. It represents the only support for different activities related to the operation and management of the system.

10.2.6 Role of EIS

An EIS improves the overall functioning of the enterprise via integration and coordination of their business processes on a robust foundation. An

Enterprise Information System

EIS is capable of being used by all parts and all levels of an enterprise. It provides a technological platform to the enterprise for the implementation of various processes. An enterprise information system provides a single system that is central to the organization that ensures information can be shared across all functional levels and management hierarchies. It may be used to amalgamate existing applications.

EIS is best suited to the larger business with lots of moving parts, whereas its operation efficiency outweighs the costs of implementation. Most businesses in manufacturing, distribution, construction and other industrial services use some sort of EIS to manage their production, finances, supply chain, and sales. But that doesn't mean that it is not good for smaller businesses. Moreover, small businesses are required to carefully do the cost and benefits analysis beforehand.

Proper and careful implementation of EIS can greatly improve a company's internal logistics. But one should keep in mind that it does not guarantee instant success. A thorough planning and proper evaluation are needed to get the best out of it. If the work can be done to match the functions the system offers, the needs of the users, and the overall goals for the company, the advantages of this system can be seen in the company's bottom line for years.

Activity 10.1:
Identify the role and various functions performed by EIS used at your institute/study center/organization.

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Check Your Progress 10.1

Note: a) Use the spaces given below for your answers.

b) Check your answer with those given at the end of the unit.

1) Define the Enterprise Information System.

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2) What are the main characteristics of an Enterprise Information System?

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3) What is meant by the physical structure of an Enterprise Information System?

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10.3 INFORMATION SYSTEM

In today's world Information systems and technologies have become an essential element of successful businesses and organizations. Information technology can facilitate all types of businesses to enhance the efficiency and value of their business processes.

10.3.1 Definition

An information system is defined as the well-structured grouping of people, hardware, software, communication networks, and data resources. These resources are responsible for gathering, conversion, and distributing information in an organization.

Information systems make use of different types of information technologies to provide help to business experts such as computer hardware, software, communication networks, and data resource management. Computer hardware technologies include microcomputers, mainframes, servers, and input, output, and storage devices. Software technologies include the operating system, different web browsers, and other applications based software. Communication network technologies include communication channels, the software necessary to provide wired and wireless access, and Internet, intranet, and extranet. Data resource management technologies include database management software to develop, access, and maintain organizational databases.

10.3.2 Types of Information System

Various kinds of information systems are used by organizations to meet their requirements. Classification of the different types of information systems for an organization can be done into the following categories:

- Office automation system
- Transaction processing system
- Decision support system
- Executive information system
- Business expert system

Office automation system

An office automation system assists in automating the general official works such as managing and organizing documents in different forms like text, image, PowerPoint presentation, word file, and so on. It does not play an important role in the decision-making process. Generally, the clerical level people use office automation systems.

Transaction Processing System

The transaction processing system records transactions that are performed daily. For example bank's transaction processing system contains deposits and withdrawals transactions. Transaction processing systems play an important role in every organization because they provide input data required for various other systems. For example, it helps in generating monthly sales reports and providing critical marketing information to management people. The organization faces a disaster situation in case of a failure in the transaction processing system.

Enterprise Information System ***Decision Support system***

Decision support systems assist the management level people of the organization in the analysis of data and making critical decisions. They use information from internal sources such as transaction processing systems and management information systems and external sources such as current prices of products of competitors. They are user-friendly and interactive.

Executive information system

Executive information systems provide support to top-level management to make decisions. An executive information system makes judgments and evaluations for non-routine decisions because there is no predefined procedure to make such decisions. Executive information system reduces the time and effort necessary to gain information valuable to executives by filtering, compressing, and efficiently tracking critical data. The executive information system is less analytical than the decision support system. It provides a generalized computing environment rather than an application-specific.

Business Expert System

A business expert system is a knowledge-based system. It works as an expert consultant and provides expert advice to users. Examples are processing monitor and control systems, and diagnostic maintenance systems.

<p>Activity 10.2: Locate the nearby organizations where Information System is used. And also find out the type of Information System used.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>

10.3.3 Decomposition

It is difficult to understand a complex system as a whole. Thus, it is necessary to decompose it into individual functional systems. A manufacturing organization can decompose information systems into the following functional systems:

- Sales and Marketing system
- Production system
- Logistics system
- Finance and Accounting system
- Human resource system
- Top Management system

Sales and Marketing system

The sales and marketing system provides support to perform the operational

activities such as employment and training of the sales personnel, routine scheduling of sales and advertising tasks, and analysis of sales regularly by region, type of product, customer, etc. Transactions to be processed are sales orders promotion orders, etc. At the management level, it compares the overall performance of a product against a marketing plan. Sales and marketing system helps strategically in making a plan of new marketing strategies, and in exploring new market opportunities by analyzing the customers and competitors, and other factors.

