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**SUBJECT :** **MANAGEMENT INFORMATION SYSTEM**

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# 1. MEANING OF MIS

## 1.1. Understanding the keywords

- Management, Information, and Systems

***What is Management?***

- Planning, control, and administration of an organization.
- Management is generally hierarchical:
  - Top managers handle planning;
  - Mid – career managers control;
  - And, junior managers administer.

***What is Information?***

- Processed data to support management functions
- Processing – record, summarize, store, and retrieve.
- Present in the required reporting format.

# 1. Meaning of MIS .. 1

***What is a System? (in the context of MIS)***

- An inputs – processing - output and feedback matrix.
- Supports the processing of data into information.

**1.2. Objectives of MIS**

- MIS processes data to support the management functions.
- MIS manages information system (IS) productively:
- Competitive advantage created from using information maximally:
  - Capturing Data – collects the relevant data.
  - Processing Data – transforms data into information.
  - Information Storage – store the information securely.
  - Information Retrieval – easy retrieval by authorized users.
  - Information Propagation – nonstop access and updating.

# 1. Meaning of MIS ..2

## 1.3. Pillars of MIS

- Long-term planning perspective.
- Respect of an organization's dynamics and structure.
- Comprehensiveness and interconnectivity.
- Hierarchical and  wholly participatory
- Supports all levels of management decisions:
  - strategic, operational and tactical.
- Highlights problems and exceptional situations.
- Driven by Information technology (IT).
- Computer-based  - Hardware, software, and telecom.

# 1. Meaning of MIS ..3

## 1.4. Information Vs Data

- Raw facts representing events.
- Organized and arranged in standard formats.
- Arranged to ease understanding and use.
- Rendered to support decision making.

# 1. Meaning of MIS ..4

## 1.5. The Knowledge Organization

- Organizational structures changing rapidly.
  - From hierarchical to flattened structures.
  - From centralized to decentralized management.
  - From rigid to flexible arrangements.
- Intra and inter firm businesses easier.
- Location and size no longer matters.
- Costumer preferences is venerated.
- Organizations and the managers continue learning.
- Competencies increasingly important.
- Flow of information to all stakeholders is important.

# 1. Meaning of MIS .. 5

## 1.5. The Knowledge Organization

- Intangible assets become key measures of wealth:
  - Securities, proprietary knowledge, brand, etc.;
  - Intellectual capital, innovation, unique business model;
  - Credit cards, goodwill, cultural advantages
- Travels and tours, package delivery, etc., are valuable.
- Sound IT competencies a key success factor.
- Qualitative information vital for success.

## 1.6. What Is an Information System (IS)?

- A unified data and knowledge (soft) infrastructure.
- Collect/retrieve, process, store, and dispense information.
- Supports decision making and control.

# 1. Meaning of MIS ..6

## 1.6.1. Uses of IS in the Organization

- Facilitates analysis of problems;
- Provides deep insight into complex subjects;
- Supports creation of new products.

## 1.6.2. Components of IS

- input, processing, and output, and a feedback system
  - Input - captures or collects raw data
  - Processing - converts raw input into a meaningful form.
  - Output - transfers the processed information the users.
- The feedback is output returned by the users.
- Feedbacks supports evaluation at the input stage.

# Meaning of MIS … 7

## 1.6.2. Components of IS

- An IS focuses on the organization and its environment.
- IS captures all the stakeholders - customers, suppliers, etc.
- Regulatory agencies also interact in the IS of firms.
- Technically, IS are IT-based information systems.

## 1.6.2.1. Computers vs IS

- Computers store and process information.
- Computers are only part of an IS.
- Computer programs, or software, support processing.
- Software are sets of operating instructions.
- Knowing how computer programs work is vital.

# 1. Meaning of MIS ..8

## 1.6.3. Business information value chain

- For a firm, IS supports the business information value chain.
- IS adds value by providing problem-solving knowledge.
- The key domains of IS:
  - Organizational;
  - Management;
  - Technological.
- But IS has to fit into the organization’s culture.
- IS cannot replace creativity of the manager.

# 2. GENERAL PRINCIPLES OF MIS

## 2.1. What is MIS?

- MIS supports Management with information for:
  - Operations –
  - Administration –
  - Decision making –
- The foundation of MIS is databases.
- Today's MIS is a computerized processing system.
- MIS differ from other ISs because:
  - MIS is used to analyze information
  - MIS also facilitates strategic and operational activities.

# 2. General Principles of MIS .. 1

## 2.1.1. Primary Components of MIS?

- The five primary components of MIS are:
  1. Hardware
  2. Software
  3. Data (information for decision making),
  4. Procedures (design, development and documentation),
  5. People (individuals, groups, or organizations).
- Raw facts representing events.
- Data is organized in standard formats or databases
- Databases ease understanding and use.
- MIS is founded on databases.

# 2. General Principles of MIS… 2

## 2.2. Evolution of MIS

- At first, MIS treated data and reported at regular intervals.
- Later, data was distinguished from information;
  - data being a raw material and,
  - information the finished product.
- MIS had to present information in formats that:
  - create impact on its user;
  - And, provokes a decision or an investigation.
- The concept of exception reporting makes MIS more impactful
  - Data is rendered accessible to authorized parties.
  - But processed further to suit the needs of different users.
  - Data is one, but viewed in different ways.

