Chapter – 2 Information Systems Concepts

1. CHARACTERISTICS OF COMPUTER BASED INFORMATION SYSTEMS

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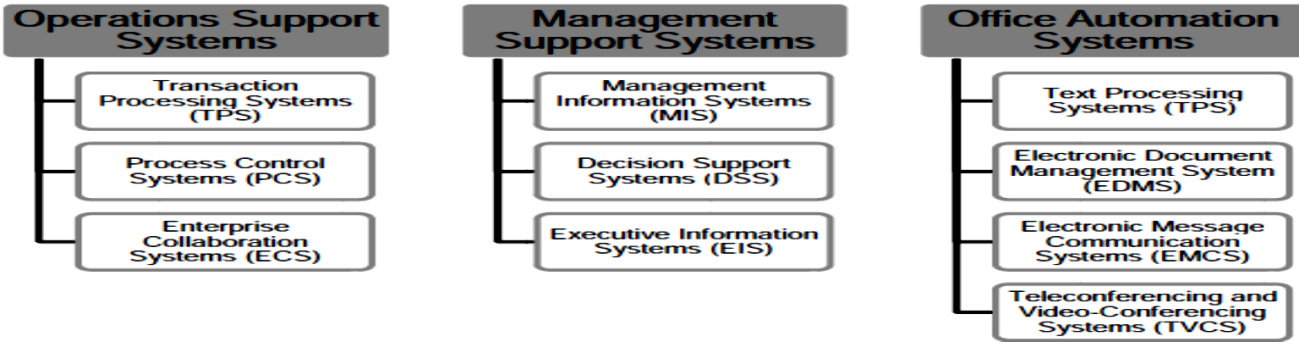
I. All systems are designed & developed for *pre-determined objectives*.
II. *Interrelated & interdependent* system components/subsystem.
III. Different subsystems *interact with each other* to achieve system's goal.
IV. Each *sub-system* has *individual objectives*, but objectives of the *system* as a *whole* have a *higher priority*.

2. MAJOR AREAS OF COMPUTER-BASED APPLICATIONS

I. ***Finance & Accounting*** – To *ensure financial viability*,
II. ***Marketing & Sales*** – to *maximize sales* and to *ensure customer satisfaction*.
III. ***Production or manufacturing*** – to *optimally deploy man, machine & material*
IV. ***Inventory/Stores management*** – To *keep track of materials*
V. ***Human Resources management*** - *utilize manpower* in *effective & efficient way.*

3. TYPES OF INFORMATION SYSTEMS



4. TRANSACTION PROCESSING SYSTEMS

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1) TPS operates at the lowest level of management.
2) It is an IS that **record & manipulate data**.
3) People involved in TPS usually do not take any management decisions.
4) TPS process transactions in two basic ways →
   a. ***Batch Processing***: All transaction are accumulated and then processed
   b. ***Real-time/Online Processing*** → Transaction is processed immediately
5) Typically, a TPS involves the following ***activities***:
   a. **Capturing** data to organize in files or databases;
   b. **Processing** of files/databases using application software;
   c. **Generating information** in the form of reports; and
   d. **Processing of queries** from various quarters of the organization.

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6) TPS **Components**:
   a. *Input* – Source document like Customer order, Employee time card
   b. *Processing* – *Permanent & chronological*
   c. *Output* – Result by TPS like Operational report, pay cheque, invoice
   d. *Storage* – In DBMS files are of 2 types viz. (i) Transaction file, (ii) Master file

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7) ***Features*** of TPS –
   I. ***Large volume of Data*** – As TPS is 'transaction-oriented', with greater storage capacity is needed.

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II. ***Automation of basic operations*** – Any TPS aims at automating the basic operations and day-to-day functioning of the enterprise.

III. ***Benefits are easily measurable*** – TPS reduces the workload of the people and improve their efficiency by automating some of the operations.

IV. ***Source of input for other system*** – TPS is the basic source of internal information for other information systems.

5. *MANAGEMENT INFORMATION SYSTEMS*

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- ✓ MIS enables management at different levels in decision making and problem solving.
- ✓ MIS is designed to provide accurate, relevant & timely information to managers.
- ✓ ***Characteristics*** of an ***effective MIS →***
  - **Management Oriented** –
  - **Management Directed** –
  - **Integrated** –
  - **Common Database** –'common database' allows to be *accessed by several information sub-systems*
  - **Computerised** *use* of *computers* increases *effectiveness* of MIS.
  - **Sub-system concept** –be *broken* down *into manageable sub-system* which can be implemented one at a time by developing a phasing plan.
  - **Heavy Planning Element** – An MIS usually takes *3 to 5 years*
- ✓ **Misconceptions** about MIS
  - Any computer based information system is a MIS.
  - Any reporting system is MIS.
  - MIS is a management technique.
  - MIS is a bunch of technologies.

