

Topic –Types of Information Systems

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DATA AND INFORMATION

- Data: facts and figures that are not currently being used in a decision process; form of historical records that are recorded and filed without immediate intent to retrieve for decision making
- Information: data that has been retrieved, processed, or otherwise used for informative or inference purposes, argument, or as a basis for forecasting or decision-making



RELATIONSHIP BETWEEN DATA AND INFORMATION

CHARACTERISTICS OF INFORMATION

- Relevance
- Timeliness
- Accuracy
- Completeness
- Summarization
- Reliability
- Validity
- Consistency
- Up-to-date
- Impartiality
- Cost-benefit analysis
- Frequency of transmission

TYPES OF INFORMATION

- Strategic information:
 - For long term planning
 - Top level management
 - Unstructured
 - Small volume
 - Source: external
 - Difficult to obtain
- Tactical information:
 - For medium term planning to run the business efficiently
 - Middle level management
 - Less unstructured
 - Volume is more than strategic information
 - Source: internal and external

Contd.

- Operational information:
 - For short term planning (day to day operations of an organization)
 - Supervisory level management
 - Easy to obtain
 - Volume is much more than tactical information
 - Source: internal
- Statutory information:
 - Imposed by law
 - Source: processing internal data
 - Clearly specified

INFORMATION SYSTEM

- Arrangement of people, data, processes, interfaces, networks and technology that interact to support and improve both day-to-day operations in a business as well as support the problem-solving and decision-making needs of management
- Set of interrelated components that collect, process, store and distribute data and information, and provide a feedback mechanism to meet an objective

TYPES OF INFORMATION SYSTEM

1. Transaction Processing System (TPS)
2. Management Information System (MIS)
3. Decision Support System (DSS)
4. Executive Information System (EIS)
5. Expert System (ES)
6. Office Automation System

Decision-Making Levels of an Organization

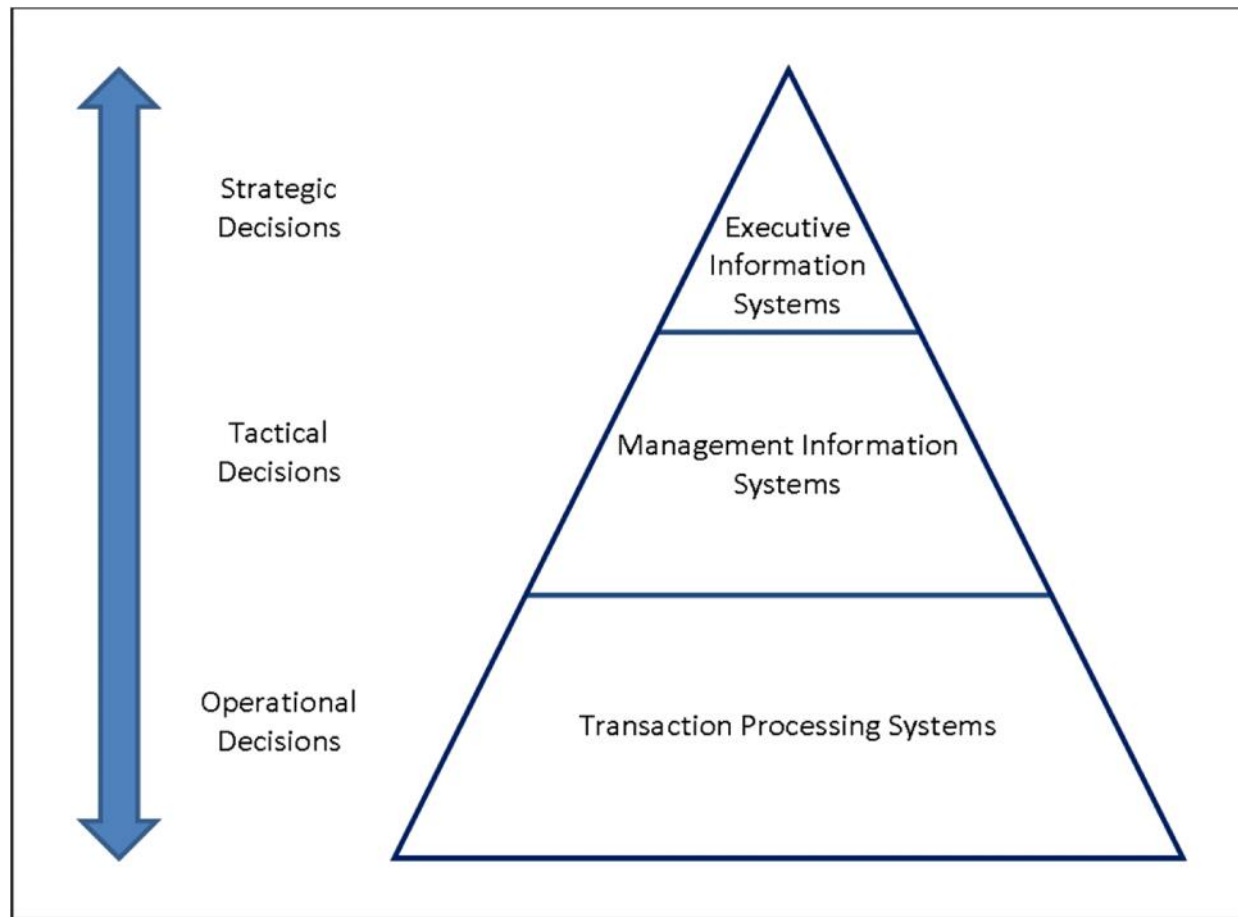
- Executive level (top)
 - Long-term decisions
 - Unstructured decisions
- Managerial level (middle)
 - Decisions covering weeks and months
 - Semi-structured decisions
- Operational level (bottom)
 - Day-to-day decisions
 - Structured decisions