# 2. General Principles of MIS … 3

## 2.2.1. The Concept of End-User Computing

- End users work with multiple databases.
- This decentralized the MIS.
- End users became independent of computer professionals.
- Then the MIS became a decision making system.

## 2.2.2. The Modern Concept of MIS

  - Handles the databases,
  - Provides computing facilities to the end user,
  - gives decision making tools to the users,
  - And connects firms to organizations.
- MIS is concerned with how to use information.

# 2. General Principles of MIS .. 4

## 2.2.2. The Modern Concept of MIS

- Information is generated through data analysis.
- Data analyses relies on many academic disciplines.
  - Management, Psychology, Human Behavior, Engineering etc.
- Thus making MIS more effective and useful.
- MIS is founded on the systems theory.
- Offers solutions input - output flow challenges.
- Using theories of communication.
- An input – Process – Output systems without noise.
- Ensures flow of information from a source to a destination.
- A blend of Management, Information and IT System.

# 2. General Principles of MIS .. 5

## 2.3. History of MIS

- MIS growth agrees with growth of computing technology:
  1. Mainframe and minicomputer computing;
  2. Personal computers;
  3. Client/server networks;
  4. Enterprise computing;
  5. And, Cloud computing.

***Phase 1 - Mainframe and minicomputer computing***

- Ruled by IBM and their mainframe computers.
- Mainframe computers were quite large.
- Required teams to run them.

# 2. General Principles of MIS .. 6

## 2.3. History of MIS

***Phase 2: Personal Computers***

- Personal computers (PCs) became popular in 1965.
- Microprocessors replaced mainframes and minicomputers.
- This accelerated the decentralizing computing power.
- Large data centers were replaced with smaller offices.
- By late 1970s PCs make computing cheaper.
- Low cost computers became mass market commodities.
- More individuals were computing with PCs.

# 2. General Principles of MIS .. 7

## 2.3. History of MIS

***Phase 3: Client/Server***

- Computers were linked to  servers.
- Servers share information via a common network access.
- Data sets became accessible to many simultaneously.

***Phase 4: Enterprise Computing***

- High speed networks became popular.
- Firms could integrate all aspects of the activities.
- MIS linking all aspects of a firm’s activities was created.
- Using computers became an important skill for all persons.

# 2. General Principles of MIS .. 8

## 2.3. History of MIS

***Phase 5: Cloud Computing***

- This (the latest) employs networking technology extensively.
- Applications and data storage are delivered to users.
- This is independent of configuration, location or hardware.
- High speed cell phone and Wi-Fi networks are also delivered.
- Managers use the MIS remotely via any networked device.
- This has increased the possibility of having multiple jobs.

# 2. General Principles of MIS .. 9

## 2.4. Physical view of MIS

- MIS has sub-systems for:
  - Data collection;
  - Transaction processing and validating;
  - Processing;
  - Analyzes and storing of information in databases.
- The subsystem can be at the micro or macro-levels.
- MIS is dynamic and subject to change.
- Changes occur from internal management process.
- Changes emanate also from the external environment.

# 3. THE ROLE OF MIS IN AN ORGANIZATION

- MIS in an organization is akin to the heart in the body.
- The information is the blood and MIS is the heart.

***Support to sub-systems***

- MIS works through a variety of systems, such as;
    - Query Systems,
    - Analysis Systems,
    - Modeling Systems,
    - And, Decision Support Systems.

***Support for Long term (Strategic) Planning***

- MIS helps long term planning in several ways, including;
    - Strategic Planning and Management Control,
    - Operational Control and Transaction Processing.

# 3. The Role of MIS in an Organization .. 1

***Support for Transaction Processing***

- Answers queries on the data relating to transactions;
  - the status of a particular record,
  - and, references on a variety of documents.
- Helps the junior management personnel by;
  - providing the operational data for planning,
  - scheduling and control,
  - supports decision making at the operations level,
  - and, corrects an out of control situation.

# 3. The Role of MIS in an Organization .. 2

***Support for Short Term Planning***

- Helps the mid career managers in the following;
  - short them planning,
  - target setting and
  - and, controlling the business functions.
- Helps the top managers in the following;
  - goal setting,
  - strategic planning and
  - evolving the business plans
  - and, the business plan implementation.
- Supports information generation and communication.
- Aids problem identification and sound decision making.

# 3. The Role of MIS in an Organization .. 3

## 3.1. MIS in Public Sector Organizations (PSOs)

- PSOs are increasingly inundated with data and information.
- PSOs need IS to support its various activities.

### 3.1.1. Centralized Vs. Decentralized PISs

- PISs need to cover eight main areas of responsibility:
  - information systems planning;
  - organizational structures and staffing;
  - data management;
  - computing and data management architecture;
  - information systems development;
  - information technology acquisition;
  - training, and technical support.

# 3. The Role of MIS in an Organization .. 4

## 3.1.1. Centralized Vs. Decentralized PISs

- A centralized PIS may be efficiency, but difficult to manage.
- A decentralized PIS spreads the tasks, but may be wasteful.
- A mix of central and local action is considered most effective.

## 3.1.2. MIS and Public Sector Accountability

- The broad set of accountabilities in PSOs include:
  - Managerial accountability;
  - Political accountability;
  - And, Financial accountability

# 4. CONTENT, DESIGN AND PERFORMANCE OF MIS

## 4.1. Types of Information

- There are four main types of information, namely;
  - Descriptive information,
  - diagnostic information,
  - predictive information, and
  - prescriptive information.

