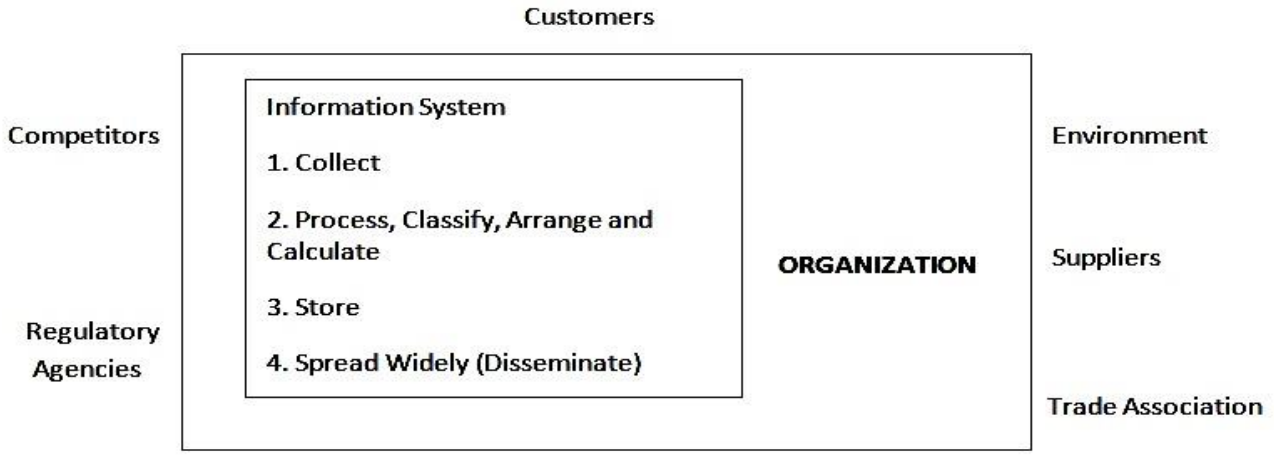
Information System Management (Unit-1)

An information system can be defined as a set of procedures that collect or retrieve process, store and spread widely (disseminate) information to support decision making and control.

Basic Operations of an Information System



The basic operations of an Information Systems are to collect, process, store and spread widely (disseminate) information in an organization. The information may be collected from inside the organization or from the external environment and may be distributed to insiders and outsiders. Figure illustrates a general diagram regarding basic operations of information systems. The primary factors acting as environment to the system are:-

1) **Suppliers** :

   The process/organization providing raw material partially finished materials/some components etc., to the organization.

2) **Trade Associations :**

   The group of persons from various organizations that provides/ generates beneficiary values to the organizations. A trade organization can provide or support a current organization helping to do better.

3) **Regulatory Authorities :**

   The government and non-government agencies that provide working rules, quality assurance, staff welfare, and production control etc.

4) **Competitors :**

The group of persons /organization producing same products, the current organization is producing.

5) **Customers :**

The most important component of business environment i.e, the consumer of the product is called a customer.

The above said external entities provide an outside information to the organization as well it also expects information from the organization.

The internal part of organization requires an Information System that works internally as well as is harmony with the external entities. The Information System has following specific tasks to accomplish.

i) Collect the information.

ii) Process the information: It involves

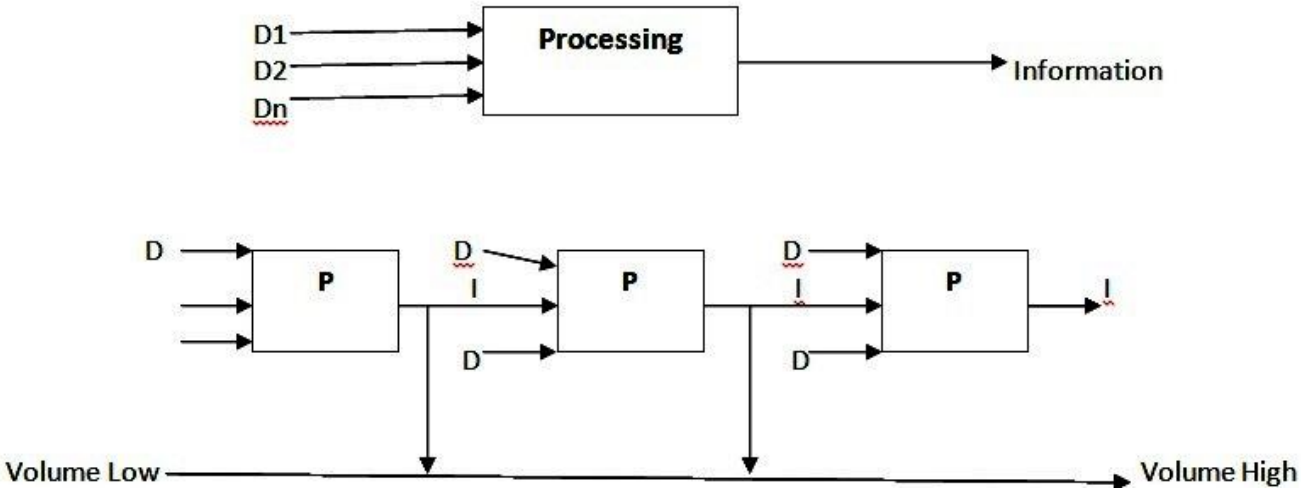
a) Classification of information.

b) Arrangement of information.

c) Calculation over information.

iii) Store the information.

iv) Spread Widely (Disseminate), the information i.e, distribute the information to relevant departments/ parts of system.



