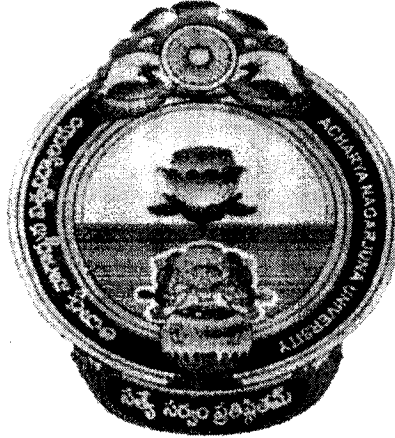# IT FOR HOTEL INDUSTRY
PGDHM, Paper- VI

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Centre for Distance Education, Acharya Nagarjuna University and this book is meant for limited
circulation only.

FOREWORD

Acharya Nagarjuna University, since its establishment in 1976, has been moving ahead in the

path of academic excellence, offering a variety of courses and research contributions. The University

achieved recognition as one of the eminent universities in the country by gaining A grade from the

NAAC 2016. At present Acharya Nagarjuna University is offering educational opportunities at the

UG, PG levels to students of 447 affiliated colleges spread over the two districts of Guntur and

Prakasam.

The University had started the Centre for Distance Education in 2003-04 with the aim to bring

Higher education within the reach of all. The Centre has been extending services to those who cannot

join in colleges, cannot afford the exorbitant fees as regular students, and to housewives desirous of

pursuing higher studies to study B.A., B.Com, and B.Sc., Courses at the Degree level and M.A.,

M.Com., M.Sc, M.B.A. and LL.M. courses at the PG level.

For better understanding by students, self-instruction materials have been prepared by eminent

and experienced teachers. The lessons have been prepared with care and expertise. However

constructive ideas and scholarly suggestions are welcome from students and teachers. Such ideas will

be incorporated for the greater efficacy of the distance mode of education. For clarification of doubts

and feedback, Weekly classes and contact classes are arranged at UG and PG levels respectively.

I wish the students who pursue higher education through Centre for Distance Education will not

only be personally benefited by improving their qualifications but also strive for nation's growth by

being a member in Knowledge society   I hope that in the years to come, the Centre for Distance

Education will grow in strength by introducing new courses, catering to the needs of people. I

congratulate all the Directors, Academic coordinators, Editors, Lesson - Writers, and Academic

Counsellors and Non-teaching staff of the Centre who have been extending their services in these

endeavours.

<div align="right">

Prof. A. Rajendraprasad
Vice - Chancellor
Acharya Nagarjuna University

</div>

PGDHM: Syllabus

Paper - VI: I. T. FOR HOTEL INDUSTRY

Objectives: To provide an understanding of computers and its diverse application management with emphasis on computer – aided decision making in management of the organization through proper handling of information.

Unit - I
Computers in Management – Role of Computers in management – role of computers in management of Hotels (Front Office, Restaurant, Kitchen and House – Keeping) – application and importance.

Unit - II
MIS-Definition, concept, Mis functions & Characteristics, importance of information, and its values characteristics, data life cycle: - Data processing methods-EDP & Automatic Data Processing.

Unit - III
Decision making process & system development-Management & its functions, Levels of management, Decision making process-Types of decisions – Programmable & non-programmable, structured & unstructured decision, System development-life cycle, feasibility, design implementation and maintenance,

Unit - IV
MIS – subsystems: Applications in functional areas of management-Marketing, Finance, Hr, Production, Accounts payable, Accounts receivable and inventory management.

Unit - V
Types of Information systems: Transaction processing system-batch processing, online processing Mis, Decision support system, _DSS nideks-Expet systems – Office Automation system – Different gadgets *(Fascimile, PBX, Voicer transmission device, Data transformation package – LAN, WAN)

Reference Books:
CSV. Murthy – Management Information systems – Himalaya Publishing House, Mumbai

PG DIPLOMA EXAMINATION, MAY – 2015
HOTEL MANAGEMENT
(Paper - VI) : IT for Hotel Industry

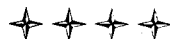**Time : 3 Hours**   **Maximum Marks : 75**

**Answer any Five questions.**   *(5 x 15 = 75)*
**All questions carry equal marks.**

Q1) Explain the role of computers in hotel industry.

Q2) State the application of computers in management.

Q3) What are the functions and features of MIS?

Q4) Bring out different methods of data processing.

Q5) Enumerate the kinds of decisions that the management takes in Policy making.

Q6) Bring out the stages in system development life cycle.

Q7) State the application of MIS in marketing.

Q8) Describe the scope of use of MIS in the management of inventory.

Q9) Give an account of LAN, WAN and PBX.

Q10) Discuss the transaction and bath processing information systems.

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Content

LESSON – 1

COMPUTERS IN MANAGEMENT

1.0 Objective:- This Lesson deals with management and various aspects like how computers will helpful in management, IT infrastructure, Elements of I.T. Infrastructure, MIS Resources, Elements of MIS, Objectives of Information Technology, Difference between computers and MIS, Future of MIS

Structure:-

1.1 Introduction to Management

1.2 Definition of Management

1.3 How Computers will helpful in Management

1.4 IT Infrastructure

1.5 Elements of I.T. Infrastructure

1.6 Information technology resources or M.I.S Resources

1.7 Elements of Management Information Systems

1.8 Objectives of Information Technology

1.9 Difference between computers and MIS

1.10 Future of MIS

1.11 Summary

1.12 Technical Terms

1.13 Self Assessment Questions

1.14 Reference Books

1.1 Introduction to Management

Management has been define in a variety of ways to someone it comprises the processes or activities that describe what managers do in the operation for their organization – plan, organize initiate, and control operations. They plan by setting strategies and goals and selecting the best course of action to achieve these plans or goals. They organize the tasks necessary for the operational plan, set these tasks – up into homogeneous groups and assign authority delegation. They control the performance of the work by setting performance standards and avoiding deviation form standard.

Management is a vital aspect of the economic life of man, which is an organized group activity. A central directing and controlling agency is indispensable for a business concern. The productive resources – material, labour, capital etc. are entrusted to the organizing skill, administrative ability and enterprising initiative of the management. Thus, management provides leadership to a business enterprise. Without able managers and effective managerial leadership

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the resources of production remain merely resources and never become production. Under competitive economy and ever – changing environment the quality and performance of managers determine both the survival as well as success of any business enterprise. Management occupies such an important place in the modern world that the welfare of the people and the destiny of the country are very much influenced by it.

1.2 Definition of Management:-

Management may be defined in many different ways. Many eminent authors on the subject have defined the term "management", some of these definitions are reproduced below

1. According to Lawrence A Appley – "Management is the development of people and not the direction of things".

2. According to Joseph Massie – "Management. is defined as the process by which a co – operative group directs action towards common goals".

3. In the words of Henry Fayol – "To manage is to forecast and to plan, to organize, to command, to co – ordinate and to control".

4. According to peter F.Drucker – "Management is a multipurpose organ that manages a business and manages managers and manages worker and work"

1.3 How Computers will helpful in Management:-

A Computer – based system that provides flexible and speedy access to accurate data. The organizational information system which in general relates to the planning operation and control of an enterprise are the most important among these. Management information system refers primarily to such organizational information system which is generally large, sophisticated, structured, dynamically evolving and commercial values. A large number of programmers and system's analysts are employed by many organizations to build a variety of management information system. Thus, the education of programmers and system analysts as well as general managers, the subject of management information systems, has occupied a key position. Here we can take one example as follows that how computers will helpful in management

Example: - When businesses use barcodes, it helps not only the business itself but it also is very beneficial to the management. Barcodes allow the management to just look at a screen and recognize what they have to do. If businesses weren't using barcodes management would have to take the time and take inventory probably every day instead of the occasional once months check. If management is able to keep up on the stock that they have and use the barcodes correctly they will be able to keep the stock to a minimum which will save the business money in the long run. Barcodes also allow the management to focus on their job more in the sense of the employees. The less time that they have to spend worrying about what they need to order or maybe were running short on something, the more time they will have to treat the employees right and offer them help if they need it. It also gives the management more time to help the customer and create a wonderful atmosphere in that place of business. Overall when companies use barcodes it will make the management much more organized and stress free of those problems, which also makes for a good atmosphere for everyone.

1.4 . IT Infrastructure:-

The present day complex business situations have forced managers to have reliable information needed to safeguard form competitors. Thus it is the need of the hour to have a suitable information technology (I.T.) infrastructure facility be available in the organization. In case where there is no I.T. base in the organization there is every possibility of mushrooming of small enclaves of information blossoming in there own way. I.T. facility will be created according to the need of the enterprise. Here, it is suggested that: to plan the architecture of the I.T. infrastructure and develop in the light of needs and priorities of the business units. The I.T. infrastructure has the comment that it encourages the nor – enthusiast majority of managers to make use of the facilities. In the absence of a well – defined I.T. facility there is a possibility of some people to monopolizing major investment in I.T.

When the investment in I.T. infrastructure is deliberately planned, there is a possibility of managers procuring computers as status symbol rather than as a productivity tool. The common IT infrastructure helps reduce the costs per user, increasing the likelihood of people making efforts to use it and sustain its use to bring success at a later stage when the user matures.

Moreover IT infrastructure is that cuts across the departmental functional and even organizational boundaries to exchange information. This reduces inconsistencies and removes communication barriers created by the organization structure. It establishes cross functional links and improves inter – personal communication within the organization.

On the other hand the information needs grow, the facilities in the enclaves of information become inadequate and lack the resources, both the technical and financial, to meet the needs of emerging mass market for information among the increasing number of users. IT infrastructure can offer shared services that are more cost effective in the long run due to standardization and economies of scale.

1.5 Elements of I.T. Infrastructure:-

The I.T. infrastructure is built up using various I.T. resources, these are as:

(1)   information

(2)   services

(3)   Network

1.   **Information:** - It is defined in a number of ways to some one it is knowledge regarding the environment that is derived from facts. While other say: It is facts placed with a specific purpose. It is no doubt which is a set of facts which reduces risk and uncertainly. Information is the most important element of IT infrastructure and its procurement is evolutionary and not revolutionary. Information is a common resource and needs to be developed and shared for better utilization. To exploit this resource, other elements in the IT infrastructure are developed and therefore, it constitutes the core of IT infrastructure.

2.   **Services:** - Information services are the facilities for generation of information. Since the business environment is dynamic, generation of information must go on continuously. Thus, IT

infrastructure must have services for generation of information on regular basis. These services would require commitment of resources for their establishment and maintenance. These resources may be called data processing resources. (The data processing resources required for generation of information are discussed later)

3.   Network: - In addition to the stock of information and services for generation of new information, we require a physical system for linking the users of information with the stock of information, as well as process of generating information. The networks not only link the users with various services and stock of information but also link the services themselves and different elements of the stock of information.

## 1.6 Information technology resources or M.I.S Resources:-

For the purpose of developing services for generation of information, one would need data processing resources or I.T. resources or MIS resources. The following Resources of Data Processing are available:

(a)   Hardware Computer

(b)   Software Computer

(c)   Data

(d)   Human Resources

It is vital important for a Manager to be in touch with the features and significance of the above resources. The manager should also known the comparative cost of each source and their practical utility.

(a) Computer Hardware: - Computer hardware refers to computer systems and other associated equipment including the communication links that a modern IT installation may need. With the rapid advancement in computer hardware technology, a large variety of computer systems, with varying sizes, speeds and functional features are available in the market one should determine the hardware resources requirements, it is necessary to properly assess the nature of IT needs, the volume of data to be processed, sources of data, complexity data analysis and impact of other related factors.

With the increased used of I.T. infrastructure, new applications are developed and existing applications are improved upon in the light of the feedback received, on doubt this has increased the demand form the I.T. infrastructure
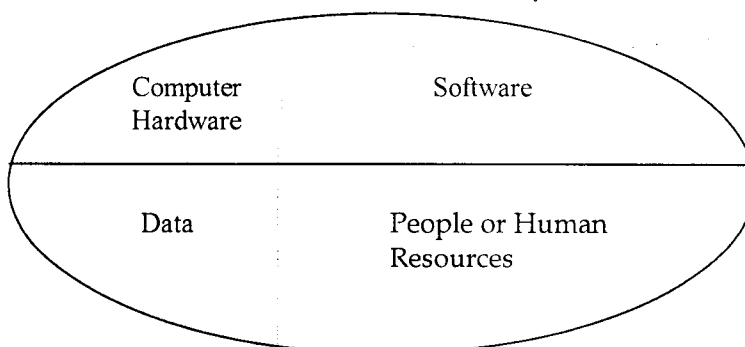
IT Resources or MIS Resources

(b) Software: - It is really life line of the I.T. infrastructure and it makes the computer hardware function. Software determines what the hardware does and makes the hardware perform. Software,

thus, is a very important IT resource and must be carefully selected and properly maintained. Software, being intangible, sometimes gets a back seat in planning for an infrastructure. In fact, improper selection of software may become a major cause of failure on an IT infrastructure in achieving its objectives.

Un like computer hardware, software acquisition is a slow process involving persistent effort for acquisition, maintenance and improvement. A rich library of well – tested software packages to meet information needs of an enterprise is a valuable resource for any IT infrastructure.

(c) Data:- Data are collections of facts represented in the form of symbols, such as digits, alphabets, pictures, graphs, etc, Capturing, processing and storage of data are the essential functions of any IT infrastructure. Data are the basic raw materials in the process of generation of information. Data may be collected from internal sources as well as external sources. Data are, thus, generally available in diverse formats using varying methods of ascertainment and valuation for each data item. Most of the internal data are well structured, clearly defined and complete. External data is fraught with a variety of weaknesses with regard to these characteristics. Proper integration of internal and external data is essential for generation of quality information. Unfortunately, data recorded on magnetic media are more prone to risks of physical security and privacy. High density of recording on these media and its exposure to computer hardware accidents make it imperative to take necessary steps to ensure security. High density of recording and quick transferability of computer readable data poses dangers to the confidentiality of data. Unauthorized access to data can result loss to the interest of a business. Therefore, it is advised to be carefully about they protection and preservation of data.

(d) Human Resources:- The effectiveness of an IT infrastructure is function of the type of IT personnel available to it. In fact, best of computer hardware, software and data may gee spoiled and may cause havoc if the human resources are not competent, honest or reliable. Qualities like competence, honesty and reliability are critical to any work environment.

Since human resources are catalysts in process of generation of information, their role becomes vital in its effectiveness in the process of application of I.T.

There is a wide gap between the demand and supply of computer professionals. The major factors that are driving the increased hiring of information technology professionals include technological trends and high rate of growth in the IT industry. Substantial jumps in pay and opportunity in updating and upgrading knowledge keep enticing the computer professionals change their jobs. It is, therefore, essential to impart requisite skills among the users of information system as well. This reduces the dependence on computer professionals for day – to – day use of the system.

1.7 Elements of Management Information Systems:-

As the quality of information generated through the IT infrastructure depends, to a great extent, on the IT resources, these are sometimes termed as elements of information systems. Some authors add one more element to this list – that is procedures. These procedures include the operational and control procedure for the use of IT infrastructure. The procedures play an important role in the smooth and effective utilization of information resource. These protect the information resource and maintain its quality. Thus, the procedures as element of information system refer to in the instructions to users regarding the use of IT infrastructure for normal day – to – day activity and also for handling special situations such as system failures and crashes.
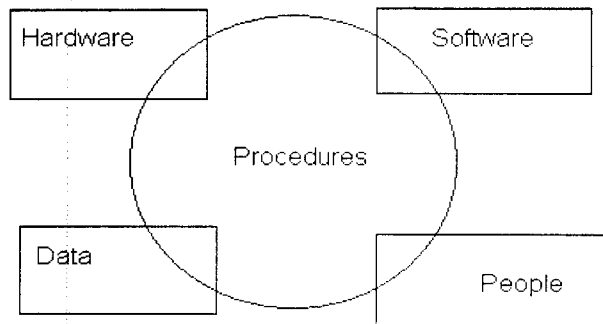
Good Quality of Information System: - There are many features which are associated with good quality information. Each of these features adds value to information. The process of generation of information must focus on the quality of information by aiming at improving the degree of each attribute. Compromise regarding the quality of information due to the technical, physical or economical constraints must be made to the user of information.

The following attributes add values to the quality of information are as:

(1) Prompt availability

(2) Accuracy

(3) Precision

(4) Completeness

(5) Un ambiguity

(1)   Prompt Availability: - Someone rightly said "Information <u>delayed</u> is information <u>denied</u>". There is information which is needed by the user periodically thus, be available to the user as and when demanded so that the process of decision making is not disturbed. Information should be which can be updated automatically. Immediately after an event is put to action.

(2)   Accuracy:- Accuracy is the degree of the absence of error in the process of generation of information. It is an important attribute of good information. Every accuracy needs cost, therefore, it necessary to determine the acceptable levels of accuracy for each type of information. For example, the cost estimates for the product need to be as accurate as possible since a minor inaccuracy may have significant impact on the performance of the enterprise. However, the estimate of total size of the market and the company's share in it with comparatively higher degree of error may still be of great, value to the decision maker. Therefore, on should be careful about the accurate information.

(3)   Precision: - <u>Precision</u> is an important <u>virtue</u> of good quality information. Too much of information sometimes results in dumping of important information in the heap of details that may not be required at a particular time. Excessive detail of information results in information overload causing what is now being termed as information <u>Fatigue   Syndrome.</u> Only precise information is respected and used by managers. Unnecessary and unwanted information are filed.

(4)   Completeness:- It is a very good quality which should be found in each information that it should be complete and meet all the needs of the user. No one can deny that incomplete and unwanted information are always misleading and may result in wrong decisions. Therefore, it is suggested that the manager must use incomplete information with utmost care.

(5) **UN ambiguity:** - Clarity of information is an important attribute of good information. Information must be <u>unambiguous</u> and should be communicated in such a way that it conveys the same meaning to different users. Modern data bases maintain data dictionaries that clearly define the variable used in the information in order to standardize the terminology used in reports.

There are other attributes such as quantifiability, <u>verifiability</u>, <u>unbiased ness,</u> etc. that one may attempt to incorporate to improve the quality of information.

1.8 Objectives of Information Technology:-

The objectives of I.T. differ from organization to organization yet the availability and quality of information in an enterprise are determined by the type of IT infrastructure and implantation strategy for IT policy. Only a cost effective IT infrastructure that focuses on a set of well – defined objectives of the IT policy can serve the broad objective of managerial effectiveness. Some of the important objective o IT policy for a modern enterprise has been listed below:

(a)   To provide IT infrastructure that would enable the users identify opportunities, improve performance and understand business environment.

(b)   To develop and preserve information as corporate resource and to offer infrastructure to ensure coherent access for users to complete, <u>concise</u> and timely information.

To achieve the above objectives, the policy must aim at:

1.   Developing user friendly high business value and high technological impact applications with the help of proper IT planning

2.   Specifying a common interface to applications to ensure high degree of consistency from one to the next application.

3.   Ensuring effective control and maintenance of IT infrastructure including defining a system of access to applications and services security procedures, etc

4.   To actively search and identify information technologies that will give strategic advantage to the enterprise and seeking opportunities to acquire such technologies that create competitive barriers in marketing, <u>procurement</u>, production, and <u>manpower</u> management.

5.   To design and develop a comprehensive plan for IT infrastructure that may serve as guide for future direction of application development effort. This may include a proper system of regular evaluation of existing and proposed application in terms of their contribution to the success of the enterprise.

The above objectives can be achieved only when there is proper planning and commitment on the part of the management at various levels. The advancement of IT has enhanced the expectations of management and made the technologies more complex. The stakes in IT infrastructure are more now than ever before and there is a need to assess the value of each IT investment proposal in terms of business performance. It is essential to adopt a business like approach towards business information systems. The information technology has to take up the challenge posed by the dynamics of business and reorient itself to take up the new role to help a manager cope up with the complex problems of the changing business <u>scenario</u>.

1.9 Difference between computers and MIS:-

Yet conceptual MIS does not need computers as a <u>prerequisite</u>, Meaningful MIS today is a computer – based system. As the major applications of computers today are for the design, development and application of MIS, to a distant observer, computer systems and information systems appear same but this is far from true, these are two disciplines that overlap and yet have quite independent existence. The following major differences between the two disciplines must be clearly maintained in order to get the maximum advantage from MIS:

1. **Technology Components:-** Computer systems provide only the *technology* component; successful information systems call for understanding of the organizational dynamics, process and control systems.

2. **MIS is a Discipline:-** MIS discipline is centered on *people* – to be well – versed in this discipline one needs a number of human qualities – the ability to communicate, the ability to listen and understand problems and resolve conflicts, to respect others opinions and value system; one also should have vision to set goals and plan strategies to achieve these goals.

3. **MIS is Applied Area:-** MIS is an *applied area.* It calls for problem solving skills, a knack of making quick and sensible assumptions to solve specific problems in a time – bound manner, often working under time and budget <u>constraints</u>. Computer systems, on the other hand, being a relatively pure area calls for a strong theoretical foundation in engineering and mathematical sciences to solve general problems.

4. **MIS is Specific to Organizational and Managerial contexts:-** MIS is a *specific to* organizational and managerial contexts. In a sense their focus is on solving problem specific to enterprise management, though enterprises are sufficiently general in scope. Computing systems, on the other hand, are far more *generic* and address problems in contexts other than managerial, for example: Scientific <u>exploration</u>, education, and entertainment. Thus they are not limited by organizational consideration alone and go much beyond business and commercial activities.

5. **MIS is a Challenge:-** MIS calls for a very high *conceptual* challenge by way of understanding individuals, organizations, and their complex inter – relationships. The complex thought – processes of vastly differing individuals, the subtle inter – personal dynamics between individuals, both in their personal capacity and organizational capacity, their attitudes, <u>aspirations</u>, goals, etc. have to be clearly understood before any information system is successfully implemented. Computer systems, on the other hand, call for a very high order of equally demanding challenges, though in an altogether different plane on intellectual challenge. Computer systems involve a fair degree of abstraction, *analytical* thinking, <u>generalization</u> and <u>rigorous</u> analysis.

6. **Tools of MIS are Specific:** - The tools of MIS are generally *context specific.* Many of the successful tools of the present generation of technology may not be successful in a different technological scenario. The mainframe and the minicomputer – based legacy systems are readily giving way to server – based computing with PC – based clients accessing the servers using client server technology. The tools of computer systems like database theory are far more *context independent.* Even the change of technology only modifies them, not completely changes them. Being context independent, they have a far – reaching and long – term impact.

1.10 Future of MIS:-

For many centuries, agriculture and other related activities formed the main professions of

man. While this is still true of countries like India which are yet to attain full economic development, the scene is far different in the economically developed countries. This is particularly true of the post – Industrial Revolution era, where the percentage of agriculture related jobs has dwindled to a single digit. Until the seventies, there was a substantial growth in manufacturing – oriented jobs. With the onset of information revolution of the eighties, manufacturing accounts only for a single digit percentage of jobs. Today, the fastest growing sector is the services sector which is likely to account for almost 90% of the entire job market very soon. This is variously known as white collar job or skilled or knowledge – based job. It is likely to be influenced significantly by the information systems, as well as by the generation, operation, use and maintenance of information. Such services include banking, finance, health – care, entertainment, travel, tourism and education. All these sectors depend heavily on information services for their survival. The Railway Reservation project of CMC Ltd. Is a classic example in the Indian context that underscores the importance of information systems to a service sector? The Airline Reservation of SITA and SWIFT [2] brought to focus the importance of information in services sector to the international community a few years back. Consequently, the share of the total business by information services is likely to <u>foreshadow</u> the oil and automobile industry that have dominated the world scene practically in the whole of the current century.

At a social level, improved communication and information will lead to substantial reduction in avoidable transportation. Already, the emergence of fax services has substantially reduced the transportation of overnight express courier mail. With the widespread access to information networks, a lot of information in the form of tables and reports will be transferred electronically rather than through bulky paper. Such developments will lead to reduced energy consumption, reduced pollution, and lead to a better environment. In short, information systems will improve the *quality of life,* including that of the man on the street.

Even the common citizen of India is likely to witness a substantial improvement in the quality of life by way of several service benefits. A representative list is as follows:

1.   Better land record management will lead to less litigation in courts and consequently reduction in violence in the rural areas.

2.   More efficient natural resource planning will result in optimal utilization of water, oil, electricity, coal, etc., and thereby reduce inter – state tension, and rivalry.

3.   Better banking and financial services with an excellent service to the customers will ensure more efficient management of money.

4.   Improved legal delivery system will help a large number of small farmers, small businessmen and the common man by way of speedy delivery of justice (remember "justice delayed is justice denied"!)

5.   Net – worked educational institutions will provide a better sharing of resources among larger population and will cater the needs of large number of students.

1.11 Summary: - Management is a vital aspect of the economic life of man, which is an organized group activity. A central directing and controlling agency is indispensable for a business concern. A Computer – based system that provides flexible and speedy access to accurate data. A large number of programmers and system's analysts are employed by many organizations to build a variety of management information system. The present day complex business situations have forced managers to have reliable information needed to safeguard form competitors. For the purpose

of developing services for generation of information, one would need data processing resources or I.T. resources or MIS resources. The following Resources of Data Processing are available: Hardware Computer, Software Computer, Data, Human Resources.

To provide IT infrastructure that would enable the users identify opportunities, improve performance and understand business environment.

To develop and preserve information as corporate resource and to offer infrastructure to ensure coherent access for users to complete, <u>concise</u> and timely information. For many centuries, agriculture and other related activities formed the main professions of man. While this is still true of countries like India which are yet to attain full economic development, the scene is far different in the economically developed countries.

1.12 Technical Terms:-

1. initiate   : to bring into practice or use; introduce by first doing or using; start; to teach the fundamentals of some subject to; help to begin doing something; to admit as a member into a fraternity, club, etc., esp. with a special or secret ceremony

2. Strategies : a) the science of planning and directing large-scale military operations,. b) a plan or action based on this c) skill in managing or planning, esp. by using stratagems.

3. homogeneous   : the same in structure, quality, etc.; similar or identical; composed of similar or identical elements or parts; uniform

4. delegation : a delegating or being delegated; a body of delegates

5. enclaves : territory surrounded or nearly surrounded by the territory of another country; a minority culture group living as an entity within a larger group

6. blossoming : a flower or bloom, esp. of a fruit-bearing plant; a state or time of flowering; to have or open into blossoms; bloom;   to begin to thrive or flourish; develop

7. Enthusiast : a person full of enthusiasm;

8. Monopolizing : to get, have or exploit a monopoly of;   to get full possession or control of; dominate completely.

9. deliberately : carefully thought out and formed, or done on purpose; premeditated; careful in considering, judging, or deciding; not rash or hasty;

10. Procuring : to get or bring about by some effort; obtain; secure;

11. productivity : something produced by nature or made by human industry or art; result; outgrowth;

12. sustain   : to keep in existence; keep up; maintain or prolong

13. ascertainment   : to make certain or definite;   to find out with certainty

14. valuation : the act of determining the value or price of anything; evaluation; appraisal; determined or estimated value or price on the market; estimation of the worth, merit, etc. of anything

15. Imperative : having the nature of, or indicating, power or authority; commanding; absolutely

necessary; urgent; compelling; a binding or compelling rule, duty, requirement, etc.; a command; order

16. Gee : a command to a horse, ox, etc., meaning a) "turn right!" b) "go ahead!" (in this sense, usually

17. Havoc : great destruction and devastation, as that resulting from hurricanes, wars, etc.; **play havoc with** to devastate; destroy; ruin

18. impart : to give a share or portion of; give; to make known; tell; reveal

19. Crashes : to make a sudden, loud noise, as of something falling and shattering b) to move or go with such a noise

20. delayed : to put off to a future time; postpone; to make late; slow up; detain; to stop for a while; linger; a delaying or being delayed; the period of time for which something is delayed.

21. denied : to declare (a statement) untrue; contradict; to refuse to accept as true or right; reject as unfounded, unreal, etc.; to refuse to acknowledge as one's own; disown; repudiate; to refuse the use of or access to; to refuse to grant or give; to refuse the request of (a person)

22. Precision : the quality of being precise; exactness, accuracy, etc; the degree of this; characterized by precision, as in measurement, operation, etc.; requiring low tolerance, as in manufacturing

23. virtue : general moral excellence; right action and thinking; goodness or morality; a specific moral quality regarded as good

24. Fatigue : physical or mental exhaustion; weariness; the cause of this; hard work; toil; any manual labor or menial duty, other than drill or instruction, assigned to soldiers: in full, **fatigue duty** [pl.] sturdy work clothing worn by soldiers doing fatigue duty: also **fatigue clothes** (or **clothing**); the tendency of a metal or other material to crack and fail under repeated applications of stress; Physiol. the decreased ability to function or inability to respond of an organism or one of its parts due to prolonged exertion or repeated stimulation; to make or become tired or exhausted; weary to subject to or undergo fatigue

25. Syndrome : a number of symptoms occurring together and characterizing a specific disease or condition; any set of characteristics regarded as identifying a certain type, condition, etc.

26. Ambiguity : the quality or state of being ambiguous; pl. **3ties** an ambiguous word, statement, etc.

27. unambiguous : having two or more possible meanings; not clear; indefinite; uncertain; vague

28. verifiability : capable of verification; that can be proved to be true or accurate

29. unbiased ness : without bias or prejudice; objective; impartial

30. concise : brief and to the point; short and clear

31. procurement : to get or bring about by some effort; obtain; secure

32. Manpower : power furnished by human physical strength; the collective strength or availability for work of the people in any given area, nation, etc. Also **man power**

33. Scenario : an outline or synopsis of a play, opera, or the like, indicating scenes, characters, etc.; the script of a film; an outline for any proposed or planned series of events, real or imagined

34. prerequisite : required beforehand, esp. as a necessary condition for something following; something prerequisite

35. constraints : a constraining or being constrained; a) confinement or restriction b) compulsion or coercion; c) repression of natural feelings or behavior b) forced, unnatural manner; awkwardness; something that constrains

36. exploration : an exploring or being explored

37. Aspirations : a) strong desire or ambition, as for advancement, honor, etc.

38. Generalization : the act or process of generalizing ; a general idea, statement, etc. resulting from this; inference applied generally

39. rigorous : very strict or harsh; very severe or sharp; rigidly precise; thoroughly accurate or exact

40. foreshadow : to be a sign of (something to come); indicate or suggest beforehand; prefigure; presage

1.13 Self Assessment Questions

1. What do you mean by Management? Explain IT infrastructure?

2. Explain the Definitions of Management? Explain the role of computers in Management?

3. Explain the Elements of IT infrastructure?

4. What do you mean by Management Information System? Explain its resources?

5. What are the different kinds of Elements that are available in M.I.S?

6. Explain the objectives of Information Technology?

7. Distinguish between computers and M.I.S?

8. How the M.I.S will play an important role in future?

1.14 Reference Books

1. CSV. Murthy – Management Information Systems

2. VARMA & AGARWAL – Management Information System

- **S.PRABHAKAR**

LESSON – 2

ROLE OF COMPUTERS IN MANAGEMENT

2.0 Objective: - This Lesson is mainly deals with how the computer will play an important role in management and How the computers will useful in management, not only that how the computers will be developed through different generations.

Structure:-

2.1 Role of Computers in M.I.S:-

The Computer's Role in M.I.S is to be appraised on the following grounds:-

1.   Useful in forecasting

2.   Useful in planning

3.   Useful in control

4.   Useful in modeling

5.   Useful in system analysis

6.   Useful in facilities of data – base

Useful in Forecasting:- (a) Computer can perform such historical analyses as below speedily which may be difficult or even impossible manually.

1.   Data smoothing by means of moving average or weighted moving average (including exponential smoothing) to <u>disentangle</u> the underlying trend from <u>amidst</u> irregularities.

2. **Seasonal Analysis:-** Economic activity varies with reasons viz., sales of Ice cream. The seasonal analysis can be used to compute the seasonal indices.

3. **Cyclical Analysis:-** Cycle of booms and depressions can be discerned factoring an economic time series into trend, seasonal, cyclical and error components.

4. **Correlation and regression analysis:-** Such relationships at the variance of sales is proportional to the mean sales etc. can be discovered. Multiple regression analysis involves a great deal of calculation and computer would be particularly useful here.

5. **Auto – Correlation Analysis:-** There are some variable that have a time delay relationship. Viz ., sales of repair parts in a period is a function of the sales in the preceding period. Such relationships can be established.

6. **Data Description:-** Various frequency distributions can be tried for a fit in the give data. Later, the goodness of the fit tests can be performed. Such summary statistics as mean, mode, median, SD, MAD, skews ness, etc. can be computed to describe the given data.

Optimal parameters of the selected forecasting model can be derived: for example, in simple exponential smoothing model what value of the smoothing coefficient to use? Different values are tried on the historical data and the one that yields the least cumulative – squared error is selected for implementation.
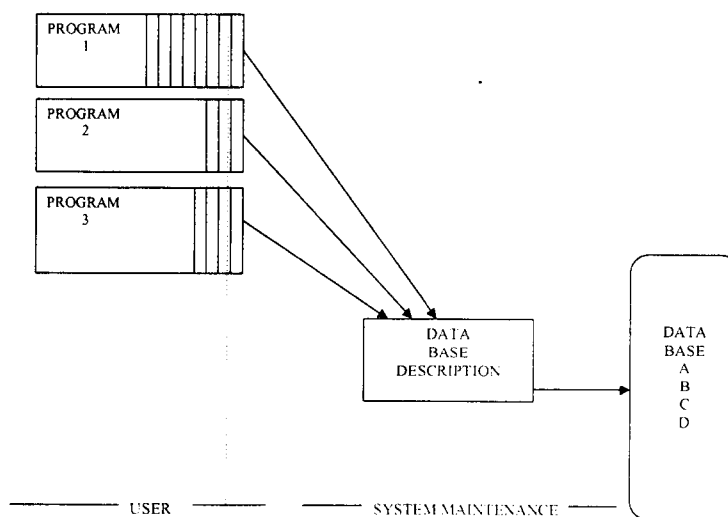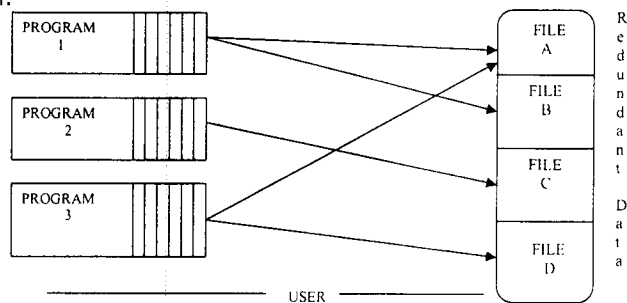
(b) For routine forecasting too, computer provides considerable assistance. For example depend forecasts. For thousands of inventory items may have to be prepared every week, months, etc.

which would be impossible manually but quite within th reach of the computer. Besides, such sophistications as adoptive response and tracking signls can be incorporated to monitor the forecasts.

(2) Useful in Planning:- (a) Planning can be done more freqently and even continuously. Because of constraints of computational and data processing abilitie in manual systems, it used to be the practice to set recorder level annually. Important demand fluwations were thus ignored resulting in higher stocks and proper service than is possible now in cmputerized systems where recorder levels can be revised much more frequently. Elian reports 10% savings in stockholding for the same service by periodically revising recorder levels on tle basis of his extensive simulation experimentation.

(b) Sophisticated models for planning can be employed. Fc example liner programming, etc. can be used for production planning. In particular project plannin and control (both physical and cost – wise) and resource allocation can be excellently carried out by means of CPM/PERT on the computer.

(c) Simulation can speed up evolution of alternative plans. Snulation is a method of reproducing the major elements of a dynamic situation within the foreshortened time available through programming a computer. Thus, instead of waiting for 2 yars to see the results of a capital investment project, the 2 year's experience may be simulated in the computer.

(d) The user can interact with the computer to do better planrng. For example, he may pose a question as what happens if the advertising budget is _slashed_ by 15% The computer, according to the mathematical model embedded in its program, would providehim with the consequences with which the user may not be satisfied. Based on the answer, however, he may structure another question and so on until the man and machine have iterated dowi to a satisfactory solution with a fine blend of their capabilities. The planner, together with this tye of interactive computer, can probe for data items, compare data, analyze relationships, test fr various conditions evaluate, execute, and produce answers to many 'what if' questions. The inteactive computer thus _amplifies_ human _intellect_.

(e) For complex planning situations heuristic rules can be derivel. Such a rule in production scheduling might be to schedule late items first, etc.

3. Control: - (a) More comprehensive, varied, accurate and frequeit reports can be produced where necessary.

(b) Statistical quality control techniques can be used to monitor marketng and financial ratios.

(c) Variance analysis plus other analyses which might assist in understarding both the reasons for variances and also the courses of action that will be corrective can be undertaken.

4. Modeling: - (a) Models can be tested for robustness simply or in _conglomeration_ against historical or _hypothesized_ data by simulation or otherwise. Sensitivity analysis can be performed to see to what extent the input variable affect the output variables. Computer can also assist in model building to sort out relationships.

5. Systems Analysis: - (a) Several alternative MIS designs can be evaluated by means of simulation experimentation.

6. Data Base Facility :- (a) Data is no longer vivisected department wise. All, planner forecaster, supervisor, system analyst, and modeler, can discharge their functions much better.

2.2 TRANSITION OF MANUAL TO COMPUTER BASED SYSTEMS:-

To increase the understanding of compuer-based management information systems, we continue our transition from manual to computf system by describing the steps involved in making a conversion or change over from the irentory accounting system, assuming as we do so that a feasibility study has been made and tht the system conversion is economical and feasible. The steps involved in the conversion are pparations of :

1. System description   . Input documents

3. Output documents   l. File design

5. Program logic   l. Computer program

7. System verification   8. Documentation

1. System Description. Th system description is usually prepared after preliminary investigation and definition of the poblem. The description is essentially a statement of the major inputs, outputs, processing operatins, and files needed. The purpose is to show the logical flow of information and the logical operatios necessary to carry out the particular design alternative chosen. Systems descriptions are in both *narrative* and *pictorial* form.

(a) Narrative. The narrativ description is an English language depiction of the operation of the system. It should describe inputs, outputs, files, and operations. It should be in that degree of detail that will allow users and conputer technicians to understand the operation of the system and to utilize the narrative as a startig point for more detailed design. The narrative form of our simple inventory accounting system mght run as follows:

The activity is concerned with an inventory control accounting system for finished goods inventory. Transactions (receits and issues) are read from terminals, the relevant master record is found on disk and updated,and the new inventory status report is printed.

(b) Pictorial (Flow chrt). A picture allows us to condense greatly the narrative version of our system description. This symbolic form facilitates a quick analysis of the job being performed and provides a visual overvew of the entire operation. Although there are numerous methods of depicting the system descrption, flowcharting is one of the most popular techniques still in use.