### 4.1.1. Descriptive information

- It tries to answer the question, what is happening?
- It covers such information as:
  - Financial results and maintenance records;
  - And, Production records, product marketing, and test results.

# 4. Content, Design and Performance of MIS .. 1

## 4.1.1. Descriptive information

- Can help to secure other needed types of information.
- Not enough for identifying and solving management problems.

## 4.1.2. Diagnostic information

- Seeks to answer the question - what is wrong?
- Can be used to define problems that develop in the business.
- Can find an how to solve the problem (including doing nothing).
- “What is” and “what ought to be” should be viewed together.

## 4.1.3. Predictive information

- Seeks to answer the question - what would happen if..
- Generated from an analysis of possible future events.

# 4. Content, Design and Performance of MIS .. 2

## 4.1.3. Predictive information

- Is exceedingly valuable with “desirable” outcomes.
- Manager use predictive information to reduce risk and uncertainty.
- Predictive models include;
  - budgeting techniques,
  - simulation models,
  - and other tools that measure expected changes in the business.

## 4.1.4. Prescriptive information

- Seeks to answer the question- What should be done?
- Not adequate for decision making.
- Used with the goals and values of the manger for decision making.

# 4. Content, Design and Performance of MIS .. 3

## 4.1.5. Classes of Information

***Organizational information***

- Information required sub-units of an organization.
- The same information may serve different uses.
- Often stored in database for the users.

***Functional information***

- Used by the functional heads for administrative functioning.
- Often function-specific, each unit can have its own.
- Largely factual, statically focusing on specific task details.
- Assessable by unit objectives, work design and responsibility.

# 4. Content, Design and Performance of MIS .. 4

## 4.1.5. Classes of Information

***Knowledge information***

- Compels the manager to think, decide and act.
- Highlights the deviation norms and abnormal variations.
- Supports the function of middle and top management.
- Often presented graphically for quick grasp, E.g.:
  - Students population may be declining;
  - Or, market demand is falling.

***Decision-support information***

- Justifies a change or amendment of the existing decisions.
- E.g., inspection report, demand forecast, etc.
- Can be sourced internally and externally

# 4. Content, Design and Performance of MIS .. 5

## 4.1.5. Classes of Information

***Operational information***

- Required by operators and Junior managers.
- Helps decisions that affect operations.
- Determined internally, through the transaction processing.
- Largely of short time span and focuses on the current status.

## 4.1.6. Determining Information Requirement

- Asking & interviewing – using mainly closed ended questions.
- Using expert testimonies
- Experiences from past decisions and problem solving.

# 4. Content, Design and Performance of MIS .. 6

## 4.2. Data Modeling

- The data model determines what data in the database.
- It explores the relation between data entities.
- It represents the required data accurately.

### 4.2.1. Databases

- Databases are now necessary in nearly all fields.
- Collection of structured, interrelated data sets rendered accessible.
- A set of application programs to update and manage the system.
- Three key requirements of good databases:
  - Reliability – broad analysis in robustness, concurrency and security.
  - Efficiency – high speed and pliability to new requirements.
  - Renewability – ease of adaptability to software progression.

# 4. Content, Design and Performance of MIS .. 7

## 4.3. Designing MIS

- Consider a typical University in Buea or elsewhere.
- Huge volumes of data have to be collected, analyzed and used.
- Personal record of staff and students;
- Courses registration by programs and by students.
- Examination records - students' grades by CA and exams.
- Financial records – accounts, payroll, and students' fee records, etc.
- E.g. it should be possible to do the following:
  - Assign courses by student, program, and level.
  - Determine students' class eligibility by fee, pre-requisite courses.
  - Determine class attendance by lecturers/students.

# 4. Content, Design and Performance of MIS .. 8

## 4.3. Designing MIS

- Prepare results/transcripts by semester and end of program.
- Produce payroll records and monthly pay slips.
- Prepare periodic statement of accounts
- Produce tax and social insurance records
- Other records as are needed internally and externally.
- These require complex data sets and fixing many reports.

### 4.3.1. Database Schemes

- Three database schemes - *Physical, Conceptual, and view levels.*

*Physical level* – having to do with the storage and retrieval.

- This is the back end that is hidden from users.

# 4. Content, Design and Performance of MIS .. 9

## 4.3.1. Database Schemes

*Conceptual level*

- Having to do with the content and how the system is networked.
- This is handled by the database administrator

*View level*

- Viewed by the different sets of users simultaneously
- Viewed in different ways and for different purposes.

## 4.3.2. Data Models

- *C*onceptual tools to describe data relations, data constraints and data semantics.
- There are object-based, record-based and physical data models.

# 4. Content, Design and Performance of MIS .. 10

## 4.3.2. Data Models

- Object-based models:
  - Related to the conceptual and view levels,
  - provides flexible structuring capabilities,
  - and specifies data constraints explicitly.
- Record-based models:
  - Focuses on the conceptual and view levels.
  - Used mainly for databases with fixed record structure.
  - With fixed sizes of the fields of the records.
- Physical data models:
  - focuses on the physical level.
  - Data model should remain fixed when the physical level changes.