Decision-Making Levels of an Organization

Figure 6.3 Organizations are composed of levels, with each using information technology to automate activities or assist in decision making.



Three level pyramid model based on the type of decisions taken at different levels in the organization



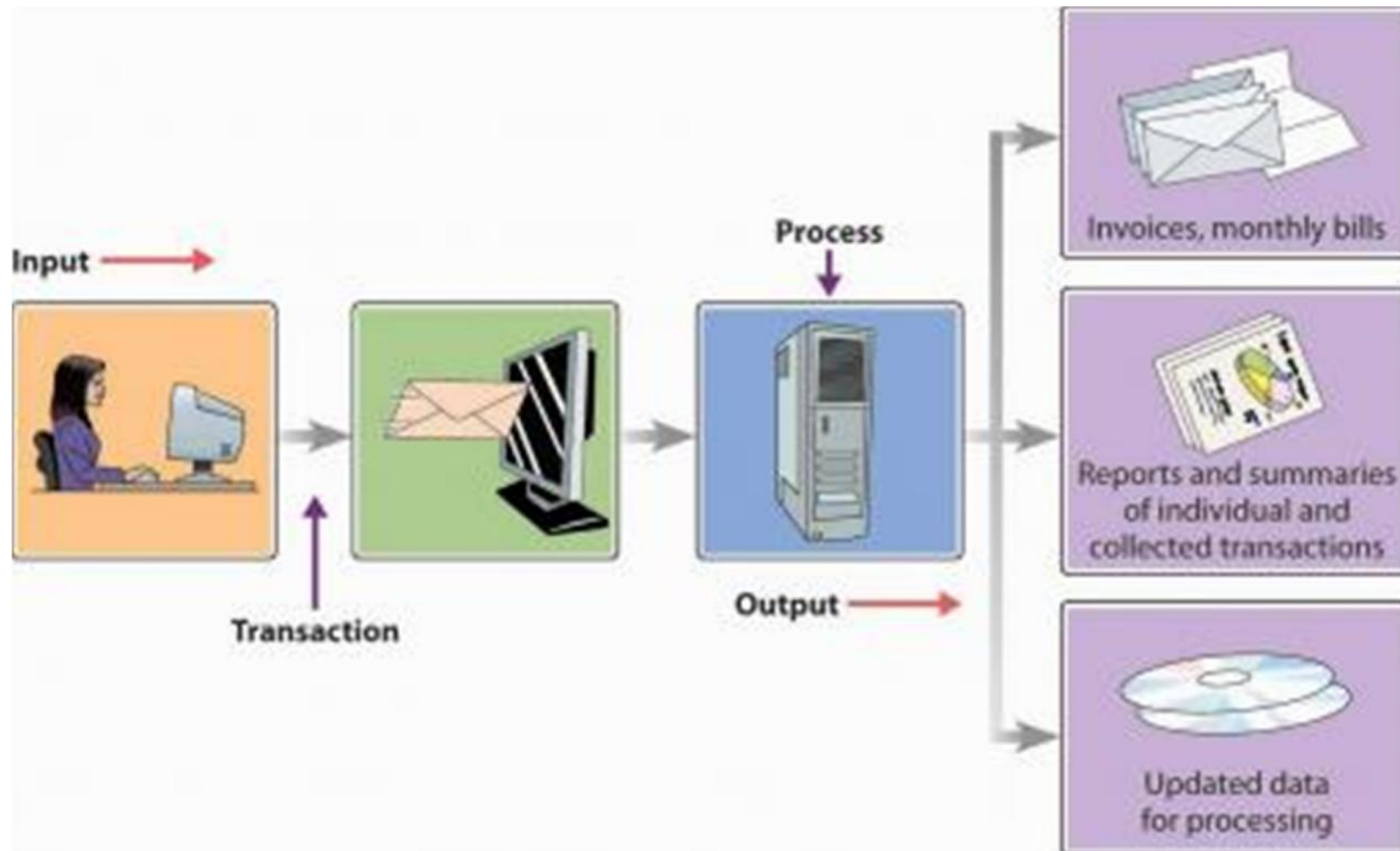
TRANSACTION PROCESSING SYSTEM

Transaction Processing System are operational-level systems at the bottom of the pyramid. They are usually operated directly by shop floor workers or front line staff, which provide the key data required to support the management of operations. This data is usually obtained through the automated or semi-automated tracking of low-level activities and basic transactions

TRANSACTION PROCESSING SYSTEM

- Transaction = an event that generates or modifies data
 - Used at Operational level of the organization
- Processes business events and transactions to produce reports
- Goal: to automate repetitive information processing activities within organizations
 - Increases speed
 - Increases accuracy
 - Greater efficiency
- Supports the monitoring, collection, storage, processing, and dissemination of the organization's basic business transactions
- Mainly includes accounting and financial transactions
- Mainly used for providing other information systems with data.

TPS



TRANSACTION PROCESSING SYSTEM

- Role of TPS

- Produce information for other systems
- Cross boundaries (internal and external)
- Used by operational personnel + supervisory levels
- Efficiency oriented