The flowchart for the narrative description of our inventory accounting system appears as Figure given below:
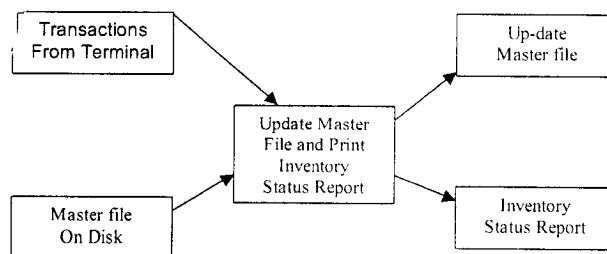
Systems flow chart, Inventory Accounting System

2. Input Documents. After the system description is completed, it is necessary to specify how the information will be put into a form that is acceptable to the computer. Volume of information, frequency, accuracy and verification requirements, and the handling of the information are considerations in the selection of input format. Sometimes input have to be accepted in the form in which they are received from the outside. The exact layout of input documents in necessary because the computer program is an exact and precise sequence of steps that operate only when data are located in prescribed positions. In our example, the input comes from terminals. The electronic impulses sent by the terminal are in computer-readable form. The computer stores this information in its memory to future procession.

The examination of the input document reveals that it provides all the relevant information contained in the system description. The typical item description normally associated with inventory is not contained in the input document because it is already filed in storage.

3. Output Documents. Output are subject to much the same considerations as input documents, but the output format should be treated with additional care because it represents the purpose or objective of the entire operation. It is the output document with which management is almost exclusively concerned, and because of its critical nature care should be taken in its design.

The output layout in our example is shown in Figure below. Although computer is capable of printing much more complex reports than our example, we show the minimum information required to meet the specification of our systems description and output requirements.

Status of Inventory Report

Item Number	Item Description	Balance
Positions 1-88	Positions 89-124	Positions 125-320

Fig. Output Report Format

Master Inventory File

Position Record	Item Number 1-88	Item Description 89-124	Item Balance 125-320
1			
2			
3			
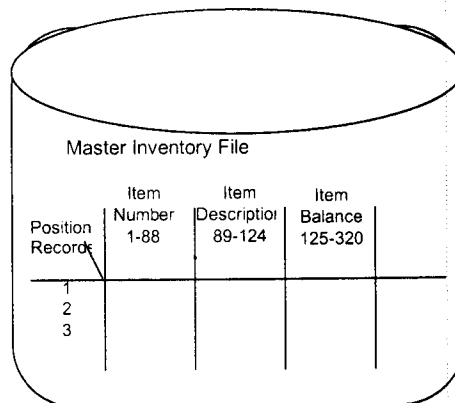
4. File Design. The logic required to control the flow of data through the system is a part of systems design, and the flow is in turn dependent upon the design of data files. These two steps are closely associated and should be considered in conjunction with considerations of type of equipment, storage capacity, input and output media, and format.

The character-by-character contents of every record are specified by the file record layouts. The item number is an 8-digit field, the same as that on the input terminal screen. The item description consists of two 8-digit fields making up 16 alphabetic characters. This description is an integral part of the inventory file maintained on disk; there is no reason to include it on the input screen representing individual transactions. The file design of the disk is completed by the 8-digit item balance field. For the sake of simplicity we have not included several other elements of file design, such as price, unit costs, weight, minimum and maximum inventory limits, and so on.

5. Program Logic. Although there are numerous means of thinking through and documenting program logic, we can use flowcharts because they have been historically dominant and they are easy to depict and understand.
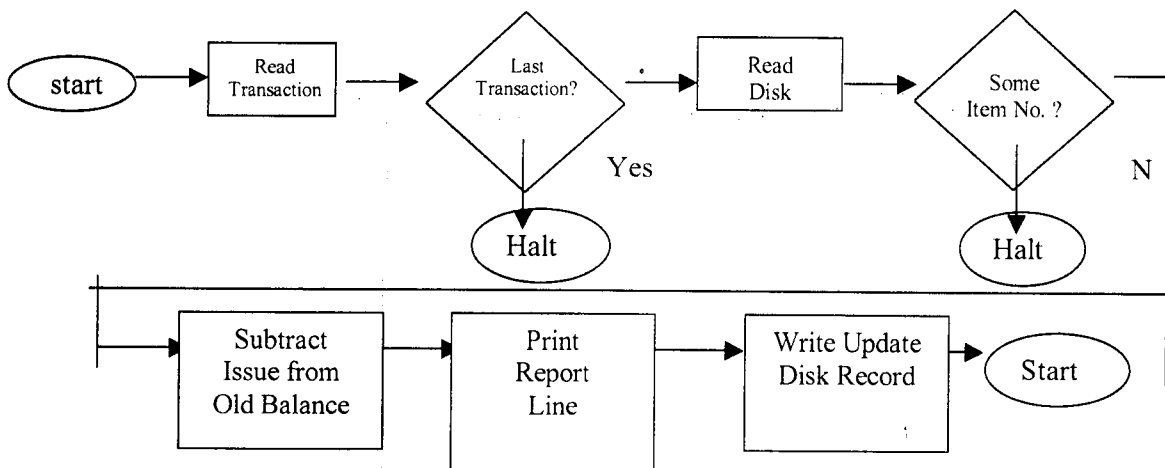
Fig. : The Program Flow Chart

The Program flowchart is the programmer's logic of the detailed, step-by-step representation of how the computer program will accomplish the job. It is the "blueprint" of a program and is used to marshal and organize the facts for examination on paper, to outline problems, logic, and solutions; and to deal with the whole problem in systematic steps. A rough flowchart of conversion from manual to computer inventory accounting might appear as shown in the above figure.

6. Computer Program. After the Program Logic, the next step is Computer Program for conversion of a manual system to a computer based system. The programmer has decided the exact flow of the program, he or she must then take steps to explain the logic used in a language the computer understands. A sequence of instructions that works together to perform a task is called a program, the program is stored internally, and the processor has access to the instructions as required.

In simplified form, an instruction to the processor consists of two parts : an operation code and operands. The operation code simply says, "Perform a READ operation," "Perform and ADD operation, "and so on. The operands give additional information to the processor. For example, being told to add is not enough; we must know what two things to add and where to put the answer. These last three pieces of information are called operands. All computer programs, no matter how large or complex, are really made up of lots of relatively primitive instructions like those just discussed in the previous pages.

A computer programming has made giant strides since the old days of "one for one". Language such as easy coder, auto coder, and auto tran. Today a large assortment of operator-machine languages is available. Until one is able to communicate with computer in the english language (a day that will surely arrive), most of our needs can be met from those programming language listed.

It is proper to digress here and note that many day-to-day problem of the business can be solved.

7. System verification: After the program has been written and run through the communication process. It is placed in memory in binary or 'Machine readable form and in ready to process the terminal input upto the master file on disk, and prink the required report. The computer execute the instructions of the program is sequence until the program come to a halt.

The probability of all program working correctly the first time approaches zero. Test cases be run against each program all error corrected. Then more test cases must be run against the whole system an any additional error fixed, only then it is reasonable to pout the customs actual transactions and firm's real inventory files under control of a automatic system.

8. Documentation: There are three types of documentation's listed.

(i) Documentation: Which provides input, a simple over view of a system a clear description of exactly what input is expected, and a no about what input is not acceptable.

(ii) Documentation. For those running and maintaining the system all the technical documentation generated during the development process.

(iii) Documentation. For those using the output a simple over view the system, a clear description of what the output means, and a note about limitations.

The documentation will make the automatic inventory system understable to everyone involved.

Thus, the above is the cycle of converting a manual invention accounting system to a computer based system. Thus the above 8 (eight) steps are needed for conversion.

2.3 INTELLIGENT TERMINALS:-

Intelligent terminals combine VDU hardware with built in micro processors that are user programmable. They can process small jobs without the need to interact with a large computer. Programmed checks can test the validity of input data computer. The cost of adding micro processor to Dumb terminal has now dropped so low that almost all new VDU has smart or intelligent features to help make data entry or retrieval easier to people.

2.4 HEURISTICS:-

A heuristic is a technique that improves the efficiency of a search process in a computer programmer, possibly by sacrificing claims completeness. In order to solve many hard problems efficiently it is often necessary to compromise the requirements of mobility and systematically and to construct a control structure that is no longer guaranteed to find the best answer but that will almost always find a very good answer. Some heuristic help to guide a search process without sacrificing any claims to completeness that the process might previously have had. Others may occasionally cause an excellent path to be overlooked. But, on the average they improve the quality of the paths that are explored using good heuristics, we can hope to get good (even if non optimal) solution to hard problems such as traveling salesman, in less than exponential time. There are

some good general purpose heuristics that are useful in a side variety of problem domain. In addition, it is possible to construct special purpose heuristics that exploit domain specific knowledge to solve particular problems.

2.5 OPERATING SYSTEM:-

An operating system is a program which acts as an interface between a user of a computer and the computer hardware. The purpose of an operating system is to provide an environment in which a user may execute programs. The primary goal of an operating system is thus to make the computer system convenient to use. A secondary goal is to use the computer hardware in an efficient way. An operating system is similar to a government. The basic resources of a computer system are provided by its hardware software and data. The operating system provides the means for the proper use of these resources in the operation of the computer system. Like a government the operating system performs no useful function by itself. It simply provides an environment within which other programs can do useful work. An operating system is a control program. A control program controls the execution of user programs to prevent errors and improper use of the computer. It is especially concerned with operation and control of I/O devices. Operating system exists because they are a reasonable way to partition into smaller pieces the problem of creating a usable computing system. The fundamental goal of computer systems is to execute user programs and solve user problems. Towards this goal computer hardware is constructed. Since bare hardware alone is not very easy to use, applications programs are developed. These various different programs require certain common operations. Such as controlling the I/O devices. The common functions of controlling and allocating resources are then brought together into one piece of software the operating system.

2.6 COMPUTER GENERATION:-

Computers may also be classified into rough groupings which have been called generations. These generations usually are indicative of a significant scientific breakthrough or improvement in computer manufacturing technology.

First Generation Computers. These computers used vacuum tube as the main electronic element. Magnetic drums were widely used as the main electronic element. Magnetic drums were widely used as the man memory. Programming had to done in machine/assembly language only. The speed of operation were in terms of milliseconds (thousandth of a second)

Second Generation. In second generation computers-transistor replaced the vacuum tubes as the basic electronic element. These transistorized computers were more compact, more reliable and were faster in speed. The speed of operations were in terms of micro-second (millions of a second). The magnetic cores were introduced as the main memory Magnetic tapes and disks were widely used for storage of bulk data. In the area of software compilers were introduced thereby enabling the programme to write programmes in high level languages. Some examples of IBM, 140 Honey well 800 to 1620.

Third Generation Computer. These computers came during the late sixties. Monolithic integrated circuits replaced the transitors. The resulted in further reduction in size andfurther improvement in speed. The required less maintenance also. Although there were improvements these were not as overwhelming as when the second generation computer replaced the first generation computer. The speed of computation was still in terms of micro second. In terms of software, operating system were introduced in this generation of computers. Large number of application packages were developed.

Fourth Generation. This uses semi-conductors in place of con memory. In this generation was achieved higher speed at lower costs. It also enables machine logic to be altered to suit user needs. But the border line between third and fourth Generation is very thin.

2.7 RANDOM ACCESS STORAGE:-

In a computer, information is stored in a memory unit, in the form of file. The memory unit may be a part of the computer (on line) or it may be stored in devices outside the computer (off line). The retrieval of required information from the storage is known as access of information. Random access storage may be defined as a storage technique in which the time required to obtain information is independent of the location of the information most evenly obtained. This strict definition must be qualified by the observation that we usually mean relatively random. Thus magnetic drums are relatively non-random, access when compared with magnetic cores for main storage but are relatively random access when magnetic tapes for file storage.

2.8 TIME SHARING COMPUTER:-

Accomplishment of several jobs simultaneous by allocating small division of total time to each function in term is called time sharing. The term time sharing is used when a computer is connected to a number of terminals with which central processing unit (CPU) can communicate. Thus time sharing system allows many individuals to use the computer at the same time and without having to wait there computer can be simultaneously used for updating files, Enquirer and production large volumes of output on a line printer. On such computer, the number of concurrent users depends upon the latest resources available on the computer. A time sharing system can operate with local or remote terminals multi-programming and multi-processing techniques is necessary in time sharing system.

2.9 Distinguish between digital and analog computers:-

A digital computer deals with discrete data and 'count' rather than 'measure'. The digital machine is one which operates essentially by counting. This is in contrast to the analog machine, because it has only a limited memory facility and is restricted in the type of calculations it can perform, can only be used for certain engineering and scientific applications. Most computers are digital. An analog computer is inaccurate but generates results instantaneously. Marry complex mathematical problems can be solved by analog computer much faster than by digitals.

2.10 'BIT' and 'BYTE':-

'BIT' is a short form of binary digit. It comes from the first two letters of Binary and last letter of 'Digit'. It can have a value 'O' or 'I'. 'BYTE' is a generic term to indicate a measurable portion of consecutive binary digits, i.e. 'BYTE' is a group of 'BITS'. A 'BYTE' has normally eight bits.

'BCD' means Binary Coded Decimal describing a decimal notation in which the individual decimal digits are represented by a pattern of 'O' and 'I'. Now, in Decimal number System there are 'IO' symbols available. Let us assume that we have only one bit. The bit can have 2 possible values, i.e. O.I. If we have two bits, the bits can be arranged in four possible combinations, i.e. OO, OI, IO, and II. Similarly with three bits we can have eight possible combinations. So, to store IO combinations of decimal number we require minimum of four bits. Extending the above logic to store both numerals (IO) and Alphabets (26) we require 6 bits.

2.11 PARITY CHECK:-

A check that tests whether the number of 'I' bits in an array is either even (even parity) or odd (odd parity). It is not a fool proof check. Thus it is a summation check in which the binary digits in a character or word are added and the sum is checked against a single digit, i.e. a check that tests whether the number of ones in a word is odd or even. If cannot find if 'I' bits are transposed or two 'I' bits are dropped.

2.12 INTER RECORD GAR (IRG):-

A blank space created between every block of record is called Inter Record Gaps. These Gaps are automatically created at the time of recording When such data are transferred to CPU through in drive, the movement will stop when a gap is reached. The tape remains motionless until the record is processed. Next data will enter after crossing the gap. Each record will thus give an interruption to the drive. It is fixed for a particular magnetic tape model and do not change irrespective of recording density or length of record. The 'IRG' can be 0.75" or 0.6" or 0.3".

2.13 FEASIBILITY FOR PURCHASE OF A COMPUTER:-

Before a particular computer is purchased the following feasibility studies should be conducted:

(i)   The particular computer should be able to fulfill the needs of the company,

(ii)   The cost of the machine should be compared with others of the same class,

(iii)   The reliability of the machine and the manufacturer has to be verified,

(iv)   Software packages, that will be accepted by the machine is an important criteria to be noted,

(v)   The memory capacity of the computer has to be cross checked with the needs of the organization,

(vi)   Storage devices, both on line and off line are important ingredients of the system,

(vii) Input/output devices are the two important devices which facilitate computer/human interaction.

2.14 Summary:-

The Computer's Role in M.I.S is to be appraised on the following grounds:- Useful in forecasting, Useful in planning, Useful in control, Useful in modeling, Useful in system analysis, Useful in facilities of data – base. To increase the understanding of computer-based management information systems, we continue our transition from manual to computer system by describing the steps involved in making a conversion or change over from the inventory accounting system, assuming as we do so that a feasibility study has been made and that the system conversion is economical and feasible.

An operating system is a program which acts as an interface between a user of a computer and the computer hardware. The purpose of an operating system is to provide an environment in which a user may execute programs. Computers may also be classified into rough groupings which have been called generations. These generations usually are indicative of a significant scientific breakthrough or improvement in computer manufacturing technology. In a computer, information is stored in a memory unit, in the form of file.

2.15 Technical Terms:-

1. Disentangle : to free from something that entangles, confuses, etc.; extricate; disengage, to straighten out (anything tangled, confused, etc.); unravel; untangle to get free from a tangle

2. Amidst : in the middle of; among

3. Slashed : to cut or wound with a sweeping stroke or strokes, as of a knife,; to whip viciously; lash; scourge

4. Amplifies : to make larger or stronger; increase or extend (power, authority, etc.); to develop more fully, as with details, examples, statistics, etc.

5. Intellect. : the ability to reason or understand or to perceive relationships, differences, etc.; power of thought; mind; great mental ability; high intelligence; a mind or intelligence, esp. a superior one; a person of high intelligence c) minds or intelligent persons, collectively

6. Conglomeration : a conglomerating or being conglomerated; a collection, mixture, or mass of miscellaneous things

7. Hypothesized : to make a hypothesis; to assume; suppose

2.16 Self Assessment Questions

1. Explain the role of computers in M.I.S?

2. In management, explain how the transactions should be transferred from manual to computers?

3. Explain about INTELLIGENT TERMINALS, HEURISTICS & OPERATING SYSTEM?

4. Explain the generations of computers that are useful in management?

5. What are the feasibilities that management require for purchasing of a computer in their office?

2.17 Reference Books

1. CSV. Murthy – Management Information Systems

2. VARMA & AGARWAL – Management Information System

- S.PRABHAKAR

LESSON – 3

ROLE OF COMPUTERS IN MANAGEMENT OF HOTELS

3.0 Objective: - The primary focus is the front office, Restaurant, Kitchen, housekeeping, reservations and night audit departments. Other departments are discussed to provide and understanding of how these departments relate to the front office and how they operate to enhance the guest experience

Structure:-

3.1 Introduction:-

If you need to know about the nature and operation of hotels as they exist today, this new book is for you. You will learn about the inner workings of a hotel, preparing readers for what to expect in the current and future hotel market. The primary focus is the front office, Restaurant, Kitchen, housekeeping, reservations and night audit departments. Other departments are discussed to provide and understanding of how these departments relate to the front office and how they operate to enhance the guest experience. An introduction of basic analyses, techniques and trends both in policy and technology are reviewed as they relate to management and the guest. The book gives newer managers, meeting planners, and others a "real world" understanding of the hotel industry balancing its past, present and future. New technologies such as the Property Management System have dramatically changed hotel operations; therefore, extensive time has been devoted to covering this technology. Additional chapters feature analysis of the physical makeup of hotels, yield management, and operational techniques. Performance measurements and analysis of what makes a truly successful hotel are discussed in detail. Finally, because hotel management is and will always be about people, chapters are devoted to both the hotel guest and hotel employee. The arrival chronology is discussed from arrival to departure.

3.2 Front Office

3.2.1 Property Management Systems: - An automated lodging information system is commonly called a property management system (PMS). Although the components of a PMS may vary, the term "PMS" is generally used to describe the set of application programs that directly relate to front office and back office activities. "Application software" is the term for programs that instruct the hardware of a technology system in what to do, when to do it, and how to do it. The following are the functions performed by PMS system:

- Allowing for the creation of a wide rage of room rates, covering different rooms, dates, and company / association discounts.

- Tracking the availability of all guestrooms and rates for at least the next 12 months.

- Tracking the details of each guest's reservation, whether as an individual or as part of a group.

- Helping select an appropriate room for the guest either on or before arrival.

- Facilitating the check – in process.

- Keeping an up – to – the – minute record of all the expenses guests change to their room during their stay, either directly or through an interface to one of the many sub – systems managing other aspects of the property, such as bar / restaurant point – of – sale charges.

- Accepting full or partial payment when guests check out.

- Following through on any resulting accounts receivable if part of the payment is charged to an outside account, such as the guests company.

Front office PMS applications consist of a series of programs including reservations, rooms management, and guest accounting functions.

ii. PMS Front office Applications

Reservations Module	Rooms Management Module
Availability / Forecasting Reservation Records Reservation Confirmations	Room Status Registration Room Assignments

Guest Accounting Module
Folio Management Credit Monitoring Transaction Tracking
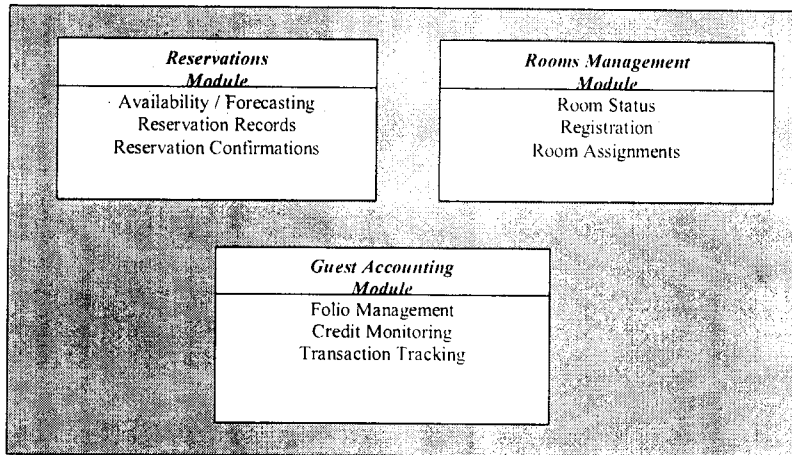
iii. Reservation Systems: - While many industries computerized during the 1960s, the hotel industry did not actively pursue the possibilities of automation until the early 1970s. This relatively late start enabled the hotel industry to benefit form advances in technology. The proper handling of reservation information is critical to the success of hotel companies and individual properties.

E – Distribution Systems:- This E – Distribution includes the following two major categories:

- Global distribution systems

- Internet distribution systems

Global distribution systems:- (GDSs) are often formed as joint ventures linking a number of diverse business. By directly linking the reservation systems of hotel airline, car rental, and travel agency companies on a world wide basis, global distribution systems provide access to travel and tourism inventories around the world. A global distribution system can represent a significant portion of reservations business for many airport and resort properties

Internet Distribution Systems:- Typically, IDSs are operated by independent web site sponsors that develop an online hotel reservation booking engine. IDS sites can connect to a hotel property in at least three ways:

1. Connection to the hotel company's central reservation system.

2. Connection to a switching company that connects to the hotel's central reservation system

3. Connection to a GDS that connects to the hotel's central reservation system.

3. Restaurants & Kitchens

A number of people have reviewed restaurants for holiday parties/business dinners, etc. They have various complaints, mostly regarding the menu choices, timing of courses, and dessert presentation. I just want to mention that the host of the party is given many different choices to serve at the party, and is in charge of how the party goes. If a salad has blue cheese, the menu didn't have a veg option, or you don't eat red meat—that was your host's choice. Same goes for

desserts—many times at parties desserts have to be portioned like a canapé or in large portions to share, and these are made especially for the party. If there is difficulty in eating these, once again, that was the choice of the host, often against the advice of the chef. Finally, as to timing, large parties take longer because the kitchen has to serve dozens of people at once, and at times the party has spaces put in between courses for speeches or toasts. So please give them another chance—normal a la carte service is not like that.

i. Food and Beverage Management Applications:-

Restaurant Managers are constantly challenged to find new ways to increase revenues while controlling and reducing costs. Food and Beverage management applications process data related to back – of – the – house food service activities. The common food service management applications such as:

- Recipe Management

- Sales analysis

- Menu Management

ii. Recipe Management:- The recipe management application maintains three of the most important files of an automated restaurant management system:

- Ingredient file

- Recipe file

- Menu item file

Most other food service applications have to access data contained within these files in order to effectively carry out their processing functions.

Ingredient File:- An **Ingredient file** contains important data on each purchased ingredient. Data may include:

- Ingredient code Number

- Ingredient description

- Purchase unit

- Purchase unit cost

- Issue unit

- Issue unit cost

- Recipe unit

- Recipe unit cost

Standard Recipe File:- A standard recipe file must contain recipes for all menu items. Important data maintained by the standard recipe file may include:

- Recipe code number

- Recipe name

- Number of portions
- Portion size
- Recipe unit
- Recipe unit cost
- Menu Selling price
- Food Cost Percentage

Few restaurants purchase all menu item ingredients in ready – to – use or pre – <u>portioned</u> form. Some ingredients are made on the <u>premises</u>.

Menu Item File:- A **menu item file** contains data for all meal periods and menu items sold. Important data maintained by this file may include:

- Identification number
- Descriptor
- Recipe code number
- Selling price
- Ingredient quantities for inventory reporting
- Sales totals

This file also stores historical information on the actual number of items sold.

iii. Sales Analysis:- A POS (point of sale) system can store or maintain files that contain important data regarding daily food service operations. The sales analysis software can then process this combined data into <u>numerous</u> reports to help management monitor and control operations in such specific areas as:

- Menu Planning
- Sales forecasting
- Menu item pricing
- Ingredient Purchasing
- Inventory control
- Labor <u>Scheduling</u>
- <u>Payroll</u> Accounting
- Net sales
- Tax
- Number of guest <u>checks</u>
- Number of covers
- Dollars per check

- Dollars per cover
- Sales category
- Day – part totals

iv. Integrated Food service software: - Perhaps the most common mistake in choosing a food service system is deciding on hardware before considering software. Computer hardware is typically purchased on the basis of brand, advertising, price, accessories, and the like. Only after the purchase is made does the search for software begin.

Identifying software aimed at an operation's needs can be time – consuming and frustrating, but learning that the software selected is incompatible with already – purchased hardware can be devastating. The best way to avoid this disaster is to remember that finding hardware to support software packages is much easier than working with inadequate software.

v. Generic Software: - The objectives of Generic Software are:

- To minimize the time it takes to process input into out put (through put)
- To minimize the handling and re - handling of data (efficiency)
- To minimize the amount of unnecessary out put (streamlining)

Integrated food service software applications enable data to pass directly form one application to another. Data is entered only once.

Vi. Point – of – Sale Systems: - A point – of – Sale system is as much the technology core system for restaurants, and other food and beverage operations as the PMS is for lodging operations. A point – of – sale (POS) system captures data at the time and place of sale. These systems use terminals that are combined with cash registers, bar code readers, optical scanners, and magnetic stripe readers for instantly capturing sales transactions. In restaurants, these systems manage the ordering and delivery of all menu items in one or more restaurants and / or bars. As such, it must be capable of handling different menus and different pricing at different times of the day.

Orders are typically entered on the system's workstations in the main seating area and are automatically routed to printers in the hot or cold preparation areas or in the service bar, as appropriate. Several systems allow all items on an order to be entered at once, with some, usually the main course, held back to be printed and prepared at a later time to suit the pace of the guests meal. Guest checks are printed on demand.

Most systems can track the hours that employees work through simple sign – on / sign – off routines; several also offer inventory / purchasing functions and recipe analysis. However, more specialized time and attendance and inventory purchasing systems are commonly used in these areas.

4. House Keeping

i. Rooms Management Module: - The room's management module is an important information and communications branch within a property management system. It is primarily designed to strengthen the communication links between the front office and the house keeping department. Most room's management modules perform the following functions:

- Identify current room status
- Assist in assigning rooms to guests at check – in
- Provide in – house guest information
- Organize house keeping activities
- Provide auxiliary services
- Generate timely reports for management

A room's management module also enables management to <u>efficiently</u> schedule needed <u>housekeeping</u> staff and to review detailed housekeeping productivity reports.

Room Status:- Before assigning rooms to guests, front desk employees must have <u>access</u> to current, accurate information on the status of rooms in the property. The <u>current</u> status of a room can be <u>affected</u> by information about future availability and information about current availability.

ii. Functions of a Rooms Management Module
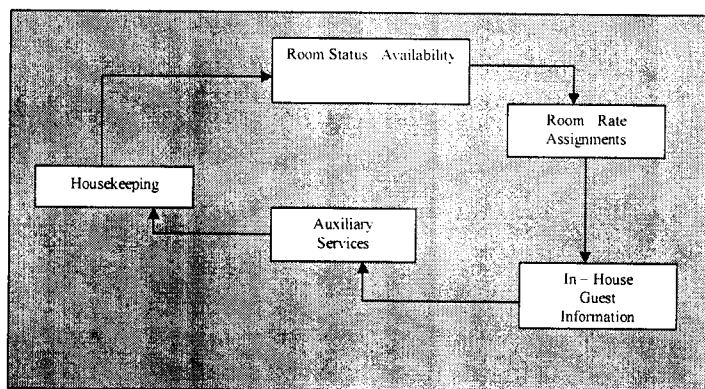
iii. In – House Guest Information Functions:- The rooms management module is also designed to provide a limited review of guest data. Guest data can be displayed on terminal screens, handheld devices, or other media, <u>enabling</u> a guest services coordinator, switchboard operator, and <u>concierge</u> or front desk employee to quickly identify the name, room number, and telephone extension of a particular guest.

iv. Housekeeping Functions:- Important housekeeping functions performed by the rooms management module include:

- <u>Forecasting</u> the number of rooms to be cleaned.
- Scheduling room <u>attendants.</u>
- <u>Assigning Workloads</u>
- <u>Measuring Productivity</u>

A room's management module forecasts the number of rooms that will require cleaning by

processing current house counts and the expected number of arrivals. After determining the number of rooms that will require cleaning, most modules can generate

Schedules for individual room attendants and assign a specific number of rooms to each attendant on the basis of property – defined standards.

Upon first entering a room to clean it, a room attendant may use the room's telephone interface to the PMS to enter his or her identification code, room number and the code identifying the rooms current status. The system may automatically log the time of the call. When a room is clean and ready for inspection, the room attendant again uses the rooms telephone interface to notify the inspector's station, and the system once again records the time of the call. The log of room attendants times in and out enables the rooms management module to determine productivity rates. Productivity rates are determined by calculating the average length of time an attendant spends in a room and the number of rooms attended to during a shift. Productivity reports keep management apprised of potential inefficiencies while also tracking the location of house – keeping personnel throughout a shift.

- Automatically setting the status of all occupied rooms to "dirty" each night.
- Allowing the grouping of dirty rooms into housekeeping sections and assigning them to specific attendants and supervisors, using different levels of cleaning difficulty for different room types.
- Updating each rooms status as cleaning progresses, either manually on a PMS workstation or automatically through the attendants dialing into the system from the guestroom phone.
- Tracking discrepancies between each rooms occupancy status as recorded by the front desk and as reported by housekeeping, to identify possible "skips" (i.e., should be occupied, housekeeping reports it as vacant) or "sleeps" (i.e., should be vacant, reported as occupied).
- Changing any rooms status to "out of order" to allow for correction of engineering or maintenance issues, preferably also issuing engineering work orders.

v. Generation of Reports:- The number and types of reports that can be generated by a rooms management module are functions of the property's needs, software capacity, and the contents of the rooms management database. A wide variety of reports are possible because the room's management module overlaps several key areas, such as the rooms department, the housekeeping department, and auxiliary services. Most rooms management modules are designed to generate reports that focus primarily on room availability, room status, and room forecasting. These reports are designed to assist management in scheduling staff and distributing workloads.

A room's allotment report summarizes rooms committed by future date. The report may list present check – ins, the number of occupied rooms, names of guests with reservations who have not yet registered, and the number of rooms available for sale. A registration progress report may also profile room status, room's revenue, and average room rate. A rooms activity forecast provides information on anticipated arrivals, departures, and vacancies. This report assists managers in staffing front desk and housekeeping areas. An actual departures report lists the names of guests who have checked out and their room numbers, billing addresses, and folio numbers.

A housekeeper assignment report is used to assign floor and room numbers to room attendants and to list room status. This report may also provide space for special messages from the housekeeping department. System – generated housekeeper productivity reports provide productivity information for each housekeeper by listing the number of rooms cleaned and the amount of time taken to clean each room.

At the end of each month, quarter, and year rooms management modules are capable of generating rooms productivity reports that rank room types by percentage of occupancy and / or by percentage of total rooms revenue. Rooms Management modules may also produce a rooms history report depicting the revenue history and use of each room by room type. This report is especially useful to those properties using an automatic room – assignment function based on a rotational usage of rooms.

3.5 Summary: - "Application software" is the term for programs that instruct the hardware of a technology system in what to do, when to do it, and how to do it.

New technologies such as the Property Management System have dramatically changed hotel operations; therefore, extensive time has been devoted to covering this technology.

A number of people have reviewed restaurants for holiday parties/business dinners, etc. They have various complaints, mostly regarding the menu choices, timing of courses, and dessert presentation. Restaurant Managers are constantly challenged to find new ways to increase revenues while controlling and reducing costs. Food and Beverage management applications process data related to back – of – the – house food service activities. The common food service management applications such as: Recipe

Management, Sales analysis, Menu Management.

A housekeeper assignment report is used to assign floor and room numbers to room attendants and to list room status. This report may also provide space for special messages from the housekeeping department. System – generated housekeeper productivity reports provide productivity information for each housekeeper by listing the number of rooms cleaned and the amount of time taken to clean each room. Automatically setting the status of all occupied rooms to "dirty" each night.

Allowing the grouping of dirty rooms into housekeeping sections and assigning them to specific attendants and supervisors, using different levels of cleaning difficulty for different room types. Changing any room's status to "out of order" to allow for correction of engineering or maintenance issues, preferably also issuing engineering work orders.

3.6 Technical Terms:-

1.   Chronology : the arrangement of events, dates, etc. in the order of occurrence;   a list or table of dates in their proper sequence

2.   Tracking : any of the courses of study continuing through succeeding grades in an educational structure (**tracking**), arranged according to various levels of mastery, to which students are assigned on the basis of test performance, abilities, needs, etc.

3.   partial : of, being, or affecting only a part; not complete or total

4.   critical : tending to find fault; censorious; characterized by careful analysis and judgment

5.   Global distribution : round like a ball; globe-shaped; anything distributed; portion; share; the result of distributing; arrangement

6.   Significant : having or expressing a meaning; full of meaning; important; momentous; having or conveying a special or hidden meaning; suggestive

7. Resort : to go; esp., to go often, customarily, or generally; to have recourse; go or turn (*to*) for use, help, support, etc.

8. Typically : serving as a type; symbolic; having or showing the characteristics, qualities, etc. of a kind, class, or group so fully as to be a representative example; of or belonging to a type or representative example;

9. canapé : small piece of bread or toast or a cracker, spread with spiced meat, fish, cheese, etc., served as an appetizer, often with drinks

10. Beverage : any liquid for drinking, esp. other than water

11. application : a way of applying or method of applying or using; specific use

12. access : the act of coming toward or near to; approach; a way or means of approaching, getting, using, etc.; the right to enter, approach, or use; admittance; increase or growth

13. contained : to have in it; hold, enclose, or include; to have the capacity for holding; to be equivalent to

14. ingredient : any of the things that a mixture is made of; a component part, or constituent, of anything

15. portioned : a part or limited quantity of anything, esp. that allotted to a person; share; the part of an estate received by an heir; the part of a man's money or property contributed by his bride; dowry; the part of experience supposedly allotted to a person by fate; one's lot; destiny; the part of a meal or quantity of food served to a person; serving; helping

16. Premises : a) a previous statement or assertion that serves as the basis for an argument b) *Logic* either of the two propositions of a syllogism from which the conclusion is drawn.

17. numerous : consisting of many persons or things; very many

18. Scheduling : a list of times of recurring events, projected operations, arriving and departing trains, etc.; timetable; a timed plan for a procedure or project

19. Payroll : a list of employees to be paid, with the amount due to each; the total amount needed or the money on hand, for this for a given period

20. checks : a written order to a bank to pay the stated amount of money from one's account; one's bill at a restaurant or bar

21. hardware : a) apparatus used for controlling spacecraft, etc. b) the mechanical, magnetic, and electronic design, structure, and devices of a computer c) electronic or mechanical equipment that uses cassettes, disks, etc.: cf.

22. Accessories : extra; additional; helping in a secondary or subordinate way; *Geol.* occurring in minor amounts in a specified rock; nonessential

23. frustrating : to cause to have no effect; bring to nothing; counteract; nullify; to prevent from achieving an objective; foil; baffle; defeat

24. devastating : to lay waste; make desolate; ravage; destroy; to make helpless; overwhelm

25. Disaster : any happening that causes great harm or damage; serious or sudden misfortune; calamity

26. Inadequate : not adequate; not sufficient; not equal to what is required

27. software : >**1** the programs, routines, etc. for a computer: ; >**2** the program material, as a film on a videocassette, that is used with electronic equipment:

28. optical : of or connected with the sense of sight; visual; ocular ; of the relation between light and vision; having to do with optics; for aiding vision

29. Instantly : in an instant; without delay; immediately

30. capturing : a taking or being taken by force, surprise, or skill, as enemy troops, an opponent's piece in chess, etc.; that which is thus taken or seized; a prize or booty in war; the absorption of a particle by an atomic nucleus; esp., the absorption of a neutron or an orbital electron that often results in the immediate emission of radiation

31. transactions : a transacting or being transacted ;something transacted; *a*) a business deal or agreement *b*) [*pl.*] a record of the proceedings of a society, convention, etc., esp. a published one

32. pace : a step in walking, running, etc.; stride; a unit of linear measure, equal to the length of a step or stride, variously estimated at from 30 in. to 40 in. the regulation **military pace** is 30 in., or 36 in. for double time: the **Roman pace**, measured from the heel of one foot to the heel of the same foot in the next stride, was 5 Roman ft., or 58.1 in., now known as a **geometric pace**, about 5 ft. ; *a*) the rate of speed in walking, running, etc. *b*) *Sports* the speed of a ball, shuttlecock, etc.;

    Rate of movement, progress, development, etc.

