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SCHOOL OF MANAGEMENT STUDIES

MASTER OF BUSINESS ADMINISTRATION

UNIT – I – Information System Management – SBAA7034

UNIT 1 INTRODUCTION

System - Characteristics of a system, Components of system- Information System-Definition - Trends in Information Systems - Fundamental role of Information System in business -Information System Resources - Information System Activities

1.0 Objectives

- Defining a system
- The role of computer in information systems
- What are the characteristic and element of information system
- What are the various types of information system and models
- What are the different types of specialized information system

1.1 Introduction

In business, System Analysis and Design refers to the process of examining a business situation with the intent of improving it through better procedures and methods. System analysis and design relates to shaping organizations, improving performance and achieving objectives for profitability and growth. The emphasis is on systems in action, the relationships among subsystems and their contribution to meeting a common goal.

Looking at a system and determining how adequately it functions, the changes to be made and the quality of the output are parts of system analysis.

Organizations are complex systems that consist of interrelated and interlocking subsystems. Changes in one part of the system have both anticipated and unanticipated

consequences in other parts of the system. The systems approval is a way of thinking about the analysis and design of computer based applications. It provides a framework for visualizing the organizational and environmental factors that operate on a system. When a computer is introduced into an organization, various functions' and dysfunction's operate on the user as well as on the organization. Among the positive consequences are improved performance and a feeling of achievement with quality information. Among the unanticipated consequences might be a possible threat to employees job, a decreased morale of personnel due to back of involvement and a feeling of intimidation by users due to computer illiteracy. The analyst's role is to remove such fears and make the system a success.

System analysis and design focus on systems, processes and technology.

1.2 Over View of System Analysis and Design

Systems development can generally be thought of as having two major components: Systems analysis and Systems design. *System design* is the process of planning a new business system or one to replace or complement an existing system. But before this planning can be done, we must thoroughly understand the old system and determine how computers can best be used to make its operation more effective. *System analysis*, then, is the process of gathering and interpreting facts, diagnosing problems, and using the information to recommend improvements to the system. This is the job of the systems analyst.

Consider, for example, the stockroom operation of a clothing store. To better control its inventory and gain access to more up – to – date information about stock levels and reordering, the store asks a system analyst, to "computerize" its stockroom operations. Before one can design a system to capture data, update files, and produce reports, one needs to know more about the store operations: what forms are being used to store information manually, such as requisitions, purchase orders, and invoices and what reports are being produced and how they are being used.

To proceed, you then seek out information about lists of reorder notices, outstanding purchase orders, records of stock on hand, and other reports. You also need to find out where this information originates, whether in the purchasing department, stockroom, or

accounting department. In other words, you must understand how the existing system works and, more specifically, what the flow of information through the system looks like.

Every businessman must know why the store wants to change its current operations. Does the business have problems tracking orders, merchandise, or money? Does it seem to fall behind in handling inventory records? Does it need a more efficient system before it can expand operations?

Only after you have collected these facts can you being to determine how and where a computer information system can benefit all the users of the system. This accumulation of information, called a *systems study*, must precede all other analysis activities.

Systems analysts do more than solve current problems. They are frequently called upon to help handle the planned expansion of a business. In the case of the clothing store, the systems study is future oriented, since no system currently exists. Analysts assess as carefully as possible what the future needs of the business will be and what changes should be considered to meet these needs. In this instance and in most others, analysts may recommend alternatives for improving the situation. Usually more than one strategy is possible.

Working with managers and employees in the organization, systems analysts recommend which alternative to adopt, based on such concerns as the suitability of the solution to the particular organization and setting, as well as the employee support the solution is likely to have. Sometimes the time required to develop one alternative, compared with others, is the most critical issue. Costs and benefits are also important determinants. In the end, management, which will pay for and use the result, actually decides which alternative to accept.

Once this decision is made, a plan is developed to implement the recommendation. The plan includes all systems design features, such as new data capture needs, file specifications, operating procedures, equipment and personnel needs. The systems design is like the blueprint for a building: it specifies all the features that are to be in the finished product.

Designs for the stockroom will provide ways to capture data about orders and sales to customers and specify the way the data will be stored, whether on paper forms or

on a computer – readable medium, such as magnetic tape or disk. The designs will also designate work to be performed by people and by computers. Designs vary in their division of human and computer tasks.

The stockroom personnel will also need information about the business. Each design describes output to be produced by the system, such as inventory reports, sales analyses, purchasing summaries, and invoices. The systems analysts will actually decide which outputs to use, as well as how to produce them.

Analysis specifies *what* the system should do. Design states *how* to accomplish the objective. Notice that each of the processes mentioned involves people. Managers and employees have good ideas about what works and what does not, about what flows smoothly and what causes problems, about where change is needed and where it is not, and especially about where change will be accepted and where it will not. Despite technology, people are still the keys that make the organizations work. Thus, communicating and dealing with people are very important parts of the systems analyst's job.

1.3 Business System Concepts

The word system is widely used. It has become fashionable to attach the word system to add a contemporary flair when referring to things or processes. People speak of exercise system, investment system, delivery system, information system, education system, computer system etc. System may be referred to any set of components, which function in interrelated manner for a common cause or objective.

1.3.1 Definition:

The term system is derived form the Greek word *systema*, which means an organized relationship among functioning units or components. A system exists because it is designed to achieve one or more objectives. We come into daily contact with the transportation system, the telephone system, the accounting system, the production system, and, for over two decades, the computer system. Similarly, we talk of the business system and of the organization as a system consisting of interrelated departments (subsystems) such as production, sales, personnel, and an information

system. None of these subsystems is of much use as a single, independent unit. When they are properly coordinated, however, the firm can function effectively and profitably.

There are more than a hundred definitions of the word system, but most seem to have a common thread that suggests that a system is an orderly grouping of interdependent components linked together according to a plan to achieve a specific objective. The word component may refer to physical parts (engines, wings of aircraft, car), managerial steps (planning, organizing and controlling), or a system in a multi-level structure. The component may be simple or complex, basic or advanced. They may be single computer with a keyboard, memory, and printer or a series of intelligent terminals linked to a mainframe. In either case, each component is part of the total system and has to do its share of work for the system to achieve the intended goal. This orientation requires an orderly grouping of the components for the design of a successful system.

The study of systems concepts, then, has three basic implications:

1. A system must be designed to achieve a predetermined objective.
2. Interrelationships and interdependence must exist among the components.
3. The objectives of the organization as a whole have a higher priority than the objectives of its subsystems. For example, computerizing personnel applications must conform to the organization's policy on privacy, confidentiality and security, as well as making selected data (e.g. payroll) available to the accounting division on request.

1.4 Characteristics of a System

The definition of a system suggests some characteristics that are present in all systems: organization (order), interaction, interdependence, integration and a central objective.

1.4.1 Organization

Organization implies structure and order. It is the arrangement of components that helps to achieve objectives. In the design of a business system, for example, the

hierarchical relationships starting with the president on top and leading downward to the blue – collar workers represents the organization structure. Such an arrangement portrays a system – subsystem relationship, defines the authority structure, specifies the formal flow of communication and formalizes the chain of command. Like – wise, a computer system is designed around an input device, a central processing unit, an output device and one or more storage units. When linked together they work as a whole system for producing information.

1.4.2 Interaction

Interaction refers to the manner in which each component functions with other components of the system. In an organization, for example, purchasing must interact with production, advertising with sales and payroll with personnel. In a computer system, the central processing unit must interact with the input device to solve a problem. In turn, the main memory holds programs and data that the arithmetic unit uses for computation. The interrelationship between these components enables the computer to perform.

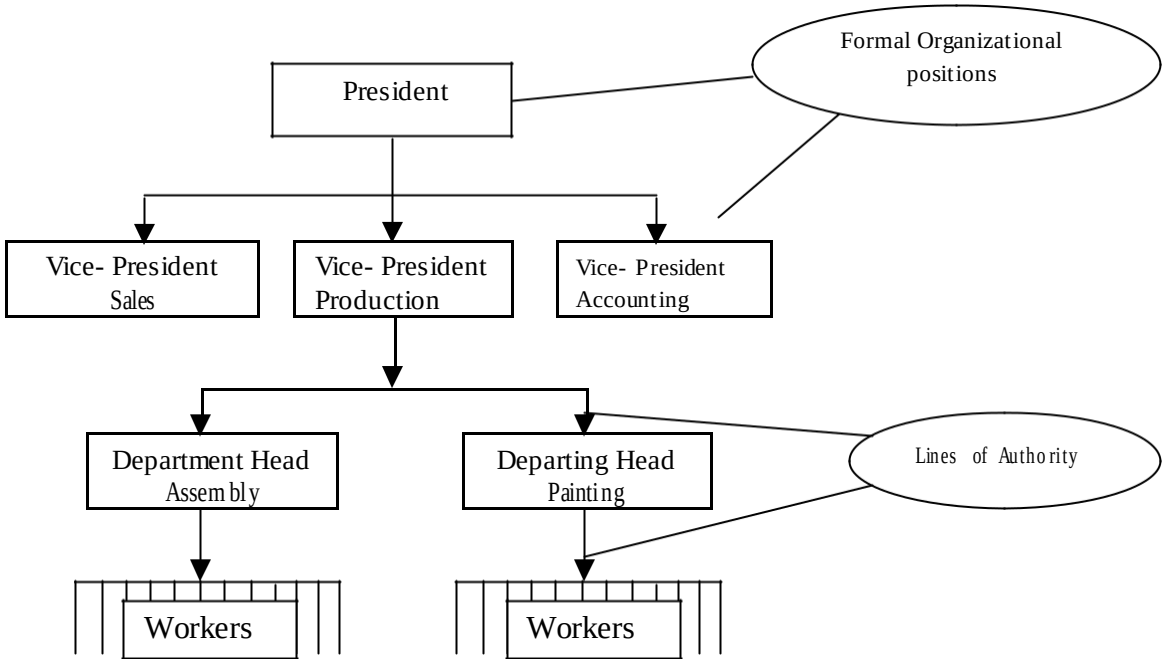
1.4.3 Interdependence

Interdependence means that parts of the organization or computer system depend on one another. They are coordinated and linked together according to a plan. One subsystem depends on the input of another subsystem for proper functioning: that is, the output of one subsystem is the required input for another subsystem. This interdependence is crucial in systems work.

An integrated information system is designed to serve the needs of authorized users (department heads, managers, etc.) for quick access and retrieval via remote terminals. The interdependence between the personnel subsystem and the organization's users is obvious.

In summary, no subsystem can function in isolation because it is dependent on the data (inputs) it receives from other subsystems to perform its required tasks. Interdependence is further illustrated by the activities and support of systems analysts, programmers, and the operations staff in a computer centre. A decision to computerize an application is initiated by the user, analyzed and designed by the analyst, programmed and tested by the programmer, and run by the computer operator. None of these persons can perform property without the required input from others in the computer center subsystem.

Figure 1-1: Organization Structure – An Example



1.4.4 Integration

Integration refers to the holism of systems. Synthesis follows analysis to achieve the central objective of the organization. Integration is concerned with how a system is tied together. It is more than sharing a physical part or location. It means that parts of the system work together within the system even though each part performs a unique function. Successful integration will typically produce a synergistic effect and greater total impact than if each component works separately.

1.4.5 Central objective

The last characteristic of a system is its central objective. Objectives may be real or stated. Although a stated objective may be the real objective, it is not uncommon for an organization to state one objective and operate to achieve another. The important point is that users must know the central objective of a computer application early in the analysis for a successful design and conversion. Political as well as organizational considerations often cloud the real objective. This means that the analyst must work around such obstacles to identify the real objective of the proposed change.

1.5 Elements of a System

In most cases, systems analysts operate in a dynamic environment where change is a way of life. The environment may be a business firm, a business application, or a computer system. To reconstruct a system, the following key elements must be considered:

1. Outputs and inputs.
2. Processor(s).
3. Control.
4. Feedback.
5. Environment.
6. Boundaries and interface.

1.5.1 Outputs and Inputs

A major objective of a system is to produce an output that has value to its user. Whatever the nature of the output (goods, services, or information), it must be in line with the expectations of the intended user. Inputs are the elements (material, human resources, and information) that enter the system for processing. Output is the outcome of processing. A system feeds on input to produce output in much the same way that a business brings in human, financial, and material resources to produce goods and services. It is important to point out here that determining the output is a first step in specifying the nature, amount, and regularity of the input needed to operate a system. For example, in systems analysis, the first concern is to determine the user's requirements of a proposed computer system – that is, specification of the output that the computer is expected to provide for meeting user requirements.

1.5.2 Processor(s)

The processor is the element of a system that involves the actual transformation of input into output. It is the operational component of a system. Processors may modify the input totally or partially, depending on the specifications of the output. This means that as

the output specifications change so does the processing. In some cases, input is also modified to enable the processor to handle the transformation.

1.5.3 Control

The control element guides the system. It is the decision – making subsystem that controls the pattern of activities governing input, processing, and output. In an organizational context, management as a decision – making body controls the inflow, handling and outflow of activities that affect the welfare of the business. In a computer system, the operating system and accompanying software influence the behaviour of the system. Output specifications determine what and how much input is needed to keep the system in balance.

In systems analysis, knowing the attitudes of the individual who controls the area for which a computer is being considered can make a difference between the success and failure of the installation. Management support is required for securing control and supporting the objective of the proposed change.

1.5.4 Feedback

Control in a dynamic system is achieved by feedback. Feedback measures output against a standard in some form of cybernetic procedure that includes communication and control. Output information is fed back to the input and / or to management (Controller) for deliberation. After the output is compared against performance standards, changes can result in the input or processing and consequently, the output.

Feedback may be positive or negative, routing or informational. Positive feedback reinforces the performance of the system. It is routine in nature. Negative feedback generally provides the controller with information for action. In systems analysis, feedback is important in different ways. During analysis, the user may be told that the problems in a given application verify the initial concerns and justify the need for change. Another form of feedback comes after the system is implemented. The user informs the analyst about the performance of the new installation. This feedback often results in enhancements to meet the user's requirements.

1.5.5 Environment

The environment is the "suprasystem" within which an organization operates. It is the source of external elements that impinge on the system. In fact, it often determines how a system must function. For example, the organization's environment, consisting of vendors, competitors, and others, may provide constraints and, consequently, influence the actual performance of the business.

1.5.6 Boundaries and interface

A system should be defined by its boundaries – the limits that identify its components, processes and interrelationship when it interfaces with another system. For example, a teller system in a commercial bank is restricted to the deposits, withdrawals and related activities of customers checking and savings accounts. It may exclude mortgage foreclosures, trust activities, and the like.

Each system has boundaries that determine its sphere of influence and control. For example, in an integrated banking – wide computer system design, a customer who has a mortgage and a checking account with the same bank may write a check through the "teller system" to pay the premium that is later processed by the "mortgage loan system." Recently, system design has been successful in allowing the automatic transfer of funds form a bank account to pay bills and other obligations to creditors, regardless of distance or location. This means that in systems analysis, knowledge of the boundaries of a given system is crucial in determining the nature of its interface with other systems for successful design.

1.6 Types of systems

The frame of reference within which one views a system is related to the use of the systems approach for analysis. Systems have been classified in different ways. Common classifications are: (1) physical or abstract, (2) open or closed, and (3) "man – made" information systems.

1.6.1 Physical or abstract systems

Physical systems are tangible entities that may be static or dynamic in operation. For example, the physical parts of the computer center are the officers, desks, and chairs

that facilitate operation of the computer. They can be seen and counted; they are static. In contrast, a programmed computer is a dynamic system. Data, programs, output, and applications change as the user's demands or the priority of the information requested changes.

Abstract systems are conceptual or non-physical entities. They may be as straightforward as formulas of relationships among sets of variables or models – the abstract conceptualization of physical situations. A model is a representation of a real or a planned system. The use of models makes it easier for the analyst to visualize relationships in the system under study. The objective is to point out the significant elements and the key interrelationships of a complex system.

1.6.2 Open or Closed Systems

Another classification of systems is based on their degree of independence. An open system has many interfaces with its environment. It permits interaction across its boundary; it receives inputs from and delivers outputs to the outside. An information system falls into this category, since it must adapt to the changing demands of the user. In contrast, a closed system is isolated from environmental influences. In reality, a completely closed system is rare. In systems analysis, organizations, applications and computers are invariably open, dynamic systems influenced by their environment.

A focus on the characteristics of an open system is particularly timely in the light of present – day business concerns with computer fraud, invasion of privacy, security controls, and ethics in computing. Whereas the technical aspects of systems analysis deal with internal routines within the user's application area, systems analysis as an open system tends to expand the scope of analysis to relationships between the user area and other users and to environmental factor that must be considered before a new system is finally approved. Furthermore, being open to suggestions implies that the analyst has to be flexible and the system being designed has to be responsive to the changing needs of the user and the environment.

Five important characteristics of open systems can be identified.

1. **Input from outside:** Open systems are self – adjusting and self-regulating. When functioning properly, an open system reaches a steady state or equilibrium. In a

retail firm, for example, a steady state exists when goods are purchased and sold without being either out of stock or overstocked. An increase in the cost of goods forces a comparable increase in prices or decrease in operating costs. This response gives the firm its steady state.

2. **Entropy:** All dynamic systems tend to run down over time, resulting in entropy or loss of energy. Open systems resist entropy by seeking new inputs or modifying the processes to return to a steady state. In our example, no reaction to increase in cost of merchandise makes the business unprofitable which could force it into insolvency – a state of disorganization.
3. **Process, output and cycles:** Open systems produce useful output and operate in cycles, following a continuous flow path.
4. **Differentiation:** Open systems have a tendency toward an increasing specialization of functions and a greater differentiation of their components. In business, the roles of people and machines tend toward greater specialization and greater interaction. This characteristic offers a compelling reason for the increasing value of the concept of systems in the systems analyst's thinking.
5. **Equifinality:** The term implies that goals are achieved through differing courses of action and a variety of paths. In most systems, there is more of a consensus on goals than on paths to reach the goals.

Understanding system characteristics helps analysts to identify their role and relate their activities to the attainment of the firm's objectives as they undertake a system project. Analysts are themselves part of the organization. They have opportunities to adapt the organization to changes through computerized application so that the system does not "run down." A key to this process is information feedback from the prime user of the new system as well as from top management.

The theme of the process of designing information systems borrows heavily from a general knowledge of systems theory. The objective is to make a system more efficient by modifying its goals or changing the outputs.

1.6.3 Man – Made Information Systems

Ideally, information reduces uncertainty about a state or event. For example, information that the wind is calm reduces the uncertainty that the boat trip will be pleasant. An information system is the basis for interaction between the user and the analyst. It provides instruction, commands and feedback. It determines the nature of the relationships among decision-makers. In fact, it may be viewed as a decision center for personnel at all 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. In systems analysis, it is important to keep in mind that considering an alternative system means improving one or more of these criteria.

Many practitioners fail to recognize that a business has several information systems; each is designed for a purpose and works to accommodate data flow, communications, decision making, control and effectiveness. The major information systems are formal, informal and computer based.

Formal Information system

A formal information system is based on the organization represented by the organization chart. The chart is a map of positions and their authority relationships, indicated by boxes and connected by straight lines. It is concerned with the pattern of authority, communication and workflow. Information is formally disseminated in instructions, memos, or reports from top management to the intended user in the organization. This structure also allows feedback up the chain of command for follow – up. In Figure 1-1 input form the environment provides impetus for policy decision by top management. Policies are generalizations that specify what an organization ought to do. Policies are translated into directives, rules and regulations and transmitted to lower-level management for implementation. The output represents employee performance.

1.7 Systems Models

In no field are models used more widely and with greater variety than in systems analysis. The analyst beings by creating a model of the reality (facts, relationships, procedures, etc.) with which the system is concerned. Every computer system deals with the real world, a problem area, or a reality outside itself. For examples, a telephone

switching system is made up of subscribers, telephone handsets, dialing, conference calls, and the like. The analyst beings by modeling this reality before considering the functions that the system is to perform.

Various business system models are used to show the benefits of abstracting complex system to model form. The major models are schematic, flow, static and dynamic system models.

1.7.1 Schematic Models.

A schematic model is a two – dimensional chart depicting system elements and their linkages. Different arrows are used to depict information flow, material flow and information feedback. Various elements of the system are depicted in boxes.