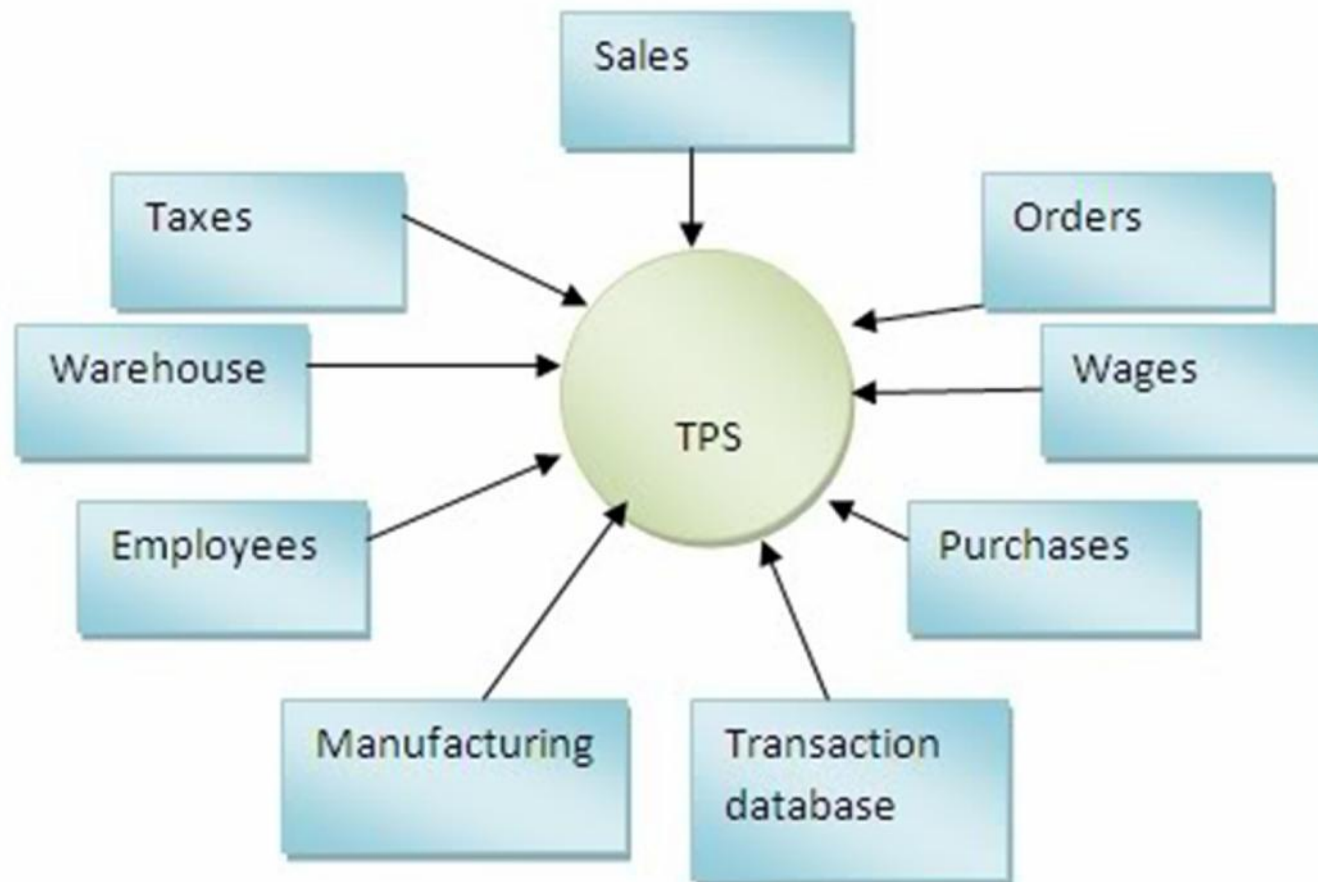
- Examples

- Payroll processing
- Sales and order processing
- Inventory management
- Accounts payable and receivable

OBJECTIVES OF TPS

- Efficient and effective operation of the organization
- Provide timely documents and reports
- Increases the competitive advantage
- Provides necessary data for tactical and strategic systems such as DSS
- Provide a framework for analyzing an organization's activities

TRANSACTION PROCESSING SYSTEM



MANAGEMENT INFORMATION SYSTEM

For historical reasons, many of the different types of Information Systems found in commercial organizations are referred to as "Management Information Systems". However, within our pyramid model, Management Information Systems are management-level systems that are used by middle managers to help ensure the smooth running of the organization in the short to medium term. The highly structured information provided by these systems allows managers to evaluate an organization's performance by comparing current with previous outputs.