33. Routines : a regular, more or less unvarying procedure, customary, prescribed, or habitual, as of business or daily life

34. Inventory : an itemized list or catalog of goods, property, etc.; esp., such a list of the stock of a business, taken annually; the store of goods, etc. that are or may be so listed; stock; any detailed list

35. modules ; *a*) any of a set of units, as cabinets, designed to be arranged or joined in a variety of ways *b*) a detachable section, compartment, or unit with a specific purpose or function, as in a spacecraft *c*) *Electronics* a compact assembly that is a component of a larger unit

36. Efficiently : directly producing an effect or result; causative; effective; producing a desired effect, product, etc. with a minimum of effort, expense, or waste; working well

37. housekeeping : the work of a housekeeper; internal management of affairs, as of a business

38. Access : the act of coming toward or near to; approach; a way or means of approaching, getting, using, etc.; the right to enter, approach, or use; admittance; increase or growth; an outburst; paroxysm

39. Current : orig., running or flowing; *a*) now going on; now in progress

40. Status : condition or position with regard to law ;*a*) position; rank; standing *b*) high position; prestige; state or condition, as of affairs

41. Affected : attacked by disease; afflicted; influenced; acted upon; emotionally moved or touched

42. Enabling : to make able; provide with means, opportunity, power, or authority (*to* do something); to make possible or effective

43. Concierge : a doorkeeper; a custodian or head porter, as of an apartment house or hotel

44. Forecasting : to foresee; to estimate or calculate in advance; predict or seek to predict (weather, business conditions, etc.); to serve as a prediction or prophecy of

45. Attendants : attending or serving; being present; accompanying as a circumstance or result; a person who attends or serves

46. Assigning : to set apart or mark for a specific purpose; designate; to place at some task or duty; appoint; to give out as a task; allot; to ascribe; attribute; *Law* to transfer to another

47. Workloads : the amount of work assigned for completion within a given period of time

48. Measuring : the extent, dimensions, capacity, etc. of anything, esp. as determined by a standard; the act or process of determining extent, dimensions, etc.; measurement

49. Productivity : something produced by nature or made by human industry or art; [Colloq.] commercial products collectively, as of a certain kind or from a certain company; merchandise; result; outgrowth; *Chem.* any substance resulting

50. Counts : to name numbers in regular order to; to add up, one by one, by units or groups, so as to get a total; to check by numbering off; inventory; to take account of; include; to believe or take to be; consider

51. Revenue : the return from property or investment; income; *a)* an item or source of income *b)* [*pl.*] items or amounts of income collectively, as of a nation; the income from taxes, licenses, etc., as of a city, state, or nation

3.7 Self Assessment Questions

1. Explain briefly how the computers will be use full in hotels?

2. What is property management system? How it is useful in front office?

3. Explain the different types of Reservation systems in front office?

4. Explain the food and beverage applications? How it is useful in restaurants and kitchens?

5. Explain about Room management module in housekeeping? What are the functions of room management module?

6. Explain about housekeeping functions and generation of reports?

3.8 Reference Book

1. Managing Technology in the Hospitality industry – Michael L. Kasavana, John J. Cahill

- S.PRABHAKAR

LESSON - 4

Management Information Systems

4.0 Objective: - This lesson is mainly deals with management information system there features, functions etc how they will be use full in hotels and computer industry. Management information systems are sets of inter-related procedures using information systems infrastructure in a business enterprise to generate and disseminated desired information.
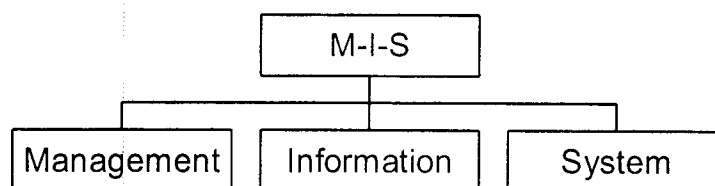
Structure:-

4.1 Introduction

4.2 Meaning of Management Information System

4.3 Definition of MIS

4.4 Functions of MIS

4.5.Characteristics or features of MIS

4.6 Concept of MIS

4.7 Limitations of MIS

4.8 Success and Failure of MIS

4.9 Summary

4.10 Technical Terms

4.11 Self Assessment Questions

4.12 Reference Books

1. INTRODUCTION: - The modern management needs new <u>approach</u> to solve its basic problems. The present day management needs more advance techniques for solving its basic requirements. The MIS is a new idea which is associated with men, machine, marketing and methods for collecting <u>pertinent</u> information from the internal and external source and processing these information for the purpose of facilitating the process of decision making of the business.

MIS is not new; only its computerization is new, before computers, MIS techniques <u>exited</u> to supply managers with the information that would permit them to plan and control business operations. The computer has added one or more <u>dimensions</u> such as speed, accuracy and increased volumes of data that permit the consideration of more alternatives in a decision-making process.

The scope and purpose of MIS is better understood if each part of this is defined. Thus,

(i) Management. Management has been define in a variety of ways to someone it comprises the processes or activities that describe what managers do in the operation

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                        ┌─────────┐
                        │  M-I-S  │
                        └────┬────┘
         ┌───────────────────┼───────────────────┐
   ┌────────────┐     ┌─────────────┐     ┌───────────┐
   │ Management │     │ Information │     │  System   │
   └────────────┘     └─────────────┘     └───────────┘
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for their Organization – plan, organize initiate, and control operations. They plan by setting strategies and goals and selecting the best course of action to achieve these plans or goods. They organize the tasks necessary for the operational plan, set these tasks-up into homogeneous groups and assign authority delegation. They control the performance of the work by setting performance standards and avoiding deviation from standard.

The decision – making is a fundamental prerequisite of each of the foregoing processes, the job of MIS is facilitating decisions necessary for planning, organizing, and controlling the work and functions of the business so that specified goals of business are achieved.

(ii) Information – Data must be distinguished from information and the distinction is clear and important for present purpose. Data are facts and figures that are not currently being used in a decision-process and usually are take from the historical records that are recorded and filed without immediate intent to retrieve for decision – making. An example to explain the supporting documents, ledgers, and so on that comprise the source material for profit and loss statements. Such material would only be of historical interest to an external auditor and share holders.

Information consists of data that have been retrieved, processed or otherwise used for information or inference purpose, argument or as a basis forecasting or decision-making regarding any, business unit. Information is knowledge that one derives from facts for effective functioning of systems placed in the right context with the purpose of reducing uncertainty regarding the alternative courses of action as they are based on description and measurement of attributes of various entities associated with the enterprise.

(iii) Systems – The system can be described simply as a set of elements joined together for a common objective. A subsystem is part of a larger system with which one is concerned. All systems for our purpose the organisation is the system and the parts (divisions, departments, functions, unit etc.) are the subsystems.

The system concept of MIS is, therefore, one of optimizing the output of the organization by connecting the operating subsystems through the medium of information exchange.

4.2 Meaning of Management Information System:-

Information is the life blood of an organization, particularly in the case of system approach management. The (MIS) or information can be define as the knowledge communicated by others or obtained from investigation or study. It is a system of providing needed information to each manager at the right time, in right form and relevant one which aids the understanding and stimulates the action. MIS an organised method of providing past-present and projection information relating to internal operations and external intelligence. It supports the planning, control and operational functions of an organisation by furnishing uniform information in proper time frame to help the process of decision making.

4.3 Definition of MIS:-

Management Information System is generally defined as an integrated user-machine system for providing information to support operations, management and decision-making function Indian Organisation. The system utilises computer hardware and software, manual procedure, models for analysis. Information is viewed as a resource much like land, labour and capital. It must be obtained, processed, stored, manipulated and analysed, distributed etc. An organisation with a well defined information system will generally have a competitive advantage over organisation with poor MIS or NOMIS.

The important definition of M.I.S. are as:- (I) According to Institute of Management Accounts – U.K. "MIS is a system in which defined data are collected, processed and communicated to assist those responsible for the use of resources".

(ii) **T.S. Grewal-** "An organised method of providing each manager with all data and only those data which he needs for decisions, when one needs there and in a form which aids his understanding and stimulate his action",

A computer-based system that provides flexible and speedy access to accurate data. The organisational information system which in general relates to the planning operation and control of an enterprise are the most important among these. MIS refers primarily to such organisational information system which is generally large, sophisticated, structured, and dynamically evolving and of immense commercial values. A large number of programmers and system's analysts are employed by many organisations to build a variety of MIS. Thus, the education of programmers and system analysts as well as general managers, the subject of MIS, has occupied a key position.

However, the concept of MIS has not clearly been known by many developers programmers, and system analysts as well as the users, such as manager. There is a long list of misconceptions about MIS as :

(i) MIS is computer-based information system

(ii) Any reporting system is an MIS.

(iii) MIS is a philosophy

(iv) MIS is a management process/technique.

(v) MIS is a bunch of different information technologies.

(vi) MIS is an implementation of organizational systems and procedures.

(vii) MIS is a course on file schedules. It is a discipline that needs skill.

Thus, MIS is a set of computer – based systems and procedures implemented to help managers in their routine job of decision-making and planning expansion and development.

The actual process relates to:

(a) Collection.

(b) Organisation

(c) Distribution

(d) Storage of wide information

(e) Managerial control and analysis of data.

The conclusion : MIS is which focus on:

(i) Organisation-wide information

(ii) Decision-making process

(iii) Managerial controls and analysis.

(iv) Computer based systems.

The objective of an MIS is to provide information, for decision-making planning, initiating, organizing and controlling the operation of the subsystems of the firm and to provide a synergistic organisation in the process. For an effective MIS design a proper framework would take into account the following key questions:

What are the essential economic and technical characteristics of the industry in which the company participates?

What trends suggesting future changes in the economic and technical characteristics are apparent?

What is the nature of competition both within the industry and across the industry?

What are the probable change with regard to technical, economic, social and political developments?

What is the range of the strategies available to any company is the industry?
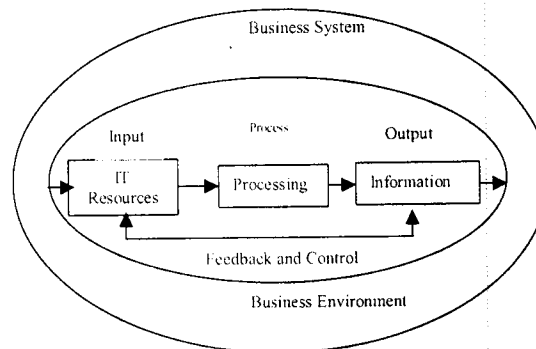
The business information system is represented in Fig. 2.2. The environment in the figure includes the internal and external environment of the business. The business information systems are to associated with other business systems to make more meaningful so that objectives of business can be achieved easily.

4.4. Functions of MIS:-

The MIS can be sub-divided into four categories each type of system is designed to cater two a specific requirement. The types are

The Main Functions are as:

(i) Transaction processing system.

(ii) Information providing system.

(iii) Decision support system.

(iv) Programmed decision-making system.

(v) MIS need proactive.

(vi) Financial and human resources.

(i) Transaction Processing System: These system are designed for processing day-to-day transactions occurring in the organisation. These system involves large volume of data and mainly help in the operation control area of the company.

(ii) Information Providing System: Attempt is made here to generate information to help decision-making activity. Starting with transaction processing system summary and exemption reports are produced. Summary reports are tabulation of detail by categories. Exemption reports provide information about deviation of actual from planned and indicate the reasons of deviations.

(iii) Decision Support System: This system is for improving that analytical capability of the decision maker. Attempt is made here to create an interaction model of a real life situation so that the decision-maker can interrogate the system for generation and evaluation of various alternatives.

(iv) Programmed Decision-making System: This involves creating system for programmed decision area, so that a decision is made by the system instead of a person. This required very clean specifications of the procedure.

(v) MIS System Need to be Proactive: MIS should anticipate change in the information needs of use accordingly adapt themselves to suit their needs.

(vi) MIS-Financial and human Resource: The MIS should be designed keeping in view the availability of financial and human resources to the business unit.

4.5. Characteristics or features of MIS:- MIS is a comprehensive co-ordinated set of Information Sub systems which are rationally integrated and transform data into information. In a variety of ways to increase productivity in conformity with the management style of working. Thus, the following are the main characteristics of MIS:-

(i) MIS is management oriented

(ii) MIS is management directed

(iii) MIS is integrated

(iv) Mis is common data base

(v) MIS is heavy planning elements

(vi) MIS is sub-system concept

(vii) MIS is flexible and easy in use

(viii) MIS is data base

(ix) MIS is distributed data processing (DDP)

(x) MIS is information resource

1. MIS is management oriented: This is the more significant characteristics of MIS. The system is designed from the top down. This does not mean that the system development starts from an appraisal of management needs and overall business objectives it is possible that middle management or operating management is the focus of the system, such that their needs are the cornerstone on which the system is built. For example, a marketing information system. Basis sales order processing, the shipment of goods to customers and the billing for the goods are fundamental operational control activities. However, if the system is designed properly, this

transaction information can be tracked by salesman, sale territory, size of order, geography and product line. Furthermore, if designed with strategic management needs in mind, external competition, market and economic data can be created to give a picture of how well the company's products are farming in their marketing environment and to serve as a basic of new product or market place introduction. The initial application can be geared to the operational and management control areas, but in such a way as not to preclude its integration into a strategic planning subsystem for upper management.

2. MIS is Management Directed: Because of the management orientation of MIS, it is imperative that management actively direct the system development efforts. Involvement is not enough, management must determine what information is necessary to improve its control of operations. It is rare to find an MIS where the manager himself or a high-level representative of his department is not spending a good deal of time in system design. It is not a one time involvement, for continued review and participation are necessary to ensure that the implemented system meets the specifications of the system that was designed. Therefore, management is responsible for setting system specification, and it must play a major role in the subsequent trade-off decisions that inevitably occur in system development. An important element of effective system planning is the process for determining the pointy off application development. Management must control this process if a management information system is the objective. A company without a formal application approved cycle and a management steering committee to determine priorities will never develop on MIS.

3. MIS is Integration. It is significant because of the ability to produce more meaningful management information. For example, in order to develop an effective production scheduling system, one must balance such factors as ·

(a) Set up costs, (b) Work force, (c) Overtime rates, (d) Production capacity, (e) Inventory levels, (f) Capital requirements, (g) Customer service.

A system that ignores one of these elements-inventory level for example is not providing management with an optional schedule. The cost of carrying excess inventory may more than offset the other benefits of the system. Integration, in the sense intended here means taking a comprehensive view or a complete picture look at the inter-locking sub systems that operate with him a company. One can start an MIS by attacking a specific subsystem but unless its place in the total system is realized and properly reflected, serious short-coming may result. Thus an integrated system that blends information from several operational areas is a necessary element of MIS.

4. MIS is Base. The integration concept of MIS there is an opportunity to avoid duplication and redundancy in data gathering, storage and dissemination. For example, Customer orders are the basis for billing the customer for goods ordered, setting up the accounts receivable, iniuating production activity, sale analysis, sales forecasting and so on. It is prudent to capture this data closest to the source where the event occur and use it throughout the functional areas. It is also prudent to capture it once and thus avoid the duplicate entry of source data into several systems. The development of common data flows is an economically sound and logical concept, but it must be viewed in a practical and internal procedures, may be better to live with a little duplication in order to make the system acceptable and workable.

5. MIS is Heavy Planning Element: Management information system do not occur overnight, take from three to five years and longer to get established firmly with him a company. Therefore a heavy planning element must be present in MIS development. The MIS designer must have the future objectives and needs of the company firmly in mind. The designer must avoid the

possibility of system obsolescence before the system gets into operation. Sound System planning is an essential ingredient to successful MIS. The MIS provides a meaningful direction towards which one strives.

6. MIS is Sub-System Concept. In tackling a project as broad and complex in scope as a management information system, one must avoid losing sight of both the forest and the tress. Even though the system is viewed as single entity, it must be broken down into digestible subsystem that can be implemented one at a time. The breakdown of MIS into meaningful subsystems set the stage for a prioritized implementation. This subsystem analysis is essential for applying boundaries to the problem thus enabling the designer to focus on manageable entities that can be assigned and computerised by selected system and programming teams.

7. MIS is Flexibility and Easy in Use. Despite a analysis of future management information needs, it is impossible to predict what is desired three to five years. This is true in most industries and especially in industries with rapid change patterns. It is native to think that anyone possesses the omniscience to predict the future. With this as a premise the next best thing as MIS developer can do in build in the flexibility to incorporate as many future nuances as possible. Even then, future happenings will sorely try the flexibility boundaries of the system. Building as MIS on a solid data base foundation is a good staring point for flexibility. A feature that often goes with flexibility is case of use. This means the incorporation of features that make the system readily accessible to a wide range of users and easy to use one they are ready to try it. The MIS should be able to incorporate the best of the improving user windows into the MIS data base.

8. MIS Data Base. The data base is the mortor that holds he functional systems together. Each system requires access to a master file of data covering inventory, personnel, vendors, customers, general ledger, work-in-progress and so on. If the data is stored efficiently and with common usage in mind one master file can provide the data needed by any of the functional system. It seems logical together data once properly validate it and place it on a central storage medium that can be assessed by the system.

9. MIS and Distributed Data Processing. The majority of companies implementing MIS have a geographic network of sale offices, distribution points, manufacturing plants, divisions, subdivisions and so on. Some of these entities are operated in a completely independent fashion and therefore may not be a part of the integrated MIS. More often than not, the remote sites do have a connection with each other and with a host operation. In order to create an effective MIS with geographic boundaries, some form of distributed data processing is necessary. DDP (Distributed Data Processing) can be thought of as the delivery system, placing information in the hands of those who need it when they need it. DDP is an important part of MIS.

10. Information as a Resource. Pervading the entire organisation must be concept that information is a valuable resource, particularly in the management control and strategic planning areas and must be properly managed. This is a subtle but important change in thinking. It was common in the past to view data processing as an entity into itself doing its own thing. The new outlook is that data processing. MIS is more than a support for the business; in many instances it is inextricably bound up in the business itself. One of the manifestation of IRM is the MIS will have a higher reporting relationship in the organisation and will become more a part of its executive committee.

4.6. Concept of MIS:-

Since MIS plays a very important role in the organisation, it creates an impact on the organisations functions, performance and productivity. The impace of MIS on the functions is in its management. With a good MIS support, the management of marketing, finance, production and personnel becomes more sufficient. The tracking and monitoring of the functional targets become easy. The functional managers are informed about the progress, achievements and shortfalls in the activity & targets. The manager is kept alert by providing certain information indicating the probable trends in the various aspects of business. This helps in forecasting and long term perspective planning. The managers attention is brought to a situation which is exceptional in nature, inducting him to take action or a decision in the matter. A disciplined information reporting system creates a structured <u>database</u> and a knowledge base for all the people in the organisation. The information is available in such a form that it can be used straight wawyh or by blending and analysis, saving the manager, some valuable time.

MIS creates another impact in the organisation, which relates to the understanding of the business itself. MIS begins with the definition of a data entity and its attributes. It uses a dictionary of data, entity and attributes respectively, designed for information generation in the organisation. Since all information systems use the dictionary, there is common understanding of terms and terminology in the organisation bringing clarity in communication and also a similar understanding of an event in the organisation. MIS calls for systemization of the business operations for an effective system design. This leads to streamlining of the operations, which complicate the system design. It improves the administration of the business by bring a discipline in its operations, as everybody is required to follow and use systems and procedures. This process brings a high degree of professionalism in the business objectives. Since the goals and objectives of MIS are the products of business goals and objectives, helps indirectly to pull the entire organisation in one direction towards the corporate goals and objectives by providing the relevant information to the people in the organisation.

A well designed system with a focus on the manager makes an impact on the managerial efficiency. The fund of information motivates an enlightened manager to use a variety of the tools of management. It helps him to resort to exercises such as experimentation and modeling. The use of computers enables him to use the tools and techniques, which are impossible to use manually. The ready made packages make this task simpler. The impact is one the managerial ability to perform. It improves the decision making ability considerably.

4.7. Limitations of MIS:-

(1)   MIS cannot replace managerial judgements in decision making. It is merely an effective tool for the managers in decision making and problem solving.

(2)   The quality of output of MIS is directly proportional to the quality of ijput and proce4sses.

(3)   MIS cannot provide tailor made information packages. It is requiredto analyze the available information before decision making.

(4)   In a fast changing and complex environment, 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 organisations where information is not being shared with other.

(8) MIS is less effective due to frequent changes in top management, organisational structure and operational staff.

4.8. Success and Failure of MIS:-

Most organisations use MIS more successfully than other organisations. Throught hardware, softward and technology available are the latest and the best, its use is more for the collection and storage of data and its elementary processing. There are some factors, which make MIS, a success while there are some factors, which make it a failure.

Factors contributing to success of MIS : If MIS is to be a success, then it should have all the features listed below:

- MIS is integrated into the management function. It sets clear objectives to ensure that MIS focuses on the major issues of the business. Also adequate development resources are provided and human & organisational barriers to progress are removed.

- An appropriate infor4mation processing technology required to meet the data processing and analysis needs of the users of MIS is selected

- MIS is oriented, defined and designed in terms of the users requirements and its operational viability is ensured

- MIS is kept under continuous surveillance, so that its open system is modified according to the changing information needs.

- MIS focuses on results and goals, and highlights the factors and reasons for non achievements

- MIS is not allowed to end up into an information generation mill avoiding the noise in the information and the communication system.

- MIS recognises that a manager is a human being and therefore, the systems must consider all the human behavioral aspects in the process of management.

- MIS recognises that the different information needs for different objectives must be met with. The globalization of information in isolation from the different objectives leads to too much information and its non use.

- MIS is easy to operate and therefore, the design of MIS has such good features which make up a user friendly design

- MIS recognises that the information needs become obsolete and new needs emerge. The MIS design, therefore has a potential capability to quickly meet newer and newer needs of information.

- MIS concentrates on developing the information support ot manage critical success factors. It concentrates on the mission critical applications serving the needs of the top management.

Factors contributing to failures : Many times, MIS is a failure. The common factors which are responsible for this are as follows :

- MIS is conceived as a data processing and not as an information system

- MIS does not provide that information which is needed by managers but it lends to provide the information generally the function calls. MIS then becomes an impersonal function.

- Underestimating the complexity in the business systems and not recognizing in the MIS design leads to problems in the successful implementation.

- Adequate attention is not given to the quality control aspects of the inputs, the process and the outputs leading to insufficient checks and controls in MIS

- MIS is developed without streamlining the transaction processing systems in the organisations.

- Lack of training and appreciation that the users of the information and the generators of the data are different, and they have to play an important role in the MIS.

- MIS does not meet certain critical and key factors of its users, such as a response to the query on the database, an inability to get the processing done in a particular manner, lack of user friendly system and the dependence on the system personnel.

- A belief that the computerised MIS can solve all the management problems of planning and control of the business.

- Lack of administrative discipline in following the standardized systems and procedures, wrong coding and deviating from the system specifications result in incomplete and incorrect information.

- MIS does not give perfect information to all the users in the organisation. Any attempt towards such a goal will be unsuccessful because every user has a human ingenuity, bias and certain assumptions not known to the designer. MIS cannot make up these by providing perfect information.

4.9 Summary:-

The business information systems get data and other resources of IT infrastructure as inputs from the environment and process them to satisfy the information needs of different entities associated with the business enterprise. There are systems of control over the use of IT resources and feedback system offers useful clues for increasing the benefits of information systems to business. The business information systems are sub-systems of business system and by themselves serve the function of feedback and control in business system. Information is the life blood of an organization, particularly in the case of system approach management.

MIS is a comprehensive co-ordinated set of Information Sub systems which are rationally integrated and transform data into information. In a variety of ways to increase productivity in conformity with the management style of working. Thus, the following are the main characteristics of MIS:- MIS is management oriented, MIS is management directed, MIS is integrated, Mis is common data base, MIS is heavy planning elements, MIS is sub-system concept, MIS is flexible and easy in use, MIS is data base, MIS is distributed data processing (DDP),MIS is information resource. The impace of MIS on the functions is in its management. With a good MIS support, the management of marketing, finance, production and personnel becomes more sufficient. The tracking and monitoring of the functional targets become easy. The functional managers are informed about the progress, achievements and shortfalls in the activity & targets. The manager is kept alert by providing certain information indicating the probable trends in the various aspects of business.

4.10Technical Terms:-

1. Approach : to come near or nearer to; to be like or similar to; approximate; to make advances, a proposal, or a request to; to begin dealing with

2. Pertinent : having some connection with the matter at hand; relevant; to the point

3. exited : an actor's departure from the stage; a going out; departure; **3** a way out; doorway or passage leading out

4. dimensions : any measurable extent, as length, width, depth, etc.:

5. Stimulate : to rouse or excite to action or increased action; animate; spur on; to invigorate or seem to invigorate, as by an alcoholic drink; *Med., Physiol.* to excite (an organ, part, etc.) to activity or increased activity

6. Sophisticated : not simple, artless, naive, etc.; urbane, worldly-wise, etc. or knowledgeable, perceptive, subtle, etc.; designed for or appealing to sophisticated people; highly complex, refined, or developed; characterized by advanced form, technique, etc.

7. Dynamically : relating to an object, or objects, in motion: opposed to; energetic; vigorous; forceful

8. Immense : orig., unmeasured; limitless; infinite; very large; vast; huge

9. Philosophy : orig., love of, or the search for, wisdom or knowledge; theory or logical analysis of the principles underlying conduct, thought, knowledge, and the nature of the universe: included in philosophy are ethics, aesthetics, logic, epistemology, metaphysics, etc. ; the general principles or laws of a field of knowledge, activity, etc.

10. Database : a large collection of data in a computer, organized so that it can be expanded, updated, and retrieved rapidly for various uses

4.11 Self Assessment Questions

1. What is Management Information System? Explain the functions of Management Information System?

2. Explain the features of MIS?

3. Explain the concept of MIS?

4. What are the disadvantages of MIS?

5. Explain about success and failures of MIS?

4.12 Reference Books

1. CSV. Murthy – Management Information Systems

2. VARMA & AGARWAL – Management Information System

- S.PRABHAKAR

LESSON - 5

MIS AND ITS IMPORTANCE

5.0 Objective:- This lesson is mainly consist of MIS and its importance such as Transport and communication, Heavy industry and chemicals, Small-scale industry, Health-care, Tourism, Hospitality industry, Education and research, Oil exploration, Space exploration, Weather forecasting, Market analysis, Financial planning, Production planning, Human resource management.

Structure:-

5.1 MIS AS A CORPORATE RESOURCE:-

Information is knowledge which is used by management for the purpose of reducing uncertainty regarding the alternative course of Action, in the process of decision making which the prime concern of top management. Reliable information is very useful in making judicious decision. No doubt, reliable information is considered as an important corporate resources, information is a source of competitive strength which enables the management in encountering its competitors.

The corporate information resource should focus on the following aspects:

(i) Value added Resources. Like Ram materials which are converted into finished product after processing same is true about information here too data are converted into information, thus it adds value to the resources.

(ii) Specific Costs. Every information if is taken from external source needs cost sacrifice.

(iii) Information is Shared. No business in the present set up cannot be seen by an individual thus all contribute something for the <u>attainment</u> of goals of the corporate thus, everybody in the organisation try to contribute to the corporate stock of information.

(iv) Risk Factor. In the modern complex situation business is associated with so many unforeseen risks, therefore, it is stressed that these be properly stored and kept for future.

(v) Out of Date Information. One always sees challenges and change in business thus, information collected be used as soon as possible as the seem can be out of date (obsolescence).

2.2 MANAGERIAL EFFECTIVENESS AND INFORMATION:-

No one can deny that a manager is responsible for effectiveness and efficiency in performance. Thus, it is true that a manager is associated with his prime functions which he is supposed to discharge thus a manager can work efficiently and effectively if he knows:

(a)   The goals to be achieved

(b)   His role in the organisation

(c)   Problem that may upset his operational working

(d)   That is committed to achieve the objectives

(e)   Know the work-in-progress

(f)   That he is the final man for results.

Thus, to have a command over all the above aspects the manager should understand the environment: internal and external which effect his action.

Tools of information technology can help a manager keeping him aware of the environment. As intense competition and pressure on pricing are becoming standard elements of an operating environment, perfect information regarding the market and role of various forces that influence the market are becoming critical for survival of a business enterprises.

Information Needs at Different Levels of Management. Every manager in an organisation performs various functions for which the requires information to facilitate decision making in relation to each area of his responsibility. No doubt, there are different types of users of information available to a business unit, the manager is the most frequent user of corporate information resource. Therefore, the main focus of the information generation process should be on the information needs of the manager.

The different level of management needs diffeent source of information, to explain it:

(i) Top Management. The top level management is associated with business planning and policy training andhave no role in routine working.

(ii) Middle or Lower Level Management. This level of management is associated with the responsibility of execution on the plans and policies as suggested by top management. <u>Decision-making</u> is, however, control as the job profile of Manager. On each level of management information are needed the top level needs external environment information. The middle order level needs summarized form of external environment information. On the other hand, Information with regard to internal environment i.e. information about activities and events with the organisation.

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It is generally accepted that internal information should be increasingly summarised for the successive levels of management for which it is prepared. Fig. 2. Illustrates sources and degree of summarisation of information for different level of management.

3.3 IMPORTANCE OF STUDY OF MIS:-

No one can underrate the study of MIS in the present competitive business environment. MIS is needed to computer science and management professionals. For a computer student : he needs compilers and operating system such as data structure and algorithms, file structure and database management (D.B.M.) programming, languaging and code generator, artificial intelligence and expert systems.

Management Student. Who is through a course of study of management will not do much if he is not well-versed with computer. As a course of MIS is a combination of many subjects in computer science, which helps a management student in developing information system. The other areas where computers are making remarkable contribution are as:

(1)   Transport and communication.

(2)   Heavy industry and chemicals.

(3)   Small-scale industry.

(4)   Health-care.

(5)   Tourism.

(6)   Hospitality industry.

(7)   Education and research.

(8)   Oil exploration.

(9)   Space exploration.

(10)   Weather forecasting.

(11)   Market analysis.

(12)   Financial planning.

(13)   Production planning.

(14)   Human resource management.

Thus, a basic knowledge of information system is almost becoming a generic skill needed by every professional. To the top management, MIS is a tool to gain insight into the overall health of the organisation itself.

The recent information revolution has pushed information systems to the centre-stage of modern management. Getting a competitive advantage, balancing market strengths, increasing market shares, acquiring more attractive finances, introducing new products and services, reaching out to more customers and quickly gaining customer preferences, etc. are all made possible in numerous ways by the introduction of information technology. The Airline Reservation System (SABRE) of American Airlines [1], the OTISLINE Maintenance Management System introduced by OTIS elevators [2], the Railway Reservation System of the Indian Railways, the Consignment Tracking

System developed by Blue Dart [3], The Market Map System introduced by Hindustan Lever, the Voice of Sankara, an innovative marketing of religious service of the saintly person Kanchi Sankaracharya, are just a few examples of information systems that create new business or change the way of doing business. The Internet, which is emerging as the largest commercial market in the world, the planned Information Highway, the electronic trading system introduced at the National Stock Exchange [4], and Video on Demand service being introduced in select counties in the US are some other examples which are likely to significantly change the life style of humanity at large. Obviously, understanding the working and appreciating the impact of information systems or the contemporary and future business are prerequisites to the education of today's computer science and management student. It is important that contemporary managers be kept abreast of current developments that have potential impact on future business. In short, the study of management information system is extremely vital in today's context.

5.4 TYPES OF INFORMATION AND PROCESS OF GENERATION OF INFORMATION

The type of decision needs different types of information. Information which are needed at different level of management can be:

(a)   Operational information

(b)   Tactical information

(c)   Strategic information

(a) Operational Information. Operational information's are such informations which refers to the everyday day needs to the organisation which are needed for control over business activities these are known as routine activity or repetitive in nature. These activities are controlled at lower level managements. The information regarding the cash position on day-to-day basis is monitored and controlled at the lower levels of management. Similarly, in marketing function, daily and weekly sales information is used by lower lever manager to monitor the performance of the sales force.

(b) Tactical Information. Tactical information help middle level managers allocating resources and establishing controls to implement the top level plans and policies of the organisation. For example (i) information regarding the alternative sources of funds and their uses in the short run, (ii) opportunities for deployment of surplus funds in short-term securities, etc. The tactical information is generally predictive, focusing on short-term trends of the business unit. It may be partly current and partly historical, and may come from internal as well as external sources.

(c) Strategic information. Of course the operational information is needed to find out how the given activity can be performed better, stratgegic information is needed for making alternative choices among the business options. The strategic information helps in identifying and evaluating these options so that a manager makes informed choices which are different from the competitors and the limitations of what the rivals are doing or planning to do. Such choices are made by owners of the business. Strategic information is used by managers to define goals and priorities, initiate new programmes and develop plans and policies for acquisition and use of firms resources. Such as information regarding the lone-term needs of funds for on-going and future projects of the company may be used by top level managers in taking decision regarding going public or approaching financial institutions for terms loan. Strategic information is predictive in nature, relies heavily on external sources of data, has a long-term perspective. It is believed that strategic information are basically information regarding the external environment. However, it is now well recognised that the internal

factors are equally responsible for success or failures of strategies and thus, internal information is also required for strategic decision making.

The difference lies in the proportion of each type of information in the total information needs of managers at different levels of managerial hierarchy.

Process of Generation of information. The process of generation of information involves a series of activities. Which may be.

(a) Data Acquisition

(b) Data Transformation

(c) Management of Information

(a) Data Acquisition. Data are facts expressed with the help of symbols such as alphabets, digits, graphs, diagrams, pictures, etc. Data may describe an event or it may represent status of an element of the environment. Whatever may be the source of data, it may be initially recorded and later verified for accuracy and authenticity. This activity is called data captured.

Data may be captured by punching with keyboard or scanning with scanning devices, facts from documents on which they were recorded. In case data are already recorded on computer media such as a disks and tapes, data capture may take place by selecting the relevant part of that recording for meeting the data needs for the purpose on hand. Data may also be captured regarding the state of affairs on industrial process with the helps of various sensing devices. As data capture and storage have a cost, it is necessary to be selective in capturing data.

Most of the data captured for business information systems are organised in data files. Each file contains records relating to various data elements (fields) expressed with the help of different symbols (characters).

(b) Data Transformation. Data transformation may be done by performing any of the following operations on data:

(i) Re-arranging, (ii) Classifying, (iii) Calculating, (iv) Summarizing

(i) Rearranging: Rearranging data in some specified order is a very common data processing activity. For example, data regarding stores may be rearranged in order of data of purchase or in order of value of each unit or in the alphabetic order of names of these items. Such a rearrangement is also know as sorting of data. Sorting may add to the usefulness of data.

(ii) Classifying: Data may be classified on the basis of the selected variables/factors. For example, sales data may be classified on the variables like customer's code, city, product or sales person involved in obtaining order. Classification is also a commonly used data processing operation, particularly in accounting information system. In fact, the whole concept of ledger is based on classification.

(iii) Calculating: Data is processed only by calculating. A series of calculations performed on numeric values is called computation. That is, perhaps, how computers aimed got their name, as earlier generations, of computers aimed at providing computing facilities. Even, as the diverse forms of data can now be processed with the help of computers, the process of generation is predominantly computing. Calculating involves performing arithmetic operation (like addition, subtraction, multiplication, division and logic operations). For example, financial ratios may be calculated by performing arithmetic operation on various values in financial statements.

(iv) Summarising: Summarising is a process of aggregating various data elements, reducing the bulk of data to a more meaningful form. For example, a finance manager may be interested in knowing the total number of shares applied for in a public issue. The data in thisregard may be summarised and such summary report may be more useful to him than the entire statement giving details of each share application received.

Summarising is a short narration for each class of share applications received, i.e. individual, corporate body, trust, etc. or number of shares applied for in etc.

(c) Management of Information. Once acquisition and/or transformation is done the processed data may be either communicated to end user or may be stored for future sake. When the information is to be communicated to the user, the format for the reporting may include simple columnar/ tabular format or visual formats, such as charts, diagrams, graphs, etc. With the availability of faster computers and better display devices, information mapping and visualisation techniques are becoming popular. In case the information generated is to be used in future it may be stored on some mass storage medium. Such activities of communicating and/or storing information may be termed as managing information.

5.5 Objectives of MIS:-

An effective MIS has the following objectives:

(a) Facilitate the decisions-making process by furnishing information in the proper time frame. This helps the decision-maker to select the best5 course of action.

(b) Provide requisite information at each level of management to carry out their functions.

(c) Help in highlighting the critical factors to the closely monitored for successful functioning of the organisation.

(d) Support decision-making in both structured and unstructured problem environments.

(e) Provide a system of people, computers, procedures, interactive query facilities, documents for collecting, storing, retrieving and transmitting information to the users.

5.6 Design of MIS:-

While designing a management information system, a general approach has to be followed so that a suitable system can be devised to cater to the needs of different organisation as per their functions and decision making requirements. Irrespective of the organisation in question, the data gets generated at various levels of the management. These data when processed and analyzed become information which, when properly communicated in time to the decision-maker, helps in making decisions and taking actions.
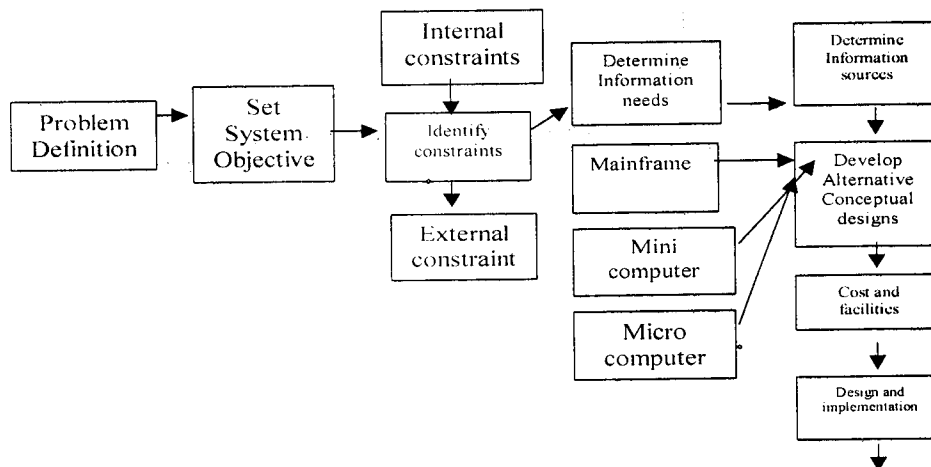
The following steps are generally taken in the design of an MIS:

(a) Identifying Information needs at all levels of management: There are problems in every growing business organisation, but most of the time a clear definition of problems and a priority system for their solution is not known. Thus, as a first step in MIS design, the management should identify, in detail, the problems to be solved.

(b) Listing objectives of MIS and anticipated benefits: The users must define the system objectives in terms of information demands. For example, in several government departments, prior to the designing of an information system, the system objective was the automation of hundreds of reports without looking at the management of tasks related to functional or resource system represented by the report. These are training needs, employee relations, safety, recruitment, staffing.

Such attention is possible only by automation of records or processing of existing data, otherwise the true objectives of the organisation represented by the system are overlooked. They system objective should be defined in terms of what a decision-maker can do and how effectively he would be able to function after his information requirements have been complied with. The basic questions which are asked, while listing down the objectives of the MIS system design are :

    (i)   What is the purpose of the system?

    (ii)   Why is it needed?

    (iii)   What is it expected to do?

    (iv)   Who are the users and what are their objectives?

(c) Identifying systems constraints (internal and external): The systems constraints are also called problem boundaries or restrictions under which objectives may be achieved. These constraints (or limitations) in the design of the system are the creation of the manager-user or the designer himself, because of his limited freedom of action in designing a system, to achieve the objectives.

The internal constraints are viewed in terms of :

    (i)   top management support

(ii)   organisational policy

(iii)   manpower needs and availability

(iv)   cost and resource

(v)   acceptance

The external constraints are mainly concerned with the customer. Ordered entry, billing and other systems that interface with the system of the customer must be designed with the customer's need in mind.

(d) Determining information needs and resources : The system design must begin with degermining the real information needs of the management: information that can increase the perception of managers in critical areas such as problems, alternatives, opportunities and plans. In other words, if a decision maker can define his objectives and spell out the items of information that are needed to attain the objectives, then he/she is at least half way through in a good system design.