The basis of MIS is getting the relevant information at a given point of time that helps in taking a decision. In earlier times the management information systems used the manual process called manual information processors for the purpose. In those times also there was existence of MIs. The invention of computer system has lead to more powerful. MIS because the processing time is reduced very much. In general are information processor is an entity accepting set of data (relevant) as inputs generating an output over which some decision may be taken.

The generated information may again be processed with additional data values to have new information helping in better decisions. Thus in an organization there exists a hierarchy of information processors, manual or automated generating information for decision making.

DATA INFORMATION AND INFORMATION SYSTEM

A raw fact is turned data or the information value that needs processing.

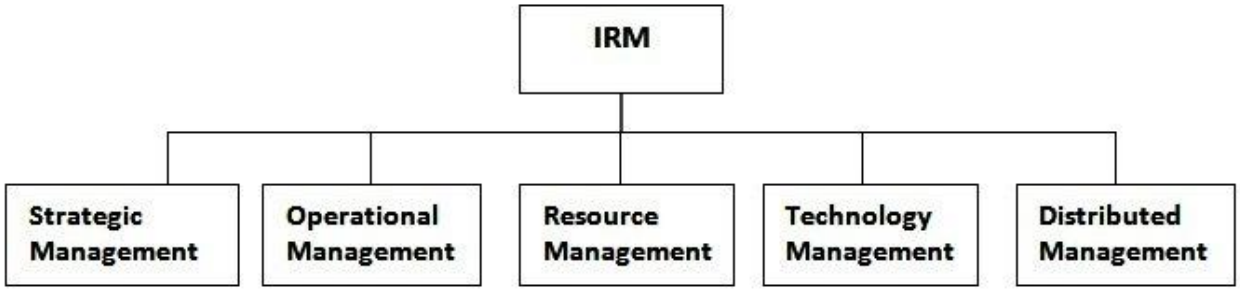
A relevant value that helps in understanding, decision making exerting control etc. is called information.

The system that accepts data generating information is termed as information systems.

INFORMATION RESOURCE MANAGEMENT (IRM)

IRM is an approach to management based on the concept that information is an organizational resource. Thus if we consider information to be a resource then we require management of it. To get correct processed information we require to have the input information in non-redundant and consistent form as well they should be available as and when needed. The functions incorporated

over information sets providing relevant information at any given point of time is specifically called IRM.



A Multidimensional Model of IRM

Figure illustrates a typical multidimensional model of IRM given by James O Brien. IRM is an IS managements concept that organizes the management and mission of information systems. The 5 major dimensions are:

1) **Strategic Management:**

   The basic task of every MIS is to provide correct strategic information to the management(top most) for decision making . The strategic management states that the information should be managed in sucha way that it is not available free to anyone without rights because this information always provides firms strategic objectives and competitive advantages.

2) **Operational Management:**

   The information should be processed /provided at relevant units of the system. Thus the management task is to bifurcate the information generation/processing at their relevant units.

3) **Resource Management:**

   In modern scenario computer systems: hardware and software, networking etc., have become a vital part. The management of these resources, which are information processors, must also be done such that right use of hardware and software can be made.

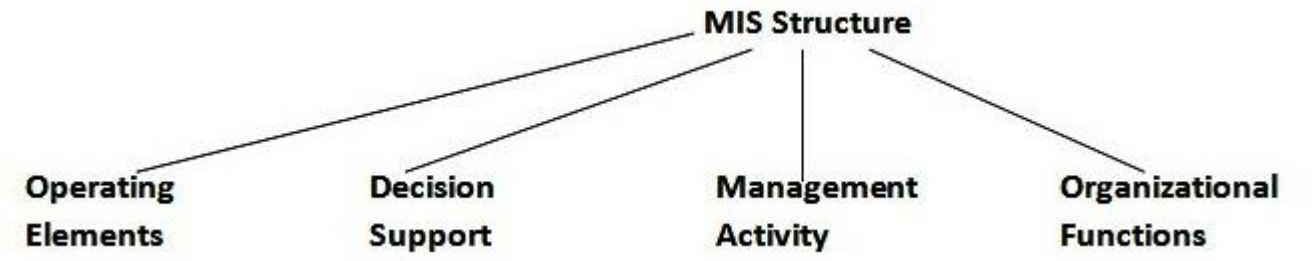
4) **Technology Management:**

   An organization should always cope with the latest trends and the advancements in technology. The management should look for latest information processing tools to have better utilization and generation of information.

5) **Distributed Management:**

The information should be classified into work groups according to the defined need at given managerial level. Here precise function must be given for the information resources produced from various units towards a specific units.

MIS STRUCTURE



An MIS structure is described in terms of 4 separate but related classifications:

1) Operating Elements.
2) Decision Support.
3) Management Activity.
4) Organizational Functions.

Operating Elements of an information Systems.

The management IS is a part of management structure that provides information for decision making at all the levels of organization. To process information we require several components and methods. Some of the components and methods are:

a) Physical Components.

b) Processing Functions.

c) Outputs for user.

Operating Elements

- Physical Components
  - Hardware
  - Software

- Database
- Procedures
- Operations Personnel.