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- ✓ **Pre-requisites** of an Effective MIS
  - **Database** – The data in *Database* is *organised* in such a way that access to the *data* is *improved* and *redundancy* is *reduced*.
  - **Qualified System and Management Staff** –
    - ***Systems and Computer experts***
    - ***Management experts***

May 2005
May 2014

  - **Control & Maintenance of MIS** – Control of the MIS means the *operation* of the system *as* it was *designed to operate*.
  - **Support of Top Management** –
- ✓ ***Evaluation of MIS***:
  - An effective MIS should be capable of meeting the information requirements of its executives in future as well.
  - The evaluation of MIS should take into account the following major points:
    - ***Ascertaining*** the ***capabilities and deficiencies*** of MIS.
    - ***Examining*** whether MIS is ***flexible***
    - ***Guiding*** the appropriate authority to make MIS ***effective***.
- ✓ ***Constrains*** in Operating a MIS

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I. **Non-availability of Experts** –
II. **Selection of Sub-System** –
III. **Non-Standardised System** –
IV. **Non-Cooperative Staff** –

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- ✓ ***Limitations*** of MIS

I. Quality of output of MIS is basically governed by the quality of input & process.
II. MIS is a tool that provides information for decision-making; it is not a substitute of managerial judgement.

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III. MIS may not be flexible enough to update itself
IV. MIS cannot provide tailor-made information packages to meet every decision making requirement of executives.

6. DECISION SUPPORT SYSTEM (DSS)

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- ✓ A DSS can be defined as a *system* that provides tools to *managers to assist* them in *solving semi structured & unstructured problems*.
- ✓ *not intended to make decisions* ***Characteristics*** of DSS:
  - This supports decision making and occurs at all levels of management.
  - DSS focuses on decision rather than data and information.
  - DSS should be user-friendly.
  - It should be easy to use.

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- ✓ ***Components*** of DSS:

I. **Users** – *manager with un-structured* or semi-structured problem to solve.
- ***Managers***:
- ***Staff Specialist (Analysts):***

II. **Databases** – DSS includes *one or more databases*
Implementation of Database
(A) ***Physical level*:**
(B) ***Logical Level***:
(C) ***External Level***:

Schema = योजना / खाका

Planning language –two types
(A) **General-purpose planning languages** that allow *routine test*
(B) **Special-purpose planning languages** are used for *specified purposes* such as PERT, CPM, SAS, SPSS etc.

IV. **Model Base** – The model base is the "***Brain***" of the DSS because it *performs data manipulation and computations*

- ✓ **Examples** of DSS in Accounting :

I. **Cost Accounting System** – For example, Cost accounting decision applications help Health-care organisations to *calculate cost of different services*.

II. **Capital Budgeting System** – Companies require *new tools* to *evaluate* high-technological *investment* decisions, for example:
(A) Decision support tools that can consider *non-financial factors* (e.g. new technology benefits) can be used *with* techniques like *NPV and IRR*.

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Budget Variance Analysis System – Financial institutions can use a co*mputerised DSS to generate monthly variance reports*

IV. **General Decision Support System** – In this, the *user inputs* data & the *DSS asks* the user to answer questions about specific problem domain. *DSS analyses* decision *variables* and *present* the decision maker with the *best alternative*.

7. DIFFERENCE BETWEEN DSS AND TRADITIONAL MIS

Dimensions	DSS	Traditional MIS
Philosophy	Providing integrated tools, data, models, and languages to end users	Providing structured information to end users
Orientation	External orientation	Internal orientation
Flexibility	Highly flexible	Relatively inflexible
Analytical capability	More analytical capability	Little analytical capability
System analysis	Emphasis on tools to be used in decision process	Emphasis on information requirement analysis
System design	Interactive process	System development based on static information requirements

8. EXECUTIVE INFORMATION SYSTEM (EIS)

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- ✓ DSS when assist executives is called EIS.
- ✓ It is sometimes referred to as an Executive Support System (ESS).
- ✓ ***Characteristics*** of EIS:
  1) EIS is a computer based Information System that *serves* the information *need* of *top executives*.
  2) It *enables* executives to *extract summary data* from database & *solve* model *Complex Problems*, *without* learning computer languages or *high computer skills*.
  3) EIS provides *rapid access* to *timely information* and *directly access* to management reports.
  4) EIS is capable of assessing both *internal & external data*.
  5) EIS can easily be given a *DSS support for decision making*.