MANAGEMENT INFORMATION SYSTEM

- Refers to the data, equipment and computer programs that are used to develop information for managerial use
- Converts raw data from transaction processing system into meaningful form
- Focus on the information requirements of low to middle level managers

MANAGEMENT INFORMATION SYSTEM

- **Role of MIS**

- Based on internal information flows
- Support relatively structured decisions
- Inflexible and have little analytical capacity
- Used by lower and middle managerial levels
- Deals with the past and present rather than the future
- Efficiency oriented

- **Some examples of MIS**

- Sales management systems
- Inventory control systems
- Budgeting systems
- Management Reporting Systems (MRS)
- Personnel (HRM) systems

OBJECTIVES OF MIS

- Provide summary information of organisational activity at periodical intervals
- Operational control and efficiency
- Focus on internal information
- Useful to structured decisions

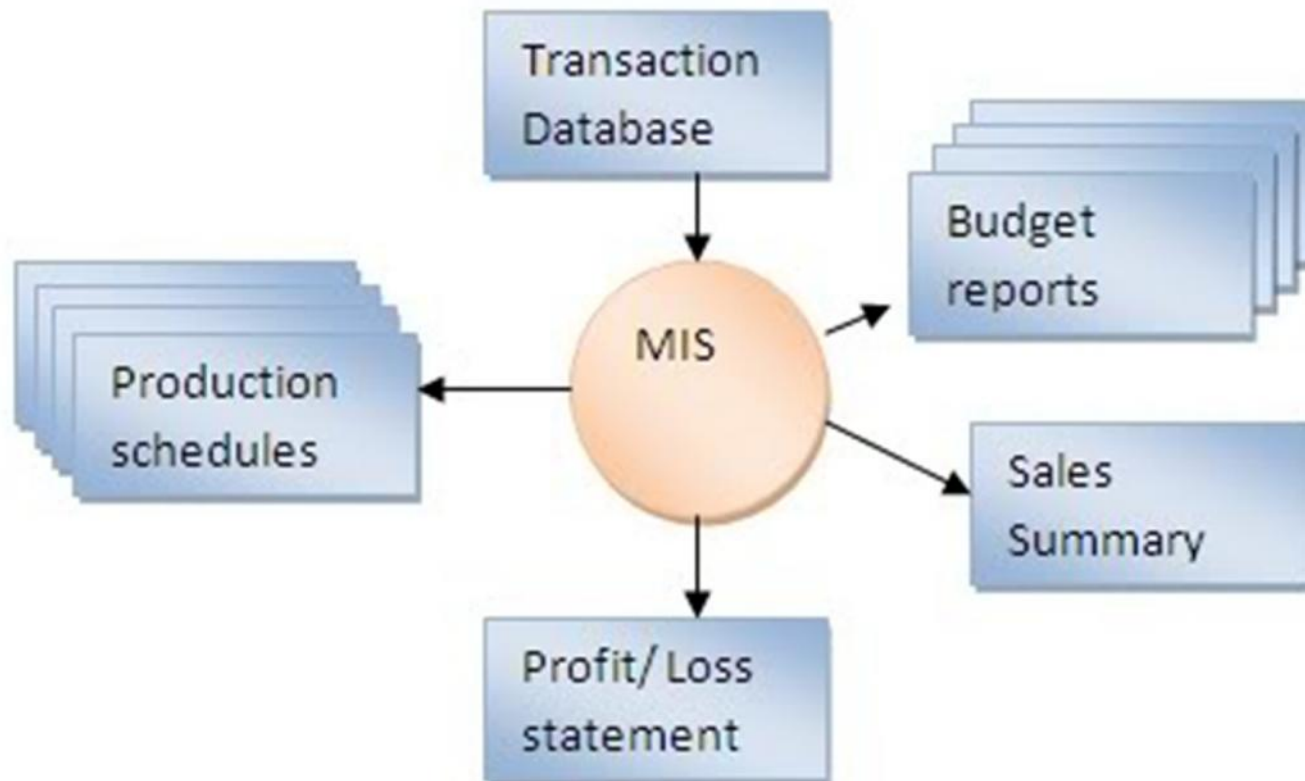
FUNCTIONS OF MIS

FUNCTIONS OF A MIS IN TERMS OF DATA PROCESSING REQUIREMENTS

INPUTS	PROCESSING	OUTPUTS
Internal transactions Internal files Structured data	Sorting Merging Summarizing	Summary reports Action reports Detailed reports