- Processing Functions.
- Outputs for users.

Physical Components

The physical components are the entities that work together for processing of information required in the organization. The specific physical components are:

1) Hardware:

   The computer systems, peripherals such as keyboard, printer, mouse etc., storage devices, communication equipment, network setup elements or so.

2) Software:

   The systems applications software mounted over hardware that provides processing of information.

3) Database:

   Since data is stored over physical entities in form of storage media such as tapes, disks etc. hence the database in broader view is considered a physical component. In manual form the database resides in form of files, reports etc.

4) Procedures:

   The former operation sets acting on database in accordance with software over the hardware to get the relevant information some specific procedures are: Generating a report, Entering of data, enquiring from database.

5) Operations Personnel:

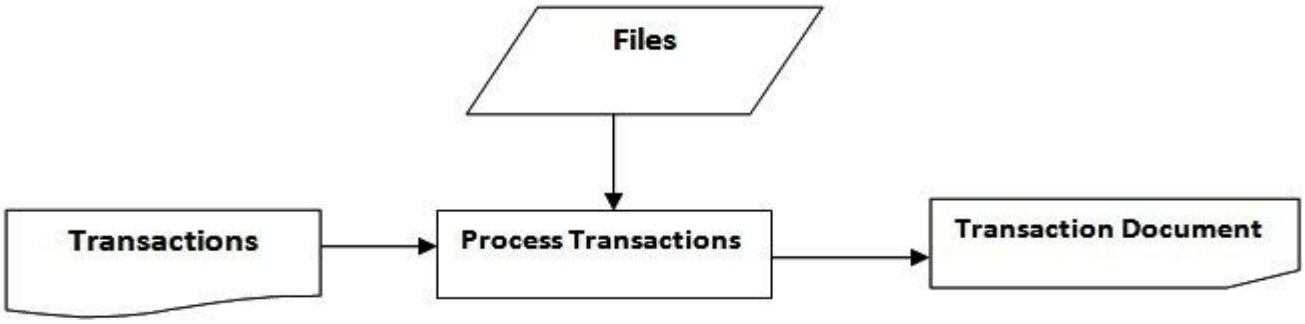
   The people of organization such as computer operator, system analyst, programmers, information managers etc. How they work? How they exchange information? What kind of information they exchange is needed to be defined as a sequence of operations?

Processing Functions

The physical components of information system only provides a description of hardware components, software used and the databases etc. it doesn't provide any information about what the system does. To describe the information processing, processing functions are used.

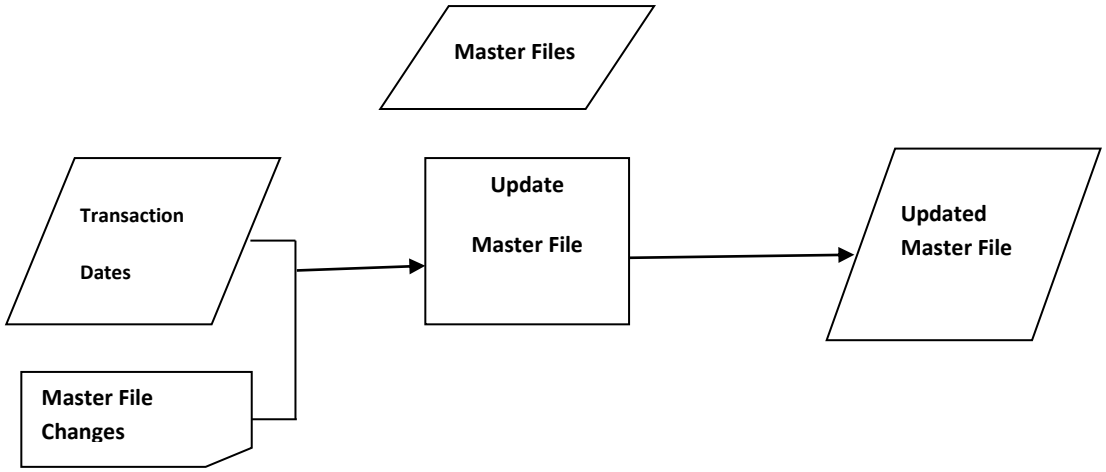
Processing functions are mechanisms that describe how the information is to be processed. There are five major processing functions as illustrated in figure 1.

1) Process Transactions



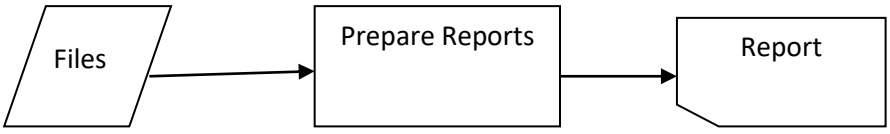
A unit activity such as making a purchase, making a sale, manufacturing a product etc. is termed process transaction. The process transaction may be exclusively an internal are or may involve the organization with external entity. Figure1 illustrates a simple process transaction. It accepts a unit transaction with a reference file processes it and produces transaction document.