A decision maker needs information for a variety of reasons concerned with the management process. The type of information which is required at various times and for various purposes depends on two factors:

(i)   Personal managerial attitudes like knowledge of information systems, managerial style, perception of information needs, etc. of the individual manager.

(ii)   Organisational environment like nature of the company, level of management, structure of the organisation.

After estimating the need of information and clearly defining the objectives, the next step in MIS system design is to determine the sources of information. The sources of information may be categorized as follows :

(i)   internal sources: It is in the form of written materials like file records, letters, reports containing information about the existing system etc.

(ii)   external sources : It may be in the form of trade and government publications, personal interviews of managers and personal interaction with decision makers.

(e) Developing alternative conceptual design and selecting one : the conceptual design of MIS is considered as a skeleton of the MIS, which guides and restricts the form of the detailed design. The concept of design of an MIS consists of patterns of information flow, channels of information, role of decision makers and competitors etc.

The alternative concepts of a system can be evaluated on the basis of the following:

(a) compare anticipated performance of the conceptual design with respect to objectives of the system developed earlier;

(b) for quantified comparison amongst systems, prepare a preliminary cost-effectiveness data for the system;

(c) examine the quality of databases and information to be made available. Study the number of operations, dispersions, and duplications files and potential breakdown points;

(d) expand the conceptual designs in greater detail if none of these provide a preferred design.

(f)   Preparing the conceptual design report: The conceptual design report is a proposal prepared for the expenditure of funds and possible changes in the organisational set-up. Since this report is submitted to management, it must contain the summary of problems that necessitate the system, the objectives, the general nature of the system, reasons why this concept was selected over others, and time and resources required to design and implement the system.

7. Implementation of MIS:-

Before installing a new MIS in any organisation, it is desirable to know whether there is already an old MIS in operation. If so, then the old system is allowed to operate in parallel, till the new system is fully operational. The implementation plan involves the following steps:

(a) Preparing organisational plans

(b) Planning of work flow

(c) Training of personnel

(d) Development of software

(e) Acquiring computer hardware

(f) Designing the format for data collection

(g) Construction

(h) Operation of old and new systems in parallel

(i) Phasing out the old and inducting the new system

(j) Evaluation, maintenance and control of the new system.

The outline of implementation phase of an MIS is shown in the fig. Below.
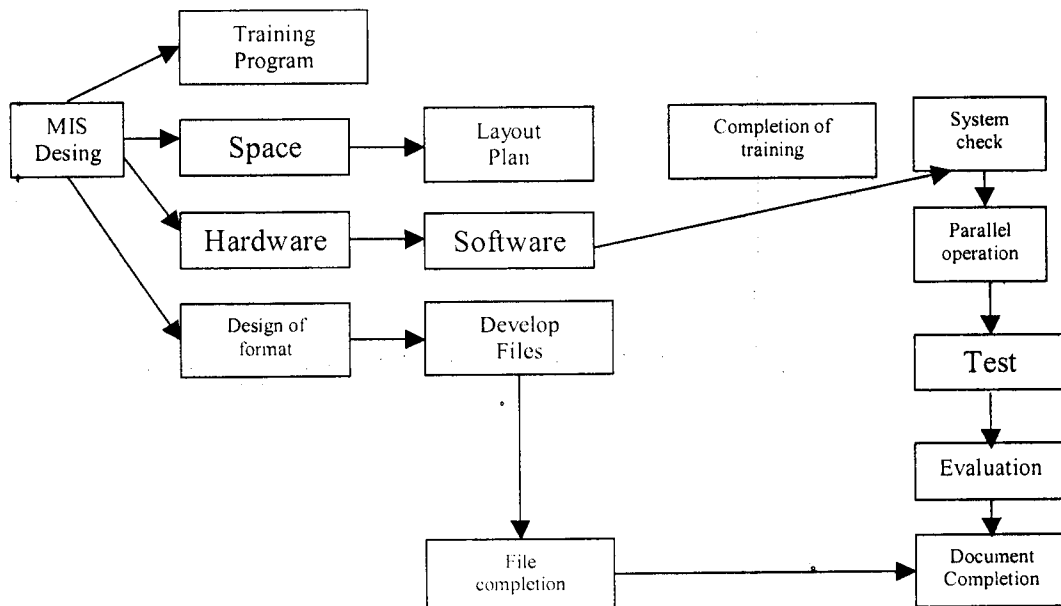
8.8 Approaches of MIS development:-

There are seven approaches, which are used for developing MIS :

(1) **Top down approach**: This approach develops 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 approach** : It consists of following five steps :

   (i) Individual functional applications are planned separately consisting of transaction processing, updating of files and simple reports.

   (ii) Files of various functional applications are integrated by means of indexing and chaining into a database.

   (iii) Various functions are added to operate on the database at management control level.

   (iv) Integration of models into a model base having a wide variety of analysis, decision and planning models.

   (v) Strategic planning data and planning models are added to the information system.

(3) **Integrative approach**: This approach permits managers at all levels to influence the design of the information system. Here evaluation, modification and approval of top management continues, till a final design is acceptable to all levels.

(4) **Traditional approach**: Here 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 by MIS professionals during each stage of processing, in order to ensure accuracy and completeness.

(5) **Prototyping approach:** In order to avoid any possible delay, prototyping approach is used. The goal is to develop a small or pilot version, called a prototype, which is built quickly and at lesser cost with the intention of modifying it when need arises.

(6) **End user development approach :** With the increasing availability of low cost technology, end use 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 systems for users. In a very small organisation, no MIS professional will exist. This does not mean that they cannot develop management information systems. They develop systems using the following steps:

   (a) Identify reuirements.

   (b) Locate, evaluate and secure software development

   (c) Locate, evaluate and secure hardwares

   (d) Implement the systems.

9.9 Strategic MIS:-

Strategic MIS is the set of systems which are considered critical to the current or future business competitiveness, and hence the survival of an organisation. Strategic MIS also supplies an organisation with business intelligence. In other words, if an information system is used in creative ways to achieve goals and fulfill set organisational missions, it can be considered to be a strategic MIS.

Strategic MIS can be external or internal systems. External strategic MIS are used mainly by external quantities in the business environment, such as customers, suppliers, distributors etc and have a value added component that gives developers some time to reap the benefits of the system innovation. Internal strategic MIS are used by employees within the organisation and do not have value added component. The employees focus on issues such as improving the quality of products, services and also enhancing the decision making capabilities of managers. Such systems are used at all levels in the organisation and they have long term implications for the firm and also for the business processes within the firm.

In general, Strategic MIS can be divided into 3 categories :

(a) systems that focus on innovation fro competitive edge

(b) systems that use information as a weapon

(c) systems that increase productivity and lower the costs of goods and services

5.10 Barriers:-

Researchers, Chris Kemerer and Glen Sosa, both from the Sloan school of management, identified 12 barriers to successful development of SMIS. These barriers fall into 3 categories:

(a) Problem definition

(b) Implementation

(c) Maintenance

Problem definition barriers

- Generating workable idea require leadership and team 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 required inter organisation 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 organisational flexibility are likely to face one or more of the above mentioned barriers.

5.11 Summary:- No one can underrate the study of MIS in the present competitive business environment. MIS is needed to computer science and management professionals. For a computer student : he needs compilers and operating system such as data structure and algorithms, file structure and database management (D.B.M.) programming, language and code generator, artificial intelligence and expert systems.

While designing a management information system, a general approach has to be followed so that a suitable system can be devised to cater to the needs of different organization as per their functions and decision making requirements. Irrespective of the organization in question, the data gets generated at various levels of the management. These data when processed and analyzed become information which, when properly communicated in time to the decision-maker, helps in making decisions and taking actions.

There are seven approaches, which are used for developing MIS: Top down approach, Bottom up approach, Integrative approach, and Traditional approach etc. Strategic MIS is the set of systems which are considered critical to the current or future business competitiveness, and hence the survival of an organization. Strategic MIS also supplies an organization with business intelligence. In other words, if an information system is used in creative ways to achieve goals and fulfill set organizational missions, it can be considered to be a strategic MIS. Researchers, Chris Kemmerer and Glen Sosa, both from the Sloan school of management, identified 12 barriers to successful development of SMIS. These barriers fall into 3 categories: Problem definition, Implementation, Maintenance

5.12 Technical Terms:-

1. Attainment : an attaining or being attained; anything attained, as an acquired skill; accomplishment

2. Decision: the act of deciding or settling a dispute or question by giving a judgment; the act of making up one's mind

3. Making   : the act of one that makes or the process of being made; formation, construction, creation, production, composition, manufacture, development, performance, etc.

4. Anticipated : to look forward to; expect; to make happen earlier; precipitate; to prevent by action in advance; forestall

5. Acquiring : to get or gain by one's own efforts or actions; to come to have as one's own; get possession of

5.13 Self Assessment Questions

1. Explain the importance of MIS and types of information?

2. Explain the design of MIS and objectives of MIS?

3. How the MIS will be implemented? Explain?

4. What are the different types of approaches in MIS and explain the Strategic of MIS?

5. Explain how the process of generation of information?

5.14 Reference Books

1. CSV. Murthy – Management Information Systems

2. VARMA & AGARWAL – Management Information System

- S.PRABHAKAR

LESSON – 6

DATA PROCESSING METHODS

6.0 Objective:- This lesson is mainly deals with the data processing through the computer, means how the data will be collected from various sources & how it will be processed in the computer and how the out put will show on the monitor not only that it also deals with the Electronic data processing, data processing in the earlier phase and next phase and also the evolution from EDP to MIS.

Structure:-

6.1 Introduction

6.2 Computer Operation

6.3 Merits of Electronic Data Porcessing (E.D.P.)

6.4 DATA PROCESSING THE EARLY PAHSE

6.5 DATA PROCESSING THE NEXT PHASE

6.6 EVOLUTION FROM EDP TO MIS

6.7 DATA BASE LANGUAGES

6.8 Summary

6.9 Technical Terms

6.10 Self Assessment

6.11 Reference Books

6.1 Introduction:-

Data are raw facts. When organised and presented properly, they become information. Turning data into information involves several steps. These steps are known as *data processing*. This section looks at data processing and the use of computers to do it easily and quickly.

The diagram below shows a simplified view of the procedure for turning data into information. Data, in a range of forms and from various sources, may be entered into a computer where it can be manipulated to produce useful information (output).
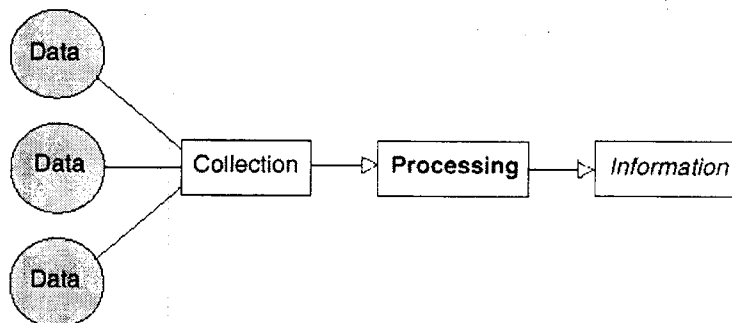
6.2 Computer Operation:- In modern times most organisations carry out business transactions on electronic data processing. The accurate recording and processing of these transactions is knows as data processing.

Automation of Manual System. With the increase in <u>complexity</u> and size of business organisation grow, so did the transactions processed. Manual system were then developed to record the transactions on documents. These documents were subsequently processed by the clerical staff to produce ledgers <u>reflecting</u> the impact of transactions of documents, and their impact on management, Example : cash and bank balance, <u>inventory</u> level.

With the passage of time, business activity being often uneven, clerks were <u>saddled</u> with backlog of transactions to be posted; the net result is loss of vouchers. Lot of time is wasted to located the errors. With the increase in size and volume of business operation the manual system began to break down, this hampered management in the primary task of planning and control. In western countries clerical costs also began to rise, there was a need to check the clerical costs low and to increase the efficiency of processing transactions. A genuine need was felt to mechanized data processing (D.P.)

The mechanized calculators were invented to facilitate and accurate calculation, thus other equipment such as : unit record equipments, card readers, sorters, collators, accounting machines and listing machines performed various tasks to enable organisations to do data processing.

In sixties and seventies computers were introduced for processing transactions. There computers offered imput/output peripherals which were rugged and could handle large volume of data. Computers of previous years were lacking many facilities in comparison to modern computers.

Business activities such as payroll accounting, financial accounting. Stores accounting and processing of dividend warrants.

6.3 Merits of Electronic Data Porcessing (E.D.P.):- All over the work business men have realised that they could computerize the business transactions processing task quickly by standard software. The following are uses of software are as:

(i) Minimised delays. In computerised processing. Data <u>capture</u> and preparation were labour <u>intensive</u> while data processing and computerised. The uneven transaction load of individual departments when <u>pooled</u> together evened the load of data entry. This led to minimizing the delays on account of data preparation. Punched cards provided a convenient form of data input. Data/ information and programs punched in cards were then transmitted through a high speed card reader into a computer for processing. Thus, organisations found that their invoices could be sent a few days earlier to the customers, pay cheques could be delivered at the end of the month, and a stores ledger produced within two or three days of the month end.

High speed card readers and line printers were found to be more rugged and reliable compared to equipments like typewriters used in manual processes. The advent of preprinted stationery and multiparty stationery made the task of generating various types of reports/invoices even easier.

(ii) Improved accuracy. In manual systems, accuracy is low because of computations, errors and inability to process some transactions of errors committed due to fatigue in repetitive clerical tasks. Since standard software was developed for data processing systems, it was possible to make its logic error free. It ways also possible to build in various types of error-checking procedures

to ensure that data entering the system for processing was error free. Various elaborate procedures were used to ensure processing of all the transaction that were generated. The question of fatigue in repetitive tasks did not arise. It was also noticed that computers are not susceptible to distractions such as phone calls, gossip or liziness that humans are prone to experience.

(iii) Lower Clerical costs. In the developed countries where clerical manpower is costly and computer hardware and software relatively cheap, organisations have found that they can cut down on clerical costs by computerised transaction processing. In these countries, organisations have been able to retrench manpower which became surplus because of automation. Over the yeas, hardware and software have become cheaper, and the clerical wage rate has gone up, making computerised data processing an attractive proposition. Many new devices like cheque reader, sorter and document reader have been developed to make data processing more efficient and less expensive.

In developing countries like India, the economics of data processing is against computerisation. Clerical manpower is cheap and the hardware and software comparatively expensive. Yet, data processing has taken roots because there is an unmistakable trend towards increasing manpower cost and reducing hardware prices. Moreover, the producftivity of clerical manpower has been going down. Although organisation have not been able to refresh labour, they have been able to absorb the surplus in other departments or in the data preparation unit. Because of high mobility and lack of trained manpower, such people could eventually leave for other organizations. The prime motive in recent years for data processing use in the Indian industry has been to keep the clerical work force as small as possible.

(iv) Ability to cope with future growth. Growing organisations have also found, in recent years, that computers enable them to cope with future growth easily, without having to expand the clerical work force. They here also observed that the cost of data preparation and entry naturally goes up with the increase in the volume of transactions, but the processing cost on the computers does not go up in the same proportion.

6.4 DATA PROCESSING THE EARLY PAHSE:-

For a decade, in the sixties, the main activity of the computer centre in an organisation was to perform data processing tasks. The data processing departments were usually created within the finance and accounting function and, therefore, most of the applications taken up for computerised processing related to accounting. Computerised systems for financial accounting, stores accounting, processing of dividend warrants, payroll accounting, etc. became very popular. The technology available at that time supported these applications very well because the input-output peripherals with the early generation computers were very fast and rugged.

Most of these data processing systems allowed the organisations to maintain an up-to-date status of their account books in various spheres of activities. However, since the early computers were batch processing machines, there was some delay inherent in processing transactions on these machines. The time taken to key punch and verify batches of data and to schedule a particular job for processing meant that the data processing operations were done in a cycle which could have been a month, a week or even a day. However, the technology did not allow this cycle to be shorter than a day. Thus, the status reflected in computer files was always a few days old, and could not be used for any operational purpose. Its best use in a managerial sense could only have been apost-mortem, but the way in which such data was presented usually did not meet the needs of analysis and classification for a manager.

6.5 DATA PROCESSING THE NEXT PHASE:-

After the early phase, the data processing systems have evolved in two directions :

1. Because of technological improvements, it became possible to capture transactions as and when they arose in the operations rather than to batch them and capture them in a cycle.

As the management was professionalising with the spread of management education, more and more managers wanted to make their planning and monitoring decisions on the basis of analysis of data. They found that much of the data captured in routine data processing could also be the ideal source for supporting their data analysis needs. Thus, demands were made on the data processing system to generate reports in a regular and routine fashion to support operational and management planning and control.

(i) Data capture at source. The advent of time-shared multi programmed systems and the ability of linking remote terminals with such systems made it possible to curtail the processing cycle and facilitate virtually instantaneous retrieval and updating of data. Large databases could be created, updated and queried from remote terminals. Such systems allowed terminals to be placed at the location where a clerical or manual processing of transaction was taking place. In addition to the hardware and the right type of operating software, other software such as database management systems and transaction procession systems were developed, and this facilitated processing and transactions in real time. These systems, which allowed instantaneous retrieval, could be used to maintain both the financial and the physical status. Thus material systems in which up-to-date balances could be seen on the terminal, were developed and the need for manual cardex system was totally eliminated. Similarly, on the shop floor, the work order, the job order, and the process of daily scheduling were totally automated. Since the manual proformas and the manual records like bin cards were eliminated, it also became easier to integrate data with functional departments. Such data were physically no more within the departments where transactions were processed but were now available on a central database from where they could be accessed easily by any department.

(ii) Integration with functional departments. The recognition of the fact that many management planning tasks had to take an integrated view of several functions gave rise to integrated systems. Figure shows an integrated production planning, consting and material control system. Figure shows an integrated production planning, costing and material control system. Access to integrated data on centralized computer systems further facilitated this integrated approach. Such systems were developed in the seventies and dominated the data processing scene for a decade.
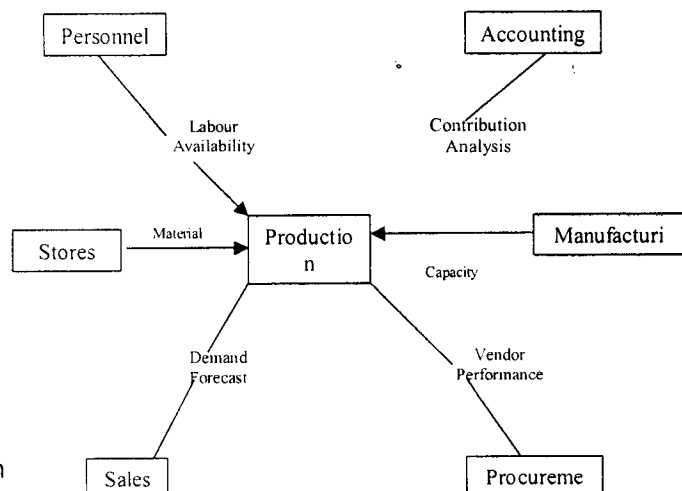

Fig. An Integrated information system

(iii) Distributed processing. With the advent of powerful microcoputers and the linkage between computers and communications, many organisations set up computer systems with intelligent remote terminals connected to a large central computer system with increasing intelligence in the terminals and subsequent up gradation of such terminals to full fledged microcomputer systems, much of the processing was done locally. This eliminated the need for frequent access to data in a non routine fashion through programs and software directly under his control.

Figure for instance, illustrates a distributed system for stock control. Here, an integrated materials database is maintained on a central computer. This can be queried from local/ remote <u>terminals</u> on products and suppliers. However, distributed computers are used to support daily operations of issue control and stock status data on the central computer is updated at the end of the day.

Units with local intelligence

Local terminals

Periodic
Manage
ment
reports

Daily access
And update

Central Computer

Integrated
Data base
On materials

Local
Data
On-stock

Flexible
Analysis for
Local needs

Data base
enquiry on
products
and
suppliers
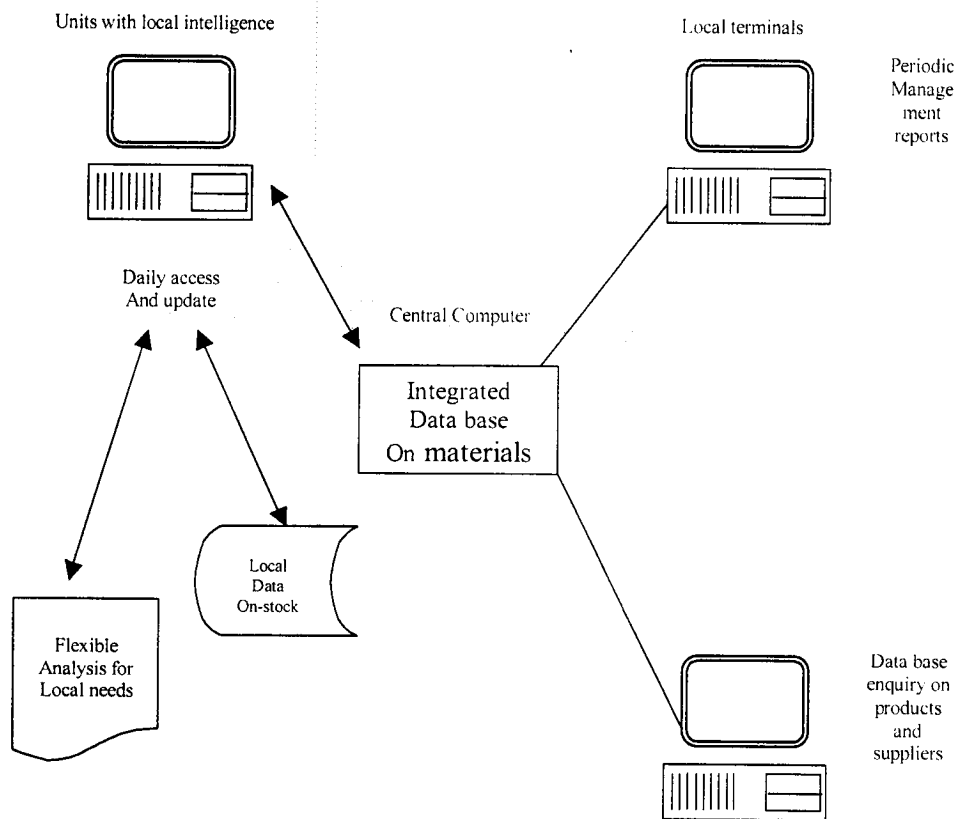
Fig. An example of distributed processing

6.6 EVOLUTION FROM EDP TO MIS:-

With the technological evolution leading to distributed computing, there was another evolution in terms of providing information support to many more managerial tasks than was being done earlier. Many data processing systems captured data from the basic transactions in a company. Thus, data was captured from invoices, stores issue and receipt vouchers, payment and receipt vouchers, job orders and work orders-virtually all the basic transactions that take place in an organisation.

6.7 DATA BASE LANGUAGES:-

There are many languages which are used in the data. Base system. The important one are as:

(i) Schema Description Language, (ii) Sub-schema Description Language, (iii) Physical Data Description Language, (v) Security Control Facilities, (vi) Data Dectionary, (vii) Programming Language, (viii) Telephone Processing Facilities, (ix) Data-base interrogation facilities.

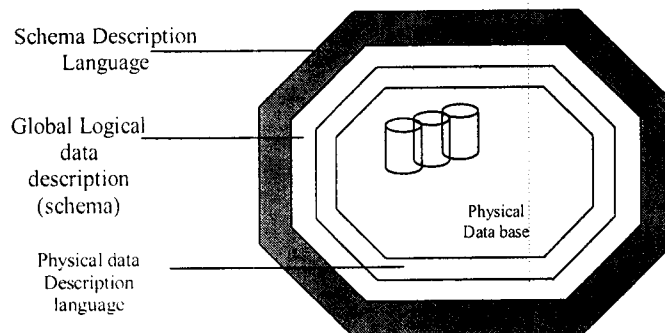**(i) Schema Description Language.** The data-base management system uses the data descriptions to derive the global logic records from the physical records and to derive the records required by the application programs from the global <u>logical</u> records. The schema description language could be :

(a) Data Declaration facility in the application programming language ossibly an extension of the Data Division of COBOL or the DECLARE statements of PL/I.

(b) A facility provided by the data base management system, which is independent of which host programming language used. IMB's for example, provides this host independent usb-schema description facility in its program specification block.

(c) An Independent data description language which could be employed by any future data-base management system.

In actual operation different data-base management systems have widely differing facilities for describing schema.

(ii) Sub-Schema Description Language. The application programmer must be able to describe data base management that he uses it declare his sub-schema. Again one of three facilities May be used for this purpose.

(a)   A set programming language (cobal) extension.

(b)   A facility of data-base management system

(c)   An independent language.

No doubt one sub-schema language can be used/shared by many programmers.

(iii) Data Manipulation Language. The application program must give instruction to the data base management system and have a means of interpreting the status messsage with which it replies, saying whether the request has been satisfactory achieved. The data base management system will provide a set of Macro-Instructions statement for the application programmer. This will be considered as an extension of the application programming language as a separate sub-language,

or merely as a set of call statements provided by a particular data-base management system. These facilities of data-base management system which can be used in any programming language.

No doubt some data-base management system provide an i9nterface which is application program independent. The CODASYL Date Base Task Group has proposed an extension of COBOL called a Data Manipulation Language (DML) which could be implemented for a wide variety of data base management systems.

(iv) Physical Data Description Language. Physical layout and structure needs some means for storage devices, some data-base management system have this facility to name CODASYL DBTG refers to a language for this purpose and a device <u>Midis</u> Control language. Such language would provide the facility of buffering, paging and overflow is controlled and would specify addressing and searching techniques such as indexing the chaining. After some gap of time system may become clever enough to do the physical <u>layout</u> data entirely automatically. Different data base management use widely differing means of specifying the physical data structure.
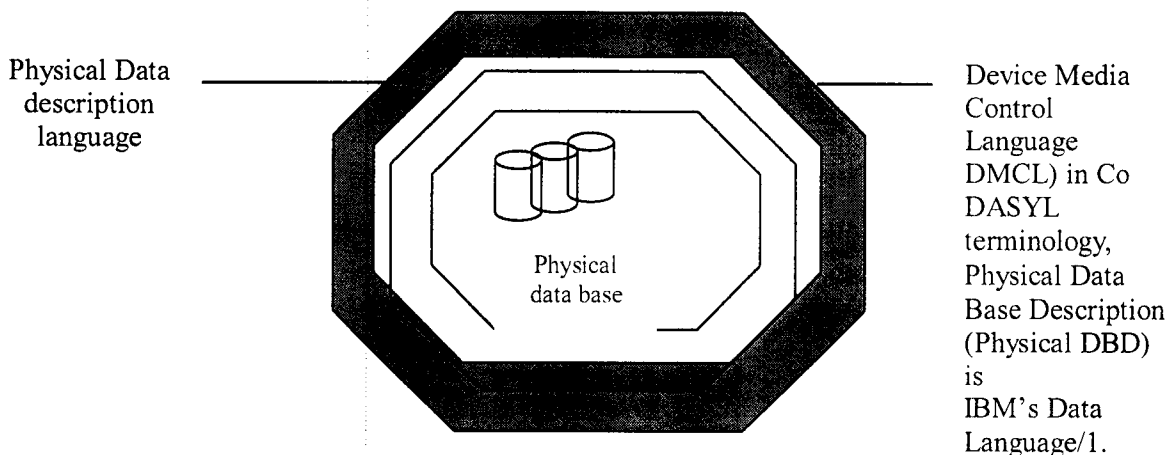
Physical Data description language — Physical data base — Device Media Control Language DMCL) in Co DASYL terminology, Physical Data Base Description (Physical DBD) is IBM's Data Language/1.

Fig. : Innermost Software Layer

(v) Security Control Facilities. The data base manager or administrator controls the data such as what kind of data and what is the present condition of data. The administrator needs a mechanism to enable him to establish and maintain in the system the tables controlling who has authorization to do what and to monitor that system is being used according to prescribed rules. This is a on-line facility – possibly in the form of a language for security control.

(vi) Data Dictionary. It is a catalogue of all the data types in the data base, giving their names, definition and silent features. It may be used by anybody which is the same as data-base interrogation facility.

(vii) Programming Language. The programmer will write his programmer in a common language such as COBOL, PL/I, or possibly assembler language.

(viii) Tele-processing Facilities. Tele-processing facilities are designed to set up and control the system through whatever form of network is used. Transmission control the next layer is designed to control a the transmission of data on each circuit that is set up, the detect any transmission errors that occur and retransmit the data that was in error.

The terminals have micro-computers inside which permits programs to exist at terminal location to assist in the application in the man Computer dialogue, or in data-base interrogation.

(ix) Data-base Interrogation Facilities. A feature of data-base technology which will become increasingly important in the future is the ability to use the data-base without involving the application programmers. Variety of data-base interrogation language is in use. Both the interrogation facilities and application programmer use the data-base schema. The data base must be protected from all types of users to ensure that unauthorized or important persons do to gain access to the data.

6.8 Summary :-

In modern times most organisations carry out business transactions on electronic data processing. The accurate recording and processing of these transactions is knows as data processing. . With the increase in complexity and size of business organisation grow, so did the transactions processed. Manual system were then developed to record the transactions on documents. These documents were subsequently processed by the clerical staff to produce ledgers reflecting the impact of transactions of documents, and their impact on management, Example : cash and bank balance, inventory level.

The data processing departments were usually created within the finance and accounting function and, therefore, most of the applications taken up for computerized processing related to accounting. Computerized systems for financial accounting, stores accounting, processing of dividend warrants, payroll accounting, etc. As the management was professionalizing with the spread of management education, more and more managers wanted to make their planning and monitoring decisions on the basis of analysis of data. There are many languages which are used in the data. Base system. The important one are as: .

(i) Schema Description Language, (ii) Sub-schema Description Language, (iii) Physical Data Description Language, (v) Security Control Facilities, (vi) Data Dectionary, (vii) Programming Language, (viii) Telephone Processing Facilities, (ix) Data-base interrogation facilities.

6.9 Technical Terms:-

1.   Complexity : the condition or quality of being complex; anything complex or intricate; complication

2.   Reflecting : to bend or throw back (light, heat, or sound); to give back an image of; mirror or reproduce; to cast or bring back as a consequence: with *on*

3.   Inventory : an itemized list or catalog of goods, property, etc.; esp., such a list of the stock of a business, taken annually; the store of goods, etc. that are or may be so listed; stock; any detailed list

4.   Saddled : a seat for a rider on a horse, bicycle, etc., usually padded and of leather, and generally straddled in riding; a padded part of a harness worn over a horse's back to hold the shafts; the part of an animal's back where a saddle is placed; anything suggesting a saddle, as in form, placement, etc.; a ridge between two peaks or summits; *a)* a cut of lamb, venison, etc., including part of the backbone and the two loins *b)* the rear part of the back of a fowl

5.   capture : a taking or being taken by force, surprise, or skill, as enemy troops, an opponent's piece in chess, etc.; that which is thus taken or seized; specif., a prize or booty in war; the

absorption of a particle by an atomic nucleus; esp., the absorption of a neutron or an orbital electron that often results in the immediate emission of radiation

6. Intensive : increasing or causing to increase in degree or amount; of or characterized by intensity; thorough, profound, and intense; concentrated or exhaustive; designating care of an especially attentive nature given to hospital patients immediately following surgery, a heart attack, etc.; *Agric.* designating a system of farming which aims at the increase of yield per acre by using increased labor, capital, etc.

7. Pooled : a small pond, as in a garden; a small collection of liquid, as a puddle

8. Eventually : finally; ultimately; in the end

9. Dividend : the number or quantity to be divided; a) a sum or quantity, usually of money, to be divided among stockholders, creditors, members of a cooperative, etc. b) an individual's share of such a sum or quantity; a gift of something extra; bonus; the refund made under some insurance policies to the insured from the year's surplus profit

10. Warrants : a) authorization or sanction, as by a superior or the law b) justification or reasonable grounds for some act, course, statement, or belief; something that serves as an assurance, or guarantee, of some event or result; a writing serving as authorization or certification for something; a) authorization in writing for the payment or receipt of money b) a short-term note issued by a municipality or other governmental agency, usually in anticipation of tax revenues c) an option issued by a company granting the holder the right to buy certain securities, generally common stock, at a specified price and usually for a limited time d) *Law* a writ or order authorizing an officer to make an arrest, seizure, or search, or perform some other designated act e) *Mil.* the certificate of appointment to the grade of warrant officer (cf. WARRANT OFFICER)

11. Spheres : any round body or figure having the surface equally distant from the center at all points; globe; ball; a star, planet, etc.; the visible heavens; sky; *short for* CELESTIAL SPHERE; any of a series of hypothetical spherical shells, transparent, concentric, and postulated as revolving one within another, in which the stars, planets, sun, moon, etc. were supposedly set: a concept of ancient astronomy; the place, range, or extent of action, existence, knowledge, experience, influence, etc.; province; compass; social stratum; place in society; walk of life

12. Terminals : of, at, or forming the end, extremity, or terminus of something; occurring at the end of a series; concluding; closing; final; designating, of, or having a fatal disease in its final stages; having to do with a term or established period of time; occurring regularly in each term; of, at, or forming the end of a transportation line; a terminating part; end; extremity; limit

13. Logical : of or used in the science of logic; according to the principles of logic, or correct reasoning; necessary or to be expected because of what has gone before; that follows as reasonable; using or accustomed to use correct reasoning

14. Midis : the south of France

15. Layout : the act or process of laying something out; the manner in which anything is laid out; arrangement; the plan or makeup of a newspaper, book page, advertisement, etc.; the thing laid out; the art or process of arranging type, illustrations, etc. in an advertisement, newspaper, etc.; an outfit or set, as of tools; a residence, factory, etc., esp. when large and complex

6.10 Self Assessment Questions

1. What is meant by data processing, explain the computer operation in it?

2. Explain the advantages of EDP?

3. Explain the things to be done in data processing early phase?

4. Explain the things to be done in data processing next phase?

5. What are data base languages? Explain?

6. Distinguish between automated data processing and electronic data processing? Explain Evaluation from EDP to MIS?

6.11 Reference Books

1. CSV. Murthy – Management Information Systems

2. VARMA & AGARWAL – Management Information System

- S. PRABHAKAR

LESSON – 7

DECISION MAKING

7.0 Objective:- This Lesson is mainly deals with the decision making process and its types and it deals with the decision cycle and at the same time Behavioral decision making. The main objective of this lesson is how this decision – making will help full to the managers in the office with help of computers

Structure:-

7.1 Decision-making:-

Decision – making is almost universally defined as choosing between alternatives. It is closely related to all the traditional management functions. In "The Functions of the Executive", Barnard gave a comprehensive analytical treatment of decision-making and noted: "The processes of decision...are largely techniques for narrowing choice".

Herbert A Simon conceptualized three major phases in the decision-making process:

1.   Intelligence activity: Simon describes this initial phase as consisting of searching the environment for conditions calling for decision-making.

2.   Design activity: During the second phase, inventing, developing and analyzing possible courses of action take place.

3.   Choice activity: The third and final phase is the actual choice-selecting a particular course of action from among those available.

The stages of decision-making as given by Mint berg and his colleagues:

(a)The Identification phase : During which recognition of a problem or opportunity arises and a diagnosis is made. It was found that severe, immediate problems did not receive a very systematic, extensive diagnosis but mild problems did.

(b)The development phase: During which there may be a search for existing standard procedures or solutions already in place or the design of a new, tailor, made solution. It was found that the design process was a grouping, trial-and-error process in which the decision-makers had only a vague idea of the ideal solution.

(c) The selection phase: During which, the choice of a solution is made. There are three ways of making this selection by the judgment of the decision, maker on the basis of experience or intuition rather than logical, systematic basis; and bargaining when the selection involves a group of decision-makers and all the political maneuvering that entails. Once the decision is formally accepted, an authorization is made.

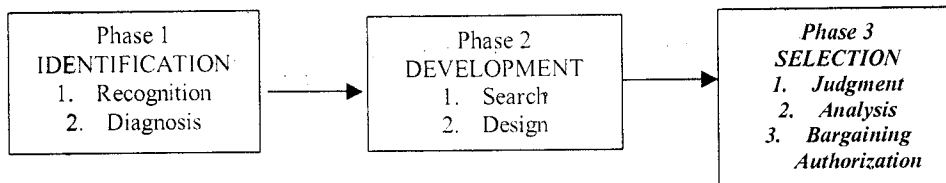| Phase 1 IDENTIFICATION 1. Recognition 2. Diagnosis	Phase 2 DEVELOPMENT 1. Search 2. Design	Phase 3 SELECTION 1. Judgment 2. Analysis 3. Bargaining Authorization

Fig. Mint berg's empirically based phases of decision-making in organizations

Whether expressed in Simon's or Mint berg's phases, there seem to be identifiable, preliminary steps leading to the choice activity in decision-making Also, it should be noted that decision-making is a dynamic process, and there are many feedback loops in each of the phases. The essential point is that decision-making is a dynamic process. This dynamic process has both strategic and behavioral implications for organizations.

2. Types of Decision-Making:-

Basically, there are two types –

1. Programmed or Structured Decisions and

2. Non-programmed or Unstructured Decisions.

(1) Programmed Decisions: It is well defined. The decision-marker is aware of the extent of the decision and there exists a clear set of options from which a choice can be made. The method of evaluating he options has been established and is straightforward. Therefore, the decision-maker has a well-specified and agreed decision procedure at his or her disposal. This could amount to a decision rule to tell decision-makers which alternative to choose once they have information about the decision situation.