MIS are built on the data provided by the TPS

MIS



DECISION SUPPORT SYSTEM

A Decision Support System can be seen as a knowledge based system, used by senior managers, which facilitates the creation of knowledge and allow its integration into the organization. These systems are often used to analyze existing structured information and allow managers to project the potential effects of their decisions into the future. Such systems are usually interactive and are used to solve ill structured problems. They offer access to databases, analytical tools, allow "what if" simulations, and may support the exchange of information within the organization.

DECISION SUPPORT SYSTEM

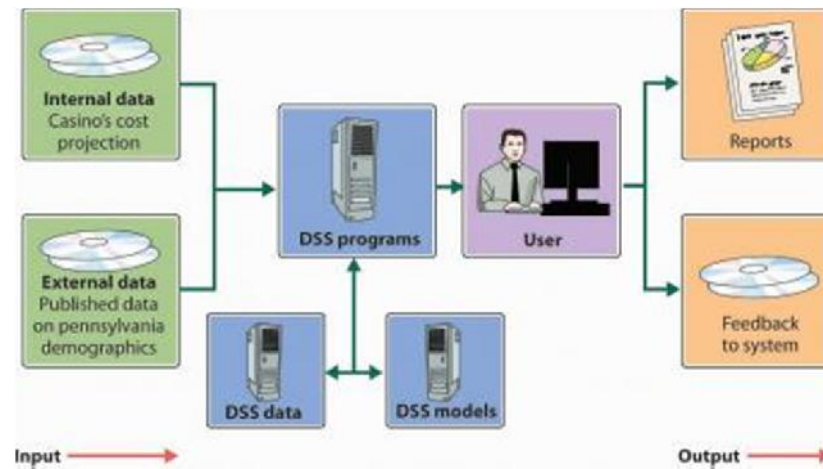
- Refers to systems which support the process of decision-making dealing with unstructured problems
- May be defined as the “what-if” approach that assists management in formulating policies and projecting the likely consequences of decisions
- Considered as an extension of MIS
- An effective blend of human intelligence, information technology and software
- Provides strategic information

FUNCTIONS OF A DSS

- DSS manipulate and build upon the information from a MIS and/or TPS to generate insights and new information

INPUTS	PROCESSING	OUTPUTS
Internal Transactions Internal Files External Information	Modelling Simulation Analysis Summarizing	Summary reports Forecasts Graphs / Plots

DSS



DECISION SUPPORT SYSTEM

- **Role of DSS**

- Support ill- structured or semi-structured decisions
- Have analytical and/or modelling capacity
- Used by more senior managerial levels
- Are concerned with predicting the future
- Are effectiveness oriented

- **Some examples of DSS**

- Group Decision Support Systems (GDSS)
- Computer Supported Co-operative work (CSCW)
- Logistics systems
- Financial Planning systems
- Spreadsheet Models

COMPARISON BETWEEN MIS AND DSS

MIS	DSS
Focuses on structured tasks	Focuses on semi-structured tasks
Emphasis on data storage	Emphasis on data manipulation
Data is often accessed indirectly by managers	Data is accessed directly by managers
Places emphasis on efficiency of decision	Places emphasis on effectiveness of decision
Provides tactical information to top management to take decisions	Provides strategic information
Need is regular and recurring	Need is irregular

EXECUTIVE INFORMATION SYSTEM

Executive Information Systems are strategic-level information systems that are found at the top of the Pyramid. They help executives and senior managers analyze the environment in which the organization operates, to identify long-term trends, and to plan appropriate courses of action. The information in such systems is often weakly structured and comes from both internal and external sources. Executive Information System are designed to be operated directly by executives without the need for intermediaries and easily tailored to the preferences of the individual using them.