1.7.2 Flow system Models.

A flow system model shows the flow of the material, energy and information that hold the system together. There is an orderly flow of logic in such models. A widely known example is PERT (Program Evaluation and Review Technique). It is used to abstract a real world system in model form, manipulate specific values to determine the critical path, interpret the relationships and relay them back as a control.

1.7.3 Static system models.

This type of model exhibits one pair of relationships such as activity – time or cost – quantity. The Gantt chart, for example, gives a static picture of an activity- time relationship. Planned activities (stamping, sanding etc.) are plotted in relation to time are shown in figure 1.3. The date column has light lines that indicate the amount of time it takes to complete a given activity. The heavy line represents the cumulative time schedule for each activity. The stamping department, for example, is scheduled to start working on order number 25 Wednesday morning and complete the job by the same evening. One day is also scheduled for order number 28, two days for order number 28, two days for order number 22 and two days (May 10-11) for order number 29. The heavy line opposite the stamping department represents the total of six days. The broken line indicates that the department is two days behind schedule. The arrowhead indicates the date when the chart is to be in effect.

1.7.4 Dynamic System Models.

Business organizations are dynamic systems. A dynamic model approximates the type of organization or application that analysts deal with. It depicts an ongoing, constantly changing system. It consists of (1) inputs that enter the system, (2) the processor through which transformation takes place, (3) the program(s) required for processing and (4) the output(s) that result from processing.

1.8 Categories of Information

There are three categories of information related to managerial levels and the decision managers make. The first level is strategic information, which relates to long – range planning policies that are of direct interest to upper management. Information such as population growth, trends in financial investment and human resources changes would be of interest to top company officials who are responsible for developing policies and determining long-range goals. This type of information is achieved with the aid of Decision Support System (DSS).

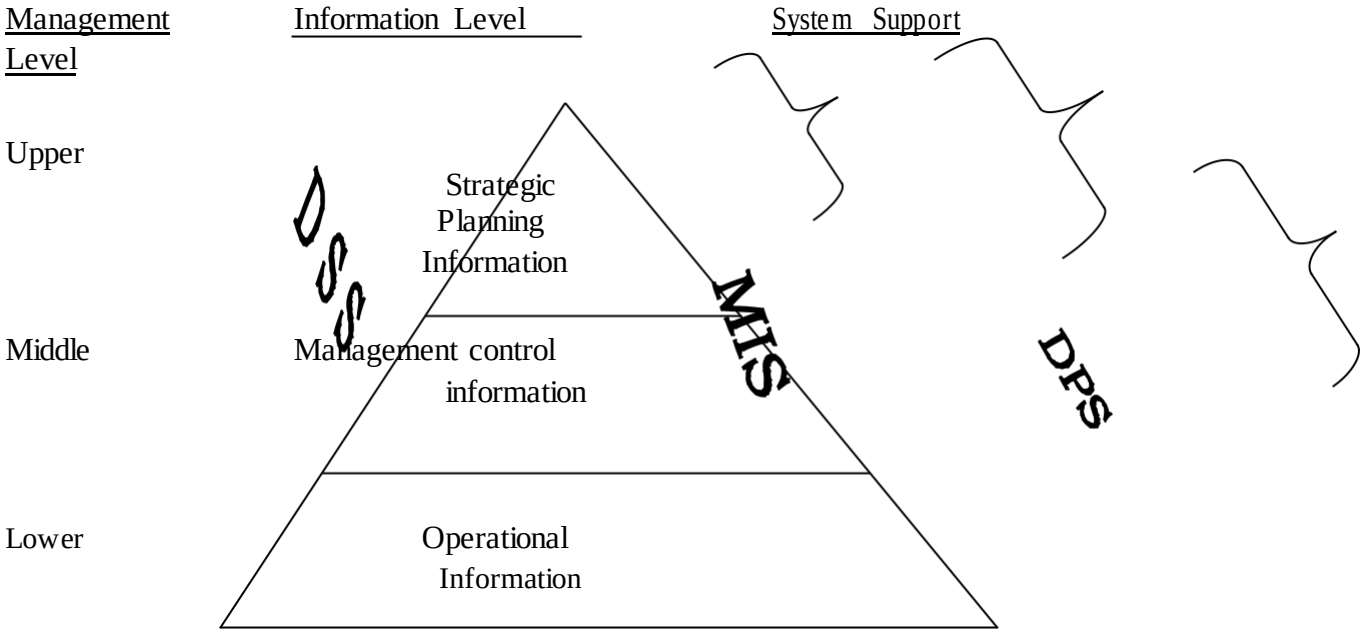
The second level of information is managerial information. It is of direct use to middle management and department heads for implementation and control. Examples are sales analysis, cash flow projection and annual financial statements. This information is of use in short – and intermediate -range planning – that is months rather than years. It is maintained with the aid of management information systems (MIS).

The third information level is operational information, which is short-term, daily information used to operate departments and enforce the day-to-day rules and regulations of the business. Examples are daily employee absent sheets, overdue purchase orders and current stocks available. Operational information is established by data processing systems (DPS). Figure 1.4 shows the same.

The nature of the information and managerial levels is also related to the major types of decision making: structured and unstructured decision making. An organizational process that is closed, stable and mechanistic tends to be more structured, computational and relies on routine decision making for planning and control. Such decision making is related to lower-level management and is readily supported with

computer systems. In contrast, open, adaptive, dynamic processes increase the uncertainty associated with decision making and are generally evidenced by a lack of structure in the decision – making process. Lack of structure as well as extra-organizational and incomplete information makes it difficult to secure computer support. Table 1-2 summarizes the characteristics of decision making and the information required at different managerial levels.

Figure 1-4: Management and Information Levels in a Typical Organization.



Therefore, in designing an information system, the analyst needs to determine the type of information needed, the level of the information, how it is structured and in what format it is before deciding on the system needed to produce it. This is another reason for having a background in systems theory and organizations.

1.8.1 Informal Information Systems

The formal information system is a power structure designed to achieve company goals. An organization's emphasis on control to ensure performance tends to restrict the communication flow among employees. As a result, an informal information system develops. It is an employee based system designed to meet personnel and vocational needs and to help solve work – related problems. It also funnels information upward through indirect channels. In this respect, it is a useful system because it works within the framework of the business and its stated policies.

In doing a systems study, the analyst should have a knowledge of the chain of command, the power-authority-influence network, and how decisions are made to get a feel for how much support can be expected for a prospective installation. Furthermore, knowledge about the inner workings of the employee- based system is useful during the exploratory phase of analysis. Employee cooperation and participation are crucial in preventing sabotage and training users. Since computers cannot provide reliable information without user staff support, a proper interface with the informal communication channels could mean the difference between the success and failure of new systems.

1.8.2 Computer – Based Information Systems

A third class of information system relies on the computer for handling business applications. The computer is now a required source of information. Systems analysis relies heavily on computers for problem solving. This suggests that the analyst must be familiar with computer technology and have experience in handling people in an organizational context.

1.8.2.1 Management Information Systems (MIS)

The computer has had a significant impact on the techniques used by management to operate a business. The level of the manager in the organization is also a factor in determining the kind of information needed to solve a problem. Lower – level management needs detailed internal information to make day – to – day, relatively structured control decisions. Higher – level management, for whom long – range objectives are the primary concerns, requires summarized information from a variety of sources to attain goals. In either case, management action is based on information that is accurate, relevant, complete, concise, and timely. MIS has been successful in meeting these information criteria quickly and responsively.

MIS is a person – machine system and a highly integrated grouping of information – processing functions designed to provide management with a comprehensive picture of specific operations. It is actually a combination of information systems. To do the job, it should operate in real time, handling inquires as quickly as they are received. Management information must also be available early enough to affect a decision. Operationally, MIS should provide for file definition, file maintenance and updating, transaction and inquiry processing and one or more databases linked to an organizational database. Within a MIS, a single transaction can simultaneously update all related data files in the system. In so doing, data redundancy (duplication) and the time it takes to duplicate data are kept to a minimum, thus insuring that data are kept current at all times.

A key element of MIS is the database – a non-redundant collection of interrelated data items that can be processed through application programs and available to many users. All records must be related in some way. Sharing common data means that many programs can use the same files or records. Information is accessed through a data base management system (DBMS). It is a part of the software that handles virtually every activity involving the physical database.

There are several advantages to a data base system:

1. Processing time and the number of programs written are substantially reduced.
2. All applications share centralized files.
3. Storage space duplication is eliminated.
4. Data are stored once in the database and are easily accessible when needed.

The two primary drawbacks of a database are the cost of specialized personnel and the need to protect sensitive data from unauthorized access. The primary users of

MIS are middle and top management, operational managers and support staff. Middle and top management use MIS for preparing forecasts, special requests for analysis, long – range plans and periodic reports. Operational managers use MIS primarily for short-range planning, periodic and exception reports. The support staff finds MIS useful for the special analysis of information and reports to help management in planning and control. Providing data for use in MIS is the function of most levels of personnel in the organization. Once entered into the system, the information is no longer owned by the initiating user but becomes available to all authorized users.

Today's typical MIS poses several problems. Most MIS reports are historical and tend to be dated. Another problem is that many installations have databases that are not in line with user requirements. This means that many MIS environments have not been congruent with the real world of the user. Finally, an inadequate or incomplete update of the database jeopardizes the reliability for all users.

A major problem encountered in MIS design is obtaining the acceptance and support of those who will interface with the system. Personnel who perceive that their jobs are threatened may resist the implementation of MIS. In understanding both technology and human behavior, the analyst faces the challenge of selling change to the right people for a successful installation.

1.8.2.1 Decision Support Systems (DSS)

One reason cited in the literature of management's frustration with MIS is the limited support it provides top management for decision making. DSS advances the capabilities of MIS. It assists management in making decisions. It is actually a continually evolving model that relies heavily on operations research.

Gorry and Morton Coined the term decision support system (DSS). The origin of the term is simple:

Decision – emphasizes decision making in problem situations, not information processing, retrieval, or reporting.

Support – requires computer-aided decision situations with enough "structure" to permit computer support.

System – accentuates the integrated nature of problem solving, suggesting a combined "man", machine, and decision environment.

Beginning with management decision systems in the early 1970's the concept of interactive computer – based systems supporting unstructured decision making has been expanded to include everything but transaction processing systems. A typical early definition required an interactive computer – based system to help users use data and models to solve unstructured problems. There are authors today who view DSS as an extension of MIS, DSS as independent of MIS, or MIS as a subset of DSS. The commonly accepted view in the literature views DSS as a second – generation MIS. MIS is generated when we add predefined managerial reports that are spun out of the transaction processing, report generation and online inquiry capabilities – all integrated with a given functional area such as production MIS or personnel MIS. DSS result from adding external data sources, accounting and statistical models and interactive query capabilities. The outcome is a system designed to serve all levels of management and top management in particular, in dealing with "what if" unstructured problem situations. It is a system with the intrinsic capability to support ad hoc data analysis as well as decision – modeling activities.

The intelligence phase of decision making involves the awareness of a problem at a symptomatic level; it requires a closer look at the problem and a through evaluation of the variables and their relationships. The more intelligence management has about the cause of a problem, the better is the likelihood of designing a good decision. A DSS can provide intelligence through information retrieval and statistical packages.

The design phase of decision making focuses on the evaluation of decision alternatives. During this phase, computer – based deterministic or stochastic models may be used for decision design. DSS plays a major role in decision design under uncertainty. The output of the model(s) is the basis of the choice phase of decision-making.

1.9 Summary:

A system is orderly grouping of interdependent components linked together according to a plan to achieve a specific objective. Its main characteristic is organization, interaction,

interdependence, integration and a central objective. To construct a system, system analyst must consider its elements- input and output, processors, control, feedback, and environment. System are classified as physical or abstract, open or closed, and man-made information systems. A system may be schematic, static or dynamic. An information system is an open system that allows inputs and facilitates interaction with the user. The main characteristic of an open system are input from outside, processing, output, operation in cycles through feedback, differentiation, and equifinality. Three level of information in organization that require a special type of information system. Strategic information system for long range planning policies and upper management. Managerial information system helps middle management and department heads in policy implementation and control. Operational information system helps the daily information needed to operate the business. Future emphasizes on the decision support system not on information processing, it requires a computer aided environment and accentuates a combined man and machine and decision environment.

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SCHOOL OF MANAGEMENT STUDIES

MASTER OF BUSINESS ADMINISTRATION

UNIT – II – INFORMATION SYSTEM MANAGEMENT – SBAA7034

UNIT 2 STRUCTURE AND CLASSIFICATION 9 Hrs.

Structure of IS - Classification of Information System - Operations Support System-TPS,Process Control System, Office Automation Systems - Management Support System - MIS, DSS, ESS, KMS Classification based on Activities-Components on Information Systems.

2.1. INTRODUCTION

The role of information systems in organisational productivity has been extremely challenging. This is partially because the benefits of information systems are often intangible, manifesting themselves in areas such as improved customer service and greater organisational responsiveness. Hence, organisations are developing new measures, such as reduce cycle times and delighting the customers come to better major the impact of information system in organisational productivity.

The various functional areas in business, including manufacturing, marketing finance and accounting, quality control and human resources have all been influence by information systems. These functional areas, using information system, to capture new market achieve at competitive edge in existing are planning to develop cross functional systems

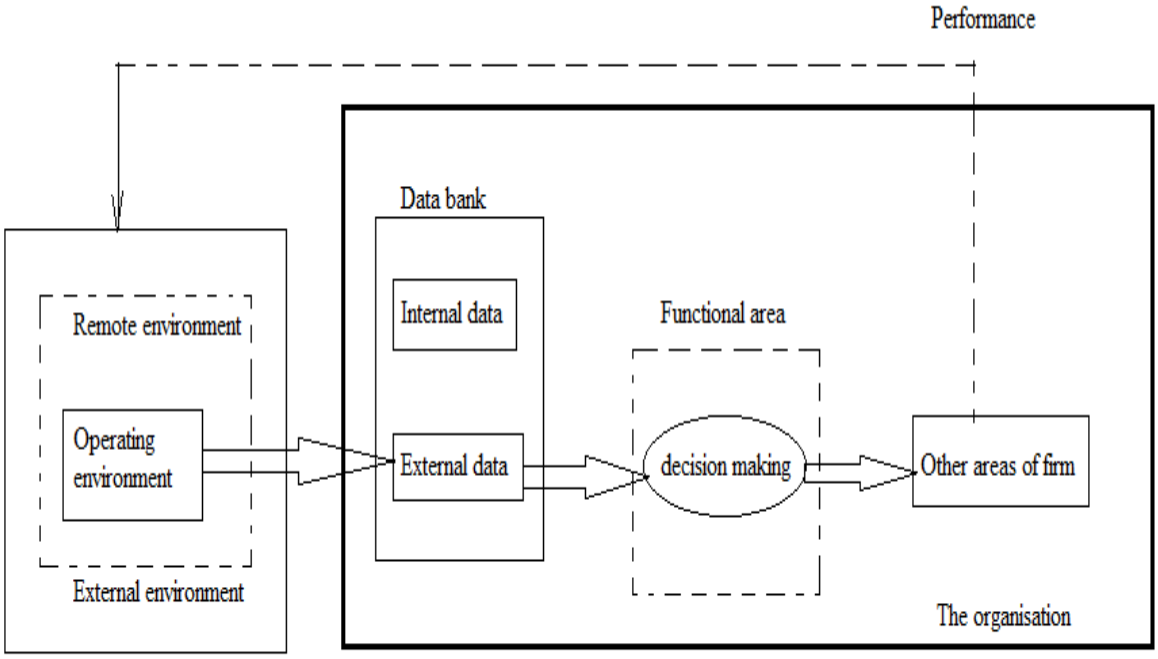
2.2. FUNCTIONAL AREAS OF BUSINESS

The following five functional areas in an organisation are:

- Manufacturing.
- Quality control.
- Marketing.
- Accounting &finance.
- Human resources.

In each of the functional area, a data flow model portrays the local decision making environment. Figure shows the data flow diagram, which consists of the following components:

- **External environment :-**The external environment contains two components the operating environments, which consists of consumer, suppliers, competitors, distributors, and the labour supply; and the remote environment, which consists of economics, social, political, technological, an industry concerns. These environmental sources generate key external information that flows into the firm, at times informally.
- **Data bank:-**It is used generally to describe the general storage of data. A data bank can include data existing in files and in computer databases. An organisation's data bank consists of internal data, such as those generated from the firm's transaction processing system or from monitoring forecasts and external data which are collected from monitoring the external environment. Both types of data have information potential.

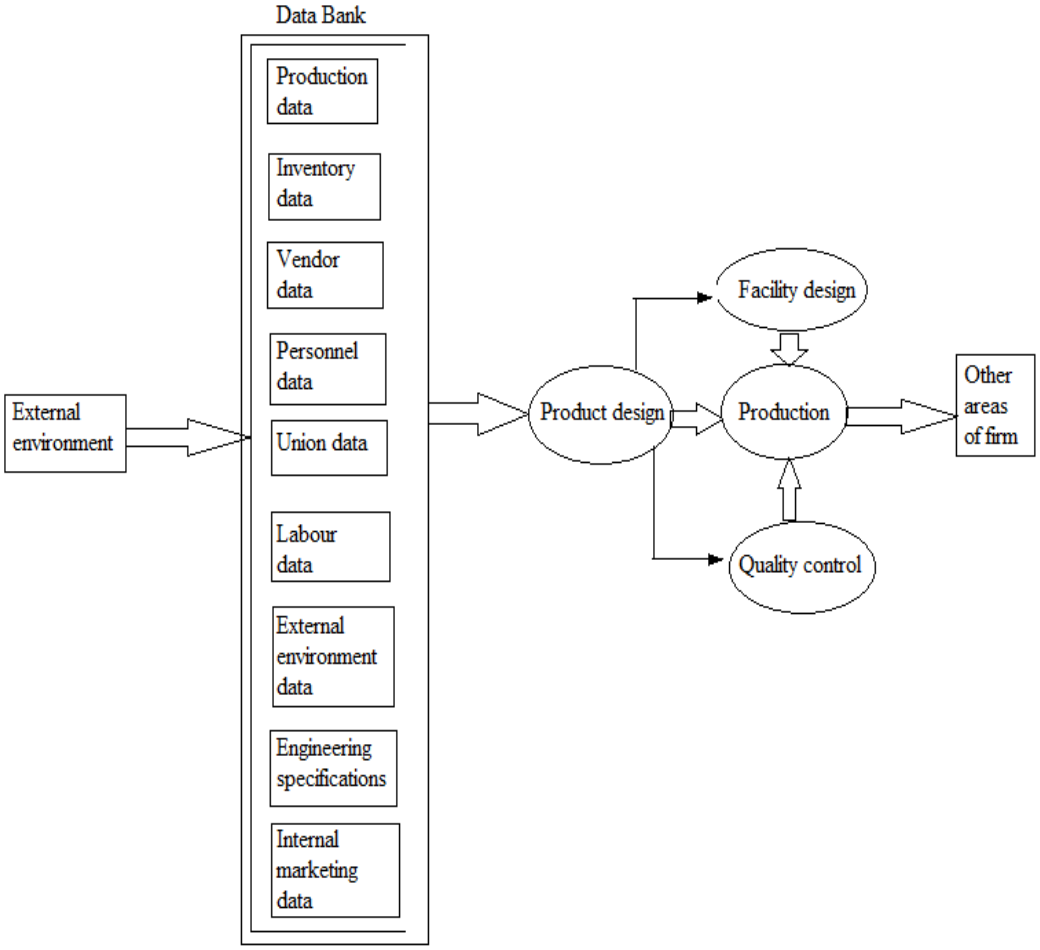


Data Flow Digram in Basic Function Areas

- **Decision making:-** Decision making is the key of each functional data flow model .this process consists of selecting those data needed to make a decision and then making the decision.
- **Other areas of the firm:-**Information produced by decision making in one functional area is often used in another. For example, sales forecast prepared by the marketing department is used as data by the finance department to produce the overall financial plan for the firm.
- **Feedback mechanism**:- The dotted feedback arrow indicates that decision made by the firm ultimately affect its performance in the market place. The firm's performance, in term, generates other data that are used by elements in the environment. The firm's performance is often important on the competitor's, consumers, and suppliers. Only a radical change coming from within a big organization such as a state (or provincial) government, or a corporate giant, like Tata industries; would cause noticeable change in the remote environment.

