

WHAT IS INFORMATION SYSTEM?

An information system can be simply defined as the interacting of man and machine which, under man's control, gathers data and disseminates information. The main objective of such a system is to provide information to its user. To accomplish this, data must be evaluated analyzed and processed to produce meaningful and useful information on which management can take correct decision for further growth of the organisation. Information systems play very important roles in modern economy. They inform us of opportunity and problems well in advance. Unprocessed facts and figures are simply data, not information. An information system is the basis for interaction between the user and the analyst. It provides instructions, commands and feedback. It determines the nature of relationship among decision makers. In fact it may be viewed as a decision centre for the management at different levels. From this basis, an information system may be defined as a set of devices, procedures and operating systems designed around user-based criteria to produce information and communicate it to the user for planning, control and performance. Systems analysts develop several different types of information systems to meet a variety of business needs. There is a class of systems which are collectively known as Computer Based Information Systems (CBIS).

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

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.

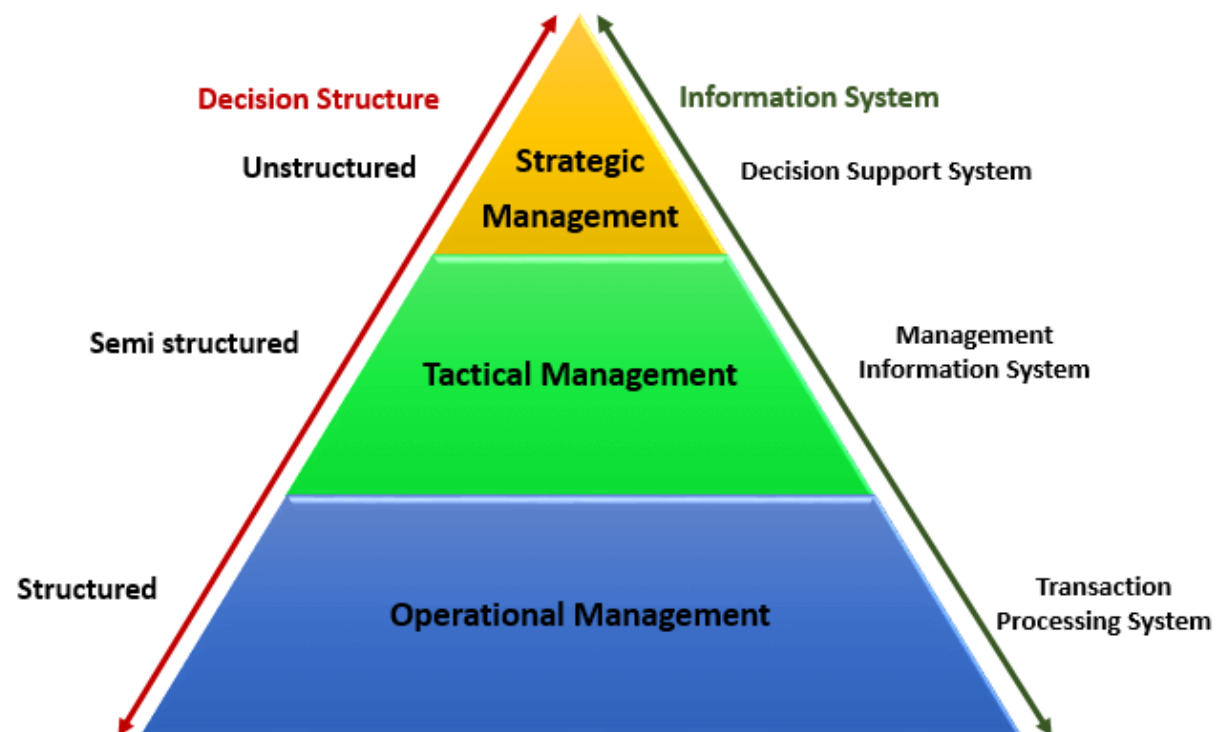
• Operational information: • For short term planning (day to day operations of an organization) • Supervisory level management • Easy to obtain • Volume is much more than tactical information • Source: internal

• Statutory information: • Imposed by law • Source: processing internal data • Clearly specified

Pyramid Diagram of Organizational levels and information requirements

Understanding the various levels of an organization is essential to understand the information required by the users who operate at their respective levels.