# 4. Content, Design and Performance of MIS .. 11

## 4.3.3. Standard terminology in Database Management

***Data Definition Language (DDL)***

- Used to describe the structure, relations, constraints of databases.
- The compiled DDL statements are called the *data directory.*

***Data Manipulation Language (DML)***

- Used to select and modify (insert, update, delete) the database.
- In *nonprocedural* DMLs the user only specifies what data is needed,
- In *procedural* DMLs the way it should be retrieved is pedetermined.

***Database Manager***

- This application connects the users to the database.
- The application enforces most requirements of the database.

# 4. Content, Design and Performance of MIS .. 12

## 4.3.3. Standard terminology in Database Management

***Database Administrator***

- The expert directing the Database.
- Defines database schemes and the storage structure.
- Specifies the access methods, entry rules and integrity constraints

***Database Users***

- Expert users - interact with the system via DML calls.
- Naive users - interact with the system via application programs.

***File manager -****r*esponsible for storage low size data and retrieval.

***Database manager*** - See above.

***Query processor -*** Translates a query language into low-level instructions.

***DDL compiler -*** Converts DDL statements into database metadata.

# 4. Content, Design and Performance of MIS .. 13

## 4.3.3. Standard terminology in Database Management

***Query processor -*** Translates a query language into low-level instructions.

***DDL compiler -*** Converts DDL statements into database metadata.

***Data file -*** Store the data themselves.

***Data directory -*** Stores information about the structure of the database.

***Indices -*** Accelerate data retrieval from the database.

## 4.3.4. Data Collection Techniques

- Surveys – field data collected via a questionnaire.
- Desk review – data collected from records.
- Objective measures or tests – data collected during an experiment.
- Interviews - data collected using a series of pre-conceived questions.

# 4. Content, Design and Performance of MIS .. 14

## 4.4. Challenges of Dealing Databases

- Data redundancy and inconsistency:
  - An information should not be generated at different points.
  - The data set be updated consistently.
- Data integrity:
  - Data stored should fulfills certain prescribed constraints.
  - The system should adapt readily to change of the constraints.
  - The system should recover from crashes with little difficulty.
- Data access:
  - The system should generate answers to queries;
  - Supports efficient data retrieval by indexing, hashing, etc.

# 4. Content, Design and Performance of MIS .. 15

## 4.4. Challenges of Dealing Databases

- Data isolation:
  - Receives different types and magnitudes of data;
    - like text documents, numerical data, photos, etc.
- Concurrency:
  - supports simultaneous use without deadlocks.
  - Consistency of the data despite multiple use.
- Security:
  - Has access rights for users and safety of database.

# 5. BUSINESS PROCESS INTEGRATION

## 5.1. Enterprise Systems (ES)

- ES are packaged enterprise application software (PEAS) systems.
- ESs have process orientation *including:*
  - Enterprise resource planning (ERP);
  - Customer Relationship Management (CRM),
  - Supply Chain Management (SCM).
- The distinction between ES and IS:
  - ES refers to software, whereas an IS a social system that uses IT.
  - An IS includes people and IT.

## 5.2. Supply chain management (SCM)

- The management of a network of interconnected businesses.
- Network involved in the provision of products and services.

# 5. Business Process Integration ..1

## 5.2. Supply chain management (SCM)

- The end-points of SCM are the end-customers.
- SCM spans all movement and storage of the following:
  - Raw materials,
  - work-in-process inventory,
  - and finished goods
- The supply chain is from the origin to point of consumption.
- More firms now need supply chains to connect global markets.

### 5.2.1. Traditional SCM

- Traditionally, firms focuses on the inputs and outputs processes.
- With little concern for how other individual players worked.
- But linkages within the supply chain network is growing.

# 5. Business Process Integration ..2

## 5.3. Developments in SCM

- Six major eras are observable in the evolution of SCM studies:
  - Creation, Integration, and Globalization;
  - And, specialization Phases One and Two, and SCM 2.0.

## a. Creation Era

- SCM was used by a US industry consultant in the early 1980s.
- But the notion of a supply chain existed since the early 20th century.
- The early focus was in manufacturing assembly line.

## b. Integration Era

- The development of Electronic Data Interchange (EDI) systems.
- The introduction of Enterprise Resource Planning (ERP) systems.
- increasing value-adding and cost reductions through integration.

# 5. Business Process Integration …3

## 5.3. Developments in SCM

### c. Globalization Era

- Although the use of global sources in SCM is traceable to the 1940s.
- However, by late 1980s more firms were integrate globally.
- The goal is to increase competitive advantage, through:
- Value addition;
- And, reducing costs through global sourcing.

### d. Specialization Era

### d.1. Phase One: Outsourced Manufacturing and Distribution

- Companies abandoned vertical integration,
- Many firms close non-core operations,
- Outsourcing is preferred to having diverse support units.

# 5. Business Process Integration … 4

## 5.3. Developments in SCM

## d. Specialization Era

## d.2. Phase Two: SCM as a Service

- Specialization within the supply chain led to the growth of:
  - Transportation brokerages,
  - Warehouse management,
  - And, non-asset-based carriers
- SCM goes beyond transportation and logistics.
- SCM increasingly involves the following:
  - supply planning,
  - collaboration,
  - execution and performance management.

# 5. Business Process Integration … 5

## 5.3. Developments in SCM

### d. Specialization Era

### d.2. Phase Two: SCM as a Service

- Specialization improves overall competencies;
- Just as outsourced manufacturing and distribution has done.
- Firms are able to use supply chain expertise without developing them.
- This reduced cost significantly
- And, has made supply chain specialization very popular.