2.3. MANUFACTURING INFORMATION SYSTEMS

- Manufacturing information system is a system the support the manufacturing functions of purchasing, receiving, quality control, inventory management, material requirements planning, capacity planning, production scheduling, and plant design. It performance applies to both Manufacturing and service environments. Hence, the term manufacturing should be considered in terms of delivering both goods and services.



Data Flow Representation of manufacturing Information System

Generally, the primary decisions made in the manufacturing include product design, production, facility design, and quality control.

- **Product design** is the starting point of the manufacturing process. It is the step in which the design and technical specifications for the product are finalized. Increasingly, product design and engineering are becoming more computerized through approaches such as computer aided design (CAD), computer aided engineering (CAE), and robotics. After a product is designed, the facilities to manufacture must be planned. This design may be as simple as changing a few manufacturing stations on the production floor or as complex as designing an entirely new plant. The computer can also model plant layout. Monte Carlo simulation on computers has been used since 1950s to address certain facility layout problems –sometimes with substantial success.
- **Production** is the process of making new products from raw materials. Generally, he production methods: job shop and process. Most production process as an integrated system. Some firms are trying to integrate CAD, CAM and other manufacturing activities, a concept known as computer integrated manufacturing (CIM). All manufacturing processes concerned with information processing, storage, collection, and distribution are related in a way that optimizes performance of the entire enterprise. Integration allows organizations to efficiently manage (and control) manufacturing and engineering information by eliminating barriers

across departments and functions-possibly even across organizations.

- **Agile manufacturing** refers to manufacturing environments that are dynamic and flexible enough to instantaneously produce customized goods and services in varying quantities and to effortlessly switch the manufacturing process from one product to another. Agile manufacturing has four main characteristics:
  1:-The ability to thrive on constant change.
  2:-recognition by the organization that people are its main asset
  3:-Incorporation of the virtual company idea through the use of telecommunications.
  4:-A focus on creating products and services with real added value.

2.3.1 Sources of Manufacturing Information

- **Product data.** By using terminals around the production floor, data on production processes can be quickly gathered and processed. These data are used for billing and in almost every aspect of production control.
- **Inventory data.** it includes inventories of raw materials goods –in-process, and finished goods. Accurate raw material data are especially imp in a manufacturing situation because running out of certain items at critical times can shut down production lines, leaving workers idle.
- **Vendor data.** It shows sources and prices for raw materials. Often, it are maintained by the purchasing department, although, sometimes the manufacturing area will personally buy certain items. In any case, manufacturing personnel must be constantly aware of the origination of their raw materials, what new types of products are offered by vendors, and current prices.
- **Personnel data**. It shows various statistics on current manufacturing personnel.
- **Union data.** Many types of labour today are unionized production shops usually have strict regulations regarding such items as pay scales, hiring and firing, promotion, and working conditions.
- **Engineering specifications.** It is the data indicate whether something can be built and how. It contain such facts a size of screws; whether a certain drill bit is suitable for wood.
- **Internal marketing data.** It ends where manufacturing begins, so marketing output is manufacturing input. Marketing specifies the number of units of goods that must be product in each time period in order to meet consumer demand.

2.3.2. Advantages of Manufacturing Information System

Manufacturing goods & services is the main function of a business. The information generated from the shop- floor drives the rest of the organization. Hence, the firms that have wall – integrated manufacturing information systems are bound to reap significant benefits.

In late 1990, an India-based multinational firm started replacing its PC- based manufacturing system with a new manufacturing information system called integrated information system architecture. The main objective was reducing manufacturing cost and cutting down cycle times. The new system, which used data base, networks, GUIs, and of the shelf software, allows 1800 employees distributed throughout the firm to easily access enterprise-wide manufacturing data by integrating a num of code business system. Embedded with decision support capabilities, the system allows managers to be decision making instead of data collectors .

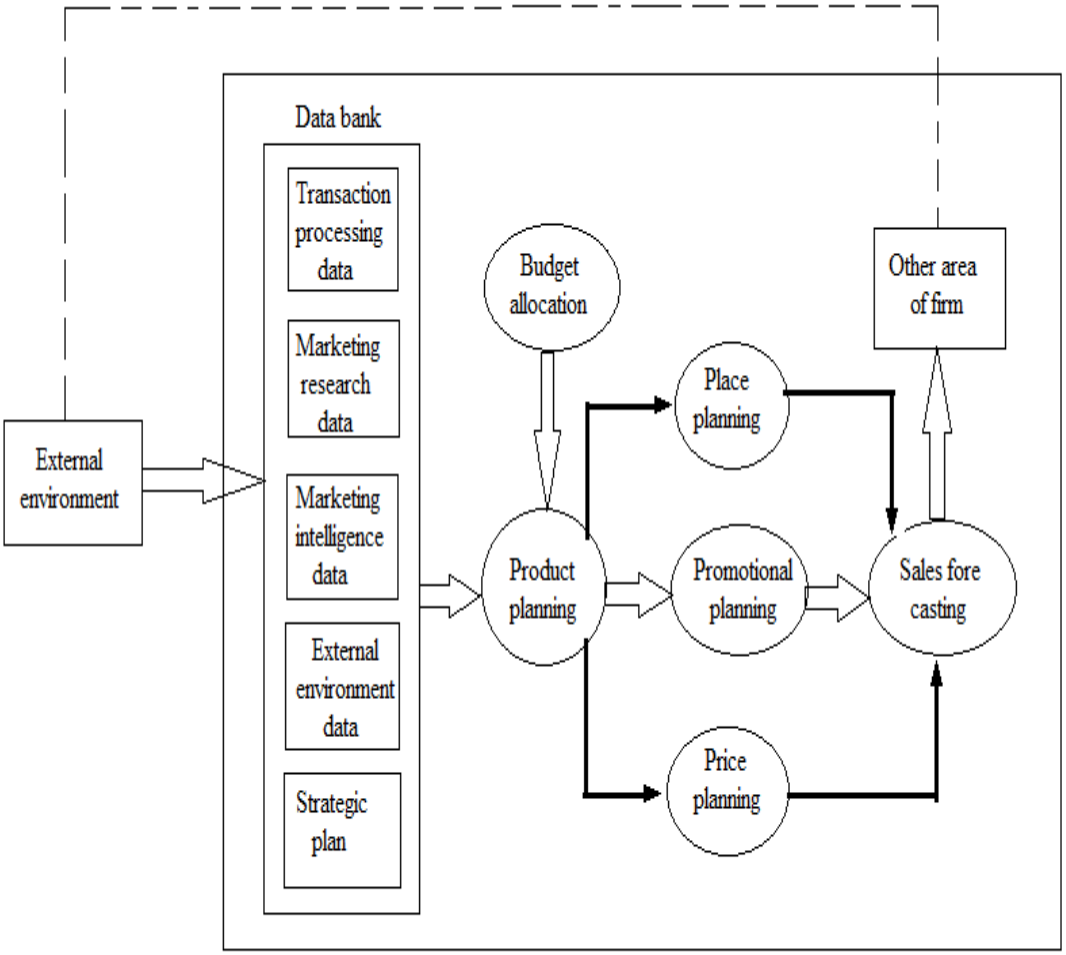
2.4. MARKETING INFORMATION SYSTEM

Marketing strategies consist of a mixture of ingredients that has been named the marketing mix product, promotion, place & price. Collectively they are known as the four Ps. Product is what the customer buys to satisfy a perceived want or need. Promotion is concerned what all the means of the encouraging the sale of the product, including advertising & personal selling. Place deals with the means of physically distributing the product to the customer through a channel of distribution. Price consists of all the elements relating to what the customer pays for the product.

2.4.1. Input of Marketing Information Systems

Information used for marketing, decisions arrived at from different data sources, the most important of which are:-

- **Transaction processing data:** This data show the sales that result from specific mixes of the four Ps. Thus they provide feedback on the effectiveness of past marketing strategies.
- **Marketing research data**. Marketing is the it is responsible for gathering consumer- related data that can be used to support making decisions; example, personal interviews, phone interviews, 7 mails survives. Often tests determined if the research findings are statistically significant or if they should be attributed, instead, to chance.
- **Marketing intelligence data:** marketing intelligence refers to information about the strategies of competitors. The term "intelligence" is a carryover from the military, which uses the term to describe data gathered about enemy activities. Most making intelligence information is collected in an unstructured or semi structure manner: through word of mouth interaction or through observing statistics available in the media & commercial data –base services.
- **External environment data: in market**, success is largely attributable to what will happen in the function external environment. For example: - when a new car is introduced, the firm never knows exactly how consumers will react to it. 198 out of 235 people are tested the prototype loved it & said they would buy it.
- **Strategic plan:-**the strategic plan is really the starting point of all marketing decisions. It contains the type of product that the firm plans to supply to the consumer marketplace. These broad guidelines define the direction of the marketing effort. The tactical marketing plan addresses what, how, when & where questions that is appropriate to the implementation of the strategic plan.



Data flow representation of the marketing information system

2.4.2. Outputs of marketing information systems

- **Product planning:-**It is often complicated, unstructured decision. A number of factors contribute to a products success or failure. Complicating these product planning decisions are the facts that the choice of consumers constantly change & that competitors always develop new products. Most products follow a product a life cycle.
- **Place planning:**-It refers to the channels of distribution that a firm uses to get its products to the consumer. The resources flowing through a channel includes a supplier, manufacturer, wholesaler, retailer, &consumer. The material flow originates with the supplier & ends with the consumer. Information that flow in the direction opposite to the material flow is called feedback information, & the flow of information toward the consumer is called feed forward information.
- **Promotion: -** It is composed of two principal areas: personal selling & advertising. Technology is vital to the selling effort in several ways: (a) typing in customers 7 suppliers; (b) increasing selling time; (c) increasing effectiveness of the client site; (d) identifying selling opportunities; & (e) making salespeople more efficient.
- **Price:**-Depending on the firm's pricing policies, the price area can run close to promotion

in terms of decision support difficulty. Some firms engage in cost-based pricing by determining their costs & then adding a desired mark-up. A less cautions pricing policy is demand-based pricing, which establishes a price compatible with the value that the consumer places on the product.

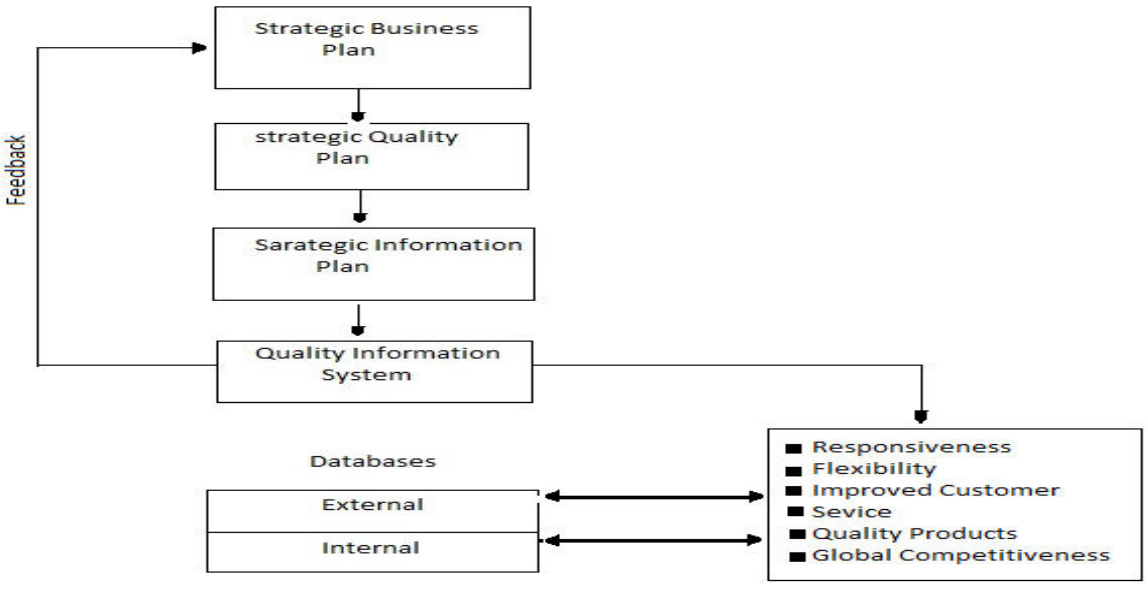
- **Budget allocation:-**Two other imp decision making areas, in addition to four Ps, are the allocation of the marketing budget & sales forecasting. Marketing does not have an unlimited source of funds. Thus, a budget must limit the overall size of expenditures.
- **Sales forecast:-**The sales forecast reflects estimates by the marketing personal on future product sales. Since it is the main source of firm's revenue, sales forecast is an important part of the financial plan. Many technology tools are also used in sales forecasting.

2.4.3. Advantages of Marketing Information Systems

A good marketing system provides employees with information that helps firms capture niche markets in highly competitive industries. Marketing system has a deep & directed influence on the quality of customer's service. Hence, it is seen that competitive intelligence is of interest to the firm as a whole. Although the name of the functional information implies that is only for managers in that area, the information output can be of value to other management & executives as well. Hence, marketing information system play a vital & critical role in helping an organization achieve its goals.

2.5. QUALITY INFORMATION SYSTEMS

- Quality information systems are standalone system or embedded system that helps an organisation to achieve its quality goals. The quality plan is derived from the strategic information plan.
- The below figure has shown how the strategic quality plan is derived from the strategic information plan. In some cases, a firm has no separate quality plan, but instead makes quality a component of other plans, such as marketing, manufacturing, and so on.
- The information system (IS) department plays a major role in ensuring the success of TQM effort in an organisation. An information system can promote quality and provide tools and techniques to help the firm achieve its quality goals. Information system also helps firms achieve quality certification. There are many institutions and agencies that certify the quality efforts of an organisation and provide guidelines to firms that plans to instill quality in all aspects of their operations.



Quality Comtrol Information System In an Organisation

- The role of IS may vary from one organisation to the next, or even from one program to the next, but there are four major areas where IS plays an important role in the certification process. They are: **partial systems overhaul, full systems overhaul, training and oversight.**

Partial systems:-It is overhaul, existing systems are partially revamped in order to update them and make them more responsive to the changing needs of decision makers. Partial systems overhaul may include providing users with better interfaces, better end-users support, or better integration of existing systems.

Full systems:-This systems overhaul, the old system is replaced with a new system. This may sometimes be necessitated by outdated equipment or systems that can no longer be update or maintained.

Training: It is another area where IS can play an important role in quality certification. Users must be well –trained in systems that are partially or fully overhauled, because this has direct impact both on quality and productivity. More important, good data come from well-trained users and good data from the basic of good decisions.

Oversight: It is the entire quality certification process; this is often a time-consuming task. It requires coordination and cooperation among departments; IS can play a facilitating role by ensuring the free flow of information between decision makers. Often, organisational data and information have to be sent to external agencies and IS plays a critical role in getting the right data to the right people at the right time.

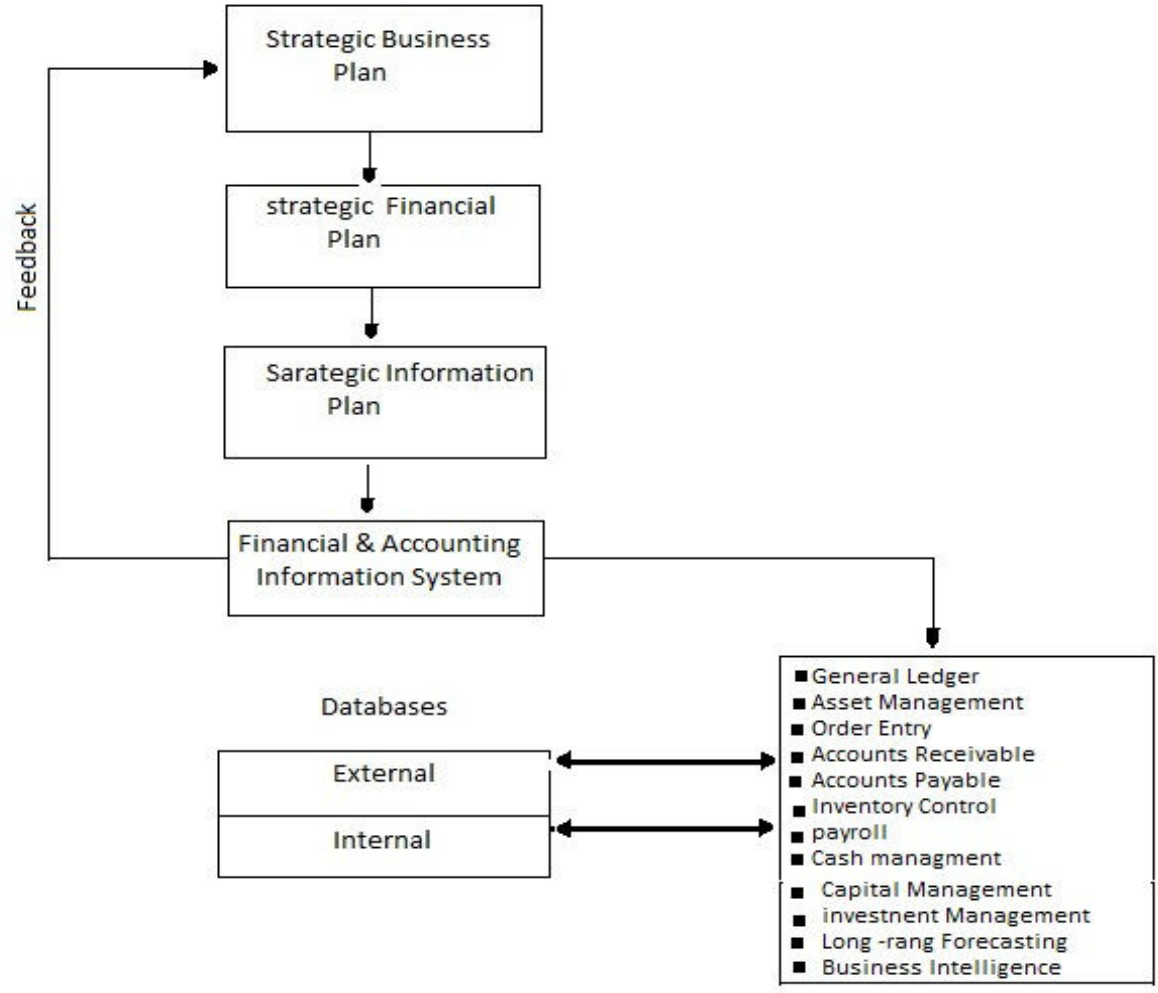
2.5.1 Advantages of quality information systems

The aim of most firms all over the world is to produce high-quality goods and services; information is essential to achieve this goal—accurate, timely, and reliable information. Achieving quality also involves being able to develop strategic alliances with suppliers and customers, and information is again essential to this process. A high-quality car manufacturing firm in Indian has developed a quality information management system (QIMS) to achieve its

quality goals. The system highly integrates information generated on the shop –floor, for instance about defective auto parts, so that decision makers can take immediate action to correct the situation. Managers have changed from data collectors to quality enforcers, since now they can take proactive action to keep the firm on the quality track.

2.6. FINANCIAL AND ACCOUNTING INFORMATION SYSTEMS

Financial and accounting information system (FAIS) is a system that provides information related to the accounting and financial activities in an organisation. It includes budgeting, cash and asset management, capital budgeting, portfolio analysis, general ledger, accounts receivable, inventory control, and payroll systems. Other systems include record keeping, account analysis, cash management, financial analysis, leasing options, insurance claims processing, and investment management. Financial institutions, such as banks, use specialized FAIS, such as commercial loan analysers, credit approval systems, commercial account rating systems, credit application systems, automated teller control, and securities trading. Other institutions and farms may have their own specialised FAIS sub systems. Regardless of the type and number of subsystems, financial and accounting subsystems work together to create, record, generate, and disseminate financial and accounting information vital to good decision making.



FInancial and Accounting Information System with its Sub System

Shown above Figure how the financial information plan is derive from the strategic information plan and the strategic business plan. Although most financial and accounting managers operate under the 'tyranny of the urgent', a strategic financial plan and an integrated set of information systems support the plan are a necessity for the survival and growth of any origination.