(2) Non-programmed Decisions: When decisions are unique and not routine, they can be classified as non-programmed or unstructured. A comparison of programmed and non-programmed decisions is given below:

Characteristics	Programmed Decisions	Non-programmed Decisions
Type of decision	Well structured	Poorly structured
Frequency	Repetitive and routine	New and usual
Goals	Clear, specific	Vague
Information	Readily available	Not available, unclear channels

Consequences	Minor	Major
Organizational level	Lower levels	Upper levels
Time for solution	Short	Relatively long
Basis for solution	Decision rules, set	
Procedures	Judgment and creativity	

Adapted from: Moorhead and Griffin, 1998

7.3 Decision Cycle:-

A study of over 2000 managers, supervisors and executives was undertaken in order to determine what steps in the decision cycle they used and found helpful. Out of this study came a simple nine-step framework.
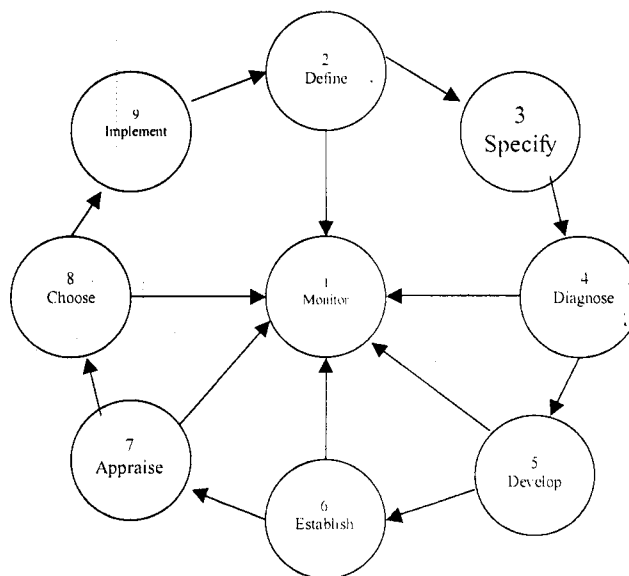
Monitor: the environment should be monitored constantly to obtain feedback. The decision-maker monitors the environment to detect deviations from plans or to pick up signals on the deed to take a decision.

1. **Define:** the problem or situation has to be defined precisely. The information picked up at the monitoring stage could relate to the symptoms of the problem, but not the causes.

2. **Specify:** the decision objectives have to be specified, and the likely risks and the constraints should be considered what the decision-makers expect to be achieved is clarified.

3. **Diagnose:** The problem or situation is analyzed more thoroughly and the causes of the problem are scrutinized.

4. **Develop:** Alternative courses of action or solutions are developed. The options open to the company are discussed at length and the critical options are listed.

5. **Establish:** At this stage, the methods or criteria to be used in the appraise the options or alternatives are established.

6. **Appraise:** Alternative solutions or courses of action should be appraised. Each alternative or option is evaluated. The costs of implementation of the alternatives would also be appraised. Both cost and benefits would be expressed in quantitative and qualitative terms.

7. **Choose:** The best alternative solution or course of action is chosen.

8. **Implement:** The best alternative solution or course of action is implemented and the detailed operational plan is discussed.

In practice, the process of decision-making is unlikely to be as smooth as the model depicted here would suggest. According to Cooke and Slack (1984). "Real decision behaviors can exhibit frequent backtracks and jumps forward before an option is finally selected. Thus the decision process may not be smooth but a jerky and hesitant progression involving, at times, one step towards and two steps backwards".

7.4 Behavioral Decision - Making:-

Why does a decision-maker choose one alternative over another? The answer to this question has been a concern of organizational behavior theorists as far back as March and Simon's classic book, "organizations" in 1958. Subsequently. However, the field became more interested in such topics as motivation and general settings, and emphasis on decision-making wanted. The field of behavioral decision-making was mainly developed outside the mainstream of organizational behavior theory and research by cognitive psychologists and decision theorists in economics an information science. Recently, however, there has been a resurgence of interest in behavioral decision-making. The foundation and point of departure for developing and analyzing the various models of behavioral decision-making remains the degree and meaning or rationality.

7.5 Decision Rationality:-

The most often used definition of rationality in decision-making is that it is a means to an end. If appropriate means are chosen to reach desired ends, the decision is said to be rational. However, there are many complications to this simple test of rationality. To begin with, it is very difficult to separate means from ends because an apparent end may be only a means from some future end. This idea is commonly referred to as the means-end chain or hierarchy.

1. **Objective Rationality:** Can be applied to decisions that maximize given values in a given situation.
2. **Subjective Rationality:** Might be used if the decision maximizes attainment relative to knowledge of the given subject.
3. **Conscious Rationality:** Might be applied to decisions in which adjustment of means to ends is a conscious process.

4. **Deliberately Rational:** A decision is deliberately rational to the degree that the adjustment of means to ends has been deliberately sought by the individual or the organization.

5. **Organizationally rational:** A decision is organizationally rational to the extent that it is aimed at the organization's goal; and

6. **Personally rational:** A decision is personally rational if it is directed towards the individual's goal.

7.6 Models of Behavioral Decision-Making:-

There are many descriptive models of behavioral decision-making. In effect, these have become models for management decision-making behavior. The models attempt to describe theoretically and realistically how practicing managers make decisions. In particular, the models strive to determine to what degree management decision-makers are rational.
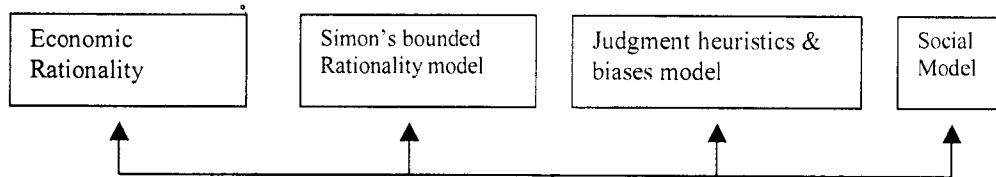

| Economic Rationality | Simon's bounded Rationality model | Judgment heuristics & biases model | Social Model |

Fig.; the continuum of decision-making behavior

(1) The Economic Rationality Model: This model comes from the classical economics model, in which the decision-maker is perfectly and completely rational in every way. Regarding decision-making activities, the following conditions are assumed.

• The decision will be completely rational in the means-ends sense

• There is a complete and consistent system of preferences that allows a choice among the alternatives.

• There is complete awareness of all the possible alternatives

• There are no limits to the complexity of computations that can be performed to determine the best alternatives.

• Probability calculations are neither frightening nor mysterious.

(2) Simon's Bounded Rationality Model: Bounded rationality explains decision-making in terms of three main processes:

1. Consideration of alternative solutions in a sequential fashion.

2. Use of heuristics to identify the most promising alternatives

3. Satisfying

(a) Sequential consideration of alternatives:

When things are going well there is tendency not to scan the environment in a serious way. But if the external environment poses a threat to the organization, then a search for solution to the problems encountered takes place. The search process is said to have three main characteristics (Cyert and March 1963)

- The search is motivated in the sense that it is activated in response to a current problem.

- It is simple minded in that it begins with the obvious solutions, and only considers other solutions if the simple-minded solutions prove inadequate.

- It is biased because the search for solutions is influenced by the individual's ego, training, experience, hopes, aspiration and other factors that serve to distort his or her view of the world.

Judgmental Heuristics and Biases Model: Although Simon's bounded rationality model and the concept of satisfying are an important extension of the wholly economic rationality mode, as Bazerman points out, it does not describe how judgment will be biased. Thus, taking the bounded rationality model one step further, a cognitively based model that identifies specific systematic biases that influence judgment has emerged in the field or organizational behaviour.

The judgmental <u>heuristics</u> and biases model is drawn mostly from Kahn man and Trusky, cognitive decision theorist, who suggested that decision-makers rely on heuristics (simplifying strategies or rule of thumb).

(b) Use of Heuristics

Heuristics are rules that guide the search for alternatives into areas where there is a good chance of finding satisfactory solutions. They reduce to manageable proportions the number of possible solutions through which the decision-maker must shift (Simon & Newell, 1971).

Heuristic models do not attempt to optimize, though they can do so by chance, but they aim to achieve satisfactory sub-optimal solutions. The heuristic approach adopts short cuts in the reasoning processes, and it uses rules of thumb.

Heuristic model are generally more complex that these rules of thumb, but equally they can be relatively simple. <u>Tier spy</u> and Kahn man (1974) recognize the influence of judgmental strategies in conditions of uncertainty and analyze three heuristics-representatives, availability and anchoring.

(c) Representative Heuristic: This is concerned with seeing a resemblance between objects or events. A person could be asked to state the extent to which an object or event has certain features to permit appropriate categorization.

3. (a) Availability Heuristic: This is concerned with our tendency to consider events more probable if they can easily be imagined than if they cannot. The events falling to this category are those that are particularly vivid or arouse our emotions or have occurred recently. The availability heuristic can be prone to error.

3. (b) Anchoring Heuristic: This is concerned with a tendency to pass judgment by starting from an initial position that is likely to influence the final outcome. But bias creeps in when we fail to change our views in the light of new information. We seem to be anchored by our starting point.

The heuristic techniques discussed here help us to draw inferences from events, but not all judgments are likely to be accurate. It has been argued (Vecchio 1995) that "They are not, strictly speaking, heuristics, in the sense of being explicit and not liable to change. Rather they represent automatic and unconscious processes that are frequently involved in judgment and decision-making processes".

4. The social Model: At the opposite extreme from the economic rationality model is the social

model drawn from psychology. Sigmund Freud viewed human as bundles of feelings, emotions and instincts, with their behavior guided largely by their unconscious desires. Obviously, if this were the complete description, people would not be capable of making effective decisions.

Although most contemporary psychologists would take issue with the Freudian description of human, almost all would agree that social influences have a significant impact of decision-making behavior. Furthermore, social pressures and influences may cause managers to make irrational decisions.

Straw and Ross have identified four major reasons why this phenomenon, called escalation of commitment might happen:

(a) **Project characteristics:** This is probably the primary reason for escalation decisions. Task or project characteristics such as delayed return on investment or obvious temporary problems may lead the decision-maker to stick with or increase the commitment to a wrong course of action.

(b) **Psychological Determinants:** Once the decision goes bad, the manager may have information processing errors (use biased factors or take more risk than are justified). Also because the decision-maker is now ego-involved. Negative information is ignored and defensive shields are set up.

(c) **Social Forces:** They may be considerable peer pressure put on decision makers and/or they may need to save face, so they continue or escalate their commitment to a wrong course of action.

(d) **Organizational Determinants:** Not only may the project or task characteristics lend themselves to the escalation of bad decisions – so may a breakdown in communication, dysfunctional politics and resistance to change.

7.7 Managerial Decision-Making:-

Decision-making is a control point for every managerial activities may be planning organizing, staffing, directing, controlling and communicating. Decision-making is the art of reasoned and judicious choice out of may alternatives. Once decision is taken, it implies commitments of resources.

The business manager has to take variety of decision. Some are routine and others are long term implication decision. Thus managerial decisions are grouped as:

(A) Strategic Decision, (B) Tactical Decision, (C) Operational Decision

(A) Strategic Decision. These are known as major decision influence whole or major part of the organization. Such decisions contribute directly to the achievement of common goals of the organization; have long range effect upon the organization.

Generally, strategic decision is unstructured and thus, a manager has to apply his business judgment, evaluation and intuition into the definition of the problem. These decisions are based on partial knowledge of the environmental factors which are uncertain and dynamic, therefore such decisions are taken at the higher level of management.

(B) Tactical Decision. Tactical decisions relate to the implementation of strategic decisions, are directed towards developing divisional plans, structuring work flows, establishing distribution channels, acquisition of resources such as men, materials and money. These decisions are taken at the middle level of management.

(C) Operational Decision. Operational decisions relate to day-to-day operations of the enterprise have a short-tem horizon and are always repeated. These decisions are based on facts regarding the events and do not require much of business judgment. Operational decisions are taken at lower levels of management.

Information is needed for helping the manager to take rational well informed decision; MIS need to focus on the process of managerial decision making.

7. 8 DECISION-MAKING PROCESS

The need to information system in organizations is to support the decision-making process. The managers must be ware of problems before decision can be made. A problem exists when the real situation is different than the expected one. After the problem has been identified, the causes of the existence of the problem must be identified and then the solution to the problem has to be found. The decision-making process can be divided into three main phases:

(i) Intelligence, (ii) design, (iii) choice

(i)Intelligence. Searching the environment for conditions calling for decisions. The phase consists of determining that a problem exists.

(ii) Design. During this phase a positive set of alternative solution is generated and tested for feasibility.

(iii) Choice. In this phase, the decision-maker selects one of the solutions identified in the design phase.

Thus the decision process follows the sequence from intelligence to design and to choice. It is possible to go back from one phase to another and the whole process may be repeated. It is very important to distinguish between programmed and non-programmed decision. Decisions lend themselves to programming techniques if they are repetitive and routine. And if a procedure can be worked out for handling them so that each is métier ad-hoc decision nor one to be treated as a new situation each time it arises. The most familiar example of the programmer decision is the compilation of pay in accordance with union agreement. Decisions are non programmed to the extent that they are unstructured new, of high consequence, complex or involved major constrains. Advertising budgets new product decisions and similar problems illustrate the non-programmer type of decision that can not be automated. The major reasons for distinguishing between these two types of decisions are to arrive at some classification of decision-making methods in order to improve decision making. Decision tables are graphical methods of representing a sequence of logical decisions. It has a tabular format. It lists all possible conditions and set of actions. The decision table is divided into four parts (a) condition stub, (b) Condition entries, (c)Actions stub and (d)Action entries.

The condition and actions are related by: "if......then......."relationship the condition stub lists all the conditions. Each condition may be either true or false. The condition entry sections list all possible states for all the conditions. The action stub lists all possible actions which can be takes depending upon the conditions, For each rule a set of action is identified.

7.9. Approaches to Managerial Decision-Making

The process of decision making is widely known. There are three different approaches for decision making known as:

(a) Quantitative approach

(b) Decision centered approach

(c) Managerial role approach

Quantitative Approach. The quantitative approach to decision making is an extension of the classical approach. It involves a sequential process of the following:

(i) observing a problem and defining its nature and scope,

(ii) formulating a hypothesis of their own,

(iii) testing the hypothesis with the help of experiments,

(iv) verifying the solution by analogical reasoning,

(v) conducting sensitivity analysis,

(vi) estimating solution of the problem,

(vii) implanting the solution and

(viii) Sensitive analysis establishing control systems for feedback and review.

Although, these steps are logically placed in a sequence, there is always interplay among these steps. Each step may be subjected to change in the light of revelation through experience. The steps are listed in below to provide the conceptual framework of this approach.

Defining the Problem	↔	Formulating Hypothesis	↔	Experiment-ing	↔	Analogical Reasoning
Establishing Control system	↔	Implement-Ing	↔	Estimating Solution	↔	Sensitivity Analysis
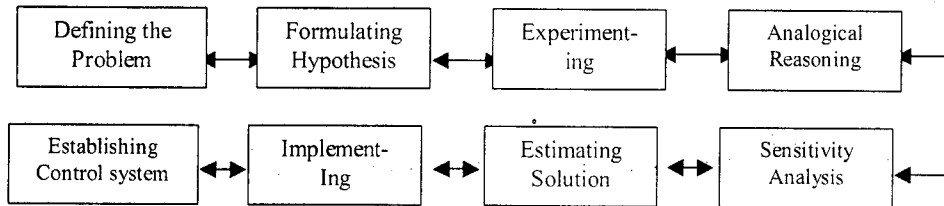
Fig. Quantitative Approach to Decision Making

The quantitative approach uses mathematical models to seek optimal solutions to the problems in the given business situation well recognizing the constraints imposed by the environment. This approach is problem oriented and more useful in the case of structured decisions. It is suitable in decision situations where most of the important factors are controllable to a reasonable extent and the manager has complete control over the decision making. Such decision situations are more common in case of operational decisions.

The quantitative approach helps in defining a problem clearly and separating the impact of problem from its causes. Many of the Operations Research and statistical techniques have been very popular among managers for not only defining the problems but also determining the optimal solution to such problems.

The three basic steps in managerial decision making under the decision centered approach are represented as:

Fig. 2 : Activities in Decision Centered Approach as Suggested by Herbert A. Simon
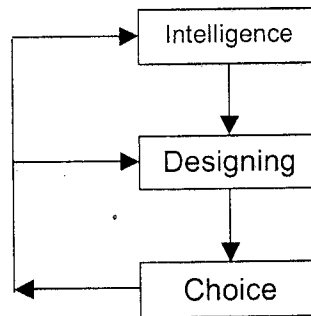
(i)   **Information for Intelligence.** The first stage in the process of decision making under the decision centered approach is gathering information regarding the internal and external environments. The gathering of information is done of regular basis with the aim of identifying (a) opportunities and (b) threats. The information may be gathered using ad hoc queries from the information systems. An alternative to this could be where the information systems themselves are proactive and report the opportunities and threats automatically. Modern business information systems, generally, offer exception reporting facilities with varying degrees of analysis of information. Many software companies are now building intelligent agents into their software products so that the analysis of information is do automatically by the software and exceptional circumstances are reported the user.

(ii)   **Information for Designing.** Designing the model for decision making can be greatly helped by modern information systems. For example the inventory problems, sequencing of jobs, production planning and scheduling can easily be automated by information systems. In the case non-programmable decisions, Which are influenced by a large number variables that are subject to random behavior, the problem is more compels. However, business information systems can help a manager in the process of decision marking by providing the possible impact of each these variable or a combination of variables.

(iii)   **Infuriation for choice.** Business information systems can help manager in evaluating the alternatives and making the choice out of the available alternatives. The choice in case of programmable decisions can be easily made by selecting the optimal solutions. The computing power available with IT infrastructure would make it possible and convenient apply sophisticated statistical or operation research tools for this purpose. In the case on non-programmable decisions, the information systems can help in identifying the satisfying solution based on bounded rationality. The advantage of IT infrastructure would be both in terms of speed and accuracy with which the satisfying solution could be obtained. For example, into investment decision, a manager can use various methods of evaluating investment proposals such as Pay-Back method, Net Present Value method Internet Rate of Return method, etc. For using these methods, the manage shall need information regarding pay-back period, discounted cash flow internal rate of return, etc. Such values can easily be calculated with the help of IT infrastructure. In fact, most of the electronic spreadsheets offer facilities for calculating these and other such related values quickly using simple procedures. Business information systems can also help in monitoring the performance and obtaining quick feedback during implementation of the decision. The quicker feedback helps in reducing the cost of mistakes in the decision-making process.

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These techniques have the advantage of suggesting the best solution to the problem, without even identifying all possible alternatives. This feature is quite useful in problems where the number of possible alternatives is very large, though only a few are worth considering for selection.

A word of caution here would not be out of context. Many a time, problem is defined by the managers in terms of the quantitative technique selected for solution which results in ignoring important decision variable. It is necessary, thus, to focus on the problem and seek its solution with the help of technique and avoid the tendency of finding 'right solutions' to wrong problems'.

(ii) Decision Centered Approach. The quantitative approach assume the availability or adequate information and time for analysis or information using some model However, the decision making environment in business organization is far from ideal in this regard, It has been observed that a manager has to take decisions with inadequate information regarding the decision variables, the time frame available for analysis is too small to permit detailed modeling without entailing opportunity losses due to delayed decisions. The decision centered approach recognizes that the absolute nationality in decision making may not be achievable in the light of the realities of business decision making scenario. This approach is based on the concepts of bounded rationality. It tries to work satisfactory solution as against the optimal solution in the previous approach. The decision making process under this approach involves the following steps:

(i)   **Intelligence.** Environment intelligence for searching problems and opportunities; identifying the available informational inputs regarding the decision variables.

(ii)   **Designing.** Identifying or designing alternative course of action, avoiding new uncertain alternatives, relying instead on well tried alternatives.

(iii)   **Choice.** Making a choice among the alternatives designed in the preceding stage. As managers reflect their goals in terms of different programmers, they evaluate alternatives on the basis of the goals set forth in the concerned programmer.

The interdependence of the goals of different programmers is generally avoided as some of the goals in a given programmer may be in conflict with goals of other programmers. When the decision is being implemented, information regarding the performance and the feedback regarding the success of decision is very helpful in identifying mistakes in playing the decision role. Better alternatives are thought of and evaluated for revision of earlier decision, if necessary.

This approach is more appropriate for higher order decision, i.e. tactical and strategic.

The variation of this approach suggests successive limited comparisons as values become clear only at the margin when specific policies are considered. Other approaches to decision-making have behavioral frames of references. They recognize the psychological biases in decision making, role of cognitive style of decision making and the influence of differing personal traits of the individuals managers in the decision-making process.

7.10 Summary:- The need to information system in organizations is to support the decision-making process. The managers must be ware of problems before decision can be made. A problem exists when the real situation is different than the expected one. After the problem has been identified, the causes of the existence of the problem must be identified and then the solution to the problem has to be found. Decision – making is almost universally defined as choosing between alternatives. It is closely related to all the traditional management functions. Basically, there are two types of decision making

Processes: Programmed or Structured Decisions and Non-programmed or Unstructured Decisions.

A study of over 2000 managers, supervisors and executives was undertaken in order to determine what steps in the decision cycle they used and found helpful. Out of this study came a simple nine-step framework. Monitor, Define, Specify, Diagnose, Develop, Establish, and Appraise, Choose, Implement. The field of behavioral decision-making was mainly developed outside the mainstream of organizational behavior theory and research by cognitive psychologists and decision theorists in economics an information science. The most often used definition of rationality in decision-making is that it is a means to an end.

The process of decision making is widely known. There are three different approaches for decision making known as: Quantitative approach, Decision centered approach

Managerial role approach. There are many descriptive models of behavioral decision-making. In effect, these have become models for management decision-making behavior. The models attempt to describe theoretically and realistically how practicing managers make decisions. In particular, the models strive to determine to what degree management decision-makers are rational.

7.11 Technical Terms:-

1. conceptualized   : to form a concept or idea of; conceive

2. extensive : having great extent; covering a large area; vast; having a wide scope, effect, influence, etc.; far-reaching; comprehensive; of or characterized by extension

3. Diagnosis : the act or process of deciding the nature of a diseased condition by examination of the symptoms; a careful examination and analysis of the facts in an attempt to understand or explain something

4. Vague : not clearly, precisely, or definitely expressed or stated; indefinite in shape, form, or character; hazily or indistinctly seen or sensed; not sharp, certain, or precise in thought, feeling, or expression; not precisely determined or known; uncertain

5. Mint : a) a place where money is coined by authority of the government b) [M3] a government bureau in charge of this; an apparently unlimited supply; large amount; a source of manufacture or invention ; new or in its original condition, as if freshly minted; to coin (money) by stamping metal; to invent or create; fabricate

6. Berg's: 1885-1935; Austrian composer

7. Empirically : relying or based solely on experiment and observation rather than theory; relying or based on practical experience without reference to scientific principles;

8. phases : any of the recurrent stages of variation in the illumination and apparent shape of a moon or a planet ; any of the stages or forms in any series or cycle of changes, as in development;   any of the ways in which something may be observed, considered, or presented; aspect; side; part ; *Chem.* a solid, liquid, or gaseous homogeneous form existing as a distinct part in a heterogeneous system; *Physics* the fractional part of a cycle through which an oscillation, as of light or sound waves, has advanced, measured from an arbitrary starting point

9. Scrutinized : to look at very carefully; examine closely; inspect minutely; **scrutinize** implies a looking over carefully and searchingly in order to observe the minutest details *[he slowly scrutinized the bank note]*; **inspect** implies close, critical observation, esp. for detecting errors, flaws, etc. *[to inspect a building for fire hazards]*; **examine** suggests close observation or investigation to determine the condition, quality, validity, etc. of something *[examined thoroughly by a doctor]*; **scan**, in its earlier, stricter sense, implies close scrutiny, but in current usage, it more frequently connotes a quick, rather superficial survey

10. Heuristics: heuristic methods or procedures; the art or practice of using heuristic methods or procedures

11. Tier : a row, or rank, of seats; any of a series of rows, layers, ranks, etc. arranged one above or behind another

12. Spy : to watch or observe closely and secretly, usually with unfriendly purpose: often with *out*; to catch sight of; make out; perceive; see; to watch or observe closely and secretly; specify., to act as a spy; to make a close examination or careful inspection; a person employed by a government to get secret information about or monitor the affairs, plans, armed forces, etc. of another government

13. Métier : a trade, profession, or occupation; esp., the work that one is particularly suited for; one's area of expertise or strength; forte

14. ad hoc : for this specific purpose; for a special case only, without general application

7.12 Self Assessment Questions

1. What is decision making? Explain the different phases available in decision making?

2. Explain the types of decision making and Explain the Decision cycle?

3. What is meant by Behavioral Decision Making and explain its models

4. Explain about Decision Rationality and managerial Decision Making?

5. What is Decision Making Process? Explain different approaches in Decision Making?

7.13 Reference Books

1. CSV. Murthy – Management Information Systems

2. VARMA & AGARWAL – Management Information System

S.PRABHAKAR

LESSON – 8

DECISION MAKING SYSTEM DEVELOPMENT

8.0 Objective:- This Lesson is deals with Decision Making Development with the help of computer through the knowing of Group Decision Making, Decision Making Environment, and Implications for information system, Behavioral Model of decision making and Decision Making under Psychological Stress.

Structure:-

8.1 Group Decision Making:- Some on rightly observed that managerial decision making is that many decisions are taken not by a manager alone, but by a group of people in the business enterprise. As there are many decisions that have implications on different organizational units having sometimes conflicting objectives, the decision has to be a collective one. Generally, such decisions are taken on the basis of consensus among the concerned managers. Key to the successful group decision making lines in better communication and frequency of meeting to deliberate on a problem. Modern MIS are equipped with powerful communication systems that ensure effective communication between various members of the group E-mail is now <u>recognized</u> as an important channel of communication in group decision making. The business information systems are helpful not only in making a choice among the alternatives but also offer the line of reasoning followed to arrive at the selection. Many software companies are offering Group ware software for improving the process of groups decision making.

(iii) Managerial Roles Approach. Another model of managerial decision making that is now gaining acceptability was originally suggested by Henry Mint berg. According to his model, a manager plays the following three basic roles:

1. **Interpersonal Role.** A manager plays the role of a leader of his subordinates, maintains liaison with the external environment and plays the role of figurehead as and when occasions arise.

2. **Information Role.** His information role includes the responsibility of managing information in the organization. He is responsible for making information available within the organization and should be able to communicate the state of affairs to the external environment.

3. **Decision Role.** A manager is supposed to take decision for bringing about changes in the light of changes in the environment. He should make decisions in case any problem arises, i.e. he should take up the role of a disturbance handler. He is also supposed to take up the role of resource allocater because he is accountable for the proper use of resources. Associated with this responsibility, is also the role of a negotiator who resolves disputes, both internal and external to the organization.

For performing these roles, a manager needs a lot of information. The information needs for decision making role have already been discussed earlier in this chapter. Modern information systems can be of great help in improving interpersonal communication, for which managers have so far been relying mainly on verbal communication. The information roles can best played with the help of proper IT infrastructure. A manager is far better equipped now to perform this role, with the improved information handling tools available with him, than ever before. The executive information systems can help a manager in monitoring information on the performance of different organizational units. It can also help in dissemination of information among his peers and subordinates regarding the external environment. He is also able to communicate more effectively with the external entities regarding state of affairs in the enterprise. Today, a manager is in a better position to explain any decline in the performance to the shareholders and investors than ever before, thanks to the availability of executive information system.

8.2 MEANING OF DECISION MAKING ENVIRONMENT:-

The decisions are taken in different types of environment. The type of environment also influences the way the decision is made. There are three types of environment in which decisions are made.

(i) Certainty, (ii) Uncertainty, (iii) Risk

(i) Certainty. In this type of decision-making environment, there is only one type of event that can take place. It is very difficult to find complete certainty in most of the business decisions. However, in many routine type of decisions, almost complete certainty can be noticed. These decisions, generally, are of very little significance to the success of business and does not taken seriously.

(ii) Uncertainty. In the environment of uncertainty, more than one type of event can take place and the decision maker is completely in dark regarding the event that is likely to take place. The decision maker is not in a position, even to assign the probabilities of happening of the event is determined by external factors. For example, demand for the product, moves of competitors, etc. are the factors that involve uncertainty.

(iii) Risk. Under the condition of risk, there are more than one possible events that can take place. However, the decision maker has adequate information to assign probability to the happening or non-happening of each possible event. Such information is generally based on the past experience.

Virtually, every decision in a modern business enterprise is based on interplay of a number of factors. New tools of analysis of such decision making situations are being developed. These tools include risk analysis, decision trees and preference theory. Modern information systems help in using these techniques for decision making under conditions of uncertainty and risk.

8.3. Implications for Information Systems

The above approaches throw light on the way the decision-making process takes place in a business enterprise. Here is a need to recognize that information needs of a manager would be determined by the type of decision, the attendant circumstances and the decision-making style of individual manager including the work culture in which the decision is to be taken and performance to be evaluated. It is, therefore, necessary to ensure that information systems should be:

(a) Flexible,   (b) Versatile,   (c) Analytical,   (d) Communication

(a) Flexible. Information systems should be flexible enough to provide alternative ways of processing data and assigning values to different decision variables. Information systems shall have to shed their earlier belief that all the relevant factors can be quantified. They shall have to include factors that cannot be quantified. Attempts are being made to process information regarding the fuzzy variables. Use of case based analysis is also gaining popularity in design of information systems.

(b) Versatile. The information systems must be designed recognizing the fact that the potential users are parts of a diverse group of managers. Thus, the information systems should be capable of catering to the information needs of managers with differences in their styles of decision making, level of computational and other analytical skills, experience and knowledge regarding business processes.

(c) Analytical. The information systems must indulge in rigorous analysis of data using multiple quantitative and intuitive models and must keep track of alternative scenarios as well. Information systems must help the manager in not only selecting the appropriate tool for analysis but also in interpretation of the results of applying the tool to available data. The enrichment of information thus, is important for information's systems to be successful in the present business scenario. Attempts are being made by the software industry to add more value to information by offering better analytical tools in the software packages. On line Analytical Processing (OLAP) solutions are now gaining popularity which provides answers to questions than mere reports in the predefined format. The OLAPs offer regression analysis, trend analysis, solving of simultaneous equations, forecasting, financial modeling and what-if scenarios, in addition to three dimensional viewing and frilling of information.

(d) Communication. The primary benefit that business information systems offer to a manager is in the form of their contribution in improving communication in the business enterprise. Thus, business information systems should incorporate tool for better communication of information so that judicious and rationale decision can be made.

8.4. CERTAIN CRITERIA FOR DECISION MAKING:-

A model of decision making which tells the decision maker to suggest him how to make a class of decision is normative or prescriptive. The model which tells how decision maker actually make decisions is descriptive. Normative decision model have generally developed by economists and management experts. Linear programming, game theory, capital budgeting, and statistical decision theory are examples of normative models. Descriptive models attempt to explain actual behaviors and therefore have been developed largely by behavioral scientists.

The criterion for selecting among alternatives in the normative model is maximization or optimization of either utility or expected value. The criterion, when stated in quantitative terms, is referred to as the objective function for a decision. It assumes a completely rational decision

maker who will always choose the optimal alternative. Decision making under certainty will select maximum utility. For a business firm, utility is usually thought of as being profit, but it can also refer to such concepts as least cost or market share. The traditional view of the criterion for decision making under risk is to maximize expected value.

Another view of the criterion for decision making is satisfying. This view comes from the descriptive, behavioral model which says that decision makers are not completely informed about alternatives and must therefore search for them. They are neither completely informed about alternatives and must therefore search for them. They are neither completely rational nor completely through in their search. They simplify the factors to be considered. The assumption of the satisfying concept is therefore bounded rationality rather than complete rationality. Decision makers have limited cognitive ability to perceive alternatives and/or consequences. As one result of these constraints, decision makers limit the search for alternatives and accept the first alternative which satisfies all the problem constraints, rather than continue to search until the optimal alternative is found. Alternative models of decision makers are discussed further in the next section.

(A) Behavioral Models of the Decision Maker. The way a person examines a problem and makes a decision can be described from several different viewpoints, depending on the assumptions made. Several models of the decision maker are described below.

(i) Classical Economic Model of Decision Maker. A normative model of the decision maker in organization is described by the classical economic model. It has the following assumptions:

1. All alternatives and all outcomes are completely known (decision making under certainty)

2. The decision maker seeks to maximize profit or utility.

3. The decision maker is infinitely sensitive to difference in utility among outcomes.

The first criterion can be relaxed to assume decision making under risk, i.e., probability can be attached to each outcome. It is then assumed that the decision maker will maximize expected value.

The classical economic model is a prescriptive model of the decision maker: completely rational, having complete information, always choosing the "best" alternative. It describes how a person should makes a decision but, in fact, all criteria of the model are rarely met in a decision situation. Even so, the rational decision maker model is useful; many methods for selecting among alternatives assume complete rationality and provide mechanisms for identifying the optimal choice.

(ii) Administrative Model of Decision Maker. The administrative model of the decision maker is descriptive. It explains how decision making actually does take place. As first proposed by Simon, the administrative model views the decisions as taking place in a complex and partially unknown environment. The decision maker is assumed not to be completely rational but rather to display rationality only within limits imposed by background, perception of alternatives, ability to handle a decision model, etc. This is the concept of bounded rationality already described. Whereas the goal of the classical economic model is well defined, the goal of the administrative model may change as the decision maker receives evidence of success or failure. The administrative model assumes that the decision maker :

1. Does not know all alternatives and all outcomes.

2. Makes a limited search to discover a few satisfactory alternatives.

3. Makes a decision satisfies his or her aspiration level (i.e., satisfies) Simon suggests that most

problem-solving strategies for satisfying are based on heuristics or rules of thumb rather than explicit decision rules. This has implications for the design of decision models, they should provide appropriate data and allow decision makers to explore alternatives using their own heuristics.

(iii) Human Expectations and Decision Making. Humans display a variety of responses in decision making. Some are related to individual difference, such as cognitive style; these are discussed in Chapter8. Others are related to expectations. Some of these responses are summarized in this section. Responses the occur in decision making can be partially explained by theory of cognitive dissonance, commitment theory, and the theory of anticipatory regret.

Cognitive dissonance, a theory by Leon Festinger, explains behaviour after a choice is made. An alternative that is selected has some negative features, and rejected alternatives have some positive characteristics. A decision maker will tend to have cognitive dissonance, feelings of mental discomfort following a decision because of the recognition of negative and positive elements of the alternatives. After a decision is made and announced, the decision maker reduces cognitive dissonance by increasing the perceived difference in the attractiveness of the alternatives. This is done by avoiding information that might be contrary to the decision and by interpreting dissonant information in a biased way. For example, people who have bought a certain make of car will tend to read the advertisements for that car and not read competitive ads. Sales procedures that follow up a sale with congratulatory information make use of the "bolstering" effect of cognitive dissonance reduction by decision makers.

Theories of commitment stress the effect on decision making of commitment to a decision. If a person knows that the decision is not revocable (there is a firm commitment following the decision), the decision time increase and decision processes are likely to be more careful. Having spent time on a decision and having announced it, a person in reluctant to change it. It fact, having made a fairly minor decision with respect to an issue, a decision maker tends to be more open to a bigger commitment.

Anticipatory regret is a psychological response to alternatives. The decision maker anticipates the regrets that may occur if a certain decision is made. The anticipatory regret inhabits the decision maker from making a decision without contemplating the consequences. Anticipatory regret can also be used as a means of lessening post decision regret; thinking about consequences before they happen reduces the psychological impact when they happen.

8.5. Behavioral Model Of Organization Decision Making

The behavioral theory of the firm has been described most fully by Cyert and March. The ideals of Simon and others have also contributed to the material in this section. The theory begins with the assumptions of the administrative model of the decision maker and explains the behavior of decision makers in an organizational context. Major concepts used to explain organizational decision making are quasi-resolution of conflict, uncertainty avoidance, problematic search, organizational learning, and incremental decision making.

Quasi-resolution of conflict. An organization represents a coalition of members having deferent goals and unequal power to influence organizational objectives. The organizational goals change as new participants enter and old participants leave. There are conflicts among the various goals of the organizational member. Even if various personal goals are ignored, the goals of sub units, such as production (level production of standard items), sales (respond to what customer wants by having high inventories), and inventory control (low inventory), are contradictory. Such conflicts are resolved by three methods:

Method of conflict resolution	Explanation
Local rationality	Sub units are allowed to set their own goals.
Acceptable-level decision rules	Within certain limits, units are allowed to make their own decisions using agreed-upon decision rules and decision procedures.
Sequential attention to goals	The organization responds first to one goal, then to another, so that each conflicting goal has a chance to influence organizational behavior. Giving sequential attention to conflicting goals means also that certain conflicts are never resolved because the conflicting goals are never handled at the same time.

Uncertainty Avoidance. Organizations live in uncertain environments. The behavior of the market, suppliers, shareholders, and government is uncertain. The behavioral theory of organizational decision making assumes that the organization will seek to avoid risk and uncertainty at the expense of expected value. In general, a decision maker will be willing to accept a reduction in the expected value of an outcome in exchange for an increase in the certainty of outcome. A person, for example, is more likely to choose a 90 percent chance of obtaining $10 than a 12 percent chance of obtaining $100 even though the expected value of the latter is higher. In some cases of collusion by sellers (such as in the assigning of markets), the profits of the conspirators do not appear to have been substantially increased. The major benefit was apparently a reduction in uncertainty. Some legal methods used to reduce or avoid uncertainty are the following:

Methods for avoiding uncertainty	Explanation
Short-run feedback and reaction cycle	A short feedback cycle allows frequent new decisions and thus reduces the need to be concerned about future uncertainty.
Negotiated environment	The organization seeks to control its environment by industry-wide conventional practices (sometimes just as restrictive as collusive behavior), by long-term supply or sales contracts, etc.

Problematic Search. The search for solutions is problem-stimulated there is very little planned search for solutions not motivated by problems. The behavioral theory postulates that search for solutions is based on rather simple rules:

1. Search locally either close to the present symptom or close to the present solution. For example, a failure in achieving the sales goal with causes the search to start with the sales department and the sales program.

2. Sometimes the local search fails, expand the search first to organizationally vulnerable areas before moving to other areas. Vulnerable areas are areas with slack resources (i.g., personnel overstaffing) or with goals that are difficult to calculate (e.g., research).

Organizational Learning. Organizations exhibit adaptive behavior over time. They change their goals and revise their problem search procedures on the basis of experience. Aspiration

levels for goals are assumed to change in response to the results experienced. In the steady state, aspiration levels are a little above achievement; when there is decreasing achievement, the aspiration level will lag behind achievements. Where there is a decreasing level of achievement, aspiration levels will decrease but tend to remain above achievement levels. These tend to reflect aspiration levels, and controls (with reports, etc.) can have positive or negative impacts on performance depending on aspiration levels of units being evaluated. The information system is therefore one factor in reconciling the achievement level and aspiration level.

Incremental Decision Making. A variation on the concept of satisfying is an incremental approach in which decision making in organizations in confined to small change from existing policy and procedures. The emphasis is on correcting or improving existing policies and actions. The range of choices considered tends to be very narrow and reflect the consensus of groups in positions of influence and power. In fact, the satisfying criterion for this decision-making strategy is consensus. This approach has been termed "muddling through" by Lindblom, who identifies it as a common strategy in governments and large organizations. It tends to be a reasonable strategy when consensus is important for changes and the changes needed are small. The incremental nature of the changes suggests that it is not a good strategy when there is need for significant shifts in policy and actions. Exzoini has suggested that organizations use a mixed strategy (mixed scanning) for decision making in which minor decisions use an incremental approach, but major policy decisions require a complete consideration of alternatives.