2) Maintain History (Master) Files



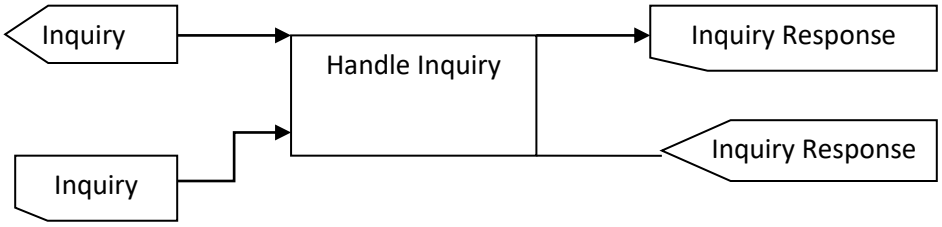
Many processing activity requires creation and file maintenance of master files for ex: creating employee salary slips. The process is defined with three inputs called transaction data, master file changes and master files themselves. According to the defined process the master file is updated with reference to transaction data in accordance with the master file changes. The output is an updated master file that again becomes a master file when next updation is called.

3) Produce Reports



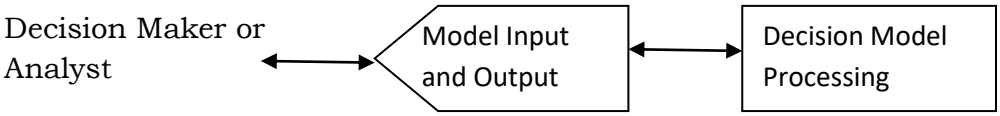
Reports play a significant role in an information system. Reports are produced an regular basis as well as they can be as-hoc type. The processing function defines the method to get an abstract or a precise piece of information from a large database of files.

4) Process Inquiries



An IS also requires to provide a quick or current information about an activity or event. These are called inquiries. An inquiry may be in form of soft or hard copy as input or output. The processing function for this purpose handles the query in accordance with authorization and generates the inquiry output.

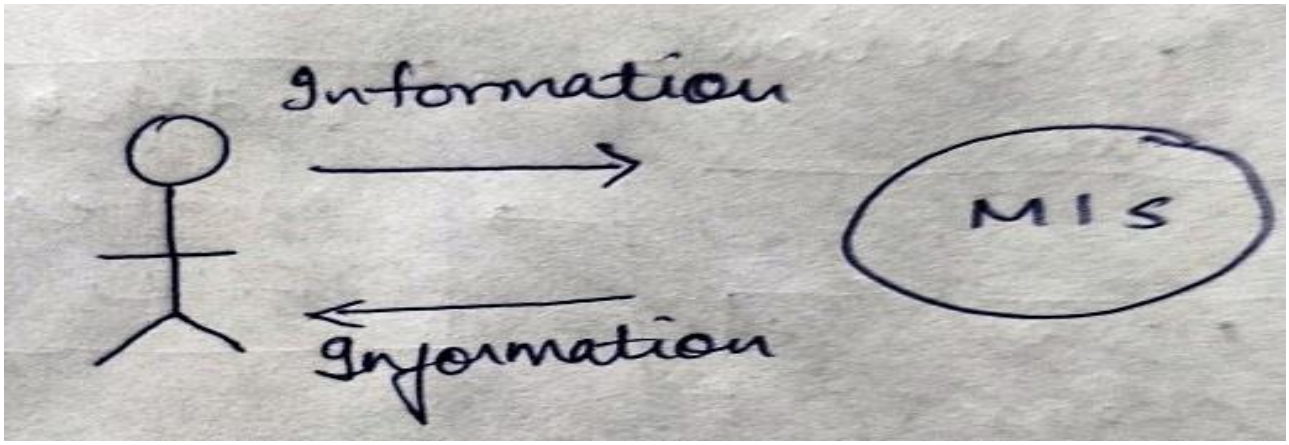
5) Process Interactive support application



The strategic decisions or the planning of system is defined for long terms. The process interactive support application works on the defined model working over current data/information providing the data/information for decision making.

OUTPUTS FOR USERS

The users of MIS provide input and receive output. The user interacts with an output dialog to which it provides input, processing is done and output is generated. Thus, the information system processing status solely depends on what kind of information is keyed in and what processing is executed.



The MIS primarily aims to provide value-based information over which decisions are taken. The output of information systems can be classified into five major types:

1) Transaction documents or screens.
2) Preplanned Reports.
3) Preplanned inquiry responses.
4) Ad-hoc reports and inquiry responses.
5) User – M/c dialog results.

At the primitive level the simplest atomic information processing such as customer billings, purchase orders, sales invoices are transaction documents. The transaction document refers directly to the operations of an organization. The transaction documents can be classified as

Transaction document type:

1) **Informational:** Reports or confirms that action will be or has been taken for ex: Sales order confirmation.
2) **Action:** Requests or instructions for action for ex: A purchase process initiates a purchase. The purchase process ten requires many tasks to be performed to fulfill it.
3) **Investigational:** Reports, exceptions, errors or other conditions for ex: stock taking with reference to purchased, processed and sold.

   The output labeled 2 to 5 provides the information for management and control. There are four major types of information generated.

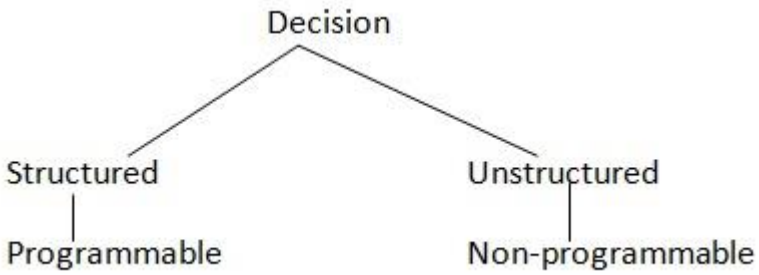
i) **Monitoring Information:** It confirms that action has been takes. It helps in diagnosis of errors if happen.

ii) **Problem finding information:** this information provided a comparative study of accumulated data with standards helping in projection.