2.6.1. Types of financial and accounting information systems

Various functions of FAIS are

1. **General ledger system** generate the firm's income statements and balance sheets and are responsible for managing new and old accounts in the firm.
2. **Asset management systems** maintain an inventory of the firm's long-term assets and ensure that accounting practices for firm assets comply with regulatory standards. The output of this system often becomes input to the general ledger system.
3. **Order entry systems** capture and manage different kinds of data relating to a transaction, such as number of units sold, customer billing, credit history, sales tax, and inventory levels. The output of this system is input to a number of other systems, such as accounts receivable and inventory management.
4. **Accounts receivable and accounts payable** capture and process data, such as creditor and customers billing information, payments received and owed, credit terms, account balances, and payment schedules.
5. **Inventory control system** captures, processes, and manages all data related to the firm's inventory, such as items in inventory, inventory levels and coasts, accounting practices related to inventory maintains, stock balance, and data on lost, damaged, or returned goods.
6. **Payroll systems** capture and process data related to wages and salaries, including central and states taxes, other payroll deductions, employee benefits, overtime, and related data.

These systems are designed to support mostly operational decisions. These are

1. **Cash management systems.** Systems that ensure that the organisation has enough cash to conduct normal business, to receive the best possible return on its short-term cash deposits, and to leverage its cash flow to achieve good ratings in financial markets.
2. **Capital budgeting system**. Systems that ensure the acquisition and disposal of capital assets, such as land, buildings, and so on.
3. **Investment management systems.** Systems that ensure that the organisation to facilitate gets the best possible returns on its long- term investments.

2.6.2. Integrated Financial and accounting systems

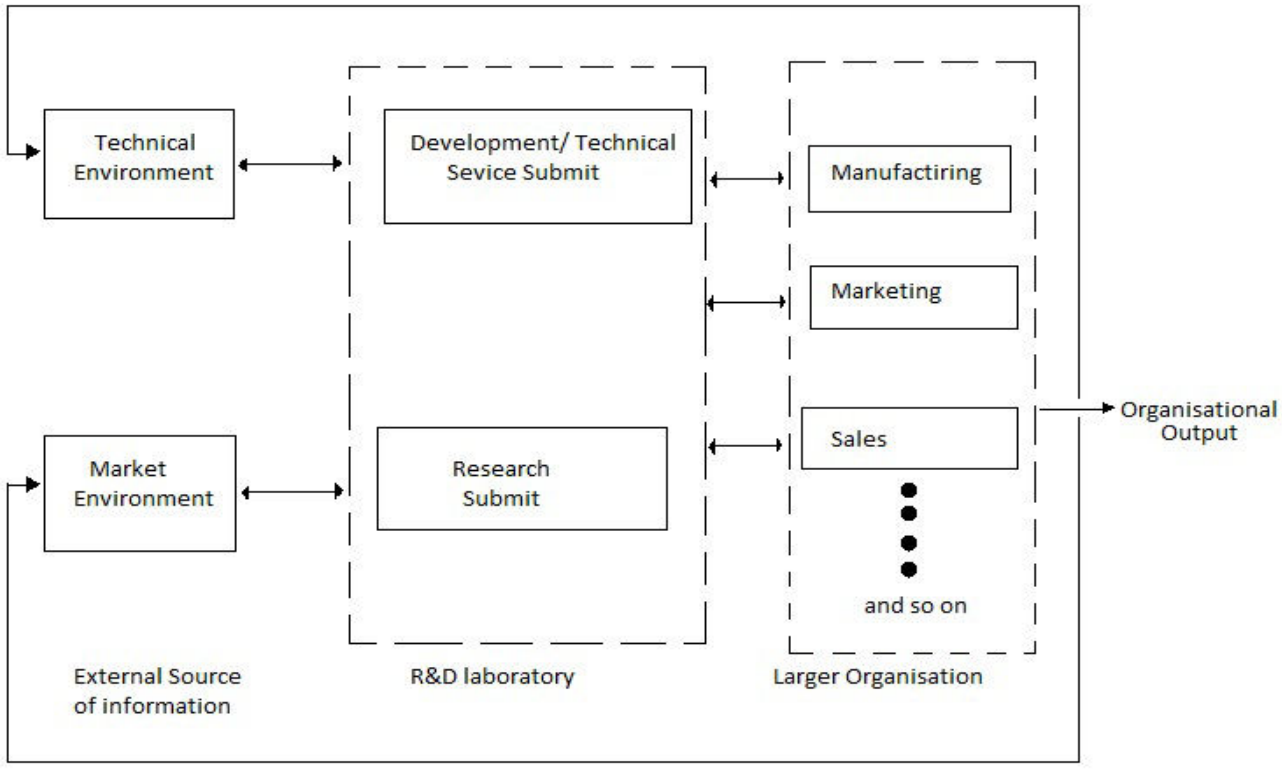
- FAIS are often integrated with other functional systems in the organisation to facilitate data sharing and team decision making. After all, financial decisions are not masse in vacuum; they often involve marketing, manufacturing, and human resources. Thus, a free flow of information among these units is vital for good decision making.
- A radically different form of accounting, called ABC accounting, is helping firms integrate financial information with other system. The activity- based coasting (ABC) accounting

system assigns overhead costs based on actual resources. A key benefit of ABC is that it allows affirm to determine the true cost of a product and the cost of serving a customer.

- This system is simple but highly information intensive. Instead of viewing the business as a collection of salaries and machines, ABC views it as a collection of processes or activities, and calculates the coast of each process or activity. These calculations are made by integrating information from different sources, such as the firm's general ledger and time-keeping systems. Determining the true coast of a product is the first step toward increasing profits and a FAIS can help a firm achieve this goal.

2.7. RESEARCH AND DEVELOPMENT INFORMATION SYSTEMS

- R&D is responsible for creating and developing new products or services in order to capitalise on recognised opportunities. R&D may also be responsible for overcoming recognised weaknesses in current organizational production and operation processes in order to make them more efficient, cost effective, and competitive.
- Because of this man date and the potential of R&D to provide the organisation with competitive advantages, many researchers suggest that R&D information system should be considered to be strategic information systems.
- R&D is an open system that has important information and communications exchanges with the external environment and other organisational subunits. Figure shows the major information flows crucial for R&D effectiveness.



Information Flow in R&D

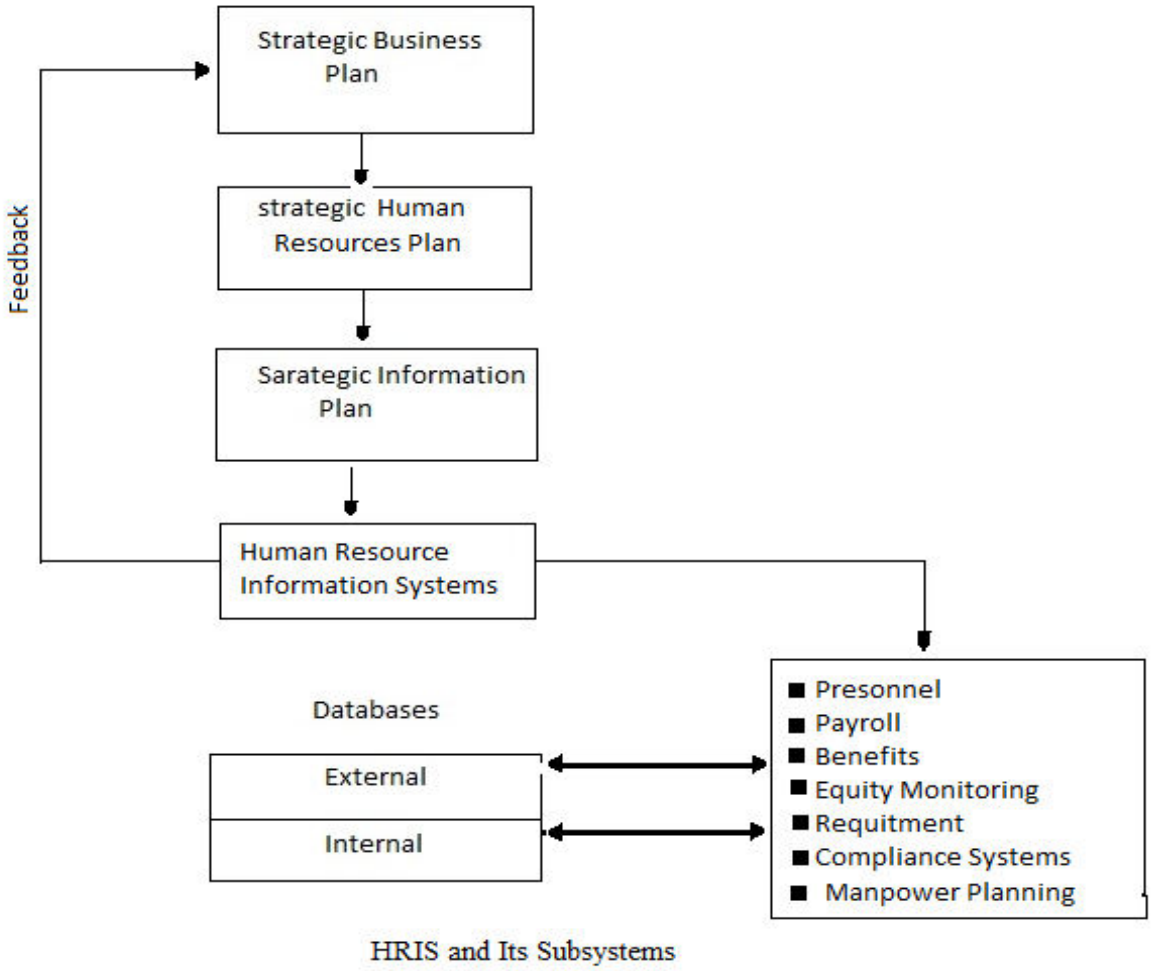
- This above figure suggests that stronge linkages should exist between R&D and the external environment; it also suggests that solid links should exist between R&D and the

marketing/production subsystem of the organisation.

- In most organisations, the proportion of spending on information technology for R&D is increasing and that integrated laboratory information management systems are gaining in popularity.
- The productivity of R&D professionals has increased because of these changes, resulting in reduced product development tines.
- Also, the access to external database and to other sources of external information has increased dramatically over the past few years. However, linkage between R&D subunits that have on-line access to marketing or production databases is far from the expected level.

2.8. HUMAN RESOURCESINFORMATION SYSTEMS

- Human resource information system (HRIS) is a system that supports the planning, control, coordination, administration, and management of an organisation's human resources.
- HRIS also include a large number of subsystems that address the information needs if various human resources functions. They provide managers with information, policies, and procedures concerning recruiting, layoffs, employee evaluation, promotion, termination, transfer, salary equity monitoring, job descriptions and responsibilities, training, affirmative action plan (AAP), and equal employment opportunities (EEO) .
- HIRS also facilitate vital information on matters such as payroll, central and state taxes, health benefits, child care, grievance procedures, and other personal information that affects employees personal and professional lives, it is imperative that these systems be highly responsive to employee needs.
- Human resource systems were slow to be computerised in 1960s. However, in 1990s, many organisations begin to realise the importance of HIRS. It is estimated that by the year 2000. HIRS will be a necessity for most of the big giants if they are to keep up with increasing government regulations and respond to personal information queries about employees.



HRIS and Its Subsystems

2.9 GEOGRAPHICAL INFORMATION SYSTEMS

- A geographical information system (GIS) is a computer-based system that stores and manipulates data that are viewed from a geographical point of reference.
- This system has four main capabilities: data input, data storage and retrieval, data manipulation and analysis, and data output.
- A GIS is one of the powerful and versatile tools as it can create information by integrating different data, sometimes from different sources, and display the data in different ways to the end-user.
- Geography plays an important role in many business decisions, since 85% of corporate data involve a number of business decisions, such as store locations, sales territories, sales promotions, and regulatory compliance rely heavily on geographical data.
- The number of business applications of GIS has grown significantly in the last few years. For example, a GIS allows a bank to compare deposits with loan approvals in a given area and show that loan approvals meet regulatory standards in areas with deposits.

2.10. CROSS FUNCTIONAL SYSTEMS

- Cross-functional system that facilitates the flow of information among all units in an organisation. Decision-making should not be compartmentalised in functional areas, but should instead be viewed in the context of the entire organisation.

- The close link between information systems and the various functional units in the organisation emphasizes the fact that students, regardless of their area of specialisation, should be well grounded in information systems and technologies. In the coming years, computer skills will be grouped with the basic skills of reading, writing, and arithmetic, and computer-literate individuals with a good understanding of information systems will be eagerly sought after by employers.
- The various types of information systems form the backbone of the functional information systems. The types of functional system depend on the nature, scope, and complexity of the task. If the task is routine, structured, involves transactional data, and is related to operational decisions, whether in finance, accounting, marketing, manufacturing, or human resources, the system is likely to be transaction processing system. Summary and exception reports for different functional areas are likely to be generated by a management information system.
- For example, a report of the number of people who worked over time last month (human resources) or the number of machines operated during the night shift last month (manufacturing) are often the output of an MIS.

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SCHOOL OF MANAGEMENT STUDIES

MASTER OF BUSINESS ADMINISTRATION

UNIT – III – INFORMATION SYSTEM MANAGEMENT – SBAA7034

UNIT 3 - MANAGEMENT INFORMATION SYSTEM (MIS)

Introduction to MIS - Definition, Scope, Objectives, Characteristics, Role of MIS - Impact of MIS - Design of MIS - Implementation of MIS - Application of MIS - Benefits of MIS - Limitations of MIS -Types of MIS.

3.1. INTRODUCTION

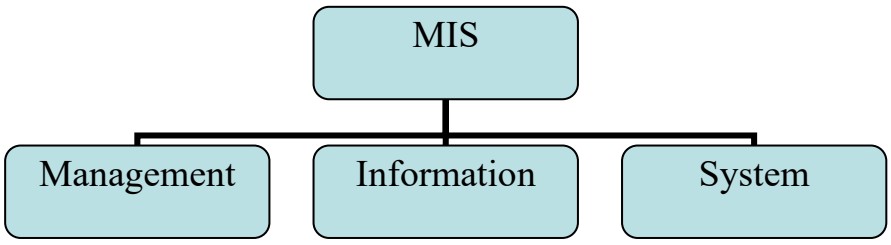
- Today the need for updated information has become inevitable to arrive at an effective decision in all walks of life. Whether it is industry, commerce, defence, banking, education, economics or politics, information is needed everywhere.
- Information is live as it is required to be updated all the time and is renewable.
- The exponential growth of information makes it necessary that information is collected, stored and retrieved in various fields when needed.
- For example

  (a) In setting of a new industry, information regarding the choice of technology, skill, money and material becomes an important requirement for its growth and smooth functioning.

  (b) In a competitive market, before deciding about the price of an item, the producer needs information about the pricing police of the competitors, specially of competitive products, sales techniques etc.

3.2. MANAGEMENT INFORMATION SYSYEM

The MIS is an integrated man machine system that provides information to support the planning and control functions of managers in an organisation.



3.2.1. Management

- Management has been viewed as be function, a process, a profession and a class of people. It refers to the kind of task and activities that are perform by managers. The specific nature of the activities is determined by such managerial functions as planning, organising, directing, leadership and controlling.
  1. **Planning:** It is the process of deciding in advance the courses of action to be followed and when and how to undertake these. Its objectives in the best possible manner and for anticipating future opportunities and problems.

2. **Organising:** It is formal grouping of people and activities to facilitate achievement of the farm's objectives. It is need for assigning responsibilities, jobs and hierarchy among personnel.
3. **Controlling:** It is the checking the progress of plans and correcting any deviations that may occur along the way.
4. **Directing:** It is the process of activating the plans, structure and group efforts desired direction. It is needed for implementation of plans by providing desired leadership motivation and proper communication.

- **The management can be group into 3 hierarchical levels –**
  - Top or Strategic management
  - Middle or Tactical management
  - Junior or Operational management

Top Management: - It is establishes the policies, plans, objectives and budget framework under which various departments will operate of the organisation.

Middle Management: - It has the responsibility of implementing the policies and overall plans of the top management.

Junior Management:-It has the responsibility of implementing day to day operations and decisions of the middle management to produce goods and services to meet the revenue, profit and other goals.

3.2.2. Information

- Information is the result or product of processing data. Information can be defined as the data which is organised and presented at a time and place so that the decision-maker may take necessary act.

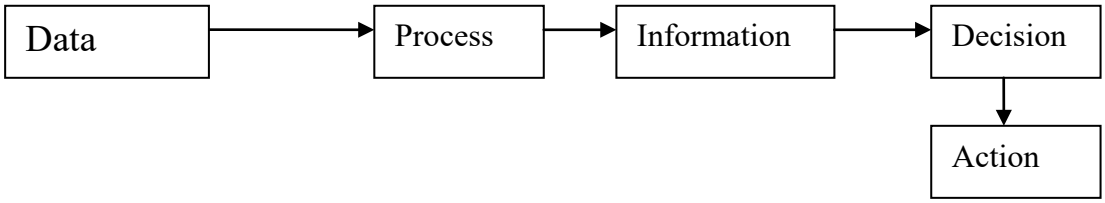


Fig: Conversion of Data into Decision

- Information consists of data that has been retrieved, processed or otherwise used, for informative or inferential purposes, arguments or as a basis for forecasting.
- For example, some supporting documents, ledgers and so on, which comprise source material for profit and loss statements may be used by the decision maker for profit planning and control.

3.2.3. System

- A system is a group of elements or components joined together to fulfil certain functions.
- A system is made up of sub-system. The systems are either natural or man-made.
- A sub-system which may be composed of further sub-systems. A subsystem itself is part of a super system.
- The given example is that of an industrial (or factory) system. It has various subsystems such as production subsystem, marketing sub-system, personnel sub-system and financial sub-system.
- These sub systems in turn are composed of further subsystem.
- For example a production subsystem could consist of sub-sub-system of production control, material control, quality control etc.
- The material sub-sub-system can be further broken down into 'black boxes' such as purchasing, stores, transportation, inspection etc.
- This industrial system is a part of the large economic system of the country which may be called as the super system.
- This relationship is shown in fig

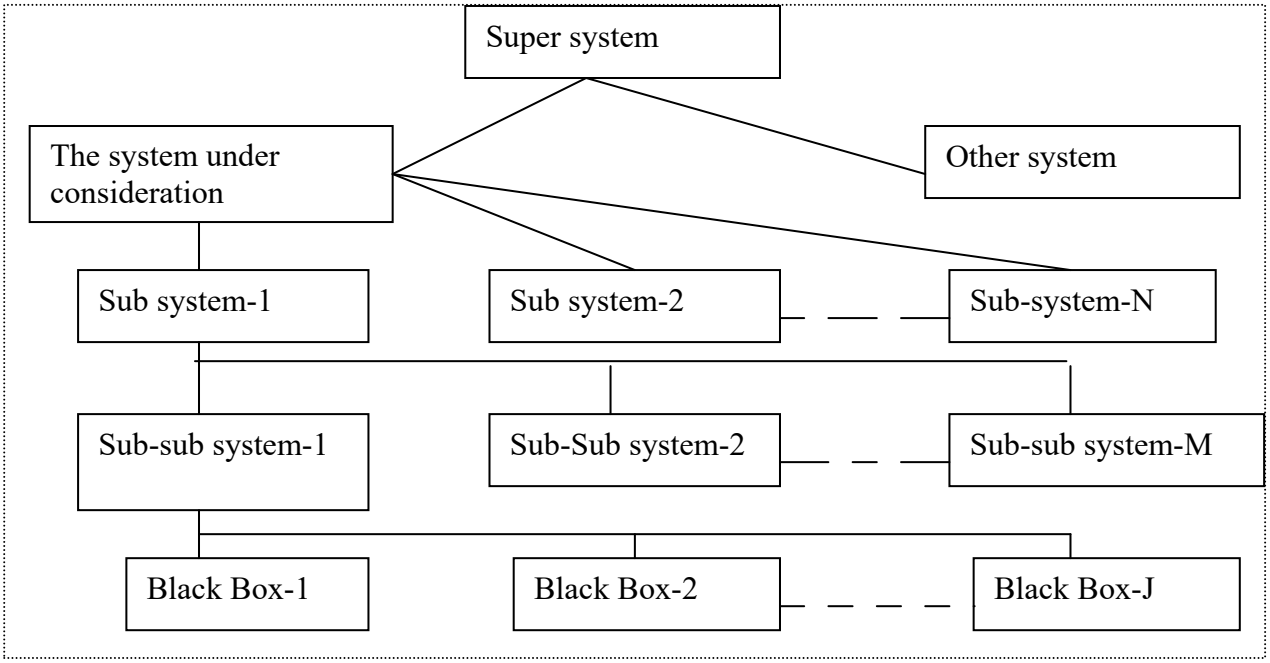


Fig: System and its Components

3.3. DEFINITIONS OF MIS.

1. According to Schwartz, 'MIS is a system of people, equipment, procedure, documents and communication that collects, validates, operates on transformers, stores, retrieves and present data for use in planning, budgeting, accounting, controlling and other management process'.
2. According to Jerome Kanter, 'MIS is a system that aids management in making, carrying out and controlling decisions'.