### e. Supply Chain Management 2.0 (SCM 2.0)

- Web 2.0 is characterized by the use of the World Wide Web.
- This has led to more creativity, information sharing, and partnerships.

# 5. Business Process Integration ….6

## 5.3. Developments in SCM

### e. Supply Chain Management 2.0 (SCM 2.0)

- Organizations have delivery options that produces speedy results.
- The speed of supply chain increases due to global competition.
- Short product life cycles and expanded specialization.

## 5.4. Supply Chain Business Process Integration

- Change from managing individual functions to supply chain processes.
- Collaborative work between buyers and suppliers,
- Joint product development,
- Common systems and shared information.
- Integrated supply chain requires a continuous information flow.
- Dominance of a process approach to the business.

# 5. Business Process Integration … 7

## 5.4. Supply Chain Business Process Integration

- Change from managing individual functions to supply chain processes.
- Collaborative work between buyers and suppliers,
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- Common systems and shared information.
- Integrated supply chain requires a continuous information flow.
- Dominance of a process approach to the business.

## 5.5. Aspects of SCM

| | |
|---|---|
| Customer relationship management | Customer service management |
| Demand management | Order fulfillment |
| Returns management | Product development and commercialization |
| Manufacturing flow management | Supplier relationship management |

# 5. Business Process Integration …8

## 5.5. 1. Customer Relationship Management (CRM)

- The link between the organization and its customers.
- Building customer relationships:
  - Set equally satisfying goals for organization and customers;
  - Establish and maintain customer rapport;
  - Produce positive feelings for organization and the customers
- CRM uses technology to manage business processes.
- Especially in sales, marketing, customer service, and technical support.
- Aims to find and retain clients.
- Reduce the costs of marketing and client service.
- Effective CRM promotes synergy and profitability, and reduces costs.

# 5. SUPPLY CHAIN MANAGEMENT

## 5.1. Meaning of Supply Chain Management (SCM)

- SCM is the systemic coordination of business functions.

### 5.1.1. Traditional Definition in Manufacturing

- SCM meant managing movement and storage of:
  - Raw materials,
  - Work-in-progress inventory,
  - And, finished goods.
- More specifically, it involved managing:
- Networks of interconnected smaller business units;
- Networks of activities from production to final sales.

# 5. Supply Chain Management … 1

## 5.1.2. Globalization of SCM

- SCM increasingly concerned with the following:
  - Adding value through management of supply chain activities;
  - Building a competitive information infrastructure;
  - Leveraging worldwide logistics;
  - Synchronizing supply with demand;
  - And, measuring performance globally.
- Current SCM systems consist of the following:
  - Operations management;
  - Logistics and procurement;
  - Information technology;
  - And, integrated business operations

# 5. Supply Chain Management .. 2

## 5.1.2. Objectives of SCM

- Precisely predict demand and forecast production to match it.
- Streamline production and improve information flow.
- Improve customer satisfaction.

## 5.1.3. Features of SCM

- Integrated Behavior.
- Mutually sharing information
- Mutually sharing channel and risk and rewards.
- Focus on serving customers.
- Co-operation – to build and maintain long term relationships.
- Integration of process

# 5. Supply Chain Management .. 3

## 5.1.2. Scope of SCM

Supply management

Sales force management

Inventory management

Payment management

Channel management

Financial management

Distribution management

# 6. PREPARING AN MIS

## 6.1. Developing a Sound MIS

- MIS developers must communicate effectively with intended users.
- The required management processses and IT systems need to be synchronized.
- The information needs should be integrated into a single integrated system.
- Pre-MIS development training to cope with the associated complexities of MIS.

### 6.1.1. Dealing with Security and ethical Issues

- Information system should be defended against the following:
  - Unauthorized access and use;
  - Disclosure, disruption and modification;
  - Perusal, inspection, recording or destruction.

# 6. Preparing an MIS .. 1

## 6.1.1. Dealing with Security and ethical Issues

There are two major aspects of information system security:

- Security of the IT used – preventing cyber-attacks.
- Security of data – protecting the data with an off-site backup.

Guaranteeing information security has the following key aspects:

- Preventing unauthorized access to the information.
- Ensuring the accuracy and consistency of data over its entire life-cycle.
- Ensuring the available of information in all situations.
- Ensuring genuine data, transactions, communications.
- Incorporation of authentication features for integrity of transactions.
- Ensuring ‘non-repudiation‘ of transactions.

# 6. Preparing an MIS .. 2

## 6.2. Prototypes vs Life cycle Systems

**Prototypes**

- Often new MIS are designed as prototypes of existing one.
- The designer can merely improve upon an existing one.

***Life Cycle***

- Many MIS have clear starting and ending steps.
- The input, resources, contents and formats are specified.
- Such systems can be developed in a systematic manner.
- E.g., accounting systems, payroll etc…

# 6. Preparing an MIS .. 3

## 6.2. Prototypes vs Life Cycle Systems

| S/N | Prototype Approach | Life Cycle approach |
|---|---|---|
| 1 | Open system with certainty information | Closed system with certainty of information |
| 2 | Uncertainty breeds instability. | The system design is stable due to certainty |
| 3 | Designer uses incomplete information. | Designer often has the needed information. |
| 4 | Some experimentation is necessary. | Experimentation may not be necessary. |
| 5 | Information needs not pre-determined | Information needs determined. |
| 6 | It is Custom oriented system. | Governed by principles and practice. |

# 7.MANAGEMENT DECISION MAKING

- Business decisions aim to achieve the objective in the given environment.
- It has to selected consciously from an array of options.
- Generally business decisions should be:
  - Chronological – taken into account the past.
  - Situation specific – address specified situations.
  - Personal values reflective – reflect personal values of the decision maker.
  - Risk and trade off consideration – take into account possible risks.
  - Sensitive to prevailing conditions - fit the institutional setting and business environment.
- Sound decision making requires creativity, ingenuity, and foresight.