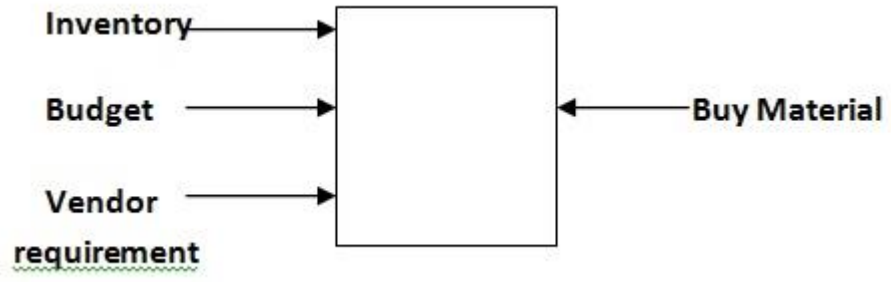
iii) **Action information:** this information is presented with specified action or implied action.

iv) **Decision Support:** the reports, inquiry, results used to perform analysis and making decisions.

MIS SUPPORT FOR DECISION MAKING



For Ex:



An organization requires decision to taken at every step of its Activity. The decision may be major or minor but every decision helps in moving towards the defined strategic goals. The decisions always rely on available information and given situations .MIS provide a voluminous information as well as some by value information for taking decisions.

Decision may be highly structured or unstructured in nature. A decision structured decision is pre-planned or pre-specified and is programmable in nature that is it is automated in general. On the other hand the unstructured decisions are non-programmable and are not frequently repeated. The decisions that are programmable are also structured in nature.

STRUCTURED PROGRAMMABLE DECISIONS

These are expressed as a set of instruction, flowchart, decision table or a formula. The structure decisions in context of MIS works over generated information in algorithmic form producing the decision values for example procurement of materials decision is based on the following management information.

1. Inventory status (reorder value).
2. Budget provision and current monetary status.
3. Vendor specifications and it is Goodwill.
4. Actual requirement of items.

The procedures for a structured decision are well defined where clear and unambiguous methods are followed. A structure decision merely gives information value that human decision maker considers for taking decisions.

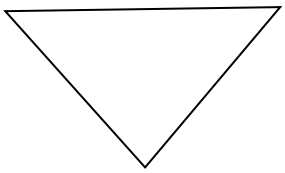
UNSTRUCTURED NON PROGRAMMABLE DECISIONS

They have no pre-established procedures. They are purely on ad-hoc basis where some internal or external situation forces the decision maker to take a decision in an unalgorithmic way. The information available is also to unstructured

MIS STRUCTURE BASED ON MANAGEMENT ACTIVITY

Characteristics of information	**Operational control**	**Management control**	**Strategic planning**
1) Source	Largely internal		external
2) Scope	Well defined, narrow		very wide
3) Level of aggregation	Detailed		aggregate
4) Time horizon	Historical		future
5) Currency	Highly current		quite old
6) Required accuracy	high		low
7) Frequency of use	very frequent		Infrequent

HIERARCHY OF MANAGEMENT ACTIVITY



1. Information for operational control (low level)
2. Information system for management control (middle level)
3. Information system for strategic planning (top level)

MIS is one of the most powerful tool that supports management activity thus the information system can be classified in terms of a hierarchy of management planning and control activities in other words the MIS component should be defined in an with the management activities of the organization. The features of MIS should be based on the management structure and the framing must be done in such a way that it gives relevant information at all levels required.

Hierarchy of Management Activity

The management activity is classified into three categories defined by anatomy. The suggested levels are:

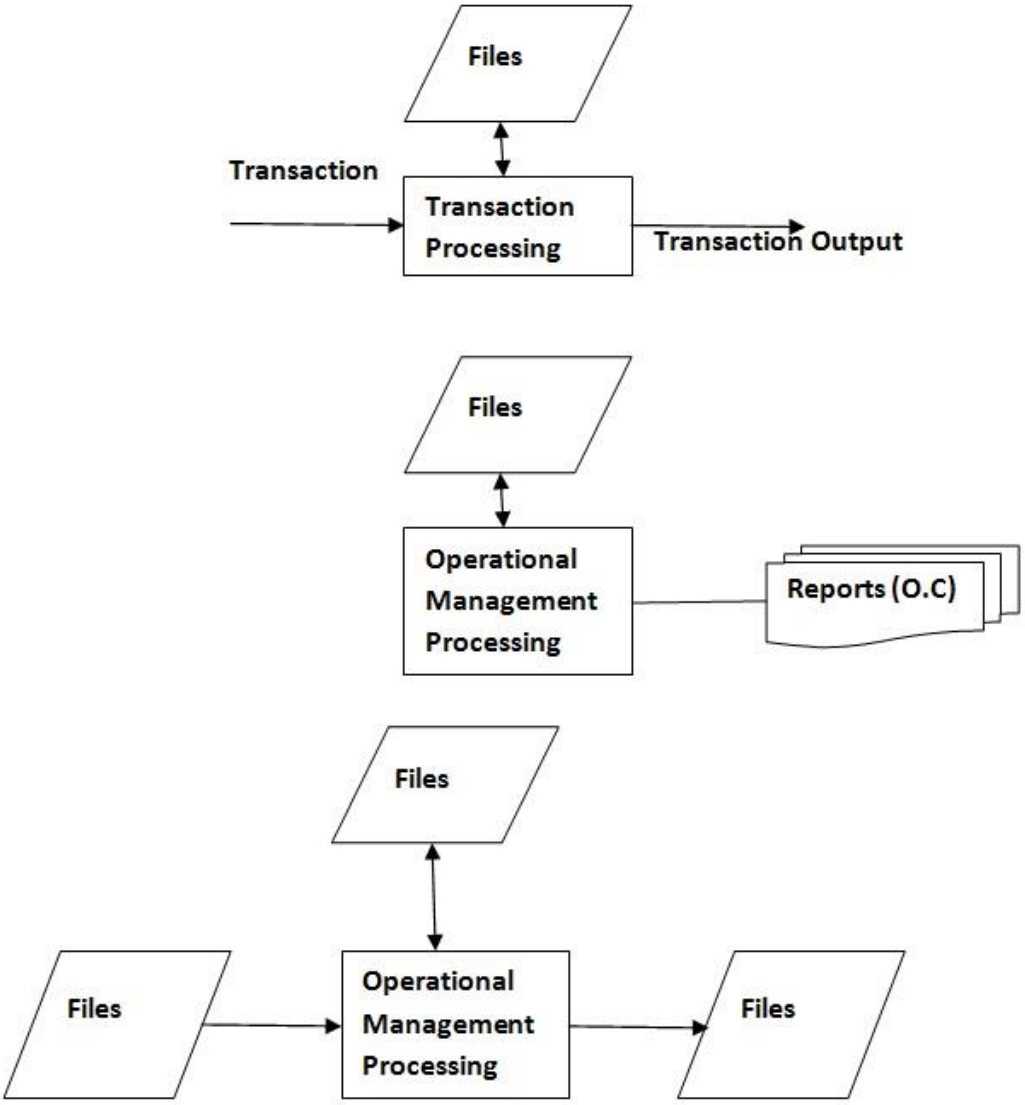
1) **Strategic planning,** definition of goals policies and general guidelines.

2) **Management control and tactical planning,** acquisition of resources in terms of MIS. Establish and monitoring of budgets

3) **Operational planning and control,** effective and efficient use of existing facilities under given constraints.

The management activity information required varies from level to level in terms of its size, its precision, its frequency etc. Table 1 shows the characteristics of information at various levels of Management

INFORMATION SYSTEM FOR OPERATIONAL CONTROL



The operational control is exerted upon the running activities of the organization where transactions are carried out. The information system for operational control is programmable set of instructions that are needed to be followed.

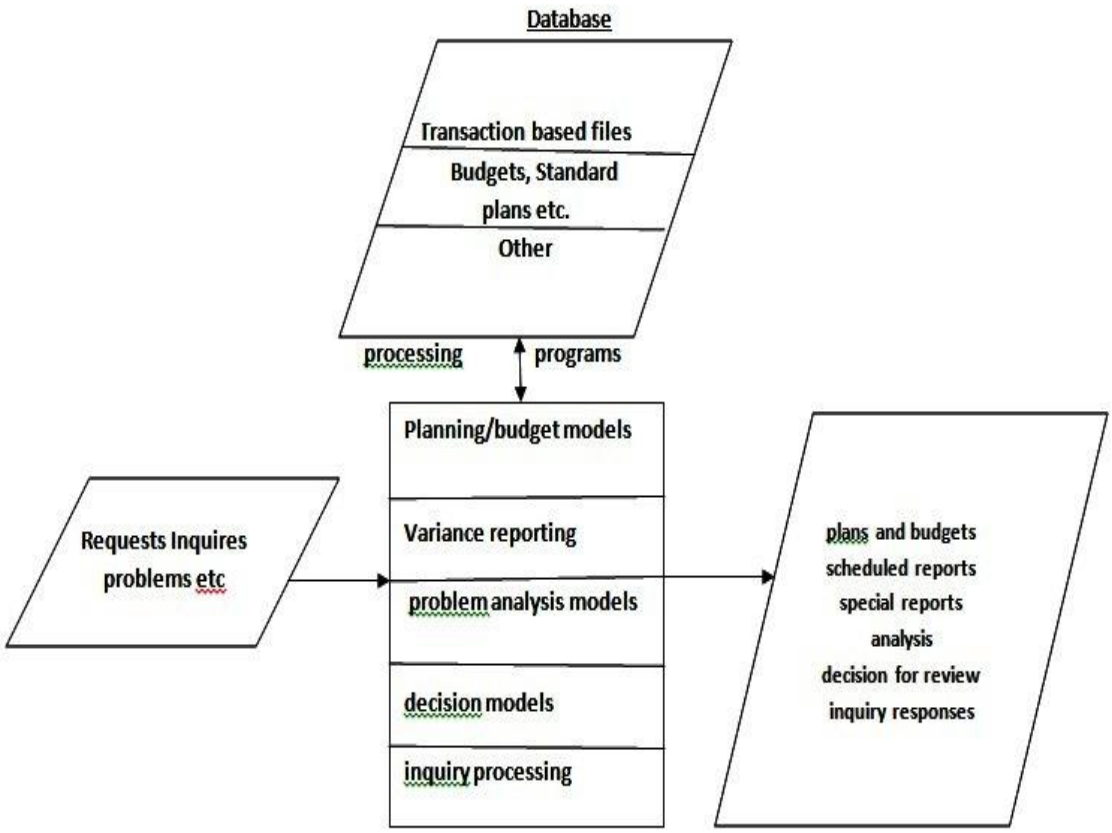
The processing support for operational control consists of