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- ✓ The ***Executive Decision-Making Environment***:
  - **Lack of structure** –
  - **High Degree of Uncertainty** –
  - **Future Oriented** –
  - **Informal Sources** –
  - **Low level of Detail** –
- ✓ ***Contents*** of EIS:
  I. *practical set of principles* to guide the *design* of measures and indicators to be included in an EIS:
     (1) *easy to understand and collect*
     (2) EIS measures must be *balanced view of the organization's objectives*.
     (3) Performance indicators in EIS *must reflect every ones contribution*
     (4) EIS must encourage management and staff to *share* ownership
     (5) EIS information *must* be *available* to *everyone* BUT confidential information should not be part of EIS.
     (6) EIS measures must evolve to *meet changing needs* of the organization.

9. EIS VS. TRADITIONAL INFORMATION SYSTEMS

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Dimension of Difference	Executive Information System	Traditional Information System
Level of Management	For top or near top executives.	For lower staff
Nature of Information Access	Specific issues/problems and aggregate reports	Status reporting
Nature of information provided	Online tools & analysis	Offline status reporting
Information Sources	More external, less internal	Internal
Drill down facility to go through details at successive	Available	Not available
Information format	Text with graphics	Tabular
Nature of interface	User-friendly	Computer-operator generated

10. OFFICE AUTOMATION SYSTEM (OAS)

The application of computer to handle the office activities is termed as office automation. Different office activities can be broadly grouped into the following types of ***operations***:

1. ***Document Capture*** –
2. ***Document Creation*** –

3. ***Receipts & Distribution –***
4. ***Filling, Search, Retrieval & Follow up –***
5. ***Calculations –***
6. ***Recording Utilization of Resources –***

The application of computers to handle the office activities is also termed as **Office Automation.**

Benefits of Office Automation System:

- ✓ Ensures *accuracy of communication flows*.
- ✓ *Improves communication* within an organisation and between organisations.
- ✓ *Reduce the cycle time between preparation*
- ✓ *Reduce the cost of office communication*

Computer-Based Office Automation System

I. **Text Processors & Related System –**
   1. Text processing systems *automate the process of development of documents*

II. **Electronic Document Management System (EDMS) –**
   1. EDMSs *capture the information contained in documents and store this for future reference and communicate it*

III. **Electronic Message Communication System** -
   These systems are *used for sending & receiving messages such as telephone, mail & facsimile (fax),*
   1. ***Electronic Mail (Email) –***
   2. ***Facsimile (Fax) –***
   3. ***Voice Mail –***

IV. **Teleconferencing & Video-conferencing Systems –**

11. EXPERT SYSTEM (ES)

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Expert systems are software systems that *imitate the reasoning processes of human experts* and *provide decision makers* with the type of *advice* they would *normally receive* from such *expert* system.

A characteristic of expert systems is the ability to declare or explain the reasoning process that was used to make decisions.

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Business applications of Expert System are as follows

I. **Accounting & Finance –**
II. **Marketing –**
III. **Manufacturing –**
IV. **Personnel –**
V. **General Business –**

Need for Expert System:

1) *Expert* labour is *expensive & scare*; moreover/and
2) *people can handle only a few factors at a time*.

Benefits of Expert System:

I. *preserves knowledge that might be lost*
II. *put information into an active-form* so it can be summoned anytime
III. Expert system assist novices in *thinking the way experienced professional do*.
IV. Expert systems are *not subject to human feelings*
V. Expert system can be effectively used as a strategic tool

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Nov 2010

Properties to Qualify as Expert System:

I. **Availability** –
II. **Complexity**
III. **Domain** –
IV. **Expertise** –
V. **Structure** –

12. *BRIEF DIFFERENCES BETWEEN VARIOUS SYSTEMS.*

Information System	Description
Transaction Processing Systems (TPS)	✓ Designed to process and carry out routine transactions efficiently and accurately. ✓ A business will have several TPS like Billing systems, stock control etc.
Management Information Systems (MIS)	✓ internal sources of information ✓ Takes data usually from the transaction processing systems ✓ Generate management reports
Decision Support Systems (DSS)	✓ designed to help management ✓ DSS consists of tools and techniques that gather & analysis information.
Office Automation Systems	✓ Help in the enhancement of performance of or productivity of employees who are dealing with the data processing and information.
Knowledge Management Systems (KMS)	✓ Help in creation and sharing of information. ✓ KMS are most effectively used in firms of lawyers, accountants and management consultants. ✓ Uses tools like data mining to extract data from spreadsheets etc.