# 7.Management Decision Making … 1

## 7.1. Rational Decision making

- A rational decision seeks to achieve the desired goal productively.
  - E.g., seek to employed after graduation

### 7.1.1. Types of rationality

- Objective rationality – maximizing the value of the objective.
- Subjective rationality – maximizing the value of what is strongly perceived.
- Conscious rationality – maximizing what the decision maker is conscious of.
- Organizational rationality – maximizing organizational values.
- Personal rationality – maximizing personal goals.

# 7.Management Decision Making … 2

## 7.2. Challenges of rational decision-making

- Problem identification – determining the main problem.
- Insufficient knowledge – it is difficult to have complete information.
- Spontaneity - most decisions may be taken based on impulse and not by reasoning.
- Broad inclusion – others may not share the rational decision.

## 7.3. The decision making process

- Step 1: Identify the problem - diagnose the problem and the possibilities.
- Step 2: Analyze the problem – situate the problem by scope, context and impact.
- Step 3: Collecting relevant data – identify causal factors, Intelligence gathering.
- Step 4: Determine alternative solution – identify other possibilities.
- Step 5: Select the best solution – decide on the appropriate option.

# 7.Management Decision Making … 3

## 7.3. The decision making process

- Step 6: Convert decisions into actions – develop and implement action plans.
- Step 7: Ensure feedback – measure performance with indicators.

## 7.4. Decision-Making systems

- Two possible systems of decision making – closed and open systems.
  - Closed decision making – manager has a ready model for decision making.
  - Open decision making – manager has to decide on a model.

## 7.5. The Law of requisite variety

- For efficient programed decision making, the manager has to provide:
  - The possible decision alternatives and choices in each state.
  - The decision rules to justify the selected option.
  - The process by which the decision choice was reached.

# 7.Management Decision Making … 4

## 7.6. Methods of decision making

- Search processes to take decisions that satisfy set goals.

### 7.6.1.Optimization techniques

- Generally these optimize goals subject to constraints.
- Examples are operations research, programming, inventory models, etc.

### 7.6.2. Decision tree analysis

- Used in selecting a set of sequence decisions pictorially.
- Decisions points are represented by square node;
- And, outcomes are represented by solid or hollow circle.
- Decision nodes are where a choice exists between the alternatives.
- Managerial decision are based on the calculations of returns expected.

# 7.Management Decision Making … 5

## 7.6.2. Decision tree analysis

- Outcome nodes where the events depend on some probability.
- Decision trees are evaluated from right to left;
- Working back from the later decisions to the first.