8.6 Decision Making Under Psychological Stress

The models of decision making thus (expect for the notes on expectation) have focused on the decision-making process as a claim, reasoned process, even when constrained by human limits that lead to satisfying instead of optimizing. There are many decisions in organizations and in personal life that the charged with emotion because of strong desires by the decision maker to achieve certain objectives or to avoid dangers or unpleasant consequences. There are strong opposing tendencies in the individual with respect to courses of action. The result is decisional conflict, a significant source of psychological stress. The stress from decisional conflict can lead to impaired decision-making processes. This concept is important to the design of information systems, because a decision support system to be used under conditions of decisional conflict may not be effective unless it is designed to take into account decision behavior under psychological stress. The concepts presented in this section are based on the conflict-theory model of irving L. Jains and Leon Mann.

Decisional Conflict and Psychological Stress. Decisional conflict arises when an important decision has to be made. The conflict is heightened if the decision maker becomes aware of the risk of serious losses from every alternatives course of action. In other words, all decision making causes some decisional conflict, but the serious symptoms to be examined here occur in the case in which all courses of action appear to have serious undesirable outcomes. The symptoms of such serious decisional conflict are apprehensiveness, hesitation, vacillation, distress, etc. Decisions are still made, however, by using various coping patterns.

Coping Patterns. The conflict-theory model of decision making can be seen most directly in emergency situations, such as a fire or flood. However, it can be extended to almost any decision associated with threats or perceived threats to important goals of the decision marker. There are four questions that determine the typical coping pattern.

1. Are the risks serious in the absence of a change?

2. Are the risks serious if change is made?

3. Is it realistic to hope for a better solution?

4. Is there sufficient time to search and deliberate?

If the answer to the first question is no, then no change need be made; if yes, then the next question is relevant. If the consequences of change are perceived as not serious, then a change can be made without decision conflict; if the consequences are serious, the question of better solutions is relevant. If no better solution is perceived possible, defensive avoidance may be the coping pattern. If a better solution is thought possible, and there is time, the coping strategy can be a vigilant process of search, appraisal, and contingency planning. If there is no time (as in a fire), the coping pattern may be hyper vigilance. Hyper vigilance and defensive evidence will be explained because these patterns may result in incomplete search and appraisal. However, the one that is most of interest in terms of information systems and decision support systems is defensive avoidance.

Hyper vigilance is typically a response to disasters. The person focuses on the expected unfavorable consequences and fails to process information indicating that they may not happen. The person feels a pressure to take immediate action, hastily choosing without considering the overall result of considering other possible actions.

Defensive Avoidance. Defensive evidence as a dominate coping strategy is marked by the decision maker avoiding exposure to disturbing information, wishful thinking, distortion of information received, and selective in attention. If the decision maker feels the risks of postponing a decision is low, procrastination will be selected. If not, getting someone else to make the decision (buck passing) might be tried. Prior to making a decision under a defensive avoidance pattern, the decision maker may perform bolstering tactics if no more information about alternatives is expected. After the decision is made, bolstering is used to reduce cognitive dissonance about the decision. The following are examples of bolstering tactics:

1. Exaggeration favorable consequences

2. Minimizing of unfavorable consequences

3. Denial of adverse feelings

4. Exaggeration of remoteness of action that will be required following decision

5. Assuming lack of concern by society (it is a private decision).

6. Minimizing of personal responsibility (social pressure or "orders")

The pattern of defensive avoidance associated with a single decision maker can also e observed under certain conditions in groups. The group may be management group, a labor union, a religious body, etc. Janis has coined the term group think for collective defensive avoidance. The conditions he has identified are illustrated by an industry that is failing to react to vigorous price, quality, and design competition by foreign competitors.

Symptoms of group think	Exanple for industry faced with serious foreign competition
1. Illusion of invulnerability	The company is large and powerful and has cistomer loyalty.
2. Collective rationalization	No one can match our research
3. Belief in the inherent morality of the group	The managers are the best trained and preserve "the traditional" values.
4. Stereotypes of out groups	The competitor products are inferior. They cannot provide service.
5. Direct pressure on dissenters	Demotion or firing of managers who disagree about the danger.
6. Self-censorship	The subject of foreign competition is never put on the agenda by anyone.
7. Illusion of unanimity	No one is objecting, and so everyone must agree that foreign competition is not serious.
8. Self-appointed mind guards	Evidence that contradicts the thinking of the group is removed as it moves up the organization.

8.7 Summary:-

As there are many decisions that have implications on different organizational units having sometimes conflicting objectives, the decision has to be a collective one. Generally, such decisions are taken on the basis of consensus among the concerned managers. The decisions are taken in different types of environment. The type of environment also influences the way the decision is made. There are three types of environment in which decisions are made; Certainty, Uncertainty, Risk.

Here is a need to recognize that information needs of a manager would be determined by the type of decision, the attendant circumstances and the decision-making style of individual manager including the work culture in which the decision is to be taken and performance to be evaluated. It is, therefore, necessary to ensure that information systems should be: Flexible, Versatile, Analytical, and Communication.

The criterion for selecting among alternatives in the normative model is maximization or optimization of either utility or expected value. The criterion, when stated in quantitative terms, is referred to as the objective function for a decision. The theory begins with the assumptions of the administrative model of the decision maker and explains the behavior of decision makers in an organizational context. Major concepts used to explain organizational decision making are quasi-resolution of conflict, uncertainty avoidance, problematic search, organizational learning, and incremental decision making. There are strong opposing tendencies in the individual with respect to courses of action. The result is decisional conflict, a significant source of psychological stress. The stress from decisional conflict can lead to impaired decision-making processes. This concept is important to the design of information systems, because a decision support system to be used under conditions of decisional conflict may not be effective unless it is designed to take into account decision behavior under psychological stress.

8.8 Technical Terms:-

1. recognized : to be aware of as something or someone known before, or as the same as that known; to know by some detail, as of appearance; identify; to be aware of the significance of

2. allocater : to distribute in shares or according to a plan; allot; to fix the location of; locate

3. Virtually : in effect, although not in fact; for all practical purposes

4. modeling : a) a small copy or imitation of an existing object, as a ship, building, etc., made to scale b) a preliminary representation of something, serving as the plan from which the final, usually larger, object is to be constructed c) ARCHETYPE (sense 1) d) a hypothetical or stylized representation, as of an atom e) a generalized, hypothetical description, often based on an

5. Rationale : the fundamental reasons, or rational basis, for something ; a statement, exposition, or explanation of reasons or principles

6. Behavioral : the way a person behaves or acts; conduct; manners; a) an organism's responses to stimulation or environment, esp. those responses that can be observed b) an instance of behavior; specify., one of a recurring or characteristic pattern of observable actions or responses; the way a machine, element, etc. acts or functions

7. stress : strain or straining force; specf.,) force exerted upon a body, that tends to strain or deform its shape b) the intensity of such force, usually measured in pounds per square inch c) the opposing reaction or cohesiveness of a body resisting such force; emphasis; importance; significance; a) mental or physical tension or strain b) urgency, pressure, etc. causing this

8. Conflict : orig., to fight; battle; contend; to be antagonistic, incompatible, or contradictory; be in opposition; clash

9. Hyper vigilance : [Slang] high-strung; keyed up; the quality or state of being vigilant; watchfulness

10. Loyalty : quality, state, or instance of being loyal; faithfulness or faithful adherence to a person, government, cause, duty, etc.

11. Illusion : a false idea or conception; belief or opinion not in accord with the facts; An unreal, deceptive, or misleading appearance or image

12. Stereotypes : a one-piece printing plate cast in type metal from a mold (*matrix*) taken of a printing surface, as a page of set type; an unvarying form or pattern; specify., a fixed or conventional notion or conception, as of a person, group, idea, etc., held by a number of people, and allowing for no individuality, critical judgment, etc; to make a stereotype of; to print from stereotype plates

8.9 Self Assessment Questions:

1. What is Group Decision Making? Explain?

2. Explain about Decision Making Environment?

3. What are the implications for information systems? Explain?

4. Explain the Criteria of Decision Making?

5. Explain about Behavioral Model of Decision Making and physic logical stress under Decision Making?

8.10 Reference Books

1. CSV. Murthy – Management Information Systems

2. VARMA & AGARWAL – Management Information System

- S. PRABHAKAR

LESSON – 9

MIS SUB SYSTEMS
ACCOUNTING INFORMATION SYSTEM

9.0 Objective: - This lesson is mainly deals with accounting information and inventory information in the computer with the help of knowing in accounting receivable module, Accounting payable module and inventory module.

Structure:-

9.1. Introduction

9.2. Accounts Receivable Module

9.3. Accounts Payable Module

9.4. Inventory Module

9.5. Inventory status

9.6. Inventory Valuation

9.7. Summary

9.8. Technical Terms

9.9. Self Assessment Questions

9.10. Reference Books

9.1 Introduction

Marketing plays a role in the firm's AIS (Accounting information system) providing sales order data. Perhaps the sales representatives enter the data from customer offices, using laptops. Or sales order personnel at headquarters may take order data over the phone or by mail and enter it into keyboard terminals. In some cases customers enter order data directly into the firm's computer, perhaps using the internet.

The data is used to prepare information in the form of periodic and special reports. The data also provides the input for mathematical models and knowledge – based systems.

Data for Preparation of Periodic Reports: - A classic example of how marketing information can be provided by the AIS is sales analysis. Sales analysis is the study of the firm's sales activity in terms of which products are being sold, which customers are buying the products, and which sales representatives are selling them.

Data for Preparation of Special Reports:- The vast majority of data that is used to respond to managers database queries likely comes from data provided by the AIS. An example is the sales analysis report.

Data for Mathematical Models and Knowledge – based Systems: - When we discussed the Decision Support Systems, we described how the firm's executives could use a pricing model

to gauge the effects of price changes on profit. Much of the output information from the pricing model was produced from data provided by the AIS.

The key point is that if a firm does not have good AIS, it cannot expect to provide its problem solvers with good information.

9.2 Accounts Receivable Module

The term **accounts receivable** refers to obligations owed to a lodging or food services operation form sales made on credit. An accounts receivable application typically performs the following functions:

- Maintains account balances

- Processes billings

- Monitors Collection activities

- Generates aging of accounts receivable reports

- Produces an audit report indicating all accounts receivable transactions

Management can also set various credit limits and the module can print reports that list all accounts with balances above their established Credit limit. For each account, the module can maintain a variety of credit history data. These data typically indicate the number of days elapsed between payments and the oldest invoice to which the last payment applied with an integrated system, accounts receivable balances may be automatically transferred from a front office accounting module to a back office accounts receivable module during the system update routine. The **city ledger** is a subsidiary ledger listing accounts receivable balances of guests who have checked out, and other receivable as well. Data from the front office accounting module (such as balance from guest folios, non – guest accounts, bill – to accounts, credit card billings, and others) form part of the **city ledger file** of the back office accounts receivable module.

Some front office systems simplify account billing procedures by creating semi – permanent and permanent folios. Semi – permanent folios are assigned to guest or non – guest accounts designated for direct billing. Permanent folios are assigned to credit card companies and other long – term contracted credit relationships.

As payments are received or additional charges incurred, they are posted to the appropriate city ledger account. Payments or charges posted to the accounts receivable module immediately update the city ledger file, helping to ensure that all accounts balances are current.

Customer Master File:-

A **Customer Master file** provide a basis for collecting and storing billing information. Customer data maintained in this file may include:
- Account code
- Name of guest or account
- Address
- Telephone number
- E – mail address
- Web site Address

- Contact person
- Type of account
- Credit limit
- Last payment date
- Last payment amount
- Credit history

Generally, management identifies the names of the various types of accounts. These accounts are not mutually exclusive and can be classified as transient, permanent, credit card Company, direct billing, and so on. Accounts receivable modules automatically generate individual account invoices.

Management Reports:- An accounts receivable module generally allows management to access data on any account stored in an accounts receivable file. Many modules maintain an **accounts aging file,** containing data that can be formatted into a variety of aging reports. An **aging of accounts receivable schedule** breaks down each account in the accounts aging file according to the date of the initial charge.

Although aging schedules can be printed on demand, they are routinely generated during month – end file updates. In addition, an accounts receivable module can automatically print (on letter – head stationery) a series of standard dunning letters for all accounts in 30 – day and delinquent Payment categories. A dunning letter is a request for payment of an outstanding balance.

An accounts receivable module can streamline reports for specific users. Much of the detailed information in an aging schedule may not be necessary for some accounting functions. In these cases, data maintained in the accounts aging file can be selected according to the user's specific needs for customized aging reports. In addition, a summary aging of accounts receivable reports may be produced for management.

For security, some accounts receivable modules issue an audit report showing accounts receivable transactions. An audit report usually charts each account by account code, account name, invoice number(s) and amount(s), and the types of transactions processed over a specified time period.

9.3 Accounts Payable Module

The term **accounts payable** refers to liabilities incurred for merchandise, equipment, or other goods and services purchased by the hospitality operation on account. The accounts payable module can be a stand – alone system or it can work with other modules of an automated accounting system. When this module is part of an accounting system, it maintains current payables records through online automatic posting of transactions to the financial reporting (or general ledger) module. This helps prevent duplicate entries of invoices and gives management up – to – date information on invoices and vendors.

An accounts payable application maintains a vendor master file, an in voice register file, and a check register file, and typically performs the following functions:

- Posts purveyor invoices
- Monitors vendor payment discount periods
- Determines amounts due
- Produces checks for payment

- Facilitates the reconciliation of cleared checks
- Generates numerous management reports

With a fully integrated hotel property management system, an accounts payable module can also access travel agent commission data from the front office reservations module to print travel agent commission checks. Along with each check, the module can print a voucher that lists guest name, arrival date, and other reservations data. Alternatively, accounts payable modules without access to reservations data. Alternatively, accounts payable modules without access to reservations data require staff to hand – process commission checks, treating them as typical accounts payable invoices.

Additional reports that can be produced from data in accounts payable module files are payable aging reports, vendor status reports, vendor activity reports, and monthly check registers. A **check register** is a printout of the checks written during a specified time period. The checks can be sorted by vendor or by the invoice due date. An **accounts Payable aging report** can contain several aging columns and list invoices by vendor number, vendor name, invoice number, and invoice date. Generally, this report can be printed on demand and streamlined to meet the needs of users. A **monthly check register** provides a hard copy audit trial of payment made to vendors. This report also identifies checks that have not been accounted for

Vendor Master file:-

The **vendor master file** maintains records of all current vendors. Data contained in this file may include:

- Vendor number
- Vendor name
- Contact name
- Address
- Telephone number
- E – mail address
- Web site address
- Vendor payment priority
- Discount Terms
- Discount account number
- Invoice description
- Payment date
- Year – to – date purchase

A **Vendor status report,** presents summary accounts payable information. A **vendor activity report** can list gross amounts invoiced, discounts taken, number of invoices, and other vendor data.

Invoice Register File:- An **invoice register file** keeps a list of all invoices currently outstanding and payable. The accounts payable module can select invoices for payment by due date or by payment discount date. The **payment discount date** is the last day on which it is possible for the operation to take advantage of a cash payment discount offered by a vendor. Many vendors offer a discount on the invoice amount If payment is made within a specified time frame. For example, the terms of an invoice could be stated as:2/10 net 30 days, meaning that the buyer applies a 2% discount to the invoice amount if payment is made within 10 days of the date on which the invoice

was issued; if the discount period elapses, full payment is expected within 30 days of the original invoice date. Tracking discount payment dates is often a tedious and time – consuming task in non – automated hotel or restaurant properties. The accounts payable module lets employees perform more productive tasks and lets management take advantage of significant savings monitored by this module.

Although accounts payable modules can automatically select invoices for payment, they typically allow management to override selected invoices. **Override options** give management complete control over cash disbursements before engaging the check – writing feature of the accounts payable module. Options that management may wish to exercise include:

- Selecting invoices for payment that are not yet due
- Making partial payments of certain invoices
- Suspending payments of certain invoices
- Adding reference data to invoices (to be printed on check stubs)

After management has exercised options, a **cash requirements report** can be printed. This report lists all invoices selected for payment and the corresponding cash requirements. These reports can be prepared by vendor number, vendor name, due date, item, or group code. They typically include vendor number, vendor name, and invoice number, due date, balance due, and amount to be paid. Most accounts payable modules can print a cash requirements reports at any time, basing it on a list of all open invoices.

Check Register File:-

The **check register file** monitors the calculation and printing of bank checks for payment of selected invoices. After printing checks, the accounts payable module deletes paid invoices from the invoice register file, preventing the possibility of double payments. With a fully integrated property management system, the check – writing routine updates account balances maintained by the general ledger module. After the checks have been written, the accounts payable module prints a check register by check number, which also may be sorted by vendor or by invoice due date.

Accounts payable modules can process hand – written checks and voided checks as well. Once hand – written checks are posted, the entire system is updated. Generally, the checks that are input as hand – written are highlighted on the check register printout. When a voided check is entered in the accounts payable module, the accounting system is also updated. The invoice is added back to the invoice register file, and the voided check is highlighted on the check register printout. Highlighting hand – written and voided checks on the printout enhances management's internal control.

After all entries have been made for hand – written and voided checks, the accounts payable module may print an **outstanding checks list**. This list details all checks that have been issued but remain outstanding. The outstanding checks list can be used to reconcile checks issued against canceled checks appearing on bank statements. While actual procedures for **check reconciliation** vary from one system to another, the procedure could prompt the user to enter check numbers and amounts from a bank statement. As each check is entered, the accounts payable module verifies the entry and removes (clears) the check from the outstanding checks list. When all checks have been reconciled, the system can print a **reconciliation audit report**. This report balances the total of checks removed from the outstanding checks list with the total of cleared checks appearing on the bank statement. After a check reconciliation routine, the accounts payable module typically prints an updated list of all checks still outstanding.

9.4. Inventory Module

An accounting system may use an inventory module for internal control. Internal control is essential to efficient hospitality industry operations. Basic inventory data is stored in an inventory master file, which typically holds the following information:

- Item name
- Item description (brief)
- Inventory code number
- Storeroom location code
- Item purchase unit
- Purchase unit price
- Item issue unit
- Product group code
- Vendor identification number
- Order lead time
- Minimum – maximum stock levels
- Date of last purchase

With this data, a back office inventory module can address three of the most common inventory concerns: inventory status, inventory variance, and inventory valuation.

9.5 Inventory status

Inventory status is an account of how much of each item is in storage. Inventory status may be determined by a physical inventory or a perpetual inventory, or both. With a physical inventory system, property staff periodically observes and count items in storage. With a perpetual inventory system, a back office inventory module maintains an inventory status file that keeps a running balance of the quantity of issued / stored items. In general this module carries over the ending inventory of the prior period as the beginning inventory of the current period and adds all newly purchased items as they enter storage areas and subtracts all quantities issued from storage to production areas.

Inventory modules may accommodate hand – held, wireless, mobile devices that significantly speed up the process of taking physical inventory. These devices can also be use to receive orders, create requisitions and transfers, and build shopping lists. In addition, some inventory modules can track by separate inventory locations and enable managers to print inventory count sheets that match the lay – out of each location. This feature can also speed up the process of taking physical inventory.

The term inventory variance refers to differences between a physical count of an item and the balance maintained by the perpetual inventory system. Significant variances may indicate control problems requiring investigation and correction. Inventory modules may generate a variety of variance reports.

8.6 Inventory Valuation

The term inventory valuation refers to the value of items in inventory. An inventory valuation file is used to determine the cost of goods sold and / or the replacement cost of items listed in the

inventory master file. Since methods of inventory valuation vary, management must be careful to clarify which methods a particular food service inventory package should support.

An inventory valuation file tracks the value of items in inventory by any of the four generally accepted methods of inventory valuation:

- First in, first out (FIFO)
- Last in, first out (LIFO)
- Actual cost
- Weighted Average

When a first in, first out (FIFO) method of inventory valuation is used, the products in storage areas are valued at the level of the most recently purchased items in storage. With a last in, first out (LIFO) method, the inventory value is assumed to be represented by the cost of items which were placed in storage the earliest. The actual cost approach values inventory only in relation to actual costs of items stored. The value of stored products is, then, the value represented by individual unit costs. The weighted average method values inventory by <u>considering</u> the quantity of products purchased at different unit costs. This method "weights" the prices to be averaged based on the quantity of products in storage at each price. Note that the method of valuation does not relate to the actual flow of items through <u>storerooms</u>.

9.7 Summary

Marketing plays a role in the firm's AIS (Accounting information system) providing sales order data. Perhaps the sales representatives enter the data from customer offices, using laptops. The data is used to prepare information in the form of periodic and special reports. The data also provides the input for mathematical models and knowledge – based systems.

Data for Preparation of Periodic Reports, Data for Preparation of Special Reports, Data for Mathematical Models and Knowledge – based Systems.

The term accounts receivable refers to obligations owed to a lodging or food services operation form sales made on credit. An accounts receivable application typically performs the following functions: Maintains account balances, Processes billings, Monitors Collection activities, Generates aging of accounts receivable reports, Produces an audit report indicating all accounts receivable transactions A Customer Master file provide a basis for collecting and storing billing information. Customer data maintained in this file may include: Account code, Name of guest or account, Address, Telephone number, E – mail address etc

An accounts payable application maintains a vendor master file, an in voice register file, and a check register file, and typically performs the following functions: Posts purveyor invoices, monitors vendor payment discount periods, Determines amounts due, Produces checks for payment, Facilitates the reconciliation of cleared checks, Generates numerous management reports. The vendor master file maintains records of all current vendors. Data contained in this file may include: Vendor number, Vendor name, Contact name, Address, Telephone number, E – mail address etc. A Vendor status report, presents summary accounts payable information. A vendor activity report can list gross amounts invoiced, discounts taken, number of invoices, and other vendor data.

An accounting system may use an inventory module for internal control. Internal control is essential to efficient hospitality industry operations. Basic inventory data is stored in an inventory master file, which typically holds the following information: Item name, Item description (brief), Inventory code number, Storeroom location code, Item purchase unit, Purchase unit price, Item issue unit etc.

Inventory status is an account of how much of each item is in storage. Inventory status may be determined by a physical inventory or a perpetual inventory, or both. The term inventory <u>valuation</u> refers to the value of items in inventory. An inventory valuation file is used to determine the cost of goods sold and / or the replacement cost of items listed in the inventory master file. Since methods of inventory valuation vary, management must be careful to clarify which methods a particular food service inventory package should support. An inventory valuation file tracks the value of items in inventory by any of the four generally accepted methods of inventory valuation: First in, first out (FIFO), Last in, first out (LIFO), Actual cost, Weighted Average

9.8 Technical Terms

1. representatives   : representing or serving to represent; specify., a) picturing; portraying; reproducing b) acting or speaking, esp. by due authority, in the place or on behalf of another or others; esp., serving as a delegate in a legislative assembly;   composed of persons duly authorized, as by election, to act and speak for others !a representative assembly" ; o f , characterized by, or based on representation of the people by elected delegates !representative government" ; being an example or type of a certain class or kind of thing; typical !a building representative of modern architecture" ; a person or thing enough like the others in its class or kind to serve as an example or type ; a person duly authorized to act or speak for another or others; specif., a) a member of a legislative assembly b) a salesman or agent for a business firm;   a member of the lower house of Congress (House of Representatives) or of a State legislature

2. Perhaps : possibly; maybe

3   Customers : a person who buys, esp. one who buys from, or patronizes, an establishment regularly; [Colloq.] any person with whom one has dealings!a rough customer"

4. Queries : a question; inquiry; a doubt ; a question mark (?) placed after a question or used to question the accuracy of written or printed matter; to call in question; ask about ; to question (a person) ; to mark with a QUERY (sense 3) ; to ask questions or express doubt

5. Vast : very great in size, extent, amount, number, degree, etc. ; [Archaic] a vast space

6. Firm's : not yielding easily under pressure; solid; hard ; not moved or shaken easily; fixed; stable ; continued steadily; remaining the same !a firm friendship" ; unchanging; resolute; constant !a firm faith" ; showing determination, strength, etc. !a firm command" ; legally or formally concluded; definite; final !a firm contract, a firm order" ; Commerce not rising or falling very much; steady: said of prices, etc. ; to make or become firm, or solid, steady, stable, definite, etc.: often with up

stand (or hold) firm to be or remain steadfast in conviction despite attack, efforts to persuade, etc.;

SYN.—firm, in referring to material consistency, suggests a compactness that does not yield easily to, or is very resilient under, pressure [firm flesh]; **hard** is applied to that which is so firm that it is not easily penetrated, cut, or crushed [hard as rock]; **solid** suggests a dense consistency throughout a mass or substance that is firm or hard and often connotes heaviness or substantiality [solid brick]; **stiff** implies resistance to bending or stretching [a stiff collar]

7. Executives : of, capable of, or concerned with, carrying out duties, functions, etc. or managing affairs, as in a business organization ; empowered and required to administer (laws, government affairs, etc.); administrative: distinguished from LEGISLATIVE, JUDICIAL ; of administrative or managerial personnel or functions ;   a person, group of people, or branch of government empowered and required to administer the laws and affairs of a nation ; any person whose function is to administer or manage affairs, as of a corporation, school, etc.

8. Gauge : a standard measure or scale of measurement ; dimensions, capacity, thickness, etc. ; any device for measuring something, as the thickness of wire, the dimensions of a machined part, the amount of liquid in a container, steam pressure, etc. ; any means of estimating or judging ; the distance between the rails of a rail track: cf. STANDARD GAUGE, BROAD GAUGE, NARROW GAUGE ; the distance between parallel wheels at opposite ends of an axle ; the size of a bore, esp. of a shotgun, expressed in terms of the number per pound of round lead balls of a diameter equal to that of the bore ; the thickness of sheet metal, diameter of wire, etc.; a) a measure of the fineness of a knitted or crocheted fabric b) the fineness of a machine-knitted fabric expressed in terms of the number of loops per 1L inches.

9. Expect : orig., to await; wait for ; to look for as likely to occur or appear; look forward to; anticipate !I expected you sooner" ; to look for as due, proper, or necessary !to expect a reward" ; [Colloq.] to suppose; presume; guess ; **be expecting** [Colloq.] to be pregnant ; **ex[pect4a[ble** ; **SYN.—expect** implies a considerable degree of confidence that a particular event will happen [to expect guests for dinner]; **anticipate** implies a looking forward to something with a foretaste of the pleasure or distress it promises, or a realizing of something in advance, and a taking of steps to meet it [to anticipate trouble]; **hope** implies a desire for something, accompanied by some confidence in the belief that it can be realized [to hope for the best]; **await** implies a waiting for, or a being ready for, a person or thing [a hearty welcome awaits you]

10. Back office : the part of the body opposite to the front; in humans and many other animals, the part to the rear or top reaching from the nape of the neck to the end of the spine; t h e backbone or spine; the part of a chair that supports one's back; the part of a garment or harness that fits on the back of a person or animal ; something performed or intended to be performed for another; (specified kind of) service !done through someone's good (or ill) offices" a) a function or duty assigned to someone, esp. as an essential part of his work or position b) the function or characteristic action of a particular thing ; a position of authority or trust, esp. in a government business, institution, etc. !the office of president" ; a) any of the branches of the U.S. Government ranking next below the departments !the Printing Office" b) [Chiefly Brit.] a governmental department !the Foreign Office" ; a) the building, room, or series of rooms in which the affairs of a business, professional person, branch of government, etc. are carried on b) all the people working in such a place; staff ; [Chiefly Brit.] the rooms or buildings of a house or estate in which the servants carry out their duties ; 5ME < ML(Ec) officium, divine rite < L, ceremonial observance6 [often O3] a religious service or set of prayers; esp., DIVINE OFFICE ; —**SYN** FUNCTION, POSITION ; **in** (or **out of**) **office** currently holding (or not holding) power or a particular position of authority

11. Aging : the time that a person or a thing has existed since birth or beginning; probable lifetime ; a stage of life !she is at the awkward age" ; the condition of being old; old age !wearied with age" ; a generation ; a) any interval of geologic time; specify., an interval corresponding to a stage in rock strata b) any prehistoric cultural period in human development !the Stone Age" c) a period characterized by some person or by some outstanding feature or influence !the Elizabethan Age, the Space Age" ; [often pl.] [Colloq.] a long time ; **aged, ag4ing** or **age4ing** ; to grow old or show signs of growing old ; to ripen or become mature; to make, or make seem, old or mature ; to cause to ripen or become mature over a period of time under fixed conditions !to age cheese" ; **of a certain age** of an unspecified age, but no longer young: usually said of women ; **of age** having reached the age when one has full legal rights

12. Delinquent : failing or neglecting to do what duty or law requires ; past the time for payment; overdue !delinquent taxes" ; a delinquent person; esp., a juvenile delinquent

13. Merchandise : things bought and sold; goods; commodities; wares ; [Obs.] buying and selling; trade ; to buy and sell; carry on trade in (some kind of goods) ; to advertise, promote, and

organize the sale of (a particular product)

14. Purveyor : to furnish or supply

15. Inventory : an itemized list or catalog of goods, property, etc.; esp., such a list of the stock of a business, taken annually; the store of goods, etc. that are or may be so listed; stock ; any detailed list ; the act of making such a list ; to make an inventory of ; to place on an inventory ; **take inventory** ; to make an inventory of stock on hand ; to make an appraisal, as of one's skills or personal characteristics

16. Typically : serving as a type; symbolic ; having or showing the characteristics, qualities, etc. of a kind, class, or group so fully as to be a representative example ; of or belonging to a type or representative example;

17. Physical : of nature and all matter; natural; material; of natural science or natural philosophy ; of or according to the laws of nature ; of, or produced by the forces of, physics ; a) of the body as opposed to the mind !physical exercise" b) preoccupied with bodily or sexual pleasures; carnal c) of or marked by aggressive or rough play, activity, etc. ; a general medical examination: in full **physical examination**

18. Property : a) the right to possess, use, and dispose of something; ownership !property in land" b) something, as a piece of writing, in which copyright or other rights are held, specify., one acquired for production as a film; a thing or things owned; possessions collectively; esp., land or real estate owned; a specific piece of land or real estate; any trait or attribute proper to a thing or, formerly, to a person; characteristic quality; peculiarity; specify., any of the principal characteristics of a substance, esp. as determined by the senses or by its effect on another substance !the properties of a chemical compound" ; something regarded as being possessed by, or at the disposal of, a person or group of persons !common property" ; Logic a quality common to all members of a species or class ; Theater, Film, TV any of the movable articles used as part of the setting or in a piece of stage business, except the costumes, backdrops, etc.

19. Subtracts : to take away (a part from a whole) ; to take away or deduct (one number or quantity from another)

20. Quantities : an amount; portion; any indeterminate bulk, weight, or number ; the exact amount of a particular thing ; [also pl.] a great amount or number ; that property of anything which can be determined by measurement ; Logic that characteristic of a proposition according to which it is classified as universal or particular ; Math. a) a thing that has the property of being measurable in dimensions, amounts, etc. or in extensions of these which can be expressed in numbers or symbols b) a number or symbol expressing a mathematical quantity ; Phonet., Prosody the relative length, or duration, of a vowel, continuant consonant, or syllable

21. Accommodate : to make fit; adjust; adapt !to accommodate oneself to changes" ; to reconcile (differences) ; to help by supplying (with something) ; to do a service or favor for ; to have space for !a table to accommodate six diners" ; to provide lodging for ; to become adjusted, as the lens of the eye in focusing on objects at various distances

22. Devices : a thing devised; plan; scheme, esp., a sly or underhanded scheme; trick ; a mechanical invention or contrivance for some specific purpose ; something used to gain an artistic effect !rhetorical devices" ; an ornamental figure or design ; a design, often with a motto, on a coat of arms; heraldic emblem ; any motto or emblem ; [Archaic] the act or power of devising ; **leave to one's own devices** to allow to do as one wishes

23. Significantly : a) having or expressing a meaning b) full of meaning ; important; momentous ; having or conveying a special or hidden meaning; suggestive ; of or pertaining to an observed

departure from a hypothesis too large to be reasonably attributed to chance !a significant statistical difference" ; [Archaic] something that has significance; sign

24. Requisitions : a requiring, as by right or authority; formal demand ;   a formal written order, request, or application, as for equipment, tools, etc. ;   the state of being demanded for service or use ;   [Rare] a requirement; indispensable condition ; Law a demand by one government upon another for the surrender of a fugitive criminal ;   to demand or take, as by authority !to requisition food for troops" ; [Now Rare] to demand from; make demands on !to requisition a town for food" ; to submit a written order or request for (equipment, etc.)

25. Perpetual : lasting or enduring forever or for an indefinitely long time; eternal; permanent ; continuing indefinitely without interruption; unceasing; constant !a perpetual nuisance" ; blooming continuously throughout the growing season ; a perpetual plant; esp., a variety of perpetual hybrid rose

26. Valuation : the act of determining the value or price of anything; evaluation; appraisal ; determined or estimated value or price on the market ; estimation of the worth, merit, etc. of anything

27. Considering : in view of; taking into account; [Colloq.] taking all circumstances into account; all things considered

28. Storerooms : a room where things are stored

9.9 Self Assessment Questions:

1. Explain about AIS?
2. Explain about the Accounting Receivable Module?
3. How the Accounting Payable Module will play an important role in Computers – Discuss?
4. Explain about Inventory Module and Inventory Status?
5. Explain about the inventory Valuation?

9.10 Reference Books

1. CSV. Murthy – Management Information Systems

2. VARMA & AGARWAL – Management Information System

3. Managing Technology in the Hospitality industry – Michael L. Kasavana, John J. Cahill

- S.PRABHAKAR

LESSON – 10

MIS SUBSYSTEMS IN MARKETING

10.0 Objective: - This Lesson consists of the role play by MIS subsystems through marketing, by knowing the things of Marketing principles, an MIS model and marketing research subsystems and at the same time intelligence of marketing.

Structure:-

10.1. **Marketing**

10.2. **A Marketing Information System Model**

10.3. **Marketing Research Subsystem**

10.4. **Marketing Intelligence Subsystem**

10.5. **Summary**

10.6. **Technical Terms**

10.7. **Self Assessment Questions**

10.8. **Reference Books**

10.1 Marketing

Marketing was the first functional area to underline exhibit an interest in MIS. Shortly after the MIS concept originated, marketers tailored it to their area and called it the MIS. Early graphic models of MIS provide a basis for organizing all functional information systems.

The model structure that we will use in this and consists of input subsystems that gather data and information from inside the firm and from its environment, a database where the data is kept, and output subsystems that transform the data into information.
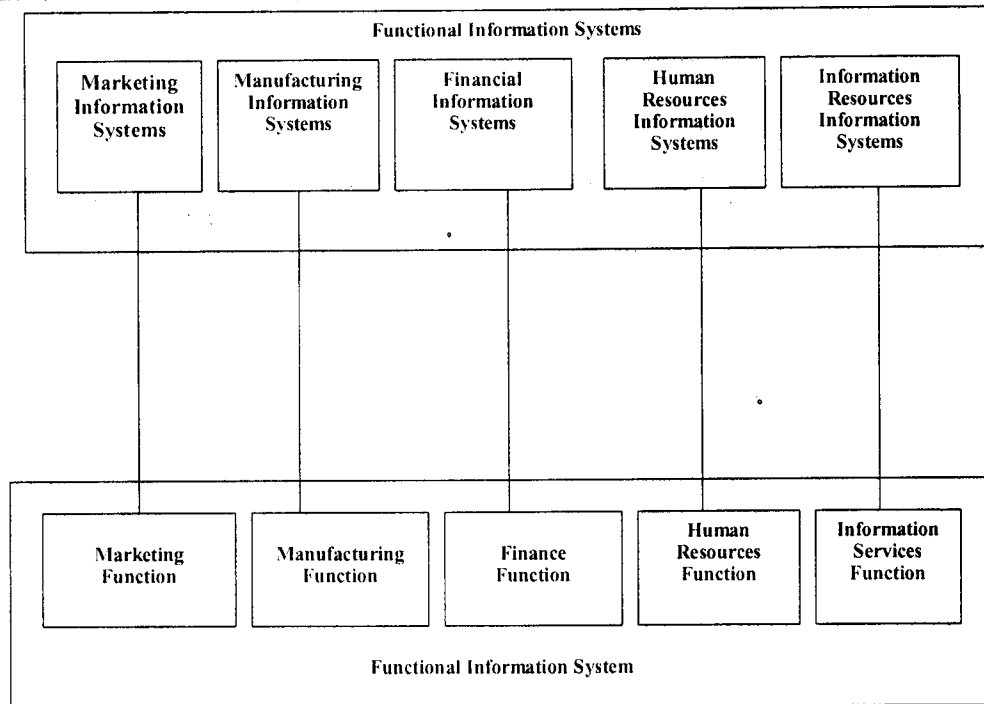
Marketing Principles: - Many people think of marketing in narrow terms, as including only selling and advertising. Marketers, however, define it very broadly. One definition states that marketing "consists of individual and organizational activities that facilitates and expedite satisfying exchange relationships in a dynamic environment through the creation, distribution, promotion, and pricing of goods, services, and ideas". Such a view suggests the broad range of problems that marketing managers must solve as well as the broad range of information that is needed to solve the problems.

Marketing Mix: - Marketing managers have a variety of resources with which to work. The objective is to develop strategies that apply these resources to market the firm's goods, services and ideas.

Marketing strategies consist of a mixture of ingredients that has been named the marketing mix product, promotion, place, and price. Collectively they are known as the four Ps. Product is what the customer buys to satisfy a perceived want of need. A product can be physical good, some type of service, or an idea.

Promotion is concerned with all the means of encouraging the sale of the product, including advertising and personal selling. Place deals with the means of physically distributing the products to the customer through a channel of distribution.

Price consists of all elements relating to what the customer pays the product.

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Functional Information Systems

Marketing Information Systems	Manufacturing Information Systems	Financial Information Systems	Human Resources Information Systems	Information Resources Information Systems

Marketing Function	Manufacturing Function	Finance Function	Human Resources Function	Information Services Function

Functional Information System

10.2 A Marketing Information System Model

Our model of a marketing information system consists of a combination of input and output subsystems connected by a database.

Output Subsystems:- Each output subsystem provides information about its part of the mix. The product subsystems provide information about the firm's products. The place subsystems provide information about the firm's distribution net work. The promotion subsystems provide information about the firm's advertising and personal and personal selling activities. The price subsystems help the manager make pricing decisions.

Each of the output subsystems consists of programs in the software library. These programs enable the manager to obtain information in the form of periodic and special reports, the results of mathematical simulations, electronic communications, and knowledge – based system advice.

It is important that you realize that the output subsystems draw on each of the CBIS subsystems – AIS, MIS, DSS, the virtual office, and knowledge based systems. The output subsystems of all functional information systems contain all types of CBIS software.