Production system

The production system processes the transactions such as production orders, assembly orders, etc. It is responsible for operational activities like planning and scheduling of tasks involved in the production, hiring of personnel required in production, quality inspection and maintenance, and performance reports generation. At the managerial level, it assists managers in efficiently creating summarized reports of performance so that managers could make the right decisions. It enables managers to make alternative strategies such as locating new plants or making use of new technology to achieve the long-term goal.

Logistic system

Transactions are related to purchasing, inventory, manufacturing, shipping, and billing. At the operational level logistic system performs activities like purchasing, inventory management, and distribution, and maintains reports containing information such as past unpaid purchases and shipments, a list of out-of-stock and over-stocked items, inventory revenue, and performance reports of vendor and supplier. Logistics system helps the organization to make proper utilization of inventory. It is used to analyze and develop new distribution plans and new policies for vendors, and “make versus buy” strategies.

Finance and Accounting System

The responsibility of the finance function is to manage the organization’s financial assets like cash, stocks, and granting of loans to customers to get the maximum return. Accounting covers the activities involved in maintaining and managing the organization’s financial reports such as income statements and balance sheets and in preparing the budget and in cost analysis. Transactions to be processed are sales, billings, checks, stock transfers, etc. The finance and accounting system generates reports containing information regarding error and exception, interruption during processing, and unprocessed transactions. The managerial control of finance and accounting system involves comparison of budgeted cost with the real cost of financial assets plus processing cost of accounting data. This system is also responsible for the planning of a long-term financial strategy and policy to reduce the effect of taxes and budget.

Human Resource System

The responsibility of the human resource system is to identify potential employees, hire and train new personnel, organize personality and skills development programs, and maintain records of each employee. The human resource system deals with operational activities like employment, training,

Enterprise Information System

termination, salary changes, and provision of benefits. This system helps management in creating performance reports and in analyzing variances between planned and real performance concerning the number of personnel hired, employment and training costs, salary paid, and other costs. The human resource system strategically deals with the evaluation of other strategies for employment, training, payment, and facilities given to employees to retain valuable employees required to achieve organizational objectives.

Top Management System

This system responds to queries and makes decisions by accessing the database or getting information from other systems of the organization. It covers operational activities like preparing meeting schedules, maintaining correspondence and contact files. This system assists top management to evaluate the performance of functions of other systems. At the strategic level, it provides strength to the business by making and executing plans for the guarantee of essential resources.

10.3.4 Elements of Information System

Every information system requires some resources. These resources are required to capture and store input data, process it, and perform other control activities to transfer data into useful information products. The main elements of an information system are following:

Hardware: It refers to computer systems and peripherals.

Software: It includes system software, application software, and procedures. Examples are operating systems word processing software and data entry procedure.

Data: various technologies such as databases, data warehouses, and data mart are used to organize, store and access data of information systems.

Human: Persons are required to handle and supervise the operations of information systems. Human resources include end-users and specialists. End-users use the information system. For example, customers, clerks, managers, etc. Specialists develop an information system. For example, system analysts, software developers, etc.

Network: Network resources refer to communication media such as twisted-pair wire, coaxial cable, fiber optic cable, and wireless media and networks such as the Internet, intranet, and extranet. Various hardware, software, and data technologies are used to support the functionalities of a communication network.

Check Your Progress 10.2

Note: a) Use the spaces given below for your answers.

b) Check your answer with those given at the end of the unit.

1. Why is it necessary to decompose an Information System?

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2. List the major elements of the Information System.

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10.3.5 Approaches to Information System

The information system can be viewed as a multidisciplinary field as it covers perspectives of various disciplines.

The major disciplines involved in the study of the information system are shown in figure 10.1. These disciplines can be separated into technical and behavioral approaches. The study of information systems covers problems with systems, issues, and insights in solutions contributed from these major disciplines. Apart from the physical structure of the information system, it requires social, organizational, and intellectual assets to make it efficient and effective. Thus, an information system is also known as a socio-technical system.