13. *APPLICATION OF INFORMATION SYSTEMS IN ENTERPRISE PROCESSES*

Information systems perform following **three vital roles** in business firms

1. ***Support an organization's business processes and operations***:
2. ***Support business decision-making***:
3. ***Support strategic competitive advantage***:

14. *PRE-REQUISITE TO OPERATE INFORMATION SYSTEMS (IS)*

1. ***Foundation Concepts –***
2. ***Information Technologies (IT) –***
3. ***Business Applications –***
4. ***Development Processes –***
5. ***Management Challenges –***

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15. *IMPORTANT IMPLICATIONS OF INFORMATION SYSTEMS*

1. helps managers in efficient decision-making to achieve the organizational goals.
2. An organization will be able to survive and thrive in a highly competitive environment
3. Information systems helps in making right decision at the right time i.e. just on time.
4. A good information system may help in generating innovative ideas for solving critical problems.

16. INFORMATION & ITS ATTRIBUTES

Information is data that has been put in some meaningful context. Data is just raw facts and figure that mean nothing.

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ATTRIBUTES OF INFORMATION

1. ***Availability***:	2. ***Purpose***:
3. ***Mode & Format***:	4. ***Decay***:
5. ***Rate***:	6. ***Frequency***:
7. ***Completeness***:	

17. INFORMATION SYSTEM & ITS ROLE IN MANAGEMENT

1. Effective decision-making to achieve the organizational goals.
2. Gain of competitive edge.
3. Knowledge gathered through information system may be utilized by managers in unusual situations.
4. Innovative ideas for solving critical problems.

18. INFORMATION SYSTEMS AT VARIOUS LEVEL OF MANAGEMENT

(a) Operational Level Systems: [TPS]
(b) Knowledge Level Systems: [KMS]
(c) Management Level Systems: [MIS]
Example include funds generated by the fees, finance planning etc. This type of systems mainly answer "what if" questions
(d) Strategic Level Systems: [EIS, DSS, ES]

19. KEY STEPS OF A TYPICAL ACCOUNTING INFORMATION SYSTEM [REFER PAGE 29]

20. THE IMPACT OF IT ON INFORMATION SYSTEMS FOR DIFFERENT SECTORS

E-business or E-commerce

1. It uses internet technologies to perform business functions including purchasing, selling, etc.
2. ***Primary components*** are infrastructure (computers, routers, communication media, software and programmers), electronically linked devices and computer aided networks.
3. Advantage
   a. Can transact 24 hours
   b. Unlimited market place and access with broaden customer base
   c. Secure payment systems, etc.
4. Only investment needed in the purchase of space on internet, designing and maintenance of website.
5. Different types → it may be B2B (Business to Business), B2C (Business to Customer), C2C (Customer to Customer) and C2B (Customer to Business) etc.

Financial Service Sector

1. Now-a-days most of the services are offered by the financial services on internet, which can be accessed from anywhere and anytime that makes it more convenient to the customers and organization both.
2. It also reduces their cost in terms of office staff and office building.
   [refer page 29 for details]

Wholesaling and Retailing

1. Retail business uses IT to carry out basic functions including **till systems** for selling items [POS], capturing the sales data, stock control, buying, management reports, customer information and accounting.
2. E-commerce among partners (suppliers, wholesalers, retailers, distributors) helps in carrying out transactions.

Public sectors

1. Includes services provided by the government mainly hospitals, police stations, universities etc.
2. Owing to use of IT/IS important documents like passports can be made easily by applying online.

21. OVERVIEW OF UNDERLYING IT TECHNOLOGIES

Business Website

1. becomes reachable to large amount of customers.
2. It can also be used in an advertisement, which is cost effective
3. These websites can be designed by using HTML, XML, ASP.NET etc.

Internet and Intranet

1. It is the best source of communication between eople working in a team from multiple locations, or with different vendors and companies.
2. **Intranet** is system that permits the electronic exchange of business data within an organization.

Software and Packages

1. Business Intelligence (BI) refers to applications and technologies that are used to collect, provide access and analyze data and information about companies operations.
2. A complete BI provides consistent and standard information essential in enterprise operations.

Enterprise Resource Planning (ERP) Packages

1. latest high-end solutions that streamline and integrate operation processes
2. ERP is a fully integrated business management system
3. An ERP System is a multi-module software system that integrates all business process
4. Each of the software modules of an ERP system automates business activities of a functional area within an organization.

Data Mining (DM)

1. Data mining refers to the process of searching for valuable business information in a large database or multiple databases.
2. Other applications of DM are:
    a. text mining,
    b. web analysis,
    c. Provide summary information i.e. various multidimensional summary reports and statistical summary information, etc.