3. According to Davis and Olson, 'MIS is an integrated user machine system designed for providing information to support operational control, management control and decision making functions in an organisation. The information systems make use of resources such as hardware, software, man, procedures as well as suppliers'.

3.4. FRAMEWORK FOR MIS ORGANISATION AND MANAGEMENT TRIANGLE

Robert Anthony in 1965 suggested that the area of management planning and control can be divided into 3 categories. These are:

1. Strategic planning.
2. Operational control.
3. Management control.

- **Strategic planning:** It develops the strategy for deciding objectives of the organisation and introducing changes in those objectives, formulating policies to govern procurement, use and disposition of those resources.
- **Management control:** It is needed by managers of a various departments to measure the performance, decide on control action, formulate new decision rules and allocate resources.
- **Operational control:** It is the processes of operational activities are carried out to achieve optimum use of resources. It makes use of pre-established procedures and decision rules.

3.4.1. Levels of Management

Each organisation is made up of several levels. These could be classified into three categories: top, middle and junior (TMJ) levels.

- ✓ The top management performs strategic planning and the other two levels provide support in the form of processed information.
- ✓ The middle management level performs tactical planning and control, and needs information to discharge these managerial functions.
- ✓ The junior level is involved in day to day operational control and needs information for its working.

3.5. INFORMATION NEEDS AND ITS ECONOMICS

The availability of information to management at various levels has improved due to three reasons. These are

1. **Development of telecommunications:** The information flow has been accelerated with developments in communication technology like radio telephony, microwave communication, laser communication and satellite communication.
2. **Processing of data with computer:** The accessibility of information has been considerably improved as a computer can readily scan the available stored data to provide the required information.
3. **Video technology:** Video technology permits the recording of activities on video cassettes and video discs.

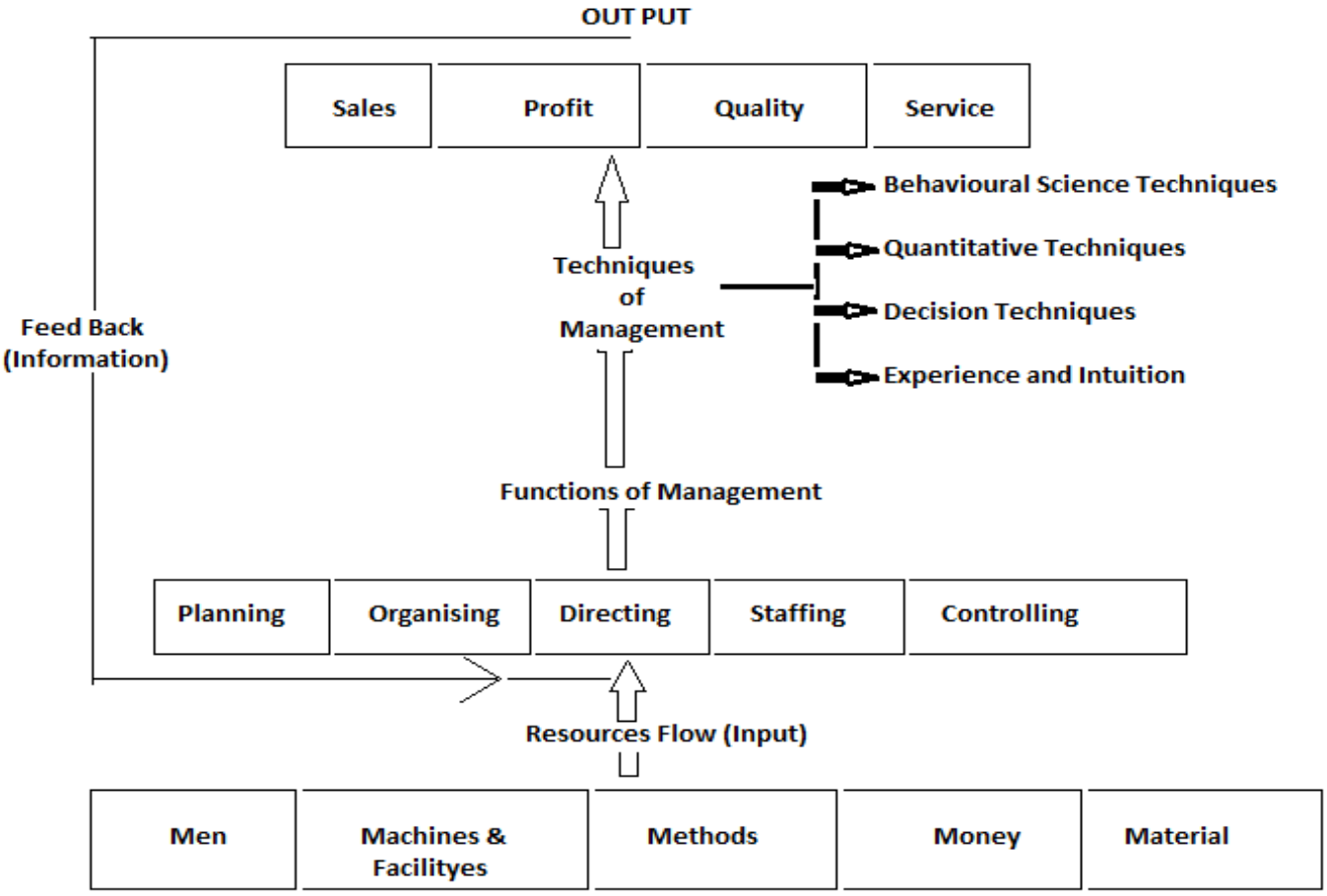
3.5.1. Information Classification

The information obtained and used in the organisations can be classified into five categories:

1. **Action vs. non-action information**: The information lying unnoticed is called non action information but the same information when processed and used in some context by the recipient is called action information.
2. **Recurring vs. non recurring information**: Information which is generated at regular intervals of time is called recurring information. A particular type of information which is arrived at through some special kind of study and which helps in management decision is called non recurring information.
3. **Documentary vs. non documentary information**: Information which is available in some document form that is either in some written form or on microfilms, magnetic tapes, floppy discs etc is called documentary information. All other information is categorised as non documentary
4. **Internal vs. external information:** The distinction is obvious. Managers at different hierarchies in the organisation require different combinations of internal and external information.
5. **Historical information vs. future projections**: Here again the distinction is obvious because historical information would be futile unless it can be used for future projection.

3.6. SYSTEMS APPROACH

- The system approach to a business organization implies a wholistic approach to the study of inter-relationships of sub-systems of an organization in view of the objectives set by the organisation.
- Thus, this requires an integrated approach which could reduce the conflict among different sub-systems and modify the objectives of these sub-systems in order to arrive at an optimum solution to the problems which may arise in the achievement of the main objectives or in the working of the whole system.
- A systems view of business in shown fig.



Business Orginisation - A System

3.6.1. Classification of systems

The various types of systems are:

Conceptual and empirical systems:

- The conceptual system is concerned with theoretical structures which may or may not have any counterpart in the real world. Examples of such systems are economic theory, organization theory, general system of relativity etc.
- Empirical systems are concrete operational systems made up of people, materials, machines, energy, and other physical things. Other systems such as electrical, thermal and chemical are also fall into this category.

1. **Natural and man-made systems**:

   The examples of natural systems are: human body, solar system, etc.

   Examples of man-made systems are: Transportation system, communication system, education system, business organisation etc.

2. **Social system**:

   A system made up of people may be taken as a social system, such as business organisations, government agencies, political parties, social clubs, professional societies etc.

3. **Man-machine system**:

Most empirical systems fall into the category of man-machine systems. One of the examples of this system is aeroplane.

4. **Open and closed systems**:
   - An open system continually interacts with its environment. This type of system can adapt to changing internal and environmental conditions. Every social and business organization is open because it reacts with its unpredictable environment
   - A closed systems one of that does not interact with its environment. This system does not change or if it does then a barrier exists between the system and the environment to prevent the system from being affected.

3.6.2. System life cycle

A management information system business has the following four phases in its life cycle:

1. **Study phase**:
   This phase is concerned with
   1. Identification of the problems
   2. Study of the present system and its effectiveness
   3. Identification and evaluation of various alternative courses of action
   4. Selection of the most appropriate course of action as per the objective.
2. **Design phase**:
   This phase is concerned with
   1. Identification of the function to be performed
   2. Study of the input/output and life cycle design
   3. Defining basic parameters of system design.
3. **Development phase**:
   At this stage, the decision about the selection and use of hardware and software is taken.
4. **Implementation phase**
   The system designed is given practical shape and is adopted for use.

3.7. MEANING AND OBJECTIVES OF MIS

- **Meaning**

✓ MIS is an integrated man-machine system which collects, maintains, correlates and selectively displays information in the proper time frame consistently, to meet the specific needs of various levels of management in order that decisions could be made and action taken for fulfilling the objectives of an organisation.

✓ In other words it is a system which:

i. Provides information to support managerial function. (Planning, control, organising, operating)
ii. Collects information systematically and routinely in accordance with a well defined set of rules.
iii. Includes files, hardware, software and operations research models of processing, storing, retrieving and transmitting information to the users.

Objectives

1. **Facilitate:** The decision making process by furnishing information in the proper time frame.
2. **Provide:** It requisite information at each level of management to carry out their functions.
3. **Help:** In highlighting the critical factors to the closely monitored for success
4. **Support:** Support decision making in both structured and unstructured problem environments.
5. **Provide:** Provide a system of people, computers, and procedures, interactive query facilities documents for collecting, storing, retrieving and transmitting information to the users.

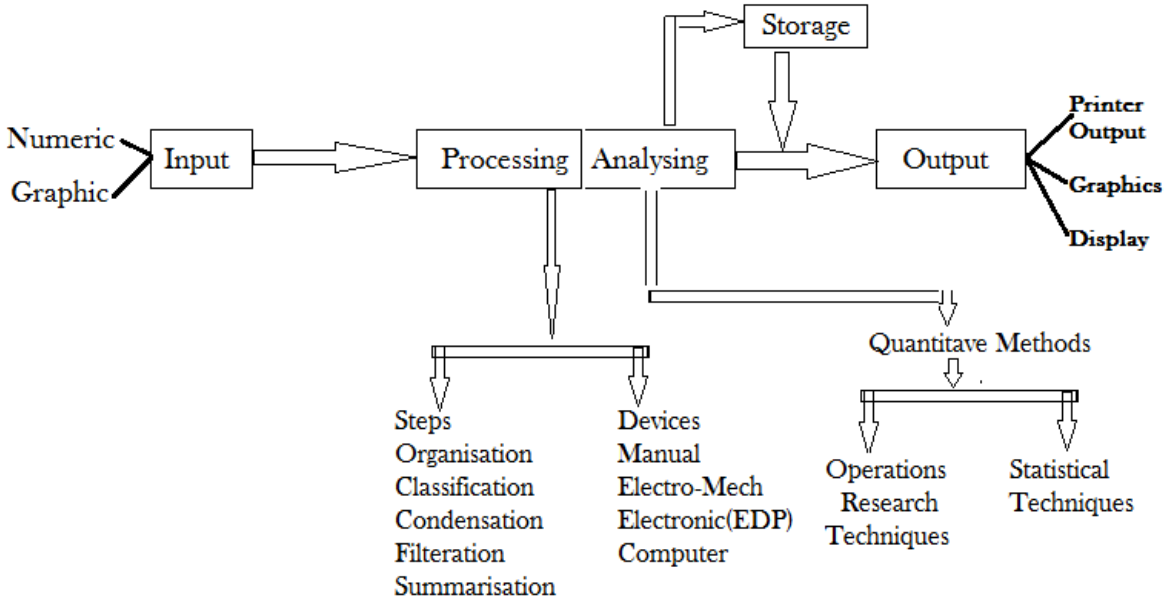
3.7.1. Categories of MIS:

The MIS can be subdivided into following four categories:

1. **Transaction processing system (TSP)**:
   The system designed for processing day to day transaction in an organisation is called TPS. This system deals with collecting and processing a large volume of data which mainly helps junior level management in discharging their responsibilities.
2. **Information providing system (IPS)**:
   This system is meant for processing information, making a summary of information, and providing exception reports. The summary reports help in giving at a glance the information available, while exception reports indicate deviations and the reasons for shortfalls in performance.
3. **Decision support system (DSS):**
   It is sometimes described as the next evolutionary step after MIS.
   It helps in improving the analytical capability of the decision maker by creating interactive model of the real life situation.
4. **Programmed decision-making system**:
   It is defined as a plan for the automatic solution of a problem. Programs are simply a string of instruction as to accomplish a job or a task. In this information age the systems for programmed decisions are created so that decisions are made by the system rather than a person.

3.7.2. MIS and Organisation Structure:

- Organisation structure and information needs are inseparably linked like the human anatomy and the nervous system.
- The knowledge of organisation structure and proper record of delegating of authority within the organisation are prerequisites of MIS.
- This actually helps in defining authority and responsibility, demarcating decision making and measuring objectives of each sub system.
- The outline of MIS for any organisation is shown in fig



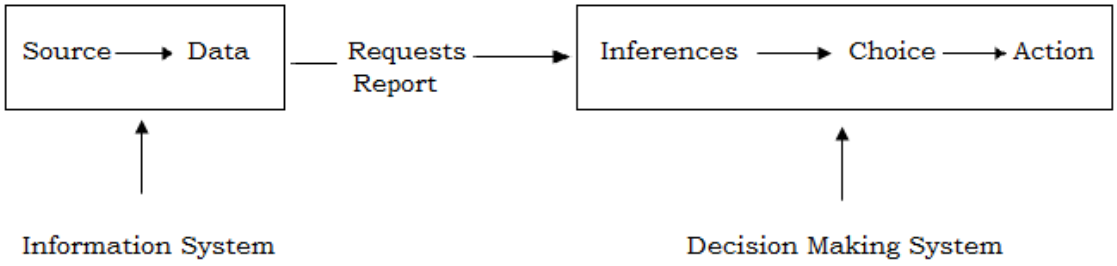
Organisation of an MIS

3.7.3. Classification of MIS

The MIS can be divided into four categories:

1.Data bank information system:

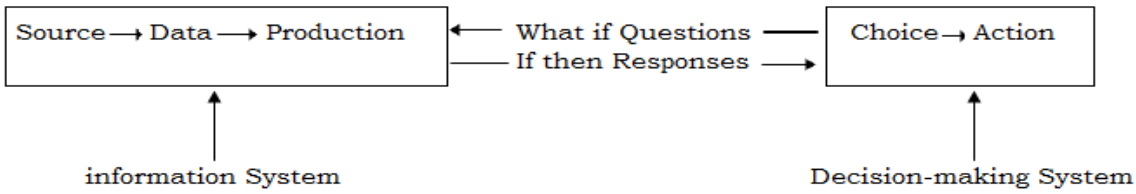
In this system, the link between the information system and the user is assumed to be weak. This type system is more useful for unstructured decisions. The information system collects, classifies and stores data which may be useful to the user. The user maker request for data as per his need and determines the cause and effect in view of the actions and make s judgement as to which outcome is suitable. The data doesn't help the user in making predictions or decisions, however, the nature and availability of data itself tend suggest certain desirable certain desirable alternatives to the user. The data bank information system is shown in fig.



[Data Bank Information System]

2. **Predictive information system**

This class of system is an extension of the databank information system. In this system prediction and inference making occurs when processing by the information system passes from basis data to conclusion about the source.



Perdictive Information System

3. **Decision making information system**

In this system an organizations value system and criteria for choice are incorporated. This level of MIS is useful for structured decisions.

4. **Decision taking information system**

In this system the information system the user are assumed to be one For example a purchase order is released automatically when an inventory level reaches or goes below the reorder or send s remainders to vendors to supply goods when supply is overdue.

3.7.4. Implementation of MIS

The implementation plan involves the following steps:

1. Preparing organisational plans.
2. Planning of work flow.
3. Training of personnel.
4. Development of software.
5. Acquiring computer hardware.
6. Designing the format for data collection.
7. Construction of data files.

8. Operation of old and new systems in parallel.
9. Phasing out the old and inducting the new system.
10. Evaluation, maintenance and control of the new system.

3.8. DISADVANTAGES OF INFORMATION SYSTEM

Following disadvantages are likely to be there from information systems:

1. **'Deskilling' of workers:-**Introduction of new technologies, especially for automation, sometimes render obsolete the existing skill of some workers. Many industries such as the automobile, steel, insurance industries, banks, have gone through periods of massive layoffs because of intense automation efforts. Therefore, while computerisation can increase operational efficiency and improve profits, sometimes it is also the root cause of workforce reduction.
2. **Information overload:** Generation of excessive amounts of information can overwhelm managers who must digit it and used it to make decisions. At times, this improvement also has its downside.
3. **Employee mistrust:** Employees sometimes fear that computers eventually replace them. They may view information system with scepticism; unless they are assured that their jobs are not in danger.
4. **Increased competitive pressure:** There is increased pressure on small and medium-scale industries, failing which they are steadily being pushed out of the marketplace by larger companies.
5. **Disenchantment with IS:** Many organisations are unable to value the information systems and technologies to their organisations vis-à-vis the return on investment. In coming years, the MIS will experience close scrutiny of its abilities to the delivery on its promises.
6. **Security breaches:** when organisation introduce new and sophisticated technologies, they most also find new ways to protected these assets from theft, pilferage, and security breaches. Therefore computers and information system actually increase the operating costs of an organisation.

3.9. APPROACHES OF MIS DEVELOPMENT

There are seven types of approaches used for developing MIS

1. **Top down approaches**:
   This approach developed a corporate plan as a guide for designing the information system. Here top management takes the lead in formulating objectives, policies and plans and communicates them down the line to middle and supervisory management for translating them into reality.
2. **Bottom up approaches**:
   It consists of following five steps:
   a. Individual functional applications are planned separately consisting of transition processing, updating of files and simple reports.
   b. Files of various functional applications are integrated by means of indexing and changing into a database.
   c. Various functions are added to operate on the database and management control level.

d. Integration of models into a model base having a wide verity of analysis, decision and planning models.
e. Strategic planning data planning models are added to the information system.

3. **Integrative approaches**:
   This approach permits managers at all levels to influence the design of MIS. Here evaluation, modification and approval of top management continue till a final design is acceptable to all levels.
4. **Traditional approaches**:
   In this case activities are performed in sequence. Each activity is undertaken only when the previous activity is completed. Managers and users consider and review the work performed the MIS professionals during each stage of processing, in order to ensure accuracy and completeness.
5. **Prototyping approaches:**
   In order to avoid any possible delay, prototyping approach is used. It is to developed a small or pilot version is called a prototype, which is built quickly and at lesser cost with the intention of modifying it when need arises.
6. **End-user development approaches:**
   In this approach the increasing availability of low cost technology, end user development is popular in many organisations. Here the end user is responsible for system development.
7. **Systematic approach for development in small organisations:**
   Since fewer MIS professionals shall be working having with variety of responsibilities that they have little time to develop new system for users. In a very small organisation, no MIS professional will exit. This does not mean that they cannot develop management information systems. They develop systems using the following steps**:**
   - ✓ Identify requirements
   - ✓ Locate, evaluate and secure software development.
   - ✓ Locate, evaluate and secure hardware.
   - ✓ Implement the systems.