The following diagram illustrates the various levels of a typical organization.



Pyramid Diagram

Operational management level

The operational level is concerned with performing day to day business transactions of the organization.

Examples of users at this level of management include cashiers at a point of sale, bank tellers, nurses in a hospital, customer care staff, etc.

Users at this level use make structured decisions. This means that they have defined rules that guides them while making decisions.

For example, if a store sells items on credit and they have a credit policy that has some set limit on the borrowing. All the sales person needs to decide whether to give credit to a customer or not is based on the current credit information from the system.

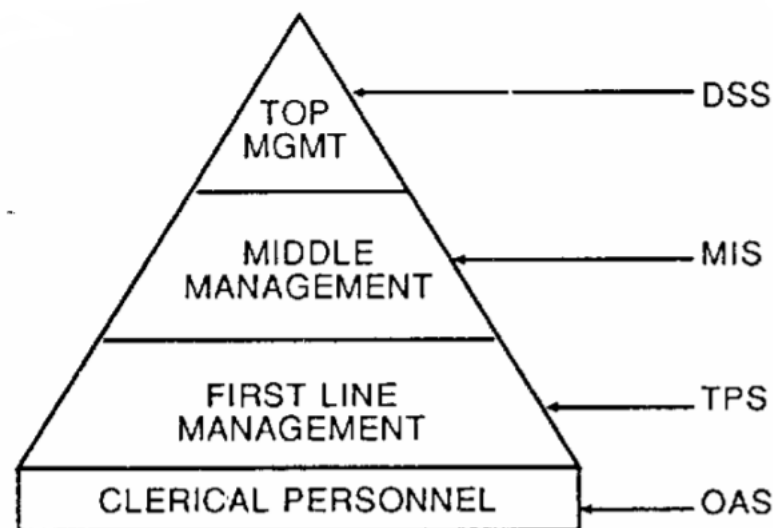
Tactical Management Level

This organization level is dominated by middle-level managers, heads of departments, supervisors, etc. The users at this level usually oversee the activities of the users at the operational management level.

Tactical users make semi-structured decisions. The decisions are partly based on set guidelines and judgmental calls. As an example, a tactical manager can check the credit limit and payments history of a customer and decide to make an exception to raise the credit limit for a particular customer. The decision is partly structured in the sense that the tactical manager has to use existing information to identify a payments history that benefits the organization and an allowed increase percentage.

Strategic Management Level

This is the most senior level in an organization. The users at this level make unstructured decisions. Senior level managers are concerned with the long-term planning of the organization. They use information from tactical managers and external data to guide them when making unstructured decisions.



Hierarchical View of CBIS

Major Types of Information Systems

Different types of information systems have been developed to meet a variety of business needs. These systems are collectively known as computer based information systems. As we have different types of transportation systems such as railway systems, highway systems and airline systems, computer based information systems also of many types. They are classified as:

- Office Automation Systems (OAS)
- Transaction Processing Systems (TPS)
- Management Information Systems (MIS)
- Decision Support Systems (DSS)
- Knowledge Based Systems (KBS)

. Transaction Processing Systems

Every firm needs to process transactions in order to perform its daily business operations. A transaction refers to any event or activity that affects the organization. Depending on the organization's business, transactions may differ from one organization to another. In a manufacturing unit, for example, transactions include order entry, receipt of goods, shipping, etc., while in a bank, transactions include deposits and withdrawals, cashing of cheques, etc.

However, some transactions, including placing orders, billing customers, hiring employees, employee record keeping, etc., are common to all organizations. To support the processing of business transactions, transaction processing systems (TPS) are used in organizations.

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

Office Automation Systems

An office automation system (OAS) is a collection of communication technology, computers, and persons to perform official tasks. It executes office transactions and supports official activities at every organizational level. These activities can be divided into clerical and managerial activities.