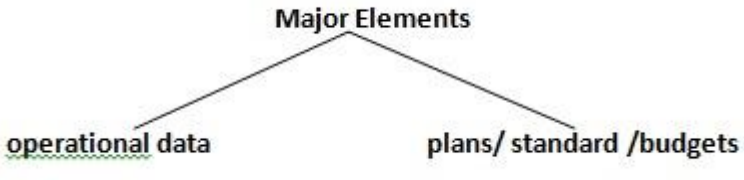
1) Transaction Processing

2) Report Processing

3) Enquiry Processing

INFORMATION SYSTEM FOR MANAGEMENT CONTROL





Management control information is required by managers of department and to those persons who decide on control actions and formulates new decision rules the control process required the following type of information :-

1) Plant performance (standard expected, budgeted)
2) Variances from plant performance.
3) Reasons for variance
4) Analysis of possible decisions or course of actions.

The database required for management control comprises of two major elements

1. The operational data
2. The plans/ standard /budgets

To exert management control, the transaction data is processed and is compared with the laid down standards. Variances are calculated and depending on their various courses of actions are taken. Figure illustrates management control database and processing support. The database comprises of transaction based files, budgets, standards etc. Depending on the requests, enquiries, processing programs are called that provides various kinds of plants reports for reviews and control.

INFORMATION SYSTEM FOR STRATEGIC PLANNING

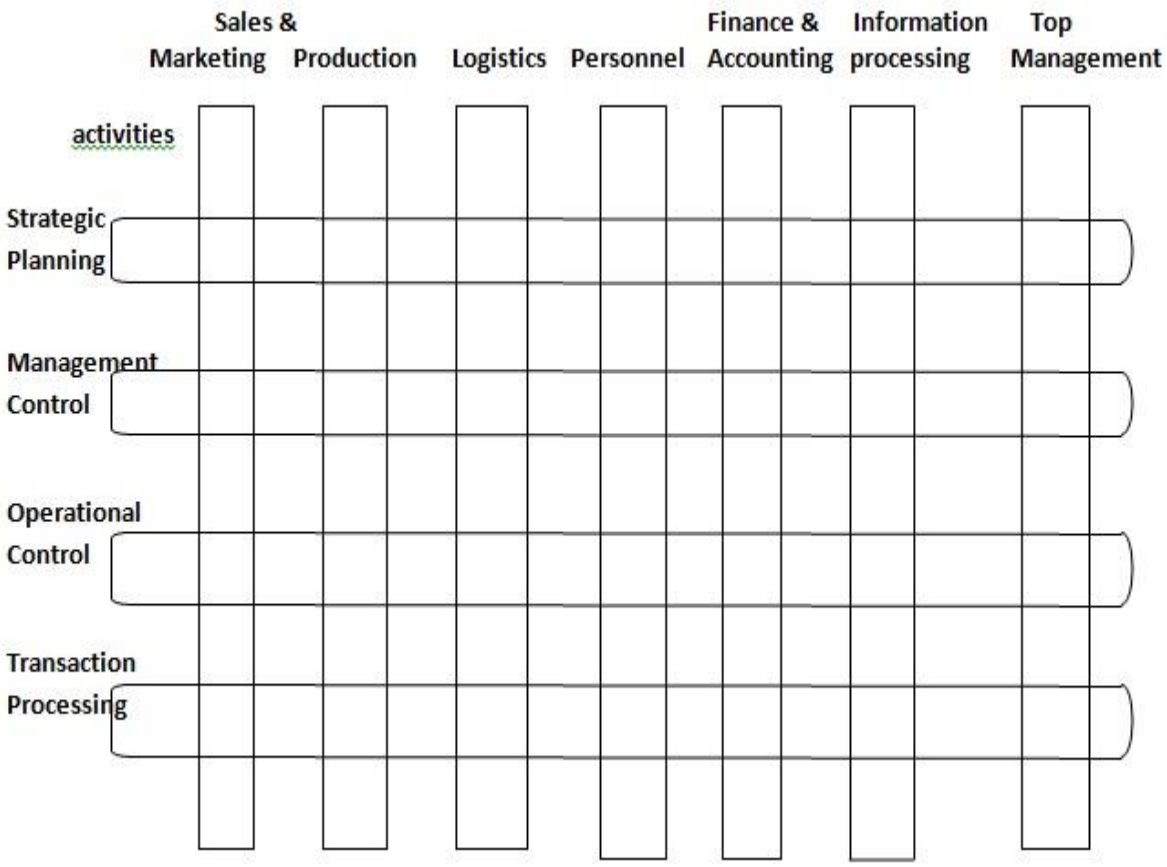
The highest level of management develops strategies, long term plan for organization. The plans generally are specified for a long period but under some specific conditions or situations the strategies may be needed to modify. If an organization is running successfully and expansion is needed or in case of new venture following data requirements are there:

1) The economy in terms of companies current and prospective area of activity.
2) The political environment: unstable political scenario is not good for business because the policies are fuzzy.
3) Market: current capabilities and performance of organization in terms of selling/ marketing.
4) Prospects for industry in each country
5) Capabilities of competitors and their market reputation
6) Opportunities for new ventures
7) Alternative strategies
8) Projections of resource requirement and their management strategies

The above said information can have some elements of internal data of the organization while the major data is available from the environment.