EXECUTIVE INFORMATION SYSTEM

- Specialized form of DSS
- Used by top-level managers
- Reduce the information overload on executives
- Makes use of internal and external information
- Provides managers and executives flexible access to information for monitoring operational results and general business conditions
- Provides a comprehensive picture of business performance by analysing key performance indicators for growth
- Meets strategic information needs of the top management
- Also known as Executive Support System

EXECUTIVE INFORMATION SYSTEM

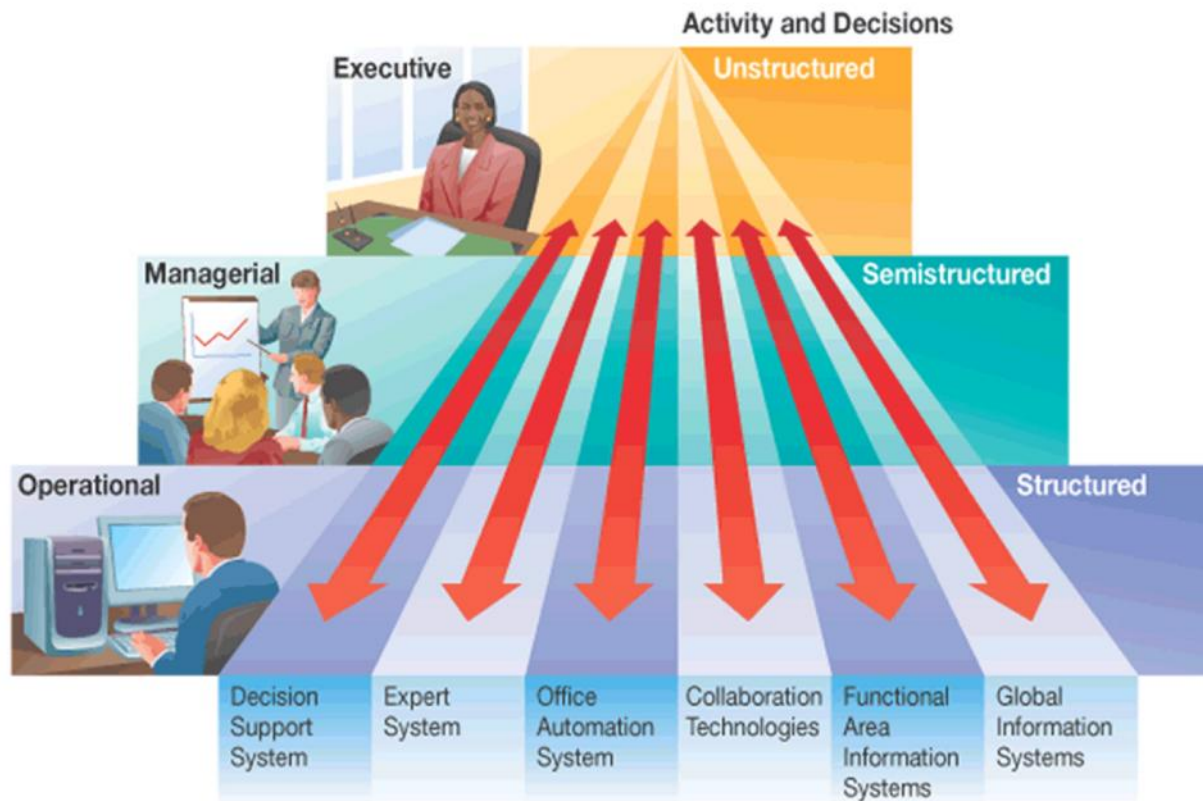
- Role of EIS
 - Are concerned with ease of use
 - Are concerned with predicting the future
 - Are effectiveness oriented
 - Are highly flexible
 - Support unstructured decisions
 - Use internal and external data sources
 - Used only at the most senior management levels
- Some examples:
 - Executive Information Systems tend to be highly individualized and are often custom made for a particular client group; however, a number of off-the-shelf EIS packages do exist and many enterprise level systems offer a customizable EIS module