Database: - The data that is used by the output subsystems come from the database is unique to the marketing function, but much is shared with other functional areas.

We will now describe each of the subsystems in greater detail, beginning with the input subsystems.
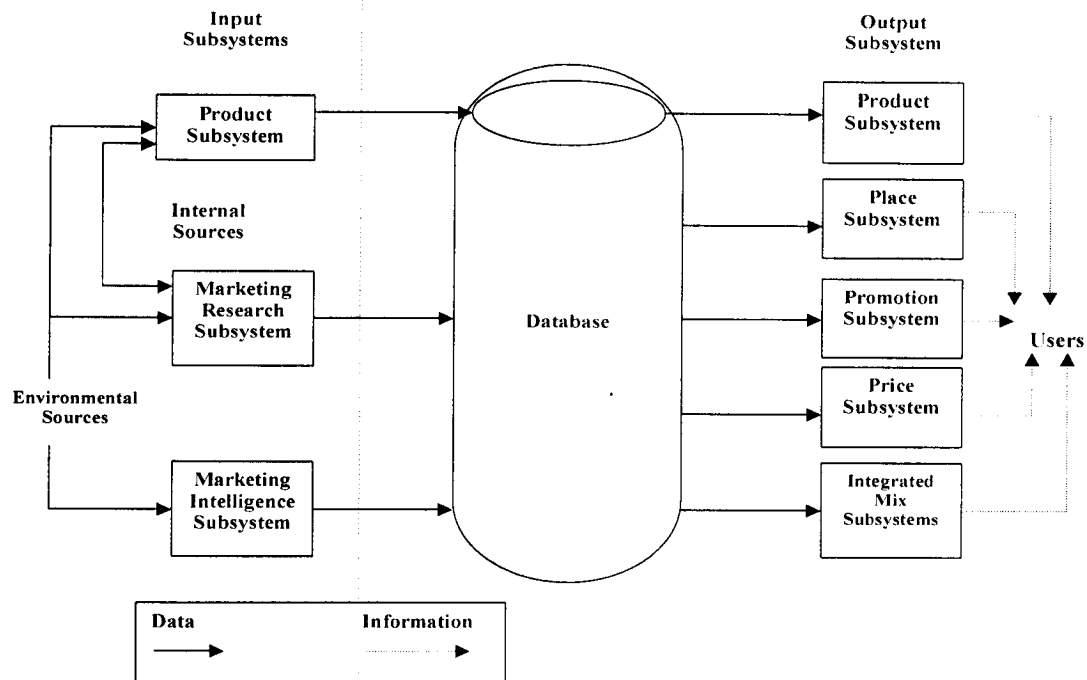
Fig.: A Model of a marketing Information System

Input Subsystems:- The accounting information system gathers data describing the firm's marketing transactions. The marketing intelligence subsystems gather information from the firm's environment that has a bearing on marketing operations. The marketing research subsystems conducts special studies of marketing operations for the purpose of learning customer needs and improving marketing efficiency.

10.3 MARKETING RESEARCH SUBSYSTEM

Marketing managers can use marketing research to gather any type of information, but most activity is aimed at customers and prospects. Marketers use the term consumer to describe both groups.

Primary and Secondary Data:- Two types of data are gathered primary and secondary. Primary data are data that the firm collects. Data gathered by the firm's sales persons is an example. Data that has been collected by some one else is called secondary data.

Using Marketing Research to Gather Secondary Data:- Some secondary data must be purchased and is often made available in the form of magnetic tapes or diskettes for easy into CBIS. Other secondary data, such as that found in libraries, is free for the asking. Computer based information retrieval systems, available in many libraries, minimize the collection time. Mailing lists are another example of secondary data. These lists are available in many forms, including magnetic tape, diskettes, gummed labels, and index cards. The lists enable the firm to establish context with very select markets, usually by direct mail.

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Using Marketing Research to Gather Primary Data:- Almost every one has been <u>approached</u> by someone conducting a survey. A survey involves asking a number of people the same questions by personal interview, telephone, or mail. The number of <u>respondents</u> may be relatively small, say thirty, or quite large, say several thousands.

When questions are asked to a small number of people, <u>perhaps</u> only three or four, the technique is known as an in – depth interview. The time <u>devoted</u> to the interview is much longer than that spent with someone participating in a survey. Also the emphasis of the in – depth interview is on <u>obtaining</u> explanations of why consumers behave as they do. This contrasts with the emphasis of surveys on what they do.

A third marketing research technique is <u>observation</u>, either watching a certain behavior or looking for evidence that it occurred. Marketing researchers often note license plate numbers in a shopping mall parking lot to <u>determine</u> how far people have <u>driven</u>. <u>Instances</u> have also been recorded of researchers going through people's <u>garbage</u> to learn what products they buy.

Marketing have also applied the technique of the controlled experiment from the physical and behavioral sciences, and both the real marketplace and the classroom are used as laboratories. College students often serve as subjects in experiments designed to measure the effect of a particular treatment (such as a certain type of ad) on behavior (such as the ability to recall the ad)

Marketing Research Software:- Until a few years ago only the largest firms could conduct their own marketing research. Smaller organizations had to rely on marketing research organizations or do with out. Now, there are a large number of varieties of marketing research software packages available. The packages, most of which are for micros, perform a variety of <u>applications</u> that range from assisting telephone interviewers in conducting <u>sophisticated statistical analysis</u>. There are also packages that produce graphics of the research findings. Colour maps are popular ways to display research data that relates to made areas.

Although the software makes marketing research a reality to firms of all sizes, it is not the key to effective research. The key is the expertise that is used to design research projects and interpret the findings. If the <u>expertise</u> does not exist within the firm, it can come from consultants, or the firm can enroll employees in <u>marketing research</u> courses

10.4 Marketing Intelligence Subsystem

Each functional area has a responsibility to interface the firm with particular elements in the environment. Marketing has primary responsibility for the customers and competitors. <u>Lie</u> the other functional areas, marketing also has responsibilities in terms of the government and the global community.

The AIS gathers customer data, and the marketing <u>intelligence</u> subsystems gather competitor data. Marketing has no responsibility for establishing an outgoing flow to the competitors, but it must establish an incoming flow.

The term marketing intelligence may bring to mind visions of one firm <u>spying</u> on another – industrial <u>espionage</u>. A certain amount of such undercover work goes on in the competitive world of business, but few instances have been publicized. Firms are <u>hesitant</u> to report thefts of <u>proprietary</u> information for fear of damaging their <u>corporate images</u>. Also, such <u>violations</u> are difficult for authorities to <u>prosecute</u>.

There is really no reason to break the law to obtain information, because it is so easy to obtain legally. Marketing intelligence refers to the wide range of ethical activities that may be used to gather information about competitors. It does not refer to unethical or clandestine activities. Using electronic media firms can remain current on their environmental elements. This concludes our description of the three input subsystems. We now turn our attention to the output subsystems.

10.5 Summary: - The model structure that we will use in this and consists of input subsystems that gather data and information from inside the firm and from its environment, a database where the data is kept, and output subsystems that transform the data into information. Marketing Principles, Marketing Mix. Marketing Information System Model of a marketing information system consists of a combination of input and output subsystems connected by a database.

Output Subsystems, Database, Input Subsystems.

Marketing managers can use marketing research to gather any type of information, but most activity is aimed at customers and prospects. Marketers use the term consumer to describe both groups. ; Primary and Secondary Data, Using Marketing Research to Gather Secondary Data, Using Marketing Research to Gather Primary Data, Marketing Research Software. Marketing Intelligence Subsystem's each functional area has a responsibility to interface the firm with particular elements in the environment. Marketing has primary responsibility for the customers and competitors. Lie the other functional areas, marketing also has responsibilities in terms of the government and the global community.

10.6 Technical Terms

1. Exhibit : to present or expose to view; show; display ; to present to public view for entertainment, instruction, advertising; judgment in a competition, etc. ; to give evidence of; reveal !to exhibit impatience" ; Law to present (a document or an object) formally to a court ;   Med.   to administer (a drug, etc.) as a remedy ; to put pictures, wares, etc. on public display ; a show; display; presentation ; a thing exhibited; esp., an object or objects displayed publicly ; Law a document or object produced as evidence in a court

2. tailored : having trim, simple lines, as some women's garments, or specially fitted, as slipcovers

3. Dynamic : relating to an object, or objects, in motion: opposed to STATIC ; energetic; vigorous; forceful ; relating to or tending toward change or productive activity ; Comput. a) designating or of an event that occurs during the execution of a program !dynamic dump" b) designating or of memory that requires periodic renewal of its stored data ; Electronics designating or of a speaker, microphone, etc. in which a diaphragm or cone is attached to a coil that vibrates within a fixed magnetic field Also

4. Strategies : a) the science of planning and directing large-scale military operations, specify. (as distinguished from TACTICS) of maneuvering forces into the most advantageous position prior to actual engagement with the enemy b) a plan or action based on this ; a)   skill   in managing or planning, esp. by using stratagems b) a stratagem or artful means to some end Also, esp. for sense

5. Mixture   : a mixing or being mixed ; something made by mixing; esp., a) a combination of ingredients, kinds, etc. b) a yarn or fabric made of two or more different fibers, often of different colors ;   Chem. a substance containing two or more ingredients: distinguished from a chemical compound in that the constituents are not in fixed proportions, do not lose their

individual characteristics, and can be separated by physical means

6. Ingredients : any of the things that a mixture is made of ; a component part, or constituent, of anything

7. Perceived : to grasp mentally; take note (of); observe ; to become aware (of) through sight, hearing, touch, taste, or smell

8. Subsystems : any system that is part of a larger system; component system

9. Simulations : the act of simulating; pretense; feigning ; a) a simulated resemblance b) an imitation or counterfeit ; the use of a computer to calculate, by means of extrapolation, the effect of a given physical process

10. Realize : to make real; bring into being; achieve ; to make appear real ; to understand fully; apprehend !to realize one's danger" ; to convert (assets, rights, etc.) into money ; to gain; obtain !to realize a profit" ; to be sold for, or bring as profit (a specified sum)

11. CBIS : Computer Based Information System

12. AIS : Accounting Information System

13. Shared : a part or portion that belongs or is allotted to an individual, or the part contributed by one ; a just, due, reasonable, or full part or quota !to do one's share of work" ; a) any of the parts or portions into which the ownership of a piece of property is divided b) any one of the equal parts into which the capital stock of a corporation is divided ; to distribute in shares; give out a portion or portions of; apportion ; to receive, use, experience, etc. in common with another or others ; to have or take a share; participate: often with in ; to share or divide something equally: often with with ; **go shares** to take part jointly, as in an enterprise ; **on shares** with each person concerned taking a share of the profit or loss ; **share and share alike** with each having an equal share

    SYN.—share means to use, enjoy, or possess in common with others and generally connotes a giving or receiving a part of something [to share expenses]; **participate** implies a taking part with others in some activity or enterprise [to participate in the talks]; **partake** implies a taking one's share, as of a meal or responsibility [to partake of a friend's hospitality]

14. Transactions : a transacting or being transacted ; something transacted; specify., a) a business deal or agreement b) [pl.] a record of the proceedings of a society, convention, etc., esp. a published one

15. Intelligence : a) the ability to learn or understand from experience; ability to acquire and retain knowledge; mental ability b) the ability to respond quickly and successfully to a new situation; use of the faculty of reason in solving problems, directing conduct, etc. effectively c) Psychol. measured success in using these abilities to perform certain tasks d) generally, any degree of keenness of mind, cleverness, shrewdness, etc. ; news or information ; a) the gathering of secret information, as for military or police purposes b) the persons or agency employed at this ; an intelligent spirit or being

16. Efficiency : ability to produce a desired effect, product, etc. with a minimum of effort, expense, or waste; quality or fact of being efficient ; short for the ratio of effective work to the energy expended in producing it, as of a machine; output divided by input ; short for EFFICIENCY APARTMENT

17. Prospects : a) a broad view; scene b) a place affording such a view ; a mental view or examination; survey ; the view obtained from any particular point; outlook ; a looking forward

to something; anticipation ; a) something hoped for or expected; anticipated outcome b) [usually pl.] apparent chance for success ; a likely or prospective customer, candidate, undertaking, etc. ; Mining a) a place where a mineral deposit is sought or found b) a sample of gravel, earth, etc. tested for a particular mineral, or the resulting yield of mineral ; to explore or search (for) !to prospect for gold" ; **in prospect** expected

18. Diskettes : FLOPPY DISK; a small, flexible, relatively inexpensive computer disk for storing data, esp. in smaller computers

19. Libraries : a) a collection of books, periodicals, musical scores, films, phonograph records, etc., esp. a large, systematically arranged collection for reading or reference b) a room or building where such a collection is kept ; a public or private institution in charge of the care and circulation of such a collection ; a set or series of books issued in a single format by a publishing house

20. Retrieval : the act or process of retrieving; possibility of recovery or restoration

21. Gummed labels : a sticky, colloidal carbohydrate found in certain trees and plants, which dries into an uncrystallized, brittle mass that dissolves or swells in water ; any similar plant secretion, as resin ; any plant gum processed for use in industry, art, etc. ; a) an adhesive, as on the back of a postage stamp b) any of various sticky or viscous substances or deposits ; a) GUM TREE b) the wood of a gum tree ; [Now Rare] a) pure rubber >b) [pl.] rubber overshoes ; CHEWING GUM ; [Dial.] a hollowed gum log used as a trough, etc.

22 approached : to come closer or draw nearer ; to come near or nearer to ; to be like or similar to; approximate; to make advances, a proposal, or a request to ; to begin dealing with !to approach a task" ;a coming closer or drawing nearer ; an approximation or similarity ; an advance or overture (to someone): usually used in pl.

   a path, road, or other means of reaching a person or place; access ; means of attaining a goal or purpose !let's take a new approach to the problem" ; Aeron. the act of bringing an aircraft into position for landing, bombing a target, etc. 'Golf a shot from the fairway, meant to knock the ball onto the putting green

22. Respondents responding; answering ; a person who responds ; Law the party who responds to a petition, as in equity, divorce, or appellate proceedings; the defendant in such proceedings

23. Perhaps : possibly; maybe

24. Devoted : dedicated; consecrated ; very loving, loyal, or faithful ;

25. Obtaining : to get possession of, esp. by some effort; procure ; [Archaic] to arrive at; reach or achieve ; to be in force or in effect; prevail !a law that no longer obtains" ; [Archaic] to succeed

26. Observation : orig., observance, as of laws, customs, etc. ; a) the act, practice, or power of noticing b) something noticed ; the fact of being seen or noticed !seeking to avoid observation" ; a) the act or practice of noting and recording facts and events, as for some scientific study b) the data so noted and recorded ; a comment or remark based on something observed ;a) the act of determining the altitude of the sun, a star, etc., in order to find a ship's position at sea b) the result obtained

27. Determine : to set limits to; bound; define ; to settle (a dispute, question, etc.) conclusively;

decide ;   to reach a decision about after thought and investigation; decide upon ; to establish or affect the nature, kind, or quality of; fix !genes determine heredity" ; to find out exactly; calculate precisely; ascertain !to determine a ship's position" ; to give direction to; shape or affect ; Law to end; terminate ; to decide; resolve ;   Law to come to an end

28. Driven : moved along and piled up by the wind! Driven snow"; having or caused to act or function by a sense of urgency or compulsion! A driven person"; To force to go; urge onward; push forward; to force into or from a state or act !driven mad" ; to force to work, usually to excess ; a) to force by or as by a blow, thrust, or stroke

29. Instances : orig., an urgent plea; persistent solicitation ; an example; case; illustration ; a step in proceeding; occasion or case !in the first instance" ; [Obs.] a motive; cause ; [Obs.] a token or sign ; a detail or circumstance ;   Law a process or proceeding in a court; suit ; to show by means of an instance; exemplify ; to use as an example; cite ; **at the instance of** at the suggestion or instigation of ; **for instance** as an example; by way of illustration ; **SYN.—** **Instance** refers to a person, thing, or event that is adduced to prove or support a general statement [here is an instance of his sincerity]; **case** is applied to any happening or condition that demonstrates the general existence or occurrence of something [a case of mistaken identity]; **example** is applied to something that is cited as typical of the members of its group [his novel is an example of romantic literature]; **illustration** is used of an instance or example that helps to explain or clarify something [this sentence is an illustration of the use of a word]

30. Garbage : spoiled or waste food, as from a market or kitchen that is thrown away; any worthless, unnecessary, or offensive matter! Literary garbage"

31. Applications : the act of applying; specify. a) the act of putting something on !the application of cosmetics" b) the act of putting something to use !a job calling for the application of many skills" ; anything applied, esp. a remedy ; a way of applying or method of applying or using; specific use !a scientific principle having many applications in industry" ; an asking for something; request !an application for employment" ; a form to be filled out with pertinent data in applying for something, as for employment ; continued mental or physical effort; close attention; diligence ;   relevance or practicality !this idea has no application to the case"

32. Sophisticated : not simple, artless, naive, etc.; urbane, worldly-wise, etc. or knowledgeable, perceptive, subtle, etc. ; designed for or appealing to sophisticated people ; highly complex, refined, or developed; characterized by advanced form, technique, etc. !sophisticated equipment"

33. Statistical : having to do with, consisting of, or based on statistics

34. analysis : a separating or breaking up of any whole into its parts, esp. with an examination of these parts to find out their nature, proportion, function, interrelationship, etc. ; a statement of the results of this process ; Linguis. the use of word order and uninflected function words rather than inflection to express syntactic relationships ; Math. a branch of mathematics, including calculus, that deals with functions and limits and their generalizations ; SYSTEMS ANALYSIS ; **in the last (or final) analysis** after all factors have been considered.

35. Expertise : the skill, knowledge, judgment, etc. of an expert

36. Marketing research : the act of buying or selling in a market; all business activity involved in the moving of goods from the producer to the consumer, including selling, advertising, packaging,

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etc.; careful, systematic, patient study and investigation in some field of knowledge, undertaken to discover or establish facts or principles; to do research; make researches; to do research on or in; investigate thoroughly

37. intelligence : a) the ability to learn or understand from experience; ability to acquire and retain knowledge; mental ability b) the ability to respond quickly and successfully to a new situation; use of the faculty of reason in solving problems, directing conduct, etc. effectively c) Psychol. measured success in using these abilities to perform certain tasks d) generally, any degree of keenness of mind, cleverness, shrewdness, etc. ; news or information ; a) the gathering of secret information, as for military or police purposes b) the persons or agency employed at this ; an intelligent spirit or being

38. Espionage : the act of spying; the use of spies by a government to learn the military secrets of other nations; the use of spies in industry or commerce to learn the secrets of other companies

39. Hesitant : hesitating or undecided; vacillating; doubtful

40. Spying : to watch or observe closely and secretly, usually with unfriendly purpose: often with out ;　　to catch sight of; make out; perceive; see ; to watch or observe closely and secretly; specify., to act as a spy ; to make a close examination or careful inspection ; pl. **spies** ; a person who keeps close and secret watch on another or others ;　　a person employed by a government to get secret information about or monitor the affairs, plans, armed forces, etc. of another government ; a person employed by a company, as in industry or commerce, to discover the business secrets of another company ; [Now Rare] an act of spying ;　of　or about spies or espionage ; used for purposes of military espionage !spy plane, spy satellite" ; **spy out** to discover or seek to discover by close observation, inspection, etc.

41. Proprietary : a proprietor or owner ; a group of proprietors ; proprietorship or ownership ; the grantee or owner of a proprietary colony in colonial America ; a proprietary medicine ; belonging to a proprietor ; holding property ; of property or proprietorship ; privately owned and operated !a proprietary nursing home" ; held under patent, trademark, or copyright by a private person or company !a proprietary medicine"

42. Corporate : [Archaic] united; combined; having the nature of, or acting by means of, a corporation; incorporated; of a corporation! corporate debts"; shared by all members of a unified group; common; joint !corporate responsibility" ;

43. Images : a) an imitation or representation of a person or thing, drawn, painted, photographed, etc.; esp., a statue b) a sculptured figure used as an idol ; the visual impression of something produced by reflection from a mirror, refraction .through a lens, etc. ; a person or thing very much like another; copy; counterpart; likeness ; a) a mental picture of something; conception; idea; impression >b) the concept of a person, product, institution, etc. held by the general public, often one deliberately created or modified by publicity, advertising, propaganda, etc. ; a type; typical example; symbol; embodiment !the very image of laziness" ; a vivid representation; graphic description !a drama that is the image of life" ; a figure of speech, esp. a metaphor or simile ; Psychoanalysis a picture or likeness of a person, as of a parent, usually idealized, constructed in the unconscious and remaining there; imago ; to make a representation or imitation of; portray; delineate ; to reflect; mirror ; to picture in the mind; imagine ; to be a symbol or type of ; to describe graphically, vividly, or with figures of speech

44. Violations : a violating or being violated; specif., a) infringement or breach, as of a law, rule,

right, etc. b) sexual assault; rape c) desecration of something sacred, as a church d) interruption; disturbance

45. Prosecute : to follow up or pursue (something) to a conclusion !to prosecute a war with vigor" ; to carry on; engage in ; a) to institute legal proceedings against, or conduct criminal proceedings in court against b) to try to get, enforce, etc. by legal process !to prosecute a claim" ; to institute and carry on a legal suit ; to act as prosecutor

46. Ethical activities : having to do with ethics or morality; of or conforming to moral standards; conforming to the standards of conduct of a given profession or group; designating or of a drug obtainable only on a doctor's prescription; the quality or state of being active; action ; energetic action; liveliness; alertness ; a normal function of the body or mind ; an active force ; any specific action or pursuit !recreational activities" ; Chem. a) the ability to react with other chemicals b) a thermodynamic quantity which represents the effective concentration of a substance in a reacting chemical system c) short for OPTICAL ACTIVITY

47. Clandestine activities : kept secret or hidden, esp. for some illicit purpose; surreptitious; furtive; the quality or state of being active; action ; energetic action; liveliness; alertness ; a normal function of the body or mind ; an active force ; any specific action or pursuit !recreational activities" ; Chem. a) the ability to react with other chemicals b) a thermodynamic quantity which represents the effective concentration of a substance in a reacting chemical system c) short for OPTICAL ACTIVITY

48. Concludes : to bring to a close; end; finish ; to decide by reasoning; infer; deduce ; t o decide; determine ; to arrange or settle; come to an agreement about !to conclude a pact" ; to come to a close; end; finish ; to come to an agreement

50. Description : the act, process, art, or technique of describing or picturing in words; a statement or passage that describes; sort, kind, or variety! Books of every description" ; the act of tracing or outlining! The description of a circle"

51. Subsystems : any system that is part of a larger system; component system

52. attention : a) the act of keeping one's mind closely on something or the ability to do this; mental concentration b) mental readiness for such concentration; notice or observation! her smile caught my attention" ; care or consideration !the matter will receive his immediate attention" ; a) thoughtful consideration for others b) an act of consideration, courtesy, or devotion (usually used in pl.) !a suitor's attentions to a woman" ;Mil. a) the erect, motionless posture of soldiers in readiness for another command b) a command to assume this posture

53. output : a) the work done or amount produced by a person, machine, production line, manufacturing plant, etc., esp. over a given period b) the act of producing; a) information, resulting from computer processing, that is delivered to a user, as printout or video display, or transferred to disk or tape b) the act or process of delivering or transferring this information ; Elec. a) the useful voltage, current, or power delivered by amplifiers, generators, receivers, etc. or by a circuit b) the terminal where such energy is delivered ; of or relating to computer output **3put$, 3put4ting** to deliver or transfer (computer output)

10.7 Self Assessment Questions:

1. What is Marketing and Explain about Marketing Principles, Marketing Mix?

2. Explain about MIS Model with neat diagram?

3. What are MR (Marketing Research) Subsystems? Explain in Detailed?

4. Explain about Marketing Intelligence Subsystems in detailed

5. What are subsystems that are available in Marketing? Explain?

10.8 Reference Books

1. CSV. Murthy – Management Information Systems

2. VARMA & AGARWAL – Management Information System

- S.PRABHAKAR

LESSON – 11

MIS SUBSYSTEMS IN PRODUCTION

11.0 Objective: - The main objective of the lesson is to know the MIS subsystem in production with the help of computer by knowing some graphs and strategies like product subsystems, Place subsystems, Promotion subsystems, pricing subsystems, integrated mix sub systems and about wireless laptops.

Structure:-

11.1 Introduction

11.2. Product Subsystem

11.3. Place Subsystem

11.4. Promotion Subsystem

11.5. Pricing Subsystem

11.6. Integrated – Mix Subsystem

11.7. Wireless Laptops

11.8 Summary

11.9 Technical Terms

11.10 Self Assessment Questions

11.11 Reference Books

11.1 Introduction

The MIS-PROD production planning software provides the connection between all <u>SMT</u> production equipment in one software platform. Machine planning for projects, loading and setup can be optimized allowing optimal production utilization. Quick over view like, Product Subsystem, Place Subsystem, Promotion Subsystem, Pricing Subsystem, Integrated – Mix Subsystem, Wireless Laptops etc. The production planning software offers all features required for complete monitoring and electronic production planning. Linked to all the process steps (even manual), it allows the optimization of all operations and offers massive savings. The online links with the productions machines (Pick and Place, Printer, Dispenser, Oven, etc) offers real-time monitoring of the complete production process from a central computer. All data can be analyzed allowing continual process optimization. The system can be linked directly with a customers IT-Solution (eg. SAP) allowing complete manufacturing integration. With all customers demands being different, we ask you to contact us so we can discuss your specific requirements.

11.2 Product Subsystem:-The product is usually the first ingredient in the marketing mix to be specified. The firm decides to provide a product to satisfy a particular market need. <u>Subsequently</u> the remaining ingredients are identified and described. The task of marketing manager is to develop <u>strategies</u> and <u>tactics</u> for each <u>ingredient</u> in the marketing mix and then to <u>integrate</u>

them into an overall marketing plan. A frame work called the product life cycle guides the manager in marketing these decisions. As its name implies, the product life cycle traces the sales of a product from its introduction to its withdrawal from the market. The four stages in the life cycle are introduction, growth, maturity, and decline. The following figure shows these stages, along with the three – time periods during which the product subsystem helps the marketing manager make product – oriented decisions. The first period precedes the introduction of the product, when a decision is made whether to develop and market the product. The second period includes the time when various strategies must be considered to keep sales healthy. The final period is during the decline, when product deletion is an alternative.
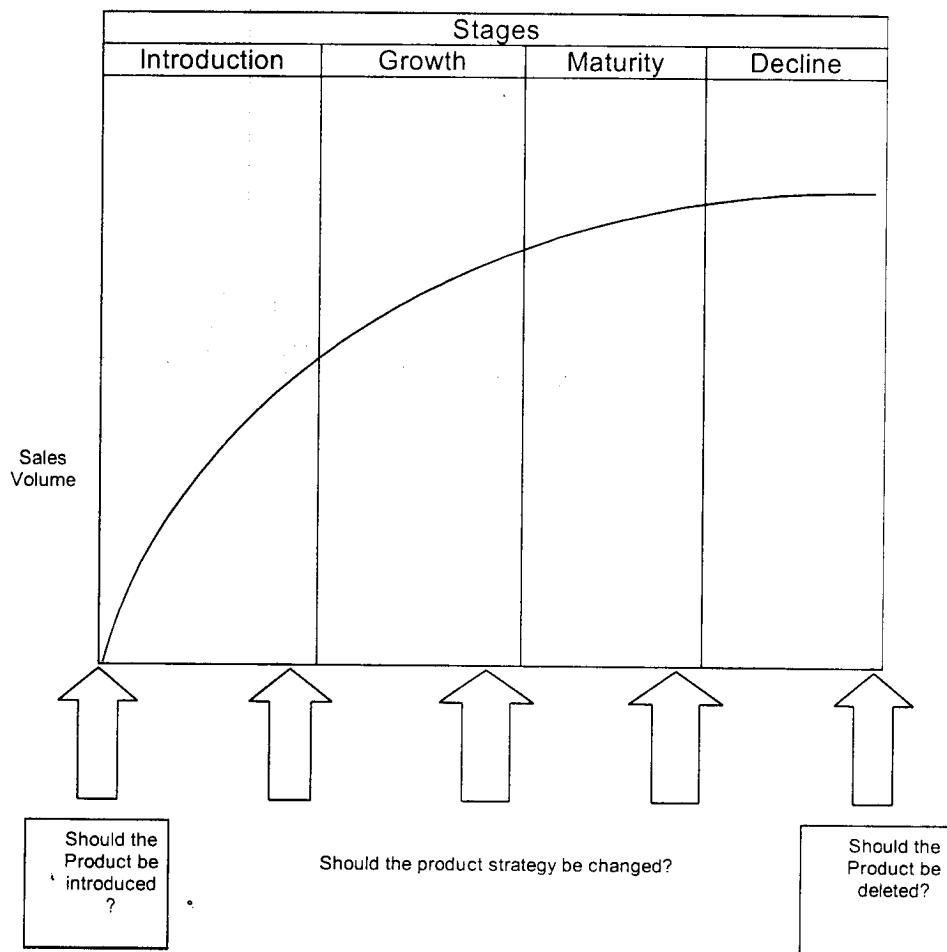

A number of techniques have been developed to provide the manager with the information needed for marketing product – oriented decisions. The technique discussed below helps the manager decide whether to introduce a product. The product subsystem consists of techniques such as these:

11.3 Place Subsystem: -
The channels of distribution that a firm uses to get its products to the consumer constitute the place ingredient in the marketing mix. For some firms the channels are short – Mary key cosmetics, for example, sells directly to the consumer. For other operations,

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the channels are long. Firm products, for example, reach the supermarket through a network of intermediaries that includes wholesalers, brokers, and distributors.

The product or material is not the only resource to flow through the channel. The following figure shows the resources flowing through a channel that includes a supplier, manufacturer, wholesaler, retailer, and consumer. The material flow originates with the supplier and ends with the consumer. The money flow is just the reverse; and an information conduit provides a two – way flow that connects all participants.

All channel members must know the details of the product flow as it relates to their role in the distribution process. For example, the manufacturer must know the rate at which wholesalers are buying the product, the rate at which retailers are buying from wholesalers, and the rate at which consumers are buying from retailers. It would be a mistake for the manufacturer to continue production of a product that is gathering dust on the retailers' shelves.

Two – way information flow
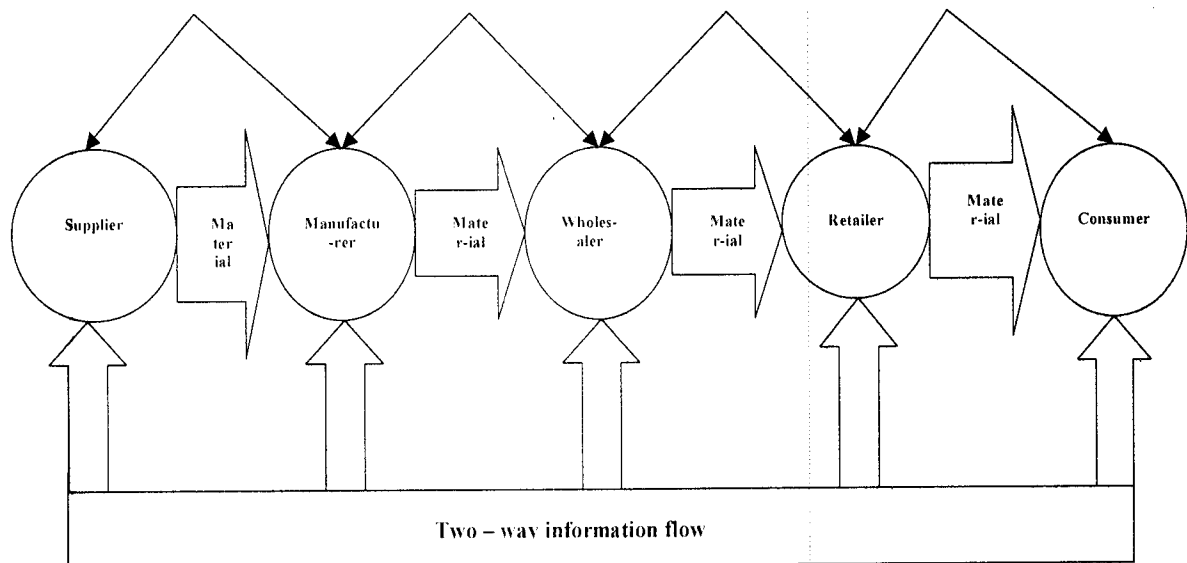
Information that flows in the direction opposite to the material flow is called feedback information. If the manufacturer expects feedback from the channel members, then something must be offered in return. Quite possibly this need only be information. The term feed forward information describes the flow of information towards the consumer. Feed forward information from the manufacturer to the wholesaler and retailer can include announcements of new products, sales and promotion aids, and forecasts of demand. Feed forward information to the consumer can include instructions for use, safety tips, and warranties.

Computer – Based Information Flow. A channel system that permits information to flow freely among many firms provides an edge over competitive systems without that capability. A capability called electronic data interchange (EDI) allows firms to establish electronic links with other organizations. EDI is excellent for achieving competitive advantage, and a conceptual system that causes it to happen is the place subsystems.

11.4 Promotion Subsystem

It has been <u>extremely</u> difficult to apply the computer to the <u>promotion</u> area. Companies have been conducting sales analysis since punched card days, but the reports provide only a look at the past. Even less has been <u>accomplished</u> in advertising because of its <u>creative</u> nature. There have been a number of efforts, primarily by advertising agencies and <u>academicians</u>, to develop mathematically models for use in making advertising media decisions, but none has met with much success – at least not publicized success.

One promotional area where the computer can be applied is sales person communications. If the firm wants to provide its sales force with a flexible means of communication, this can be accomplished with laptops. Sales persons carry the laptops with them as they cover their <u>territories</u> and use them to:

•   <u>Query</u> the <u>database</u> to answer questions that the consumer asks about products being considered for purchase – availability, price, shipping costs, and the like.

•   Enter sales order data into the order entry system.

•   Submit call reports that summaries each sales call, specifying who was contacted, what was discussed, what the next sales objective will be, and so on. It is a simple matter to design the call report so that it contains space for recording competitive <u>intelligence</u>. In fact, the report can be designed so that different types of intelligence can be gathered from one month to the next <u>varying</u> with competitive activity

When marketing management decides to implement such electronic communications systems, it is important that sales persons see how their sales will increase. For example, the systems can provide sales persons with

1.   information about new prospects

2.   Information about existing consumers such as historical <u>patterns</u> of previous purchases.

3.   Information about the most profitable products to sell, taking into account such factors as varying commission rates, bonuses and contests.

All of this information enables sales persons to do their job better everybody benefits – sales persons increase their commissions, the company increases its sales, and the consumers receive improved service.

11.5 Pricing Subsystem

The price area can run a close second to promotion in terms of decision support difficulty, depending on the firm's pricing policies.

Cost – based Pricing: - Some firms engage in cost – based pricing by determining their costs and then adding a desired markup. This approach is a rather cautious one. You make your desired profit when you sell the items, but there is a chance that the consumer would have paid. More when the firm has a good AIS (Accounting Information System), the availability of accurate cost data makes it an easy task for the pricing subsystem to support cost – based pricing.

Demand – based Pricing:- A less cautious   pricing policy is demand – based pricing, which establishes a price compatible with the value that the consumer places on the product. The key to this approach is correctly estimating demand. This require a good understanding of the consumer and also of the market, including the competition and the state of the economy.

When the firm follows a demand – oriented pricing approach computer support can come in the form of a mathematical model. The model enables the manager to play the what – if game in locating the price level that maximizes profit yet does not intensify competitive activity.

11.6 Integrated – Mix Subsystem:-

The integrated – mix subsystem supports the manager as the ingredients of the marketing mix are combined to form a particular strategy. This goal is accomplished by projecting the possible outcomes of various mixes.

Descriptions of integrated – mix Subsystems in the literature are rare, a fact that a probably due more to the difficulty of the task than to firms desire for secrecy. The integrated mix model receiving the most publicity is BRANDAID, developed by MIT professor John D.C.Little.

BRANDAID includes sub – models for advertising, promotion price, personal selling, and retail distribution. It simulates the activities of a manufacturer that sells to consumers through retailers in a competitive environment. This environment, including the main elements and the influences that inter → connected them, is shown in the following figure. The solid arrows represent the influences flowing from the manufacturer, retailer, competitor and business environment. The dashed arrows represent responses to those influences.

Product .49		Product .32
Price .27		Price .39
Place .16		Place .15
Promotion .08		Promotion .13

Figure; Marketing Managers are using the computer more for making the difficult price and promotion decisions

11.7 Wireless Laptops

The job of traveling sales representative was among the first that was recognized as having a need to communicate with the corporate computer from a remote location. While in a customer's office, for example, a sales representative might want to verify that sufficient stock was on hand to satisfy customer's needs. This information could help seal the order. Companies that first provided

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this sales support installed WATS (wide Area Tele communication Service) lines that the representative could use to dial the corporate computer from the customer's office, using the customer's push – button telephone. Using the buttons, the representative would indicate that a query of a particular inventory record was to be made, and the computer, using the recorded vocabulary of a voice – response unit, would say something like, "ITEM 12345 BALANCE ON HAND 6789". Other than the inconvenience of having to borrow the customer's phone, this worked very well.

Then along came the laptop computer with a built – in modem. This greatly increased the flexibility of the two – way communication but continued to rely on conventional communications lines. Now that constraint is being removed by wireless communication. Throw in the internet and you have a communication capability of almost limitless potential.

Metricom, a Los Gatos, California, Communication Company, has been making the necessary installations to facilitate connection of laptops with wireless modems to the internet. Metricom customers add a small wireless modem about the size of a TV remote control to their laptops. These modems relay signals of modems about the size of shoeboxes that are mounted on telephone poles. These larger modems relay their signals over leased telephone lines to Houston and are linked to the internet. As long as you are traveling in an area that has been properly equipped, you can use your wireless laptop to gain internet access.

11.8 Summary: - The product is usually the first ingredient in the marketing mix to be specified. The firm decides to provide a product to satisfy a particular market need. Subsequently the remaining ingredients are identified and described. The channels of distribution that a firm uses to get its products to the consumer constitute the place ingredient in the marketing mix. For some firms the channels are short – Mary key cosmetics, for example, sells directly to the consumer. For other operations, the channels are long. Firm products, for example, reach the supermarket through a network of intermediaries that includes wholesalers, brokers, and distributors. It has been extremely difficult to apply the computer to the promotion area. Companies have been conducting sales analysis since punched card days, but the reports provide only a look at the past. Even less has been accomplished in advertising because of its creative nature. There have been a number of efforts, primarily by advertising agencies and academicians, to develop mathematically models for use in making advertising media decisions, but none has met with much success – at least not publicized success.