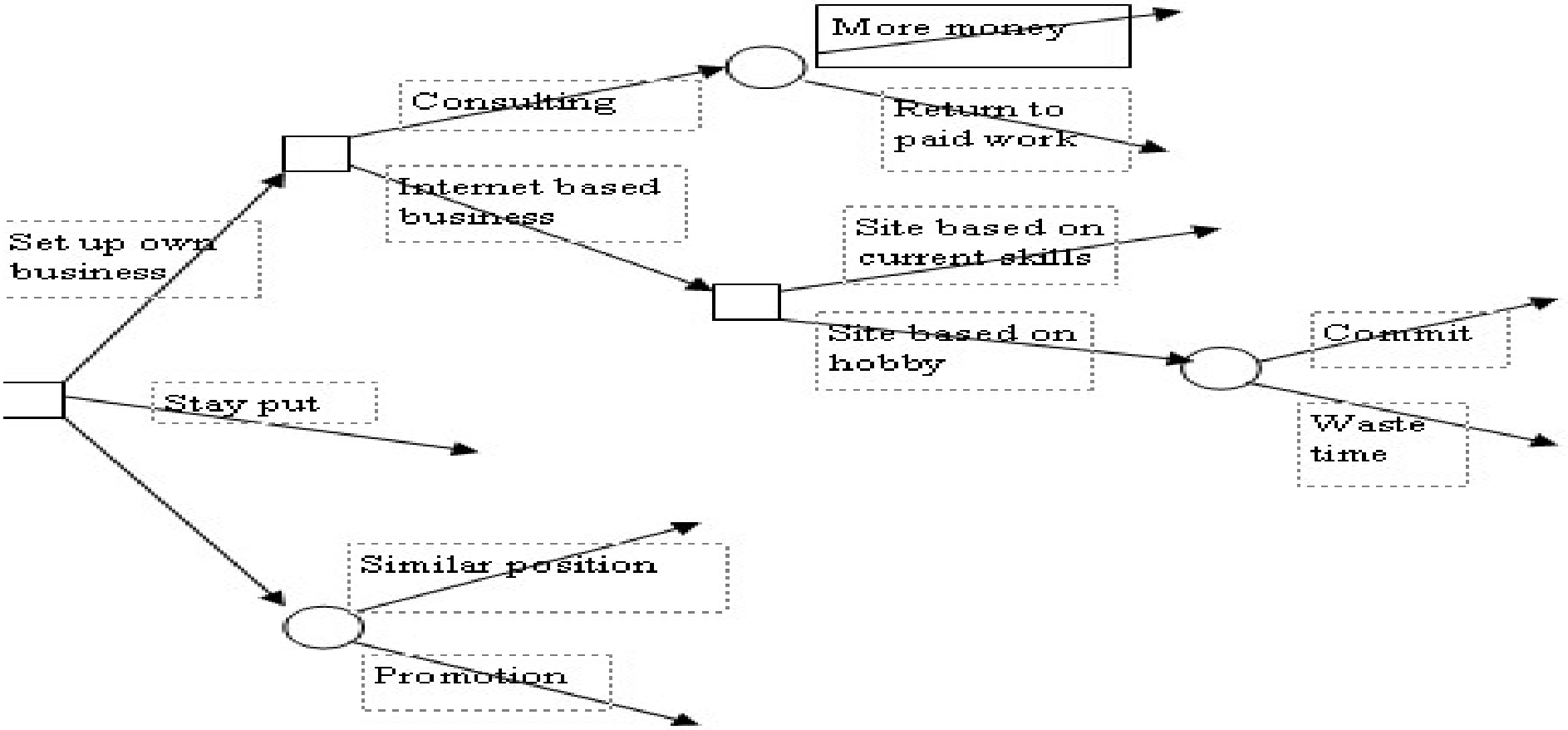
## 7.7.Organizational decision making

- Individuals influence the management process differently.
- Managing conflicts is important in organizational decision making.

## 7.7.1. Dealing with uncertainty

- The decision with highest probability and minimum profit is selected.
- E.g., 95% chance of low earning is preferred 10% chance high earning.
- Decisions can be taken trade off uncertainty for certainty.

# 7.Management Decision Making … 6



# 7.Management Decision Making … 7

## 7.7. Development of MIS

- MIS should be flexible, interactive and progressive.
- MIS has to be responsive to changing information needs.
- This makes planning vital for MIS development.

***Architecture of MIS***

- The sub-systems, their relationships and functionality.

***System development schedule***

- Development steps against the timescale of the system development.

***Hardware and software plan***

- Selecting the appropriate hardware and software for the MIS.
  - Should fit the organization's strategic plan.
  - Should match the execution schedule of the business plan.

# 8. IMPLEMENTATION OF MIS

## 8.1. Sound MIS Implementation Requirements

- The system satisfies the information needs of the user.
- The system offers the required services to the users.
- The demands of users are respected.
- Improves decision making capability.
- In addition:
  - Unleash unfreezing potentials i.e., MIS inspire acceptance of innovations.
  - Choosing potentials – MIS allows users to execute their functions.
  - Refreezing potentials – MIS is able to accept change and restore equilibrium.

### 8.1.1.Factors responsible for success of MIS

- Expediency – MIS serves the organization's development needs.
- Appropriate technology – MIS adopts the most cost pliable IT system.
- Productivity – data processing needs of the users are met effectively.
- MIS does not give the perfect information.

# 8. Implementation of MIS .. 1

## 8.1.2. Factors responsible for success of MIS

- Operational feasibility – design of the MIS is operationally feasible.
- Goal oriented – intended result known and failures explainable.
- Focused – information processing executed without noise.
- Human sensitive - Put up human aspects of the management process.
- User friendly – usable with very minimal learning.
- Need oriented - Serve the organization's information needs.

## 8.1.3. Why MIS Fail

- Poor conception – MIS often mistaken for a database system.
- Incompleteness – under identification of the information needs.
- Poor quality control – quality requirements not respected.
- Poor administration and usage – deviation in system specification.

# 8. Implementation of MIS .. 2

## 8.2. Choice of Information Technology

- IT type is selected from an array options based on the following:
  - communication capability,
  - data sharing potency,
  - affordability,
  - availability and the people to run are critical.
- Future needs can also affect IT choice.
- There are 3 types of IT decision:
  - Operational decisions.
  - Execution and control decisions.
  - Strategic decision.
- Front end system takes care of operations management.
- Back office manages strategic, control and operational planning.

# 8. Implementation of MIS .. 3

## 8.3. Business Operations

- Business operations can define information needs.
- Information needs differ among businesses.
- The needs of some are easier than others.
- The operational feasibility is needed in each case.

### 8.3.1. Configuration design

The details of IT are based on the following features:

- Data type - numeric, word, image, voice, etc.
- Data volumes - hard-disk, zip devices, floppy disk, etc.
- Storage capacity - based on processing needs of the system.
- Input/output operation – sets the control and speed of I/O processing.

# 8. Implementation of MIS .. 4

## 8.3.1. Configuration design

- Data sharing – storage capacity of the databases is appropriate.
- Process speed - memory processing architect decides the CPU.
- Communication protocol – shows how the different platforms are linked.
- Interface and gateways – determine data transfer on various location.
- Security and integrity – determined by operating system's configuration.
- Languages and packages – determined hardware-software choice.

## 8.4. IT Selection Plan

- Site preparation – IT installation may need space:
  - Server rooms, demo room, laboratories.
- System development plan – equipment procured and staff trained.
- IT installation schedule – timing for powering up the MIS has to be determined.