Clerical activities performed with the help of an office automation system include preparing written communication, typesetting, printing, mailing, scheduling meetings, calendar keeping, etc. Under managerial activities, an office automation system helps in conferencing, creating reports and messages, and controlling the performance of the organization. Many

applications like word processing, electronic filing, and e-mail are integrated into office automation systems.

- **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

Knowledge Work Systems

A knowledge work system (KWS) is a specialized system built to promote the creation of knowledge and to make sure that knowledge and technical skills are properly integrated into the business. It helps the knowledge workers in creating and propagating new information and knowledge by providing them the graphics, analytical, communications, and document management tools.

The knowledge workers also need to search for knowledge outside the organization. Thus, the knowledge work system must give easy access to external databases. In addition, knowledge work systems should have a user-friendly interface to help users to get the required information quickly and easily.

Some examples of knowledge work systems are computer-aided design (CAD) systems, virtual reality systems, and financial workstations.

Management Information Systems

Management information systems are specially developed to support the planning, controlling, and decision-making functions of middle managers. A management information system (MIS) extracts transaction data from underlying TPSs, compiles them, and produces information products in the form of reports, displays, or responses.

These information products provide information that conforms to the decision-making needs of managers and supervisors. Management information systems use simple routines like summaries and comparisons which enable managers to take decisions for which the procedure of reaching a solution has been specified in advance.

Generally, the format of reports produced by MIS is pre-specified. A typical MIS report is a summary report, such as a report on the quarterly sales made by each sales representative of the organization. Another type of management information system report is an; for example, exception report that specifies the exception conditions the sales made by some sales representative is far below than expected.

Usually, management information systems are used to produce reports on a monthly, quarterly, or yearly basis. However, if managers want to view the daily or hourly data, MIS

enables them to do so. In addition, they provide managers online access to the current performance as well as past records of the organization.

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

Decision Support Systems

A decision support system (DSS) is an interactive computer-based information system that, like MIS, also serves at the management level of an organization. However, in contrast to MIS, it processes information to support the decision-making process of managers.

It provides middle managers with the information that enables them to make intelligent decisions. A decision support system in a bank, for example, enables a manager to analyze the changing trends in deposits and loans in order to ascertain the yearly targets.

Decision support systems are designed for every manager to execute a specific managerial task or problem. Generally, they help managers to make semi-structured decisions, the solution to which can be arrived at logically. However, sometimes, they can also help in making complex decisions. To support such decisions, they use the information generated by OASs and TPSs.

Decision support systems have more analytical power as compared to other information systems. They employ a wide variety of decision models to analyze data or summarize a vast amount of data into a form (usually the form of tables or charts) that makes the comparison and analysis of data easier for managers.

They provide an interactive environment so that the users could work with them directly, add or change data as per their requirements, and ask new questions.

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

Executive Support Systems

An executive support system (ESS) – an extension of MIS – is a computer-based information system that helps in decision-making at the top level of an organization. The decisions taken with the help of an executive support system are non-routine decisions that affect the entire organization and, thus, require judgment and sight.

As compared to DSSs, ESSs offer more general computing capabilities, better telecommunications, and efficient display options. They use advanced graphics software to display critical information in the form of charts or graphs that help senior executives to solve a wide range of problems.

To make effective decisions, they use summarized internal data from MIS and DSS as well as data from external sources about events like new tax laws, new competitors, etc. They filter, compress, and track data of high importance and make it available to the strategic-level managers.

Executive support systems help to monitor performance, track activities of competitors, identify opportunities, and forecast trends. They also assist senior managers in answering the following question:

- What business should we do?
- How are our competitors doing the business?
- Which units can be sold and which new units are to be bought?

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

Knowledge Based Systems

Knowledge Based Systems (KBS) goes beyond the decision support philosophy to incorporate the expert system technology into the decision making framework. Expert Systems (ES) have been the tools and the techniques perfected by artificial intelligence (AI) researchers to reduce decision influences based on codified knowledge. The codification of knowledge uses the principles of knowledge representation (part of the large theoretical ideas of knowledge engineering). Typically such codification uses rules like IF-THEN rules to represent logical implications. Using first order predicate calculus, it is fairly easy to construct inference engines that use forward chaining or backward chaining to perform the induction.