The strategic planning thus requires a very broad understanding of the environment in which the organization wants to flourish.

MIS STRUCTURED BASED ON ORGANIZATIONAL FUNCTION



An information system can well be described in terms of the organization function in the way it uses the information a typical functional Matrix showing the subsystems and management activities is shown above. The row represents activities whereas the column represents organizational functions. The hierarchy of activities is defined as:

1) **Planning:** carried out at topmost level

2) **Control I:** the control at Ist level is called management control from which all the lower entities receives direction.

3) **Control II:** the control at IInd level is termed operational control gives instruction to carryout tasks.

4) **Processing:** it is the lowest state where the actual work /transaction is carried out.

All the activities at each state of its work required information and generates information does the defined matrix gives us and intersection of function and activity that should be stated in two ways.

1) What information it needs, how much it needs and when it needs

2) What information it produces, when it produces, from whom it produces

Some of the prominent organizational functions are:

1) Sales and marketing subsystems-

It includes all the activities related to the promotion and sales of the products or services.

a) Strategic:

(i) Search for new market and marketing strategies

(ii) Analysis of competitors' strategy

(iii) Technological and the demographic forecast and products changes.

b) Tactical:

i) Advertising Technology /techniques and analysis of their impact

ii) Customer performance survey

iii) Correlation of prices and sales

iv) Sales deployment and targets

v)timing of special sales campaign

c) Operational:

i) Sales analysis by region, customer, class, sales person

ii) Sales target v/s achievement

iii) Market shares and trends

iv) Seasonal variations

v) Effect of model change

d) Transactional:

i) Sales order

ii) Selling of actual items

iii) Pending order

2) Production subsystems:

the responsibility of the production or manufacturing is true of optimally produce the items by planning the production facilities and personnel activity control is the one of the major factor that needs maximum attention during production cycle.

a) Strategic:

i) Yearly and monthly production quotas and alternate schedules

ii) Policies on replacement, their modernization

iii) Acquiring knowledge about new production technologies and how to incorporate them

b) Tactical:
i) Identifying and controlling the areas of high cost

ii) Identify critical bottlenecks and production

iii) Defining production schedules

iv) Performance measure, their repairs and breakdowns history along with service record.

c) Operational:
i) Monitoring up to data production, examining assemblies ,detecting storages and giving warning

ii) Production schedule monitoring

iii) Monitoring of tools and personal activities

d) Transactional:

i) Production of items and their assembly

ii) Bin management.

iii) Timekeeping of production

Logistic subsystem

The Logistic function and encompasses such as the purchasing, receiving inventory control and distribution. it is one of the most sensitive management required for business organizations.

The material accumulation neither should overflowed laws should underflow. The materials should be kept at optimum level all the times.

a) Strategic:

i) Developing vendor list according to their supply

ii) Identifying vendors for critical items

iii) Information on new technology/ new products/ new vendors

b) Tactical:

i) Developing vendor performance measure

ii) Determine the material cost, inventory cost

iii) Determining optimal reorder level

iv) Maintaining stocks

c) Operational:

i) List of excess and deficit items received

ii) List of rejected item

iii) Backlog of supplies

iv) Item inspection

v) Value of inventory in hand

d) Transactional:

i) Purchase requisition

ii) Purchase orders

iii) Shipping orders

iv) Manufacturing orders

Personnel subsystems

The major goal of personnel management is to make the best use of available human resources in organization.

a) Strategic:

i)long range human resource requirement at the different levels

ii) Salary structure recruitment techniques

iii) Human resource development and training

iv) Policies for welfare and facilities

b) Tactical:

i) Performance appraisal

ii) Incentive related to productivity

iii) To reduce absentees and make persons work

iv) Increase the skill

c) Operational:

i) Hiring, training, termination

ii) Changing pay scales, issuing benefits

iii) Loan advances and recovery

d) Transactions:

i) Employment requisition description

ii) Job description

iii) Hour calculation

iv) Attendance maintenance

Finance and accounting

The main goal of this function is to ensure financial viability of the organization. Enforce financial discipline and plan and monitor the financial budget

a) Strategic:

i) Methods of financing to assure adequate finances for a long run

ii) Accounting policy

iii) Tax planning and benefit calculations

b) Tactical:

i) Variation between budget and expenses

ii) Outstanding payments and receipts (larger amount)

iii) Credit and payment status

iv) Cost decision and item pricing

v) Impact of taxation on pricing

c) Operational:

i) Periodic financial reports

ii) Budget status to all functional managers

iii) Tax return

iv) Share transfers

d) Transactions:

i) cash management (cash collection and disinvestments)

ii) Bookkeeping of money received and given

iii) Policy such as insurance, accident etc, premium payments

iv) Preparation of balance sheet at lowest level