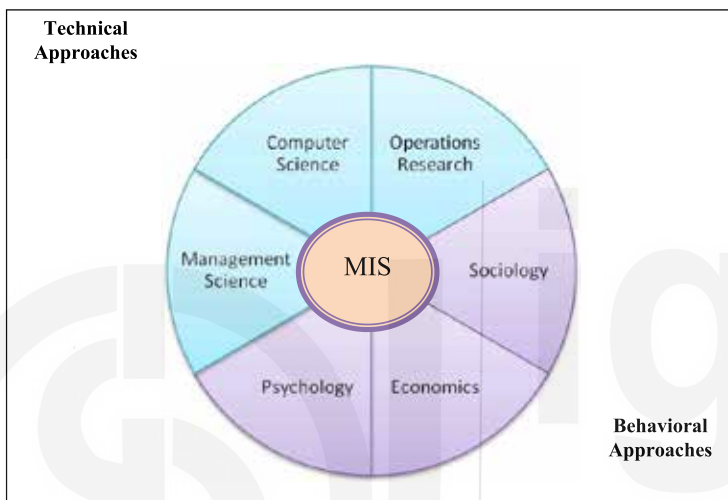


Figure 10.1: Contemporary approaches to information systems.

(Source: Laudon, K. & Laudon, J., Management Information Systems: Managing the Digital Firm, Ninth Edition)

Technical Approach

The technical approach deals with the study of mathematical models, physical structure, and proper capabilities of information systems. Computer science, management science, and operations research disciplines give a significant contribution to the technical approach. Computer science emphasizes the determination of computation methods and theories and efficient and effective ways of data storage and access. Management science is concerned with the planning and development of models for decision-making and management practices. Operations research deals with mathematical techniques for optimizing significant functionalities of an organization's subsystems such as shipping, inventory management, and operations costs.

Behavioral Approach

The behavioral approach deals with issues related to behaviors that occur during the development and enduring maintenance of the information system. The models used in the technical approach cannot properly determine behavioral issues related to strategy, design, construction, performance, and management. Behavioral disciplines are Sociology, Psychology, and Economics.

Enterprise Information System

The social study of information systems gives a view about the formation of groups, the influence of groups and organizations on system development, and the effect of systems on individuals, groups, and organizations. The psychological view of the information system deals with how humans perceive and apply proper information to make decisions. The economic vision of information systems emphasizes on influence of the system on cost structure within organizations and in the markets. The technical approach acts as a stimulus for problems or issues related to the behavioral approach. The behavioral approach focuses on variation in behavioral aspects of an organization.

Socio-technical system

The use of advanced information technology doesn't need to always increase productivity and profits. A socio-technical system view of information systems focuses on both the technical and behavioral components to optimize the efficiency and performance of a complete system. The mutual adjustment between technology and organization is shown in figure 10.2.

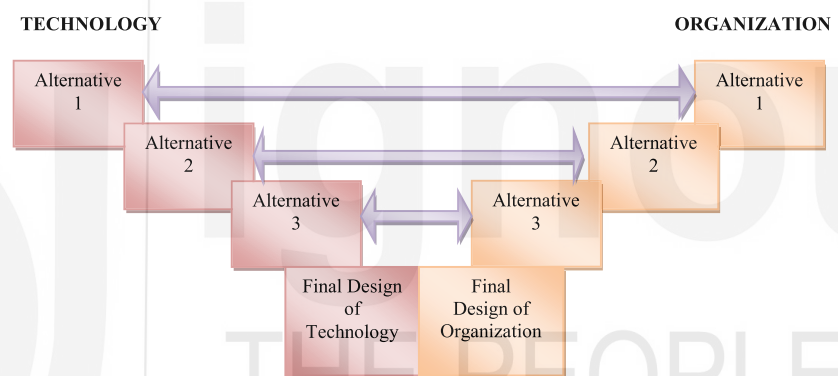


Figure 10.2 :A socio-technical perspective on information systems

(Source: Laudon, K. & Laudon, J., Management Information Systems: Managing the Digital Firm, Ninth Edition)

It implies that technology must be adopted changes and designed in a way to fulfill the requirements of individuals and organizations. Similarly, the organization and its employees accept changes to take benefit of new technology.