3.10. CONSTRAINTS IN DEVELOPING AN MIS

Following are the constraints in developing an effective MIS:

1. No management system to build upon.
2. No clear definition of mission and purpose.
3. No objectives for the company.
4. Misorganisation.
5. Communication gap.
6. Lack of management participation.

3.11. MIS AND USE OF COMPUTER

Following are the main advantages of using computer technology in MIS:

1 .Expanding scope for using system
2. Enhancing speed of processing and retrieval of data
3. Widening the scope of analysis.
4. Increasing complexity of system design and operation.

5. Integrating different information sub systems.
6. Increasing the effectiveness of information system.
7. Extending more comprehensive information to business managers.

3.12. LIMITATIONS OF MIS

The limitations of MIS

1. MIS cannot replace managerial judgment in decision making. It is merely effective tool for the managers in decision making problem solving.
2. The quality of output of MIS is directly proportional to the quality of input and processes.
3. MIS cannot provide tailor made information packages. It is required to analyse the available information before decision making.
4. In a fast changing and complex environments, MIS may not have enough flexibility to update itself quickly.
5. MIS takes only quantitative factors into account.
6. MIS is less useful for making non programmed decisions.
7. MIS is less effective in organizations where information is not being shared with others.
8. MIS is less effective due to frequent changes in top management, organizational structure and operational staff.

3.13. COMPUTER BASED INFORMATION SYSTEMS

- Mangers make decisions to solve problems and information is used in making the decisions.
- Information is presented in both oral and written forms by an information processor.
- It contains each of the computer based application areas:-Accounting Information System (AIS), Management Information System (MIS), Decision Support System (DSS), Office Automation (OA) and Expert System (ES).
- The term computer based information system (CBIS) is used to describe the five subsystems that utilize the computer.
- All of the CBIS sub-system provides information for problem solving.
- Each CBIS subsystem can support quality management. These are external customers that exist outside the firm. Information services interfaces with these external customers by means of the AIS. Much of the external customer's perception of the firm is based on the capabilities of the AIS to execute orders promptly and accurately. Hence, information system has a direct influence on the firm's product and service quality. IS also provides an indirect influence by providing information to users inside the firm.
- These are internal customers and they exist on all organizational levels and in all functional areas. The information enables these internal customers to do their jobs better, resulting in better products and services. In addition, the standard financial reports produced by AIS, such as the income statement and cost analyses, serve as a scorecard of the quality effort, reporting cost of rework, scarp customer returns, warranty claims and so on. Fig. shows each of these subsystems which provide information to be used in quality management.

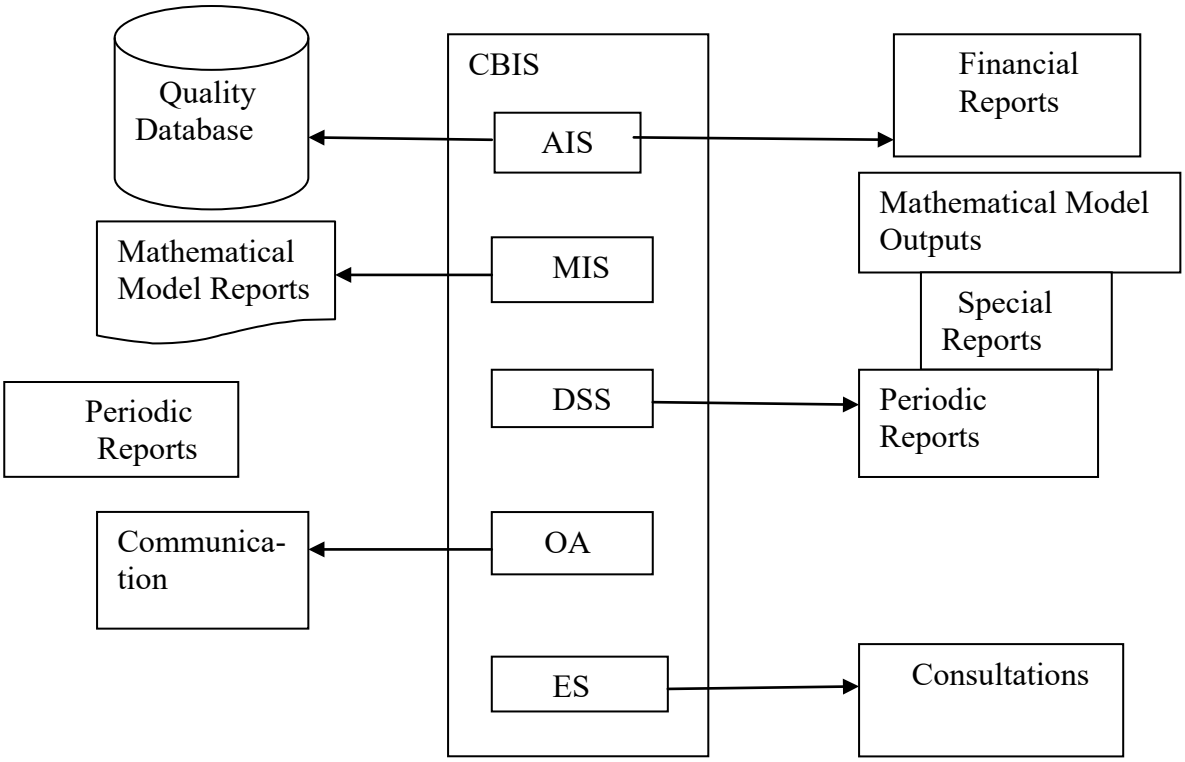


Fig. CBIS sub-systems support-quality management

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SCHOOL OF MANAGEMENT STUDIES

MASTER OF BUSINESS ADMINISTRATION

UNIT – IV – INFORMATION SYSTEM MANAGEMENT – SBAA7034

UNIT 4 - STRATEGIC INFORMATION SYSTEM

Competitive Strategy Concepts - Value chain and Strategic IS - Using Information Technology for Strategic advantage - Strategic uses of IT - Role of IT - Reengineering Business Processes - Security and Ethics in MIS.

4.1. INTRODUCTION

- Strategic management information system (SIMS) is the set containing systems considered critical to the current or future business competitiveness and hence survival of an organization.
- An SMIS also supplies and organization with business intelligence. If an information system is used in creative ways to achieve the goals and fulfill the mission of the organization, it can be viewed as an SMIS weather it is TPS, an MIS, or any other type of system.
- Strategic management information system can be external or internal system.

1. **External Strategic system**
   - These are used mainly by external entities in the business environment, such as customers, suppliers, and distributors, and have a value-added component that gives developers some time to reap the benefit of system innovation.
   - Some benefits of external strategic system are two fold:
     - **Benefits to the customer-**increase customer satisfaction, increased customer control, and reduction in transaction cost ; and
     - **Benefit to the organisation** – increased market share, reducing of the processing cost, ability to charge higher price because of value-added component, and increased in profit margins.
2. **Internal Strategic System,**
   - These are used by employees with in the organisation and do not have a value-added component. The employees focus on the issues such as improving the quality of products and services and enhancing the decision making capability of manager.
   - Such systems are often used at all levels in the organisation; they have long term implications for the firm and for the business process with in the firm.

- Strategic information systems can be divided in three categories
  - System that focus on innovation for competitive advantage.
  - System the use information as a weapon.
  - System that increase productivity and lower the cost of goods and services.

Innovation

- Customer service systems
- Order, order inquiry, service systems
- Marketing planning systems
- Forecasting sales analyses

Information services

- Financial planning systems
- Systems with mathematical models to aid financial planning
- Executive information systems

- Systems that allow top management to retrieve internal and external data and information directive form the computer.
- Logistics
- Vehicle routing, freight rate management, shipment tracing, performance measurement
- Electronic data interchange (EDI)
- Electronically sending bills, payments, or orders to suppliers and customers
- Access to external data bases
- Compustat, CompuServe, Dow Jones, and so on;
- Expert systems
- Computerized "consultant" systems for specified situations.

Productivity

- Transaction processing accounting, billing, pay roll
- Inventory management
- Raw material, finished product work-in process
- Centralised DBMS
- Software system to facilitate access to organizational data and information
- Production planning
- Material and capacity requirements planning, scheduling, due date setting
- Personnel system
- Skills inventory and personal performance tracking
- Statistical system
- SAS, SPSS, Minitab, and so on.
- Factory floor control
- Robotic islands, automated guided vehicle systems, automated storage and retrieval

4.2. CHARACTERISTICS OF SMIS

There are three common characteristics in all strategic management information systems. These are:

- Telecommunication as central part of SMIS.
- Reliance on a number of vendors for providing information technologies.
- Cooperation among a number of organisations.

Telecommunication: - It is a vital part of SMIS**.** The successful organisation transcended traditional organizational boundaries and eliminated the barriers of time and space through the use of telecommunication. However, developing and implementing information system that rely heavily on telecommunication is a challenging task and is often becomes one of the bottlenecks for development of SMIS.

Interorganaisational systems:- Those systems which are shared by more than to organizational, in terms of cooperation and collaboration rather than the competition. Such ventures often results in powerful systems enhancing productivity, reduction in cooperating cost, increased market share, and create new partnership specially for organisational that the conduct business transaction in global markets.

4.3. STRATEGIC PLANNING FOR MIS

An organisation's IS strategy, and the plan that document it, must be consist with:

- Its corporate plans
- Its management's view of the role of IS in the organisation
- Its stage of maturity of use and management of IS

  For strategic planning of MIS, following five questions should be addressed:
- Where does IS strategic fit with in the wider set of strategic?
- What has been the history IS strategic planning?
- What circumstances demand major re-assessment of IS strategy plans?
- Who might be the employed to the actual planning?
- What might an IS strategy plan contain?

4.4. DEVELOPMENT OF SMIS

- An organization should ask two questions before developing a SMIS.
  - Is the protect financially feasible?
  - Is the protect technically feasible?
- Strategic system required substantial resources over an extended period of time, often with little or no graduate of success.
- The primary reason why strategic system is risky financial ventures is that they are often ground-breaking system with few or on procedure, so they must be justified on the basic of the business strategic they support.
- Justifying SMIS primarily by financial standards is often futile.
- **Technical feasibility of the project: -** Strategic system requires well established technology, which is also widely accepted by users. Sometimes the complexity of the technology can be hinder the success of the system. State-of-the-art technologies and untested technology can be added a new and unexpected twist to the development of the strategic system. Technical failures of strategic system can be even place organization at strategic disadvantages.
- **Key factors to success SMIS.** Following are the five factors that contribute to the success of a strategic system.
  - Technology decision should be grounded in a clear understanding of the process that drives the technology.
  - Strategic system should be driven by the strategic alliances between trading partners.
  - Continuous improvement and investment in strategic systems are essential for their long-term success.
  - The organizational culture should encourage some risk-taking.
  - Users must be fully trained if the full potential of the strategic system is to be aimed.

These techniques are known as three **Rs**—reverse engineering, restructuring, and re-engineering. These components can be applied separately or in combination.

4.4.1. Reverse Engineering

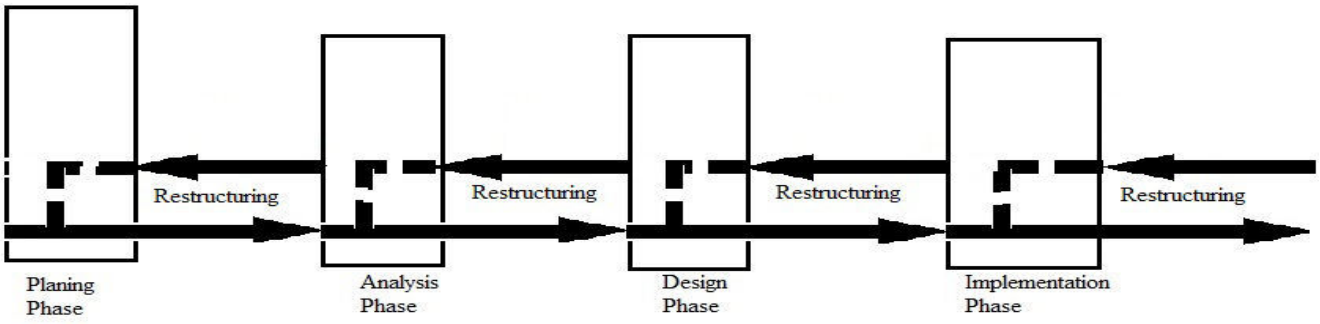
- Reverse engineering had its origin in business intelligence. firms keep current on their competitors products by purchasing samples and taking them a part to see what makes the sick the design specification of the competitors products are derived form the product themselves, reversing the normal pattern, where the design come first.
- Reverse engineering is the process of analyzing a system to identify its elements and there interrelationship, and to create documentation in a higher level of abstraction then currently

exits. *Reverse engineering* is applied to a system when little or more documentation exist and there is a need to prepare new documentation.

- The starting point in reverse engineering a system it the program code, which is transform into such program documentation as structured English and program flow chart. This documentation can, in turn, be transform into more abstract description such as data flow diagrams and system flow charts. The transformation can be accomplished manually or by business process redesign software.
- Reverse engineering therefore follows a back word path through the system life cycle as illustrated in, reconstructing the system design and planning that went in to the original development effort.

4.4.2. RESTRUCTURING

Restructuring is the transformation of a system into another form without changing its functionality. A good example of restructuring is the transformation of a program written in "spaghetti code" into one in a structured format. Restructuring is pursued as a means of updating systems that developed prior to advantage of structured techniques.

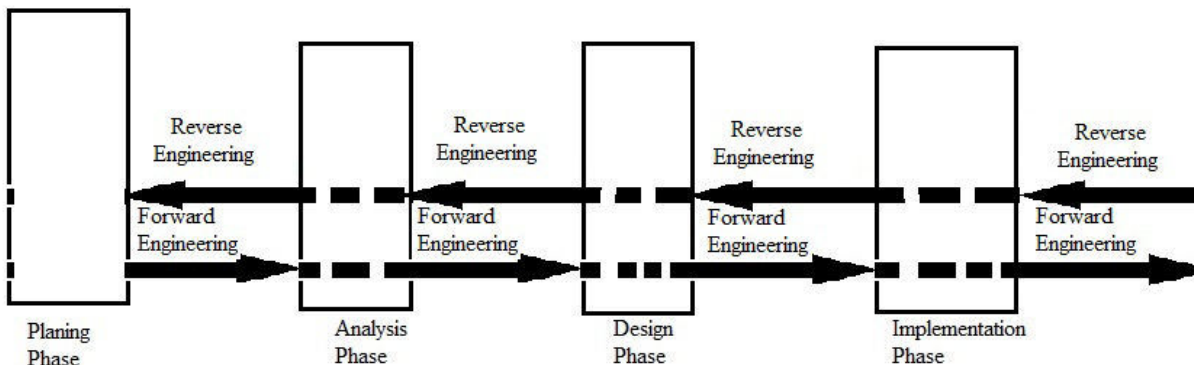


Restructuring Process

As soon as a program has been restructured it is put back into use, producing the looping patterned as the above figure as with reverse engineering, restructuring can be pursued in a backward direction through each phased of system life cycle. The result is a completely structured system- from the plan to the code.

4.4.3. REENGINEERING

Reengineering is the complete redesign on of a system with the objective of changing its functionality. It is not a "clean slate" approach because the knowledge of the way that the system currently performs is not completely ignored. The know ledged can be gained by first engaging in reverse engaging in reverse engineering and then developing the new system in the normal manner.



Reengineering identifies the essential element of a core business process right across the organisation and sometimes beyond its boundaries.

- Identify the process of innovation
- Identify the change levers
- Develop the process vision
- Understand the existing processes
- Design the prototype the new process

Hence, it is necessary that construction investment in strategic system is valid to staying ahead of the compaction. The organizational culture should encourage top manager to be 'champion' and 'passionate sponsored' who are willing to play a key role in the development and implementations of SMIS and encouraged its use and acceptance by employees and customer. Finally, the organization should have a pool of talents people with technical skills and a good understanding of the business for the development of complex and sophisticated information system.

4.5. MIS STRATEGY IMPLIMENTATION

There are five major strategy implementation issues:

- information system resource structure
- end-user computing
- information systems management and hybrid managers
- information value and information systems investment
- Selection and acquisition.

4.6. BARRIERS TO DEVELOPMENT OF SMIS

- **Development (definition) barriers**
  - ✓ Generating workable ideas requires leadership and term work.
  - ✓ Many innovative ideas are technically infeasible.
  - ✓ Many innovative ideas are prohibitively expansive.
  - ✓ Many ideas die because they lack a sufficient market.
- **Implementation barriers**
  - ✓ Telecommunications increases the complexity of implementing SMIS.
  - ✓ Multiple systems are difficult to integrate.
  - ✓ SMIS systems often require interorganisational cooperation.
  - ✓ State-of-the-art technologies are difficult to implement.
- **Maintenance barriers**
  - ✓ Competitors can copy SMIS.
  - ✓ Unanticipated demand can overwhelm the usefulness of an SMIS.
  - ✓ Applications can be expensive to maintain or enhance.
  - ✓ High exit barriers can cause devastating losses.

Organisations with limited financial resources, technological sophistication, and organizational flexibility will likely face one or more of these barriers.

4.7 Application of IT in Business

→ A new revolution is in the making, similar to the industrial Revolution that took place at the turn of the last century. Many economists, management export and futurists agree that the world has entered the new age of information.

→ Alvin Toffler's third wave or Peter Drucker's post-industrial society – the new era is being increasingly referred to as the information age.

→ The primary driver of this information age – technology and markets – is well known. Marketing, enterprise, entrepreneurship are some of the other drivers. According to Professor Tom Cannon, the new industrial revolution surrounding us required profound change; profound change in the way enterprise is being considered, develop business, the way we manage and the structures within which we manage. He foresees not just a change in the market but a fundamental change in the economic relationship between people, between economies, and between societies. Information and information technology (IT) are the new drivers of this age.

4.8 E-COMMERECE (EC)

The internet and the web have revolutionised commerce and created new paradigms. The new business paradigm is base on the virtual corporation paradigm which has come into being through combination of intranets an extranets. The following three types of EC, supported by networks, have emerged:

- Consumer to business
- Business to business
- Intranet procurement

Consumer to business EC: - Electronic malls, virtual storefronts allow individual consumers to browse for products and shop using credit cards. This form of EC is internet based, with unrestricted access to consumer's .Credit-card payments have to be secured against unauthorised access by intruders on public network.

Business to business EC: - In this case, bulk of commerce, as much as 70%, is conducted over networks, Business to business procurement and fulfilment including financial transactions has traditionally been conducted over private networks. This segment of EC is driving extranets .It is restricted to business partners and users secure procedures based on firewall , encryption authorisation level, with payment by predetermined credit terms.

Intranet procurement:- Business transactions , which are internal to an organisation , across its departments and subsidiaries also comes under EC.Internet sales, order processing, intracompany charging and billing, fund transfer for accounting purposes are some of the an organisation. This can span the entire globe in case of multinationals. Intranets are responding to this challenge.

4.9. COMMERCE OVER THE INTERNET

Commerce over the internet conducted essentially in two ways: EDI over the internet and Web-based EDI.

4.9.1. EDI over the internet

- Internet mail is used as a means for transmitting EDI messages. The IETF-MIME specification is used to envelope the EDI data within the E-mail message. With this arrangement internet replace the proprietary VANs for exchanging of EDI message between trading partner. While the cost of transmitting of EDI message gets substantially reduced this way, there are other problems related to security and integrity of transactions, as also relatively of the internet which becomes dominate issues. These issues are being addressed, and cost effective solution have been created by a number of organizations.
- EDI over the internet for more flexible, since there is no need for prior network connection. This way more and more firms, including smaller firms, exchange EDI messages. EDI network are typically set as a hub with spokes; a big buyer at the hub dictating its suppliers at the spokes, which cannot communicate among themselves. Since the internet replaces much of this limit network its own likes, which are everywhere, virtual trading communities' gate formed over it.
- Individually trading partners (TP) register there business as domain names on the internet. When if they change network service providers, they own domain name. Filtering software, based on rules, processes the EDI messages, and issues auto response for information about setting of a TP relationship. Mechanisms are in position that allows delivery of the EDI messages directly to redundant EDI-process with out the usual store and forwarding, which greatly simplify EDI-over the internet. The filtering programs analyse values in MIME headers, and forward messages to appropriate application based. It is through this approach that the EDI messages get directed to EDI translator programs, which retrieve the business, interchange for future processing the recipients' computer system.