# 8. Implementation of MIS .. 5

## 8.4. IT Selection Plan

- Training of users – users often need training on various IT facilities.
- Investment plan – cost-benefit analysis of the IT plan required.
- Choice of IT system should be guided by the following:
  - Scalable architecture,
  - Upgradeable software,
  - Open system,
  - Communication through gateways and interfaces

## 8.5. IT Evaluation

- It is evaluated in the following dimension:

# 8. Implementation of MIS .. 6

**a. Technical Evaluation**

- Testing the technical details:
  - Data transfer, responses, connectivity, hardware platform.
- Testing reliability, security, dependability.

**b. Operational Evaluation**

- Checking people related issues, such as:
  - Whether system procedure is complementary and conducive.
  - The capacity of the operators
  - And, readiness of the operators to accept change.

**c. Financial Evaluation**

- Checking the value of information it gives,
- And, the relative cost of the comparable alternatives.

# 9. DECISION SUPPORT SYSTEMS

## 8.1. Features of DSS

- DSS diagnoses problems and proposes possible system re-design.
- Undertakes sensitivity analysis on aspects of the problem.
- DSS supports but does not by itself generate decisions.

## 8.1.1. Attributes of Decision Support System

- Flexibility – supports easy and speedy decisions.
- Simplicity – uses simplified models of decision making.
- Database: The decision supports the database.

## 8.1.2. Types of Decision Support System

***Status inquiry systems* -** The decisions and solution is unique relation.

# 9. DECISION SUPPORT SYSTEMS

## 8.1.2. Types of Decision Support System

- ***Data analysis systems* –** processes vary as the problem.
- **Information analysis systems –** engages basically in data analysis.
- ***Accounting systems* –** process financial data for control and decision.
- ***Model based systems* -** Simulation or optimization models:
  - Often one time or infrequent situations.
  - Provide general operational guidelines.
  - E.g., product mix decision, material mix, job scheduling rules;
  - Resources or asset or facilities planning systems.

## 8.2. Design of DSSs

- Developed by the users and system analysts jointly.
- DSSs are multi-faceted – use principles from various disciplines.

# 9. DECISION SUPPORT SYSTEMS

## 9.3.Deterministic Systems

- Deterministic systems are DSSs structured as business models.

### a. Behavioral models

- Used to understand relationship among variables.
- Supports understanding of behavioral relationships.
- E.g., a regression model.

### b. Management science models

- Management systems turned to DSS models.
- E.g., budgetary systems, cost accounting systems;
- Inventory models, and production management models.

# 9. DECISION SUPPORT SYSTEMS

## 9.3.Deterministic Systems

### c. Operations Research (OR) Models

- OR models are mathematical models.
- OR models address optimization problems –
- E.g., profit optimization and cost reduction.
- Maximizes an objective subject to constraints.
- Optimizing inventory allocation and management.

### d. Artificial Intelligence (AI) System

- AI is Intelligence supported by knowledge and reasoning.
- AI stored in databases for future use.

# 9. DECISION SUPPORT SYSTEMS

## 9.3.Deterministic Systems

## d. Artificial Intelligence (AI) System

- AI system falls into three basic categories:
  - Expert systems - knowledge based;
  - Natural Language (Native languages) Systems;
  - And, Perception System (vision, speech, touch);
- AI is a software technique applied to the nonnumeric data.
- The data is presented in symbols, statements, and patterns.
- AI uses the following for problem solving:
  - symbolic processing,
  - social and scientific reasoning,
  - Conceptual modeling.

# 9. DECISION SUPPORT SYSTEMS

## 9.3.Deterministic Systems

## e. Knowledge Based Expert System (KBES)

Knowledge based problem solving approach considers:

- The specific constraints within a domain,
- Checks the solution options within a knowledge domain,
- And an option with reference to a goal.
- Articulates the problem characteristics.
- A mix of theory and application of the subject;
- Organized information on the problem;
- Ability to generate solution options.
- Critical composites of KBES –
  - knowledge base, inference and use control mechanisms.

# 9. DECISION SUPPORT SYSTEMS

## 9.3.Deterministic Systems

### e.1. Semantic networks

- A network of nodes connected by arcs.
- Node represents an entity, and the arc the association with meaning.

### e.2. Frames

- An organized data structure of knowledge.
- A frame can be related to other frames.
- A frame consists of the slots representing a part of the knowledge.
- The slot is expressed as data, information, process and rules.

### e.3. Rules

- A conditional outcome that occur under certain conditions.
- Some rules are in the form of ‘If Then’ statements.

# 9. DECISION SUPPORT SYSTEMS

## 9.3.Deterministic Systems

### e.4. Rules

- E.g., If it rains, then the streets will be wet.
- If a knife is blunt, then it cannot cut well.

### e.5. Inference mechanism

  - Based on the principle of reasoning.
  - Goal driven reasoning  is called Backward Chaining to goal.
  - Data driven reasoning it is called Forward Chaining to goal.
  - Selecting either backward or forward chaining is situation specific.
  - Backward chaining is solving a problem after the event.
  - Forward chaining is preventing a problem or breakdown.
- The KBES uses both the methods of reasoning.

# 9. DECISION SUPPORT SYSTEMS

## 9.4. MIS and the Role of DSS

- The DSS could be an internal part of the MIS
- DSS can be embedded or kept out of the MIS:
- DSS embedded in MIS for internally sourced information.
- DSS kept out of MIS when information is sourced internally and externally.