FUNCTIONS OF AN EIS

INPUTS	PROCESSING	OUTPUTS
External Data Internal Files Pre-defined models	Summarizing Simulation "Drilling Down"	Summary reports Forecasts Graphs / Plots

Information Systems that Span Organizational Boundaries

Figure 6.20 Organizational boundary–spanning information systems.



EXPERT SYSTEMS

Expert systems can be defined as programs that help the computer make decisions in a similar way as an expert in specific domain, a particular subject area of interest. It aims at formalising expertise and make it available for repetitive type of business decisions. It makes use of artificial intelligence to generate knowledge out of the information, existing theories, beliefs and experiences of managers in various business activities. It mimics the judgment of experts by following sets of rules that experts would follow. They're useful in such diverse areas as medical diagnosis, portfolio management, and credit assessment.

EXPERT SYSTEMS

- Expert systems can be used in several areas of an organisation:
 - Accounting and finance
 - In selecting forecasting models
 - In providing tax advice
 - Marketing
 - In establishing sales quotas
 - In responding to customer inquiries
 - Manufacturing
 - In determining whether process is running correctly
 - In analysing quality and providing corrective actions
 - In product design and layout
 - Others
 - In assessing project proposals, etc

Artificial intelligence

- Artificial intelligence is referred to as the capabilities which can be imparted to computers to enable them to display intelligent human-like behavior.
- AI is the science of developing computer systems that can mimic human behavior. The term was coined in 1956.

AN EXAMPLE OF EXPERT SYSTEM

RULES CONTAINED IN KNOWLEDGE BASE:

1. If the applicant has required education, then hire applicant
2. If the applicant has required experience, then hire the applicant
3. If applicant has degree in Commerce, then applicant has required education.
4. If applicant has two or more years experience, then the applicant has required experience

And so on...

- The user enters the above information. The inference engine uses the rules to evaluate the data entered.
- In this example, if the user enters education as B.Com and experience as four years, then the inference engine would determine that the applicant has the requisite education and experience as per Rule 3 and Rule 4 respectively. Therefore as per Rule 1 and 2, the applicant should be hired. This recommendation is the output of the system

OFFICE AUTOMATION SYSTEMS

Office automation is the integration of computer, telecommunications and office equipment technologies to improve the execution of business functions through increasing the productivity, effectiveness and working conditions of office support. The concept of office automation encompasses the application of computer and communication technology to improve the productivity of all types of office workers including clerical, administrative, professional and executive.

OFFICE AUTOMATION SYSTEMS

- Help people perform personal record keeping, writing, and calculations efficiently
- Aim is to improve the productivity of managers at various levels of management by providing secretarial assistance and better communication facilities.
- Main types of tools include:
 - Spreadsheet programs
 - Text & image processing systems
 - Presentation packages
 - Personal database systems and note-taking systems
- Examples:
 - Communicating and scheduling
 - Document preparation
 - Analyzing data
 - Consolidating information

COMPONENTS OF OFFICE AUTOMATION SYSTEM AND THEIR FUNCTIONS

COMPONENT	FUNCTION
Word Processing	Facilitates the preparation of typed documents
Electronic Mail	Allows typed messages to be transmitted electronically
Voice Mail	Allows spoken messages to be transmitted electronically
Facsimile	Allows documents to be transmitted electronically
Teleconferencing	Allows bringing together of participants electronically without travel
Telecommuting	Allows employees to work from home
Computer Terminals	Provide access to other components of the automated office
Micrographics	Stores documents on microfilm for ease of storage and retrieval