4.9.2. Web based commerce

- Web based commerce on the internet has taken the world storm. It is a new way of conducting. The web, with its capability to play audio, display graphics, pictures and video, enables internet users to request information and order products instantly. This is possible in interactive mode making it an excellent choice for companies and 0rganisations to display their wares: products and services. It is this capability, coupled with the world wide reach of the web that has led to a phenomenal growth of commercial sites with Internet registrations (.com address). The growth of Web Sites continues exponentially.
- The commercial web sites of companies have web documents that offer useful product information, interactive brochures, news, reviews, etc. The companies can create electronic brochures in colour with graphics, audio and video and can reach customers worldwide for very little cost, instead of printing brochures and mailing them which is much more expensive. The electronic malls and stores on the web enable one to see and order

merchandise by using a forms interface, an *electronic form* that contains blank boxes for the user to enter information on product codes, credit card number, etc.

4.9.3. Security issues in electronic transactions

The main issues that confront in relation to securing electronic transactions are:

1. Confidentiality
2. Integrity
3. Availability
4. Authenticity/ non- reputability
5. Auditability

- **Confidentiality:** - Information should be protected form prying eyes of unauthorised internal users, external hackers and from being intercepted during transmission on communication networks by making unintelligible to the attacker. The content should be transmission in such a way that it is not decipherable by anyone who does not know the transformation algorithm.
- **Integrity:** - On retrieval or receipt at the other end of a communication network the information should appear exactly as was stored or sent. It should be possible to generate an alert on any modification, addition or deletion to the original content. Integrity also precludes information 're-play' i.e., a fresh copy of the data is generated/ re-sends using the authorisation features of the earlier authentic message. Suitable mechanisms are required to ensure end to – end message content and copy authentication.
- **Availability:** - The information that is being stored or transmitted across communication network should be available whenever required and to whatever extent as desired within pre-established time constraints. Network errors, power outages, operational errors, applications software errors, hardware problems and viruses are some of the causes of unavailability of information. The mechanisms of implementation of counter – measures to these threats are available but beyond the scope of end- to –end message security for implementing electronic commerce**.**
- **Authenticity: -** It should be possible to prevent any person or object from masquerading as some other parson or object. When a message is received it should be therefore be possible to verify whether it has indeed been send by person or object claiming to be the originator. Similarly, it should also be possible to ensure that the message is sent to the person or object for whom it is meant. This implies the need for reliable identification of the originator and recipient of data.
- **Non-reputability:-** After sending / authorising a message, the sender should not be able to, at a later date, deny having done so. Similarly, the recipient of a message should not be able to deny receipt at a later date. It should, therefore be possible to bind message and message acknowledgements their originators.
- **Auditability:-** Audit data must be recorded in such a way that all specified confidentiality and integrity requirements are met.

4.10. ELECTRONIC CASH OVER THE INTERNET

- Electronic or digital cash (e-cash) is a new concept to execute cash payments using computers connected over networks. To make it a reality with security and privacy of transaction, a number of solution providers have come into being.
- Using software on the customer's own computer, the concept can withdraw e-cash from his/her own account in a blank. The e-cash is stored is the hard disk of the customer's computer in an electronic wallet which can be spent by the customer for purchase of items from any shop accepting e-cash.
- Digital cash can be used for making/receiving payments between customer and merchant or persons or for money transaction.
- The customer can use a browser to see products offered for sale on the web. He scans the sale pages and identifies ten products available in different shops along with their sale prices. In doing so, the customer browses through the web pages on the merchant/shop owner's servers.
- After identifying the products the customer wants to buy he sends a request to the customer's bank server for spending electronic cash from his account to his own system. The message is in enciphered form. The Bank server (after checking authenticity, balance, etc) sends back a secure e-cash packet which is the stored in the electronic wallet of the customer's hard disk.
- Having obtained e-cash from his own computer, the customer sends an order to the merchant/shop owner's server along with billing and shopping address, quantity ordered and the exact e-case required for the purchase.
- The merchant (after receiving the order along with e-case) issues a receipt electronically to the customer and send the e-case to his account in the merchant bank. The merchant takes the desired step for delivery of items to the customer. The merchant back send the e-case packet to the customer's banks. The customer's bank after using the customer sends the e-case packet to customer's bank. The customers public key allow along with the security packet received verifies the remits the actual fund to the merchant's bank who transfer this money to the account. The customer gets the item despatched by the merchant at the shipping address.
- As the e-cash can reach the destination site using computer network or internet which has an open architecture, the security of the system is very important. Security is provided using encryption, digital signature and passwords. As e-cash is digitally signed by the customer, there is no room for dispute over payment. The implementations very from one to another solution provider.

4.10.1. Elements in electronic Cash Flow

- **Client software**

  Software available from various solution providers works latest versions of windows 98, windows 3.1, Macintosh and UNIX. Some of them make use of web browsers and e-mail reader and some require desiccated software for browsing encrypted information. In most of these cases, the software at the customer site is provided free. Almost all solutions require a TCP/IP network connection.
- **Merchant server software**

Some solution providers design custom application software for the merchant, others integrate functions with web servers. In another solution, the server must have the Netscape commerce server whereas some provide a software library for free.

- **Payment by the customer**

  The customer can make payment using a credit-card number, by e- cash from a participating bank, or through an automated clearing house (ACH). The option depends again on the solution being provided by the service provider.

- **Payment to merchant**

  In debit-based transactions , the merchants gets payment immediately , from the customer's bank in his account, through ACH, through a bank transfer, or, within a day of the cleaning period, In credit transactions, the merchant gets paid through a bank transfer of through a normal credit-card processing cycle.

- **Transaction cost**

  The cost per transaction varies for credit and debit transaction and with the service provide. In some cases, there is a fixed amount per transaction, whereas others charge a percentage of the amount of transaction.

- **Risk**

  In most of the solutions provided, the risk is the merchant's for fraudulent transactions. In case of disputed debit transactions or if after payment a merchant is unable to deliver, the customers lose.

- **Applications**

  Electronic case applications include debit cards, vending telebanking, teleshopping, phone cards, parking systems, public transit systems and automatic toll collection, etc.

4.11. INTERNET SECURITY

- Establishing rules to decide which packets, depending on the originating IP address, should be allowed to pass into the organisation network.
- Establishment of proxy servers, so that internal client requests for accessing external service are routed through the proxy server. This ensures that the client and the external server are not in direct communication with each other.
- Establishment of an additional network as a buffer between the internal and external networks.

4.11.1. Guidelines for Cryptography policy

- The cryptography method should be trustworthy in order to generate confidence in their use.
- Users should be free to choose any cryptography method based on their security re-quirements.
- Cryptography methods should be developed in response to the needs of businesses, individuals and governments.
- Technical standards and protocols for cryptography should be developed and promulgated at the national level.
- Fundamental rights of individuals to privacy should be protected.

- National policies may allow lawful access to plaintext, cryptographic keys and encrypted data.
- Liabilities of individuals and entities that offer cryptographic service should be clearly stated.
- Governments should cooperate in coordination of cryptographic policies.

4.11.2 ELECTRONIC BUSINEES (E-BUSINEES) 11

E-business is about using internet technologies to transform the way key business processes are performed. Its visible from is online purchasing, both wholesale and retail. Every day, more companies and people gain access to the Web, and every day, more purchases are transacted electronically.

4.12.1. Opportunities

There is a range of E-business opportunities that depend on the nature of the business and the customers services. Here are some opportunities of online business:

- Retail sellers on the internet can sell high- quality, specialized product that appeal to an audience of affluent, well-educated, and well- informed people.
- Companies that sell their good through catalogs and expand their reach to additional global customers at a low marginal cost.
- Business – to –business sellers, the majority of whose customer base is already on the internet, can build a closer relationship, electronically.
- Companies that already have a corporate web site and an efficient network operation can establish subsidiary sites for related, ancillary, or consumable products.
- Business selling products that can be sampled on the web (for example, books, magazines, and recorded music) can promote them economically.

4.12.2. Benefits

The primary benefits of e-business are global accessibility and sales reach, the prospect of increased profits from new markets and electronic channels, improved customer service and loyalty, shorter time-to-market and supply chain integration.

- Global accessibility and sales reach
- Market base expansion
- Increased profits
- Improved customer service and loyalty
- Shorter time to market
- Supply chain integration

4.12.3. E-business strategy

Following are the e-business strategies:

- The impact of extending the enterprise

- Updating operational habits and reducing costs
- Pressuring resellers
- Transferring power to buyers
- Personalization
- Trust and privacy
- Requirements for e-business platforms
- Quick start-up
- Scalability and variety of upgrade paths
- Staff familiarity
- Availability of end-to-end service
- Flexible purchasing process
- Strong search and product selection capabilities
- Open architecture

4.13. APPLICATIONS OF E-COMMERCE IN INDIA

- Customs
- Reserve bank of India
- Airport authority of India(AAI)
- Apparel export promotion council(AEPC)
- Banks
- Directorate general of foreign trade
- Port authorities
- Ford India ltd-A Giant in Automobile company
- Building and construction materials industry
- Metal industries
- Office Automation industry
- Packaging industry
- Indian engineering industry
- The logistics industry

4.14. SUCCESSFUL E-COMMERCE

In order to remain successful in today internet-driven marketplace, established enter-prises have to be able to function e-business. E-business is extended organisations, with lean, core business models, supplemented by outsourcing arrangements and business alliances. They are tightly integrated with customers, supplies, partners, and remote employees via intranets, extranets and the public internet.

4.15. MOBILE COMMERCE

Mobile commerce, commonly referred to as M – commerce, means to pay for merchandise services or information through a mobile phone. Wireless application protocol (WAP) is enabling technology to bring the internet content and services to mobile phones and other wireless terminals.

Some of the important aspects of M-commerce are: -

WAP: - WAP provide a much – needed medium to connect in a secure, fast, nimble, online, interactive way with services, information and other users.

WAP application:- Wireless application have a major role to play in easing business processes in every situation where information exchange is a critical need. WAP is being used to develop enhanced forms of existing application and view versions of today's emerging application.

4.16 E-GOVERNANCE

E-government is defined as a mere delivery of government services and information to the public using electronic means, e-governance allows citizens to communicate with government , participate in the government's policy-making and citizens to communicate each other. It truly allows citizens to participate in the government decision-making process.

- Government to government
- Government to citizen
- Citizen to Government
- Government to private and other sectors
- Private and NGOs to Government

4.16.1. Models of E-governance

There are four model of e-governance

- **Broadcasting / wider dissemination model**

❖ Placing government laws and legalisation online.

❖ To make available online the name, address, fax numbers, e-mail, etc.

❖ To make available online information relating to government plans, budgets, expenditure, and performances.

- **Critical value information-flow model**

❖ To make available online research, enquiry reports, reports of the various commissions.

❖ To make available critical environmental information to local inhabitants.

- **Comparative analysis model**

❖ To learn from historic policies and actions and derive learning lessons for future policy-making.

❖ To evaluate effectiveness of current policies and identify key learning in terms of strengths, flaws in policies.

- **Interactive service model**

❖ Establish decentralised form of governance.

❖ Performing governance functions online such as revenue collection, governmental procurement, payment transfer etc.

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UNIT – V – INFORMATION SYSTEM MANAGEMENT – SBAA7034

UNIT 5 KNOWLEDGE MANAGEMENT SYSTEM

Decision Support System - Types - Knowledge Management System - Types of Knowledge Management System - Artificial Intelligence Management System.

5.1. INTRODUCTION

- → Decision support system (DSS) in an outcome of management information system, providing support for management at operational control, management control, and strategic planning.
- → Management activity of each of these classes includes planning, control, and decision making.
- → A feature of the DSS that is currently receiving much publicity is computer graphics Graphs are good only in certain situations. However, in those situations some graphs are more effective than others.
- → The most recent embellishment of the DSS concept is the group decision support system (GDSS). The GDSS endeavours to improve communication among group members by providing simulating environment.

5.2. DEFINATIONS

- → The term decision support system refers to a class of system which support the process of making decisions. The emphasis is on 'support' rather than on automation of decision.
- → DSS allows the decision maker to retrieve data and test alternative solution during the process of problem-solving.

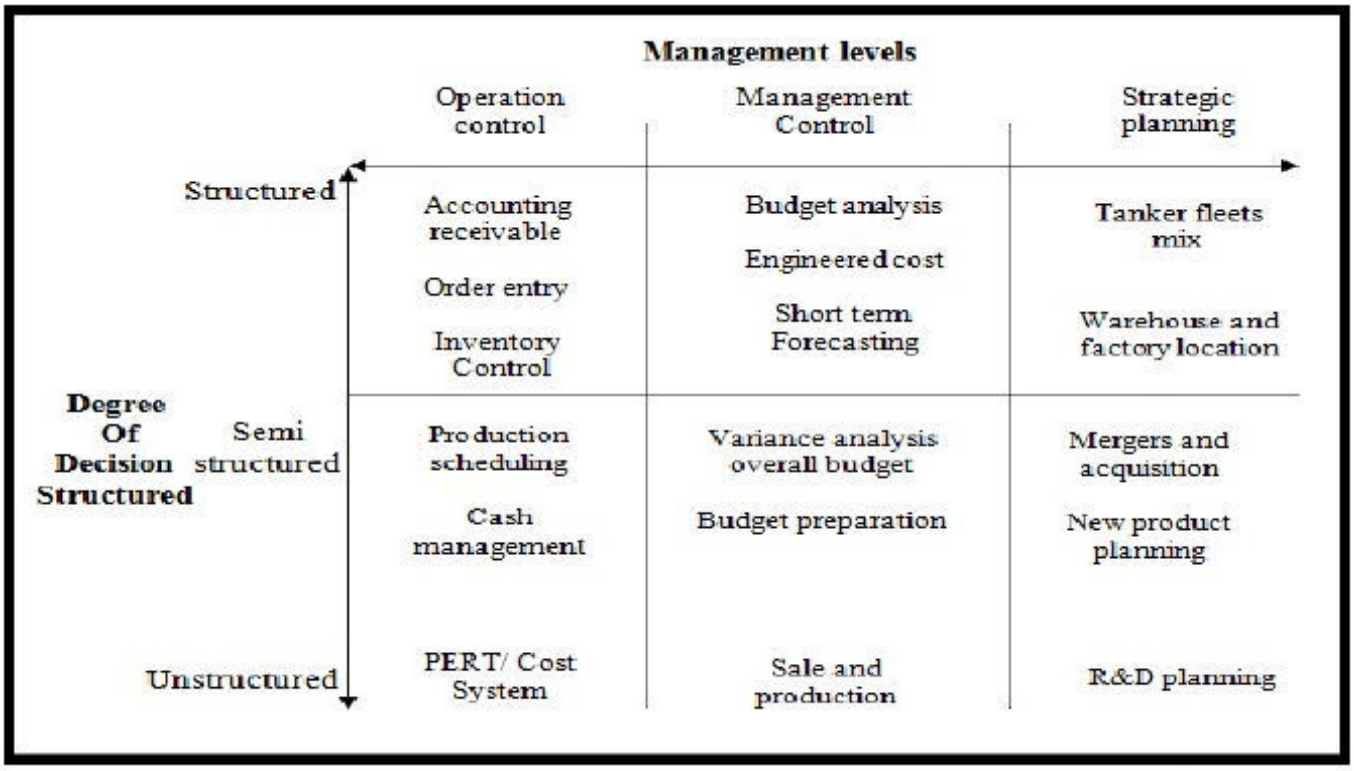
  Keen and Scott Morton (1978) defined DSS as:
- → The impact is on decisions in which there is sufficient structure for computer and analytic aids to be of value but where manager's judgement is essential;
- → The payoff is in extending the range and capability of manager's decision processes to help them improve their effectiveness; and
- → The relevance for managers is the creation of a supportive tool, under their own control, which does not attempt to automate the decision process, predefine or objectives, or impose solution.

  However, this definition has certain limitations.

  In 1984, Freyenfeld (1984) proposed the following empirical definition of DSS based on discussions with some 30 supplier user and academic organisation:
- → "A Decision support system is an interactive data processing and display system which is used to assist in a concurrent decision making process, and which also confirm to following characteristics:
- → It is sufficiently user- friendly to used by decision makers(s) in person;
- → It display its information in a format and terminology which is familiar to the user(s);and
- → It is selective in its provision of information and avoids its user(s) in information overload."
- → Another definition of a decision support system is: "A set of well-integrated, user-friendly, computer-based tools that combine data with various decision-making models—quantitative and qualitative---to solve semi –structured and unstructured problems.''

5.3. EVOLUTION OF DSS:

- → The notion of decision support as a formal concept was coined by G. Anthony Gorry and Michael S. Scott Morton. They felt a need for a frame work to channel computer application towards management decision making and developed a grid, known as the Gorry and Scott Morton grid.
- → The grid each based on Simon's concept of programmed and non-programmed decision and Robert N. Anthony's management levels.
- → The decision types are described in terms of problems structure, ranging from structured to semi-structured to unstructured.
- → A fully structured problem is one in which the first three of Simon's phases – intelligence, design and choice-are structured. The decisions are routine and straightforward. By following a setup pre-established step, a solution to the problem can be found. Such a problem does not require intuition or judgement. Therefore, the system returns the same solution every time.
- → An unstructured problem is one in which none of the three phases is structured. The decisions are unique and non--repetitive. Because they require intuition, experience judgement, there may be no one 'best' solution and solutions may differ from one decision maker to the other.
- → A semi-structured problem is one in which one or two of the phases are structured. The decision in this category fall somewhere between structured decisions, which are routine and repetitive, and unstructured decision, which are unique and non-repetitive.
- → Gorry and Scott Morton entered types of business problem into their grid. For example, accounts receivable is solved by managers on the operational-control level making structured decision. R&D planning is accomplished by strategic planning managers making unstructured decisions.
- → The horizontal dotted line through the middle of the grid is significant. Its separate the problem that had been successfully solved with computer assistance from those problems that had not been subjected to computer processing.
- → The upper area was named structured *decision system* and the lower area was named decision support systems.



- → DSS are especially useful for semi-structured problems where problem-solving is improved by interaction between the managers and the computer system.
- → The emphasis is on small, simple models which can easily be understood and used by the decision maker.
- → Examples of semi-structured decision are : planning a mix of investments for a portfolio, looking at the financial implication of various way of financing a short-term cash flow deficit, consideration of alternative production and pricing policies, assessing the impact of potential future changes in exogenous variables such as interest rates, analysis of the of the credit-worthiness of corporate clients, and assessing the likely impacts of departmental reorganisation

5.4. OBJECTIVES OF DSS

- → Assist managers in making decisions to solve semi-structured problems.
- → Support the manager's judgement rather try to replace it.
- → Improve the manager's decision-making effectiveness rather than its efficiency.
- → These objectives correlate with three fundamental principles of the DSS concept-problem structure, decision support, and decision effectiveness.

5.5. CLASSIFICATION OF DSS

- ❖ **File Drawer Systems**: This is a system which provides the user with organized information regarding specific demands. This system provides on-line information. This is very useful system for decision making.
- ❖ **Data Analysis Systems**: These decision systems are based on comparative analysis and makes use of a formula. The cash flow analysis, inventory analysis and personnel inventory

systems are examples of the analysis systems. This use of simple data processing tools and business rules are required to develop that system.

- **Information Analysis System**: In this system the data is analysed and the information reports are generated. The decision makers use these reports for assessment of the situation for decision-making. The sales analysis, accounts receivables system, market research analysis are examples of such systems
- **Accounting Systems:** These systems are not necessarily required for decision making but they are desirable to keep track of the major aspects of the business. These systems account items such as cash, inventory, and personnel and so on.
- **Model Based Systems**: These systems are simulation models or optimization models for decision making. It provides guidelines for operation or management. The product decision mix decisions, material mix, job scheduling rules are the examples. It is the most important type of DSS.
- **Solver Oriented DSS:** It is performing certain computations for solving a particular type of problem. The solver could be economic order quantity procedure for calculating an optimal ordering quantity.
- **Suggestion System:** There are used for operational purposes. They give suggestion to the management for a particular problem. This model helps in making required collection of data before taking a suitable decision.