10.4 CLASSIFICATION OF INFORMATION

To provide the proper information security in an organization classification of information is necessary according to its real value and sensitivity. All data and information are not equally important or relevant to the organization. Some important data are required to make business strategies and decisions. Such data must be identified and secure. Loss and unauthorized access to this could create serious problems for the organization Thus organization classifies the information to take advantage of its market competitors. Classification of Information helps organizations to identify sensitivity levels of information and protections methods apply to these levels. A classification system should be simple to understand and manage. This system must be efficient and effective to establish the level of security

to the information and be used uniformly in the organization. Generally, information can be classified into the following levels:

Secret: It refers to extremely in-house documents and data such as various types of planning, investments, and designs reports. Unauthorized access to this data could damage the company. A very secure system must be developed to use this type of data.

Confidential: Confidential data is considered significant to the organization's operational effectiveness. It includes financial and accounting information, customers' information, etc. Unauthorized access to this data could make a financial loss, fall in customer confidence, and give significant profit to a competitor. Security at this level should be very high.

Proprietary: Project development plans, designs, operational procedures, and specifications information in an organization is generally for proprietary use by authoritative employees only. The security scheme should be high.

Internal information: Access to this type of information outside the organization is to be prohibited because it results in financial loss or spoiling to reliability and reputation of the organization. It indicates internal reports and the minutes of the meetings. Security used at this level is normal.

Public documents: These include product brochures, press statements, annual reports, etc. These documents could be made public. Data integrity is not important. Security at this level is nominal.

Information requires to be classified if it has value for organizations or their competitors. Some type of information loses its value with time and such information should be declassified after passing a preset period. Sometimes information becomes outdated and it should be declassified and new information should be obtained.

Managers or executive has the main responsibility to protect information assets. The manager decides the required level of information classification to protect business data and information reviews classification schemes frequently and makes required modifications. The manager also allows the duties of data protection to the delegated personnel. These personnel are responsible to run and validate backups regularly. End users access the information to perform their day-to-day tasks. End users are managers, executives, supervisors, and other authorized employees in an organization and external parties.

Check Your Progress 10.3

Note: a) Use the spaces given below for your answers.

b) Check your answer with those given at the end of the unit.

1. Distinguish between technical and behavioral approaches.

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2. How is information classified?

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10.5 LET US SUM UP

A computer-based enterprise information system enables the organization to both decrease costs and increase information processing capabilities. The scope of EIS is broad because it can provide help to any type of organization in performing its various functions. An efficient and useful enterprise information system should be integrated, flexible, effective, accurate, complete, and predictor. Enterprise information system performs processing functions such as processing of transactions, maintaining master files, report generation, query processing, and performs managerial functions like planning, monitoring and controlling, and decision-making. EIS can be defined by conceptual and Physical structure. The conceptual structure of EIS defines a conceptual framework to describe a planned information system. The physical structure shows the actual implementation of EIS. The physical structure may differ from the conceptual structure. EIS provides different facilities to different types of users. Clerical personnel use to feed input data into the system. Supervisors use EIS to monitor and control operations and develop reports. Management people use it for planning, analysis, decision-making, and special reports.

Information systems can be defined in terms of their essential elements like hardware, software, database, human and network infrastructure. Information system enables the organization to carry out its responsibilities in an improved way. Organizations use different types of information systems such as office automation, transaction processing, decision support system, executive information system, business expert system. Each such system is used for a specific purpose. An information system can be divided into separate systems to perform and control different functions of an organization. Both technical and behavioral aspects of information systems require consideration to optimize the overall performance of an organization. Information is an essential constituent for managing the business operations of an organization. Therefore, it is required to classify information to one of the levels such as secret, confidential, proprietary, internal information, and public documents according to its sensitivity.

10.6 KEYWORDS

- Data Integrity** : It represents the correctness and consistency of data.
- Query processing system** : A system that processes users' queries and retrieves data from the database.

10.7 SUGGESTED FURTHER READINGS/ REFERENCES

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10.8 ANSWER TO CHECK YOUR PROGRESS

Check Your Progress 10.1

1. An Enterprise Information System (EIS) is a type of information system that by integration improves the functions of an enterprise's business processes.
2. Integrated, Flexible, Effective, Accurate, Complete, Predictor.
3. The physical structure of the enterprise information system represents the integrated processing and use of shared modules.

Check Your Progress 10.2

1. The information system is decomposed into individual functional systems to reduce complexity and to make easy understanding of the overall system.
2. Hardware, Software, Data, Human, Network.

Check Your Progress 10.3

1. The technical approach deals with the study of mathematical models, physical structure, and proper capabilities of information systems. The models used in the technical approach cannot properly determine behavioral issues related to strategy, design, construction, performance, and management.
2. Information is classified as Secret, Confidential, Proprietary, Internal, and Public.