5.6. CHARACTERISTICS OF DECISION SUPPORT SYSTEM (DSS)

1. DSS tends to be aimed at the less well structured, underspecified problem that upper level managers typically face;
2. DSS attempts to combine the use of models or analytic techniques with traditional data access and retrieval functions;
3. DSS specifically focuses on features which make them easy to use by non computer people in an interactive mode; and
4. DSS emphasizes flexibility and adaptability to accommodate changes in the environment and the decision making approach of the user.

5.7. COMPONENTS OF A DSS

Following are the components of the Decision Support System:

5.7.1. Database Management System (DBMS)

→ To solve a problem the necessary data may come from internal or external database.
→ In an organization, internal data are generated by a system such as TPS and MIS.
→ External data come from a variety of sources such as newspapers, online data services, databases (financial, marketing, human resources).

5.7.2. Model Management system

→ It stores and accesses models that managers use to make decisions.

➔ Such models are used for designing manufacturing facility, analyzing the financial health of an organization. Forecasting demand of a product or service etc.

5.7.3. Support Tools

➔ Support tools like online help; pull down menus, user interfaces, graphical analysis, error correction mechanism, facilitates the user interactions with the system.

5.8. FUNCTIONS OF A DSS

There are five function of a DSS facilitating managerial decision making. They are:

- Model building
- What-if analysis
- Goal seeking
- Risk analysis
- Graphical analysis.

⇨ **Model building**

➢ It allows decision makers to identify the most appropriate model for solving the problem at hand. It takes in to account input variables, interrelationships among the variables, problem assumptions and constraints.

➢ For example, a marketing manager of Videocon is charged with the responsibility of developing a sales forecasting model for colour TV sets.

➢ A model builder uses a structured framework to identify variables like demand, cost and profit, analyse the relationships among these variables identify the assumptions, if any (e.g., assume the prices of raw materials will increase by 5% over the forecasting period), and identify the constraints, viz., the production capacity of the plant.

➢ All this information's are then integrated by a system into a decision making model, which can be updated and modified whenever required.

⇨ **'What-if' analysis**

It is the process of assessing the impact of changes to model variables, the values of the variables, or the interrelationships among variables.

➢ This helps managers to be proactive, rather than reactive, in their decision making.

➢ This analysis is critical for semi-structured and unstructured problems because the data necessary to make such decisions are often either not available or incomplete. Hence, managers normally use their intuition and judgement in predicting the long-term implication of their decisions.

➢ Managers can prepare themselves to face a dynamic business environment by developing a group of scenarios (best-case scenario, worst-case scenario and realistic scenario). Spreadsheet packages, such as Excel and Lotus 1-2-3, have' what-if' applications.

⇨ **Goal seeking**

➢ It is the process of determining the input values required to achieve a certain goal.

- For example, house buyers determine the monthly payment they can afford (say, Rs.700) and calculate the number of such payment required to pay the desired house.

⇨ **Risk analysis**

- It is a function of DSS that allows managers to assess the risks associated with various alternatives.
- Decision can be classified as low-risk and high-risk environments.

⇨ **Graphical analysis**

- It helps managers to quickly digest large volumes of data and visualise the impact of various courses of action.
- First, the Lotus system enabled uses to easily display and print information in a graphic form. S L Jarvenpaa G W Dickson (1988) studied the relative advantages and disadvantages of tabular and graphic output.

5.9. DEVELOPMENT OF DECISION SUPPORT SYSTEMS

- The development of a decision support system is determined by the types of information and the facilities needed for taking the decision.
- Decision support systems are developed using programming language or produced by packages specially in cooperating decision support development tools.
- Conventional high-level languages, such as C++ and BASIC, can be used to develop DSSs. They are extremely flexible. However DSSs using this language involving a lengthy analysis and decision phase.
- Fourth-generation or very high-level languages are more appropriate. They are particularly useful as they are generally data base-oriented.
- This is important for those systems that really on data retrieval and analysis for decision support.
- An example of prominent four generation language is SQL, which can used on many relation database system such as ORCAL.
- The selection of language depends on factors such as:
  - Availability of language and support for it.
  - Experience of developers with various languages.
  - Amount of manipulation vs. presentation of data.
  - Need to document and maintain the program.
  - Frequency of use and number of users.
- The advantages of using programming languages are that:
  - Application development is speedy.
  - Many are end-user oriented.
  - They are more likely to the decorating rather than procedural.
- There are three methods for developing DSSs.
  1. DSS generator
  2. DSS shells

3. Customer made software

5.10. GROUP DECISION SUPPORT SYSTEMS

- Group decision support systems (GDSS) are computer based information systems that facilitate the free flow and exchange of ideas and information among group members while maintaining their anonymity.
- Other terms have also been coined to describe the application of information technology group setting.
- The terms include Group support system (GSS), Computer supported cooperative work (CSCW), Computerised collaborative work support, Electronic meeting system (EMS).
- Group typically consist of less than 20 people who arrive at decisions through taking process. The decision may be taken by vote for often by negotiation, consensus or preference ranking.
- There are three types of computer based support are available in GDSS. These are

Decision networks:

- This type allows participants to communicate though networks with each other or a central database.
- Applications software is using a local area network and microcomputers. The technology filters out many of the typical group dynamics of a participative meeting.

Decision room

- Participants are located in one place the decision room.
- The purpose of this to enhance participant interaction and decision making by computerised support within a fixed period of time using a facilitator.

Tele/computer conferencing:

- If groups are composed of members or subgroups that are geographically dispersed, tele/computer conferencing provides for interactive connection between two or more decision rooms. This interaction will involve transmission computerised and audiovisual in information.

5.11. EXECUTIVE INFORMAION SYSTEMS

- An executive information system (EIS) is a set of computer based tools with features such as colour graphics touch screens, voice activated commands, and natural language interfaces the hep managers to quickly retrieve , analyse, navigate, summarise and disseminate large volumes of data.
- An EIS is frequently connected with on line information services so that top managers can quickly access external data as well. the primary aim of an EIS is therefore the delivery and displays of information rather than the analysis diagnosis of problems and possible solutions.

5.11.1. Characteristics of an EIS

An EIS has two special functions:

- **Derived information function:-** It allows managers to find the cause or source of a certain problem through data analysis.

→ **Drill down function:-** EIS precisely locate and retrieve necessary information at any desired level of detail.

Another recent feature found in DSS and EIS that increases the usefulness of drilldown and derived information is a software agent. Many spread sheets have some simple EIS like Capabilities. Microsoft Excel also has many EIS features.

5.12. SUCCESS CRITERIA FOR DSS/EIS:

Rockart and Delong (1988) identified eight critical success factors for achieving successful DSS/EIS. These are:

→ Commitment from top management.
→ Availability of accurate and reliable data.
→ Careful problem selection.
→ Integrated of DSS and EIS with existing technologies
→ Meaningful analysis of cost vs. benefits.
→ A clear link to business objectives
→ Management of organisational resistance.
→ Management of the spread and evolution of the system.

5.13 RELATIONSHIP BETWEEN MIS AND DSS

❖ **MIS:**

✓ Management Information system operates on operational efficiency i.e. it concentrates to do the things in right manner.
✓ It allows the communication across the managers from different areas in a business organisation.
✓ It allows flow of information in both upward and downward direction.
✓ MIS is original form of management information.

❖ **DSS**:

✓ Decision support system helps in making effective decisions as it allows to do only right things.
✓ It is concerned about leadership and senior management in an organization providing effective judgment support.
✓ It flows only in upward direction.
✓ DSS is actually advancement of MIS.

5.14 DSS MEASURES OF SUCCESS IN ORGANISATIONS:

→ It is likely that the effects of DSS on the organisational goals will be difficult to identify.
→ Thus, the search for indirect measures of DSS success that can more likely be operationalised.
→ A broad indication of the form of these indirect measures is shown in the lower portion of below fig.
→ The hierarchy of organisational measures is shown in the upper portion of below fig.

➔ Where possible success of a DSS would be sought in terms of how well it helped the organisation meet goals on these dimensions. These measures are supra DSS measures.

➔ A hierarchy of organisational and DSS measures of success are shown in fig.

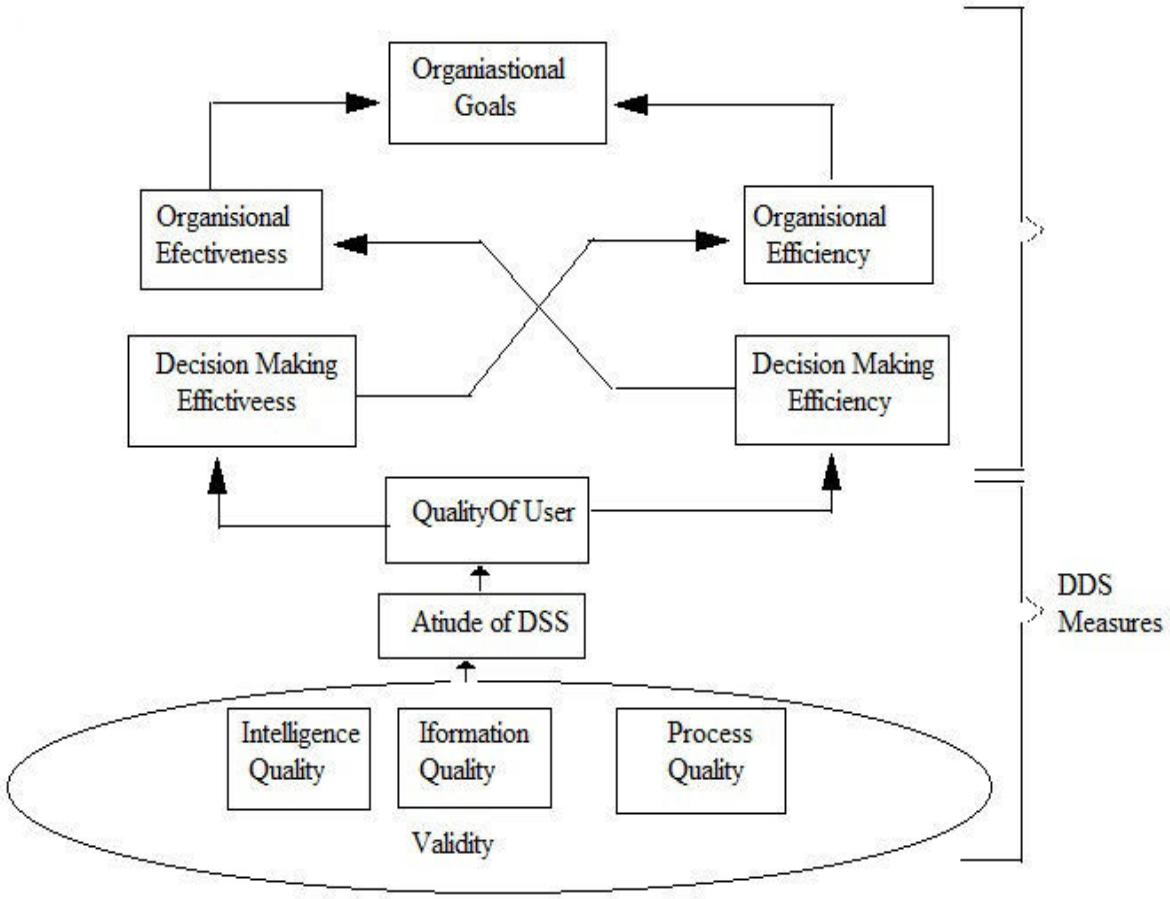


Fig. Organisational Hierarchy and DSS measures of success

5.15 APPLICATION OF A DSS

Application of a DSS can be classified into three types. These are:

1. **Independent problems:**
   - ⇨ The independent problems are standalone problems whose solutions are independent of other problems.
   - ⇨ The goal is to find the best solution to the given problem.
2. **Interrelated problems:**
   - ⇨ In interrelated problems solutions are interrelated by each other to find the most effective solutions to the group of interrelated problems.
   - ⇨ These types of problems usually require team effort. This requires the coordination of a set of interrelated tasks such as developing an effective advertising campaign, motivation of the sales force, developing pricing strategies, and offering incentives to distributors.

3. **Organisational problems**:
   - ⇨ In organisational problem, all departments with in an organisation are included .Such problems require team effort.
   - ⇨ Totally quality management a good example of an organisational effort, because for it to be effective, it requires a joint effort from all departments/units in the organisation.

5.16. TPS, MIS, DSS, AND EIS:

Difference and similarities among TPS, MIS, DSS and EIS:

	TPS	MIS	DSS	EIS
Targeted audience	Operational management	Operational Management	Middle Management	Top management
Primary purpose	Capture transaction data	Generate summary and exception reports	Facilitate Generate decision making	Clear concise enterprise wide information
Nature of tasks	Highly structured	Highly structured	Semi or unstructured	Semi or unstructured
Type of data	Internal	Internal	Internal and external	Internal and external

5.17. FUTURE DEVELOPMENT IN DSS

- → The technology in DSS is now reasonably well established, there remains a substantial mismatch between the information and intelligence mad available which is necessary for managerial decision making.
- → There is also a mismatch between the means by which information is made available and intelligence is produced.
- → This is especially true at strategic levels where the need is to be able to handle qualitative, ill-structured and messy information .most recent DSS are only able to handle quantitative, certain and well defined data.
- → Three general areas can be identified where the future thrusts of DSS lie. These are improvements in current DSS the inclusion of expert system methodologies into DSS, and developments in GDSS. In all cases there should be strong moves into the softer more qualitative areas.

5.18. INTELLIGENT SUPPORT SYSTEMS

- Systems which facilitate decision requiring the use of knowledge, intuition, experience, and expertise, are called intelligent support system (ISS). Decision support systems (DSS), executive information systems (EIS) and artificial intelligence (AI) and expert systems (ES) fall into this category. These systems are explained in brief and their role in organisational decision making.

5.18.1. Decision support system:

- Decision support systems are interactive, well integrated systems that provide managers with data, tools and models to facilitate semi-structured decisions or tactical decisions. It automates the routine and repetitive elements in a problem while simultaneously supporting the use of intuition and judgement. DSS are ideally suited for problem like location selection, identifying new products to be marketed, scheduling personnel, and analysing the effect that price increases for resources have on profits.
- DSS are man/machine systems and are suitable of semi structured problems. The problem must be important to the manager and the decision required must be an important one. In addition, If an interactive computers based system is to be used then some of the following criteria must be met:

✓ There should be a large data base,
✓ Large amount of computation or data manipulation,
✓ Complex interrelationships,
✓ Analysis by stages,
✓ Judgment required and
✓ Communication

- It follows form the above criteria that DSS are inappropriate for unstructured problems and unnecessary for completely structured problems because they can be dealt with wholly by the computer. In outline, DSS require a database, the software to handle the database and decision support programs including eg. Modelling, spreadsheet and analysis packages, expert system etc.
- A DSS allows managers to perform goal seeking, which specifies the action a manager should take in order to accomplish a certain goal. Another important feature of DSS is that an individual or a group of individuals can use them. DSS that support group decision making are called **Group Decision Support Systems** (**GDSS**).In most organizations, decision of any significance are made collectively by a group, not by a single person .GDSS are a set of interactive, well integrated systems that facilitate and support group decision making.

5.18.2. Executive information systems:

- EIS are forms of data retrieval systems that provide selected and summarised information for senior executive engaged in long range planning. Crisis management and other strategic decisions. It is a user friendly interactive system. It has excellent menus graphic capabilities. A typical way that an EIS works is by exception reporting and drilling down to investigate

the causes. For example a director of an organisation may be altered that a particular department is well over budget. The manager would then drill down the data by pursuing lower and lower levels of detail.

5.18.3. Artificial intelligence and Expert systems:

- AI is a branch of computer science whose goals is to design and develop machines that emulate human intelligence. It attempts to endow machines will capabilities and characteristics that would indicate intelligence in human being.
- Expert systems (ES) also known as knowledge based system is a software designed to capture the knowledge and problem solving skills of human expert. It has three main components: a knowledge base, an inference engine, and a user interface.

Main characteristics of expert systems are:

- ✓ An expert system is a program designed to capture the knowledge and problem solving of human expert. Expert system is a branch of artificial intelligence.
- ✓ Expert systems handle problem that require knowledge, intuition, and judgment.
- ✓ Expert systems, unlike DSS and EIS, can replace decision makers.
- ✓ It has three main components: the knowledge base which stores the knowledge, the inference engine, which stores the reasoning principles used by the expert, and the user interface, which allows the user to interact with the system.
- ✓ Expert systems are not designed for any one level of management, their primary function is to disseminate expertise throughout the organisation

5.19. OFFICE AUTOMATION SYSTEM

OAS refers to the user mechanical, electrical, & electronic devices to enhance communication in the work place & increase the efficiency & productivity of knowledge workers or clerical workers. OAS includes:

- ❖ Word processing
- ❖ Electronic mail
- ❖ Voice mail
- ❖ Audio conferencing
- ❖ Video conferencing
- ❖ Computer conferencing
- ❖ Tele conferencing
- ❖ Facsimile transmission
- ❖ Desktop publishing
- ❖ Video task
- ❖ Imaging
- ❖ Multimedia system

- **Word processing**:

It is use of an electronic device that automatically performs many of the tasks necessary to create written document such as letters, memo, & report that are directed to the manager.

- **Electronic mail:**

Electronic mail known as E-mail. It is the use of a network computer that allows users to send, store, and receive messages using the computers terminals & storage devices. It sends mail electronically from one computer to other.

- **Voice mail**:

Voice mail is just like electronic mail & performs storing, accessing, retrieving, and distributing messages using the telephone.

- **Audio conferencing**:

Audio conferencing is the use of voice communication equipment to establish an audio link between geographically dispersed persons for conducting a conference. The conference call, which allows more than 2 people to participate in a telephone conversation, was the first form of audio conferencing & is still in use.

- **Video conferencing**:

It is the use of television equipment to link geographically dispersed conference participants to engage in face to face communication. The equipment provides for audio as well as video linkage.

- **Computer conferencing:**

Computer conferencing is the use of a network computer to all members of a problem solving team to exchange information concerning the problem that is being solved.

- **Tele conferencing:**

It is includes all three forms of electronically aided conferencing audio, video & computer.

- **Facsimile transmission**:

Facsimile transmission popularly known as fax is the transfer of written or pictorial information by the use of special equipment that can read a document image at one end of a communication channel & make a copy at the other end.

- **Desktop publishing**:

Desktop publishing is the use of a computer to prepare printed output, using software with sophisticated publishing capability.

- **Video task:**

It is the use of the computer for displaying a stored narrative & graphic material on a CRT screen.

- **Imaging:**

Imaging is the use of optical character recognises to convert paper or microfilm records to a digital format for storage in a secondary storage device for easy retrieval & processing.

- **Multimedia system:**

Multimedia system are well integrated systems that store, retrieve, & process different types of data such as test, graphics, image, full motion video, audio, & animation.

It helps users to create, process, share, & display information in a broad variety of formats.

5.20. CHARACTERISTICS OF INFORMATION SYSTEM

- **Transaction Processing System (TPS)**
  - ✓ **Input:** Transaction related data.
  - ✓ **Processing:** Use procedure & rules.
  - ✓ **Output:** Summaries of transaction.
  - ✓ **Users:** Lower-level managers.
  - ✓ **Application:** Sales transaction applications, Credit & payment, Insurance claims.

- **Management Information System (MIS)**
  - ✓ **Input:** Output from TPS & other internal data.
  - ✓ **Processing:** Measures & monitors operational performance.
  - ✓ **Output:** Summary & exception reports.
  - ✓ **Users:** Middle level managers.
  - ✓ **Application:** Monthly production report.
- **Intelligent Support System (ISS)**
  - ✓ **Input:** Internal & external data & models.
  - ✓ **Processing:** Interactive ad-hoc reporting.
  - ✓ **Output:** Alternatives & Analysis reports.
  - ✓ **Users:** Top managers.
  - ✓ **Application:** Investment portfolios.
- **Office Automation System (OAS)**
  - ✓ **Input:** Data & information.
  - ✓ **Processing:** Formatting, Summarizing & Displaying.
  - ✓ **Output:** Document, Graphics, Multimedia.
  - ✓ **Users:** Knowledge & Clerical workers.
  - ✓ **Application:** Fax, Multimedia, Video conferencing.