One promotional area where the computer can be applied is sales person communications.

The price area can run a close second to promotion in terms of decision support difficulty, depending on the firm's pricing policies. Cost – based Pricing, Demand – based Pricing. The integrated – mix subsystem supports the manager as the ingredients of the marketing mix are combined to form a particular strategy. This goal is accomplished by projecting the possible outcomes of various mixes. The job of traveling sales representative was among the first that was recognized as having a need to communicate with the corporate computer from a remote location.

11.9 Technical Terms

1. Subsequently : coming after; following in time, place, or order **Subsequent to** after; following

2. SMT : surface mounts technology (A circuit board packaging technique in which the leads (pins) on the chips and components are soldered on top of the board, not through it. Boards can be smaller and built faster.)

3. Strategies : *a)* the science of planning and directing large-scale military operations, specify. (as distinguished from TACTICS) of maneuvering forces into the most advantageous position prior to actual engagement with the enemy *b)* a plan or action based on this

4. Tactics : *a)* [*with sing. v.*] the science of arranging and maneuvering military and naval forces in action or before the enemy, esp. (as distinguished from STRATEGY) with reference to short-range objectives *b)* actions in accord with this science ; any methods used to gain an end; esp., skillful methods or procedure

5. Ingredient : any of the things that a mixture is made of ; a component part, or constituent, of anything

6. Integrate : to make whole or complete by adding or bringing together parts ; to put or bring (parts) together into a whole; unify ; to give or indicate the whole, sum, or total of ; *a)* to remove the legal and social barriers imposing segregation upon (racial groups) so as to permit free and equal association *b)* to abolish segregation in; desegregate (a school, neighborhood, etc.)

7. Withdrawal : the act of withdrawing ; the act or process of giving up the use of a narcotic drug to which one has become addicted, typically accompanied by distressing physiological and mental effects (**withdrawal symptoms**)

8. Decline : to bend, turn, or slope downward or aside ; *a)* to sink, as the setting sun *b)* to approach the end; wane !the day is *declining*" ; to lessen in force, health, value, etc.; deteriorate; decay ; to descend to behavior that is base or immoral ; to refuse to accept or do something, esp. in a way that is formally polite ; to cause to bend or slope downward or aside ; to refuse, esp. in a formally polite way !I must *decline* your offer"

9. Oriented : [Old Poet.] the east ; *a)* the quality that determines a pearl's value; luster *b)* a pearl of high quality ; 5L *oriens,* direction of the rising sun, prp. of *oriri,* to arise < IE base *er3, to set in motion, elevate > RISE, RUN, Gr *oros,* mountain6 ; brilliant; shining; precious: orig. of pearls, now more general ; [Old Poet.] ; eastern; oriental *b)* rising, as the sun ;

10. Proceeds : to be, come, or go before in time, place, order, rank, or importance ; to introduce with prefatory remarks, etc. ; to be, come, or go before

11. Constitute : to set up (a law, government, institution, etc.); establish ; to set up (an assembly, proceedings, etc.) in a legal or official form ; to give a certain office or function to; appoint !our officially *constituted* spokesperson" ; to make up; be the components or elements of; form; compose !twelve people *constitute* a jury" ; to be actually as designated !such action *constitutes* a felony"

12. Mary : (*Mary Stuart*) 1542-87; queen of Scotland (1542-67): beheaded

13. Cosmetics : beautifying or designed to beautify the complexion, hair, etc. ; for improving the appearance by the removal or correction of blemishes or deformities, esp. of the face ; of or for improving the appearance without making any basic changes, as to conceal defects, make more acceptable, etc.; also, superficial ; any cosmetic preparation for the skin, hair, etc., as rouge and powder ; anything cosmetic: *often used in*

14. Intermediaries : acting between two persons; acting as mediator; being or happening between; intermediate; a go-between; mediator ; any medium, means, or agency ; an intermediate form, phase, etc.

15. Originates : to bring into being; esp., to create (something original); invent

16. Conduit : a pipe or channel for conveying fluids ; a tube, pipe, or protected trough for electric wires ; [Archaic] a fountain

17. Feedback : *Elec.* the transfer of part of the output of an active circuit or device back to the input, either as an unwanted effect or in an intentional use, as to reduce distortion ; *a*) a process in which the factors that produce a result are themselves modified, corrected, strengthened, etc. by that result *b*) a response, as one that sets such a process in motion

18. Channel   : the bed of a running stream, river, etc. ; the deeper part of a river, harbor, etc. ; a body of water joining two larger bodies of water ; a tube like passage for liquids ; *a*) any means of passage *b*) a course through which something moves or is transmitted, conveyed, expressed, etc. ; [*pl.*] the proper or official course of transmission of communications !to make a request through army *channels*" ; a long groove or furrow ; a rolled metal bar whose section is shaped thus I: also **channel iron (or bar)** ; *a*) a narrow band of frequencies within which a radio or television transmitting station must keep its signal to prevent interference with other transmitters *b*) the path followed by one type of signal, as in a radio receiver ; to make a channel or channels in ; to flute (a pillar, column, etc.) ;to send through a channel ; in spiritualism, to serve as a medium for (a spirit)

19. Feed forward : to provide something necessary for the growth, development, or existence of; nourish; sustain; at, toward, or of the front, or forepart ; advanced; specify., *a*) mentally advanced; precocious *b*) advanced socially, politically, etc.; progressive or radical *c*) [Now Rare] ahead of time; early ; moving toward a point in front; onward; advancing ; ready or eager; prompt ; too bold or free in manners; pushing; presumptuous

20. Forecasts   : [Archaic] to foresee ; to estimate or calculate in advance; predict or seek to predict (weather, business conditions, etc.) ; to serve as a prediction or prophecy of ; to make a forecast ; [Archaic] foresight; forethought ; a prediction, as of weather conditions

21. Warranties : official authorization or sanction ; justification; reasonable grounds, as for an opinion or action ; *Law* a guarantee;

22. Capability : the quality of being capable; practical ability ; a capacity for being used or developed ; [*pl.*] abilities, features, etc. not yet developed or utilized

23. Conceptual : of conception or concepts

24. Extremely : at the end or outermost point; farthest away; most remote; utmost ; *a*) in or to the greatest degree; very great or greatest !*extreme* pain" *b*) to an excessive degree; immoderate ; far from what is usual or conventional

25. promotion : the act or an instance of promoting; specify., *a*) advancement in rank, grade, or position *b*) furtherance of an enterprise, cause, etc.

26. Accomplished : done; done successfully; completed ; skilled; proficient !an *accomplished* pianist" ; having social poise; polished

27. Creative   : creating or able to create ; having or showing imagination and artistic or intellectual inventiveness !*creative* writing" ; stimulating the imagination and inventive powers !*creative* toys" ; imaginatively or inventively deceptive !*creative* accounting"

28. Academicians : an artist, writer, etc. who follows certain academic rules or conventions

29. Territories : the land and waters under the jurisdiction of a nation, state, ruler, etc. ;   a part of a country or empire that does not have the full status of a principal division; specif., >a) [T3] a part of the U.S. having its own legislature but without the status of a State and under the administration of an appointed governor b) [T3] a similar region, as in Canada or Australia, without the status of a province or State: see also TRUST TERRITORY ; any large tract of land; region; district ; an assigned area, as of a traveling salesman or franchised dealer ; a sphere or province of action, existence, thought, etc. ; *Ethnology* the particular area occupied by an animal or group of animals; esp., the specific area appropriated by an animal or pair of animals, usually for breeding, nesting, and foraging purposes, and forcibly defended against by any intruders ; *Football, Hockey, etc.* that half of the playing area defended by a specified team

30. Query : a question; inquiry ; a doubt ; a question mark (?) placed after a question or used to question the accuracy of written or printed matter ; to call in question; ask about ; to question (a person) ; to mark with a QUERY (sense 3) ; to ask questions or express doubt

31. Database : a large collection of data in a computer, organized so that it can be expanded, updated, and retrieved rapidly for various uses ; any large or extensive collection of information Also **data base**

32. intelligence : a) the ability to learn or understand from experience; ability to acquire and retain knowledge; mental ability b) the ability to respond quickly and successfully to a new situation; use of the faculty of reason in solving problems, directing conduct, etc. effectively c) *Psychol.* measured success in using these abilities to perform certain tasks d) generally, any degree of keenness of mind, cleverness, shrewdness, etc. ; news or information ; a) the gathering of secret information, as for military or police purposes b) the persons or agency employed at this ; an intelligent spirit or being

33. Varying   : to change in form, appearance, nature, substance, etc.; alter; modify ;   t   o make different from one another ; to give variety to; diversify !to *vary* one's reading" ; *Music* to repeat (a theme or idea) with changes in harmony, rhythm, key, etc. ; to undergo change in any way; become different ; to be different or diverse; differ !*varying* opinions" ; to deviate, diverge, or depart (*from*) ; *Biol.* to show variation

34. Patterns : a person or thing considered worthy of imitation or copying ; a model or plan used as a guide in making things; set of forms to the shape of which material is cut for assembly into the finished article !a dress *pattern*" ; the full-scale model used in making a sand mold for casting metal ; something representing a class or type; example; sample ; an arrangement of form; disposition of parts or elements; design !wallpaper *patterns*, the *pattern* of a novel" ; a regular, mainly unvarying way of acting or doing !behavior *patterns*" ; a   predictable   or prescribed route, movement, etc. !traffic *pattern*, landing *pattern*" ; a) grouping or distribution, as of a number of bullets fired at a mark b) something, as a diagram, showing such distribution ; [Now Rare] sufficient material for making a garment ; to make, do, shape, or plan in imitation of a model or pattern: with *on, upon,* or *after* ;   to supply with a pattern or design; mark or decorate with a pattern

35. Mounted : seated on horseback, a bicycle, etc. ; serving on horseback !*mounted* police" ; set up and ready for use !*mounted* gun" ; fixed on or in the proper backing, support, setting, etc. ; *Mil.* Regularly equipped with a means of transportation, as with horses, tanks, armored vehicles, etc.

11.10 Self Assessment Questions

1. What is meant by Production? Explain the different kinds of subsystems in it?

2. Explain the following: a. Product Subsystem, b. Place Subsystem,

   c. Promotion Subsystem

3. Explain about Wireless laptops, Pricing subsystem and integrated mix subsystems?

11.11 Reference Books:

1. CSV. Murthy – Management Information Systems

2. VARMA & AGARWAL – Management Information System

- S.PRABHAKAR

LESSON – 12

MIS SUBSYSTEMS IN FINANCE

12.0 Objective:- The main objective of this lesson is Management Information System subsystems in finance and that to play an important role in computers, how the subsystems of finance useful in computers

Structure:-

12.1 FINANCIAL INFORMATION SYSTEMS

Tasks of the Financial Information System: - Mechanical Financial Information System has been in use for long, to name as: Punch card machines, which were used by large business houses before the computer application. The application of these machines was restricted to processing of accounting data, and little attention was paid to the information needs of managers. When computer came in operation, the financial information systems were developed and could handle anything beyond the basic accounting functions. The recognition of financial function is concerned with the flow of money through the organization. The funds are needed for manufacturing, marketing, distribution and other activities: All managers in the organization have financial responsibilities, are given operation budget, to keep a balance between income and expenditure to speed up the working of the organization.

The interested parties in the financial matters are: stock – holders, financial institutions, suppliers (Creditors), stock exchanges, researchers, economists and <u>prospective</u> investors

Model of the Financial Information System: -

The financial information system is to describe the <u>CBIS</u> subsystem that provides information to persons and groups both inside and outside the firm concerning the firm's financial matters. Information is provided in the form of periodic reports, special reports, result of mathematical <u>simulations</u>, electronic communications, and the advice of expert systems.

A model of the financial information system appears in the following figure like the other functional information systems, the financial information systems consists of input and output subsystems. Two of the input subsystems, the accounting information system and a subsystem.

The dedicated to gathering intelligence, are also found in the other functional systems. The third, internal audit consists of the firm's internal auditors who analyze the firm's conceptual systems to ensure that they process financial data the proper way.

The three output subsystems exert an influence on the firm's money flow. The forecasting subsystems projects the firms long – range activity in an economic environment. The funds management subsystem manages the money flow as it occurs, seeks to keep it balanced and positive. With the control subsystems, managers can get effective use from resources of all types that are made available to them.

As with the other functional information systems, the output subsystems contain various types of software that transform the database contents into information.
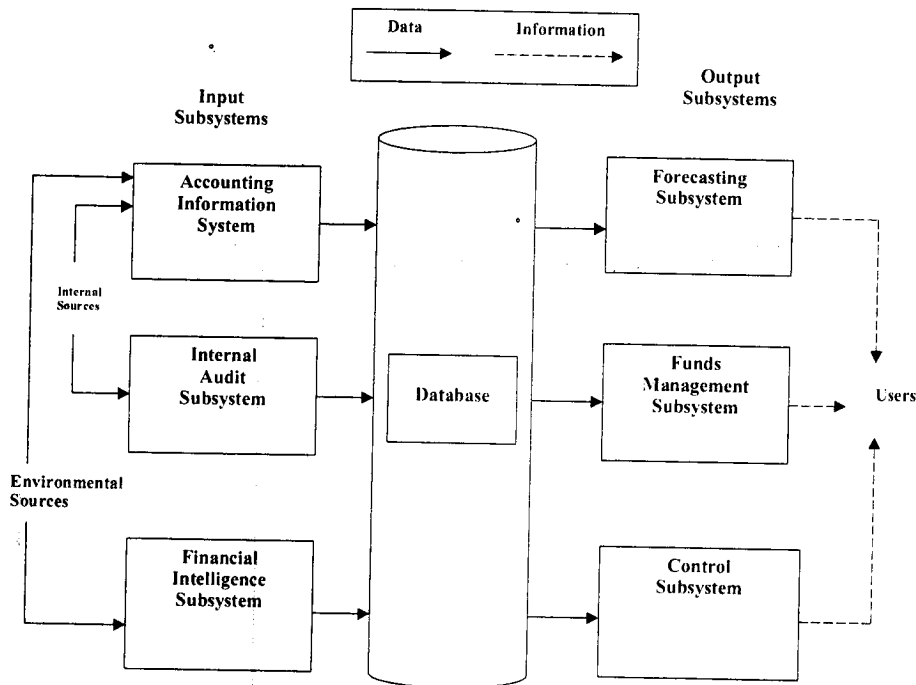

Fig; A model of a financial information system

12.2 Prewritten Financial Software:-

More Prewritten application Software has been developed for the financial area than for any other. These are mostly data processing packages such as payroll, inventory, and accounts receivable. Financial managers and analysts also make good use of electronic spreadsheets, which are example of personal productivity packages. The spreadsheet rows are excellent for representing such financial data as sales and cost of goods sold, and the columns can represent such time periods as months, quarters, or years.

These prewritten software systems enable small firms to achieve good financial control without investing in large information services staffs. The systems also enjoy widespread use in large firms, where their user friendliness is a main stimulus to end – user computing.

Importance of Accounting Data: -

Accounting data provides a record of everything of monetary importance that happens in the firm. A record is made of each transaction, describing what happened, when it happened, who participated, and (in many cases) how much money was involved. This data can be analyzed in various ways to meet a portion of management's information needs.

AIS are the only input component that appears in all of the functional information systems. Even more fundamentally: The AIS is the foundation upon which all information – oriented CBIS Subsystems are built. If the firm does not have a good AIS, it can not expect to have a good MIS, good DSSs and expert systems.

Internal Audit Subsystems:-

Firms of all sizes rely on external auditors to audit the accounting records to verify their accuracy. External auditors work for such accounting firms as Arthur Andersen and Price Waterhouse. Annual stockholder reports contain a statement to the stockholders that such an audit has been conducted.

Large firms have their own staffs of internal auditors, who perform the same analysis as external auditors but have a broader range of responsibilities, its include internal auditing as an input subsystems of the financial information system because of its ability to independently evaluate and influence the firm's operations from a financial standpoint. The following figure shows a popular way to position internal auditing in the organization.

```
┌─────────────────────────────┐
│   Board of Directors        │
│  ┌───────────────────────┐  │
│  │   Audit Committee     │  │
│  └───────────────────────┘  │
└─────────────────────────────┘
              │
┌─────────────────────────────┐
│   Chief Executive Officer   │
│            Or               │
│   Chief Financial Officer   │
└─────────────────────────────┘
              │
┌─────────────────────────────┐
│  Director of Internal Auditing │
└─────────────────────────────┘
              │
┌─────────────────────────────┐
│  Internal Auditing Department │
└─────────────────────────────┘
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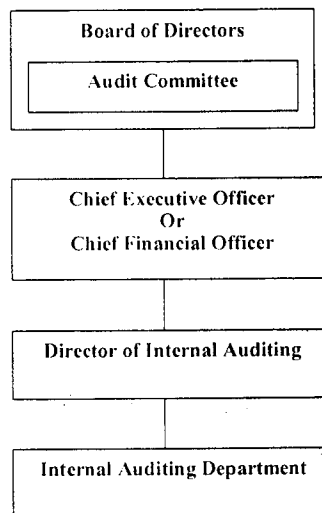
Fig; The Position of Internal Auditing in the organization

The board of directors includes an audit committee, which defines the responsibilities of the internal auditing department and receives many of the audit reports. The director of internal auditing manages the internal auditing department and usually reports to the CEO or the CFO. The CFO (Chief Financial Officer), is the person who manages the financial function and typically holds the title of vice – president of finance. This top – level positioning of internal auditing within the organizations ensures that it is recognized as an important activity and receives the co – operation of managers on all levels.

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Importance of Objectivity:-

A unique ingredient that internal auditors offer is objectivity. They operate independently of the firm's functional units and have no ties with any individuals or groups with in the firm. Their only allegiance is to the board, the CEO and the CFO.

In order for the auditors to retain their objectivity, they make it clear that they do not want operational responsibility for systems that they help develop. They work strictly in an advisory capacity. They make recommendations to management and management decides whether to implement those recommendations. In this respect, internal auditors perform in exactly the same manner as systems analysts.

12.3 Types of Auditing Activity: There are four basic types of internal auditing activity: Financial, Operational, Concurrent, and internal control systems design one internal auditor can engage in all four types.

Financial Auditing: A Financial audit verifies the accuracy of the firm's records and is the type of activity performed by external auditors. On some assignments the internal auditors work jointly with external auditors. One other assignment, the internal do all the auditing work themselves.

Operational Auditing:- An operational audit is not conducted to verify the accuracy of records but rather to validate the effectiveness of procedures. This is the type of work done by the system analyst during the analysis Phase of the system lifecycle. The system that are studied are almost invariable conceptual rather than physical but they do not necessarily involve the computer. An auditor who works with computer-based systems has traditionally been called an **EDP (Electronic Data Processing)** Auditor However, this title is being used less frequently as more auditors become expert in computing.

When internal auditors conduct operational audits, they look for three basic system features:

Adequacy of controls Is the system designed to prevent detect or correct errors?

Efficiency Are the operations of the system carried out so as to achieve the greatest productivity from the available resources.

Compliance with Company Policy : Does the system enable the firm to meet its objective or solve its problem in the prescribed way ?

When information specialists develop systems, they should also look for these same features.

Concurrent Auditing:- A concurrent audit is the same as an operational audit except that the concurrent audit is ongoing. For example, internal auditors may randomly select employees and personally hand them over their may checks rather than the use the company mails. This procedures ensures that the names on the payroll represent real employees and are not simply fictitious entries made by an unscrupulous supervisor who wants to receive some extra may checks.

Internal Control Systems Design:- In operational and concurrent auditing, the internal auditors study existing systems. However, an auditor should not wait until a system is implemented to exert an influence on it. Internal auditors should actively participate in system development. There are two basic reasons. First, the cost of correcting a system flaw increases dramatically as the systems life cycle progresses. According to Figure 3, it costs 4,000 times as much to correct a design error during the operation and maintenance of a system than when the design is being conceptualized. The second reason for involving the internal auditors in system development is that they offer

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expertise that can improve the quality of the system.

Internal Auditors as a Member of the CBIS Team: - The contributors that internal auditors can make to the CBIS depend on a combination of their knowledge and skills and the attitudes of top management.

Auditor's Required Knowledge and Skills:- Contrary to what you might think, internal auditors do not always major in accounting in college; they come into auditing with a variety of backgrounds. This situation, combined with the fact that business systems are complex, makes it necessary for a new internal auditors to undergo a training period of several years. All of this means that internal auditors, like information specialists, can contribute in varying degrees to system projects based on their capabilities, education, and experience.

Top Managements Attitude Towards Auditing:- Perhaps an even greater influence on the auditor's contribution is the attitude of top management. If Management sees the auditors as simply watchdogs whose main mission is to detect weaknesses in already installed systems, the auditor's contributions will be minimal. On the other hand, if management sees the auditors are active contributors throughout the system life cycle, then the level of the auditor's contribution can be high.

12.4 FINANCIAL INTELLIGENCE SUBSYSTEM

Since the financial function controls the money flow through the firm information is needed to expedite the flow. The financial intelligence subsystem seeks to identify the best sources of additional capital and the best

Investments of surplus funds. In order to meet his objective, the financial intelligence subsystem gathers data and information from stockholders and the financial community. Like the other functional intelligence subsystems. It also gathers data and information from the government. Much information that affects the money flow comes from the national government and to a lesser extent state or province and local government.
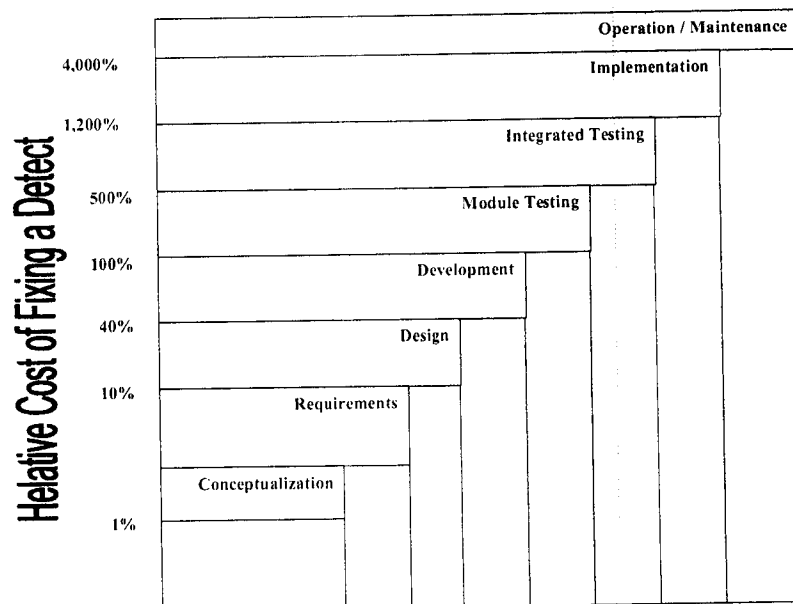

Fig; the Escalating cost of correcting design errors as the system life cycle progresses

Stockholder Information: All corporations have one or more people who are responsible for stockholder relations. The stockholder relations department is usually located within the financial function. This department maintains the communication link between the firm and its stock holders. Information flows from the firm to the stockholders, primarily in the form of the annual and quarterly reports. The reports contain information in a highly summarized form. Figure 4 is an example of the impressive graphics that are typical of annual reports.

Stockholders also use the stockholder relations department as a conduit to communicate complaints, suggestions, ideas, and other information to the firm. Once a year, stockholders have the opportunity to attend the annual stockholder meeting. At this meeting, stockholders are given the opportunity to express their views.

Financial community Information: The best developed intelligence activity of the firm is most likely the one involving the financial community Long before the computer era, managers and staff in the financial function had systems in place that gathered information described the financial environment.
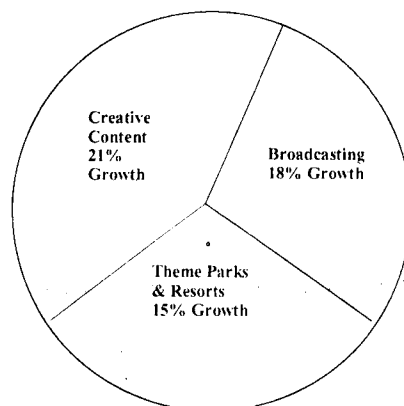
Fig; Stockholder annual reports use graphics to communicate information

There are two reasons why firms have established this information flow. First, the information is readily available, existing in the form of printed material and databases that contain economic and environmental information. Second, top management recognizes the influence of the economic environment on the firm and wants to remain alert to changes that must be acted upon.

Environmental Influence on the Money Flow : The environment exerts both an indirect and a direct influence on the flow of money through the firm.

A Good example of indirect influences is provided by the Federal Reserve System. When the Fed wants to speed up the money flow, it releases its various controls, for example, by lowering the prime interest rate. When the Fed wants to slow down the flow, it tightens the controls; for example, by raising the prime interest rate.

The manner in which the financial community-banks, savings and loan associations, mortgage loans firms, and insurance companies—responds to the actions of the fed is a direct

influence. The members of the financial community raise or lower the interest rates that they charge from their customers. The firm feels this direct influence when it borrows money or invests surplus funds.

Example of a Financial Database Service. A large number of databases of financial information are available to the firm on a subscription basis. By paying the subscription fee, the firm can either access the central database of the service provider or receive database in a CD-ROM foam on a scheduled basis.

One such service is Datastream Information Services. The subscribing firm provides Datastream with a financial interest profile that specifies the types of information that are to be provided. This profile enables the firm to gain access to the Datastream database by means of the Internet. The Datastream database contains current US. Canadian and international balance-sheet data. Current and historical equities information, bond information, and detailed economics data. The company accounts portion of the database provides balance-sheet data, financial, and rations for over 6,000 US public companies. 300 Canadian companies and selected companies in Europe and Asia.

Datastream is a subscription service but similar financial intelligence can be obtained from the Internet without paying a special fee. Three such services are Dun & Bradstreet, Barron's and Bloomberg.

In recent years, the availability of computer-based financial information such as that provided by subscription services and Internet service providers has greatly increased by ability of the financial intelligence substream to remain current on the firm's financial environment.

This concludes our discussion of the input subsystems of the financial information system. We now turn our attention to the output subsystems.

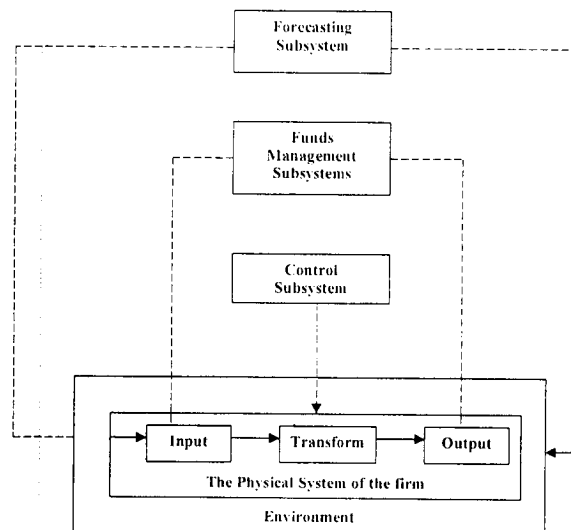## 12.5 USE THE FINANCIAL INFORMATION SYSTEM BY MANAGERS

The following Table identifies the users of the financial information system Executives in the financial function, such as a the vice-president of finance and the controller, use the information produced by all three output subsystems. Other executives, including members of the board of director, also use all of the outputs. Lower-level managers and members of the professional staff favour those subsystems that relate to their areas of responsibility. For example an investment analyst uses the funds management subsystem, and a store manager relies on the control subsystem.

Table : users of the Financial Information System

User	Subsystem		
	Forecasting	Funds Management	Control
Vice – President of Finance	X	X	X
Other Executives	X	X	X
Controller	X	X	X
Manager of Accounting			X
Manager of Financial Accounting	X		X
Director of budgets			X
Other functional managers	X	X	X

Let's say that you have just been given the task of identifying the output subsystems of the financial information system and that your knowledge of finance is sktetchy at best. You decide to apply the systems approach and start with the fact that the finance function is primarily concerned with the money flow. Money flows into the firm, is used in certain ways while it is in the firm and ultimately flows out If that is true, then the financial information system should assist management in managing this money flow.You think a little bit more and decide that the three points at which assistance should be applied are (1) at input (2) at the point at which the money is being transformed into other recourses internally, and (3) at output. After all these are the three main parts of a system-input, transformation, and output. You then indentify output subsystems that contribute to (10 getting money into the firm, (2) using the money effectively while it is in the firm, and (3) directing surplus money to elements in the environment in order to maximize the value of the investment).This is exactly what the subsystem described in this chapter accomplish. The forecasting subsystem projects the financial environment of the firm into the future so that management can plan its operations to make money flow into the firm. The forecasting subsystem, therefore, provides the setting for financial planning, as illustrated in Figure 6. Next, it is the responsibility of the funds management subsystem to track the flow of money into and out of the firm. By keeping management aware of this flow, this subsystem can alert management to periods of surplus and deficit so that the managers can make arrangements for taking the required action. Finally, it is the responsibility of the control subsystem to allocate money internally to the units that need it for its operations. Figure 6 positions the output subsystem in relation to the money flow.

The designers of financial information systems understand the importance of the money flows that connect the firm to elements in its environment, and they thus design systems to provide information to manage these flows.

Legend _____ Money flow ------------ Subsystem Application

Fig: The output subsystems help manage the money flow

12.6 Summary:
- Mechanical Financial Information System has been in use for long, to name as: Punch card machines, which were used by large business houses before the computer application. The financial information system is to describe the CBIS subsystem that provides information to persons and groups both inside and outside the firm concerning the firm's financial

matters. Information is provided in the form of periodic reports, special reports, and result of mathematical simulations, electronic communications, and the advice of expert systems. These prewritten software systems enable small firms to achieve good financial control without investing in large information services staffs. The systems also enjoy widespread use in large firms, where their user friendliness is a main stimulus to end – user computing.

There are four basic types of internal auditing activity: Financial, Operational, Concurrent, and internal control systems design one internal auditor can engage in all four types. Since the financial function controls the money flow through the firm information is needed to expedite the flow. The financial intelligence subsystem seeks to identify the best sources of additional capital and the best. The designers of financial information systems understand the importance of the money flows that connect the firm to elements in its environment, and they thus design systems to provide information to manage these flows.

12.7 Technical Terms:

1. CBIS : Computer Based Information System

2. Prospective : looking toward the future, expected; likely; future

3. Simulations : the act of simulating; pretense; feigning ; a) a simulated resemblance b) an imitation or counterfeit ; the use of a computer to calculate, by means of extrapolation, the effect of a given physical process

4. Conceptual : of conception or concepts

5. Ensure : to make sure or certain; guarantee; secure !measures to *ensure* accuracy" ; to make safe; protect !safety devices to *ensure* workers against accidents"

6. Exert : to put forth or use energetically; put into action or use !to *exert* strength, influence, etc." ; to apply (oneself) with great energy or straining effort

7. Oriented   : [Old Poet.] the east ; a) the quality that determines a pearl's value; luster b) a pearl of high quality ;   brilliant; shining; precious: orig. of pearls, now more general ; [Old Poet.] a) eastern; oriental b) rising, as the sun

8. rely : to have confidence; trust !you can *rely* on their willingness to help" ; to look to for support or aid; depend Used with *on* or *upon* ; *SYN.*—to **rely** (*on* or *upon*) a person or thing is to have confidence, usually on the basis of past experience, that what is expected will be done [she can be *relied* on to keep the secret]; to **trust** is to have complete faith or assurance that one will not be let down by another [to *trust* in God]; to **depend** (*on* or *upon*) a person or thing is to be assured of support or aid from that person or thing [he can *depend* on his wife for sympathy]; to **count** (*on*) or, colloquially, to **reckon** (*on*) something is to consider it in one's calculations as certain [they *counted*, or *reckoned*, on my going]; to **bank** (*on*), a colloquial term, is to have confidence like that of one who is willing to risk money on something [don't *bank* on their help]

9. Allegiance : the duty that was owed by a vassal to his feudal lord ; the obligation of support and loyalty to one's ruler, government, or country ; loyalty or devotion, as to a cause, person, etc. ; *SYN.*—**allegiance** refers to the duty of a citizen to the government or a similarly felt obligation to support a cause or leader; **fidelity** implies strict adherence to an obligation or trust; **loyalty** suggests a steadfast devotion of an unquestioning kind that one may feel for one's family, friends, or country; **fealty**, now chiefly a literary word, suggests faithfulness that one has sworn to uphold; **homage** implies respect, or honor rendered to a person because of rank or

achievement —*ANT.* **Faithlessness, disaffection**

12.8 Self Assessment Questions:

1. What do you mean by Financial Information System? Explain?

2. What are the prewritten software's?

3. Explain about types of auditing activity?

4. What is meant by financial intelligence subsystem? Explain with a neat graph?

5. How the manager will use Financial Information system?

12.9 Reference Books

1. CSV. Murthy – Management Information Systems

2. VARMA & AGARWAL – Management Information System

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LESSON – 13

MIS SUBSYSTEMS IN HUMAN RESOURCES

13.0 Objective:- This lesson is mainly deals with the human resources and the subsystems in it with related to computers in IT industry, more over how the managers will manage this human resources with the help of charts and graphs in the computer.

Structure:-

13.1 HUMAN RESOURCES INFORMATION SYSTEM OR HUMAN RESOURCE MODEL:-

In all large-scale organizations human recourse function is performed by personnel department, which is known as Human Resource Development System or (HRIS). HRIS conforms the same basic format as other financial system. The AIS provides data for financial needs, the HRIS conduct special research projects to gather new data and the human resources <u>intelligence</u>

providers personnel data and information from environment. HRIS has come a long journey and many executives now consider it valuable like other functional information systems. Yet there is still room from growth as the HRIS tackles some of the most difficult management problems.

Human Resources Function. The organizational structure of most firms includes a unit that is responsible for many of the activities related to the personnel resources. The term personnel was originally given to these units. But the practice today is to use the name **human resources (HR)**. HR can be a department or division with a functional area, or it can have functional status equal to marketing, manufacturing, finance, and IS. We use the title of HR director to describe the person in charge of HR. The HR director can be a member of the executive committee.

Primary HR Activities:- HR supports the other functional areas by assisting in obtaining new personnel, preparing personnel to do their jobs, and handling much of the record-keeping that is related to employees and former employee. In meeting its responsibilities, HR performs four primary activities.

1. **Recruiting and Hiring:-** HR helps bring new employees into the firm by running help wanted advertisements in newspapers providing position requests to both government and private employment agencies, holding screening interviews on college campuses and at the firm's facilities, and administering employment tests. HR stays current on government legislation affecting employment practices and counsels management in the proper policies to establish.

2. **Education and Training:-** During a person's period of employment. HR can administer educational and training programs that are required to <u>cultivate</u> the employee's job-related knowledge and skills. For example, members of the HR staff can assist systems analysts in training users during the implementation phase of the SLC.

3. **Data Management:-** HR maintains a database of employee-related data, and processes that data to meet users information needs.

4. **Termination and Benefit Administration:-** During the time that persons are employed by the firm, they receive a package of such benefits as hospitalization, dental insurance and profit sharing. When employees terminate their employment, HR processes the necessary paperwork and often conducts exit interviews. One purpose of the interviews is to learn how the firm can better serve its employee in the future. After termination, HR administers the firm's retirement program to former employees who are eligible

As the employee work for the firm, they are not managed by HR but by the managers of the areas where they work. HR therefore performs a support function, facilitating the flow of the personnel resource through the firm.

13.2 HUMAN RESOURCES INFORMATION SYSTEM (HRIS):-

Each firm must have a system for gathering and maintaining the data that describes the human resources, transforming the data into information and then reporting the information to users. This system has been named the **human resources information system (HRIS)**. The name **human resources management system (HRMS)** is gaining popularity, but we will stick with HRIS, since it will probably remain the most widely used.

Although it is easy to think of the HRIS as a computer-based system, this view can be misleading-for two reasons. First, a relatively large number of HRISs are non-computer-based, and second the term also applies to the people who work with the computer. The HR organization

typically includes and HRIS section that has the responsibility for managing the conceptual system of human resource data and information.

1990-91 HRSP Survey. In 1990, a study was conducted by the Associate of Human Resources Systems Professionals (HRSP), and the findings from that study shed considerable light on the current status of the HRIS. HRSP is an international origination of over 3,000 members, who represent over 2,000 organisations in all fifty states in US. Canada and many other countries. Most of the HRSP members are assigned to their firms' HRIS units, but some work in other areas.

A wide variety of industries was represented in the study and there was also wide variation in terms of the firms' scope of operations. More than one third of the 513 firms that responded to the survey (35.5 percent) are multinational. At the other extreme, 11.3 percent operate in only single metropolitan areas.

Location of the HRIS within the Firm:- Approximately 10 percent of the HRSP firms reported that they had no formal HRIS unit, but for those that did , it could be located in various places. Most of the units (73.5 percent) resided in HR, but some (8.4 percent) were a part of information services some (1.8 percent) were found in the payroll section of the accounting department, and some (4.9 percent) were located outside the firm in such places as service organizations and outsources.

The number of full-time HRIS employees ranged from 0 to 260. On an average, there were 5.87 programmer-analysts. 4.28 data entry operators.

Evolution of the HRIS:- Until recently, management did not pay as much attention to personnel data as it did to data describing money and material resources. The stimulus for elevating the status of personnel data was provided by such governmental legislation or initiatives as EEO (Equal Employment Opportunity), OSHA (Occupational Safety and Health Administration), and AAP (Affirmative Action Programmed) which were enacted during the 1960s and 1970s. Firms were required to provide the national government with statistics that showed the extent to which the firms personnel practices complied with the laws. The firms quickly learned that they could not keep up with the increasing reporting requirements without the aid of computer-based systems.

The firm's top management began allocating additional resources to the development of information-oriented personnel systems. The new systems were developed by information specialists from information services, who worked with users in HR. The processing was done on the large-scale computer located in IS.

When microcomputers came onto the scene, HR began installing them in their area. Some were used in a stand-alone manner, some were networked together to form LANs, and some were networked to the firm's central computing facility. Some HR organizations even installed their own minicomputers and even mainframes.

3. A MODEL OF A HUMAN RESOURCES INFORMATION SYSTEM:-

One feature of the HRIS that distinguishes it from other functional information system is the wide variety of applications that it performs. This variety is reflected in the six output subsystems in the model illustrated in the following Figure

In devising our mode, we use the same general format of input subsystems, database, and output subsystems that we have used for other functional areas. The input subsystems are the standard combination of data processing research, and intelligence. In most firms, the database is housed in computer storage. Only 5.7 percent of the HRSP firms reported using a non-computer database.

ACCOUNTING INFORMATION SYSTEMS (AIS):-

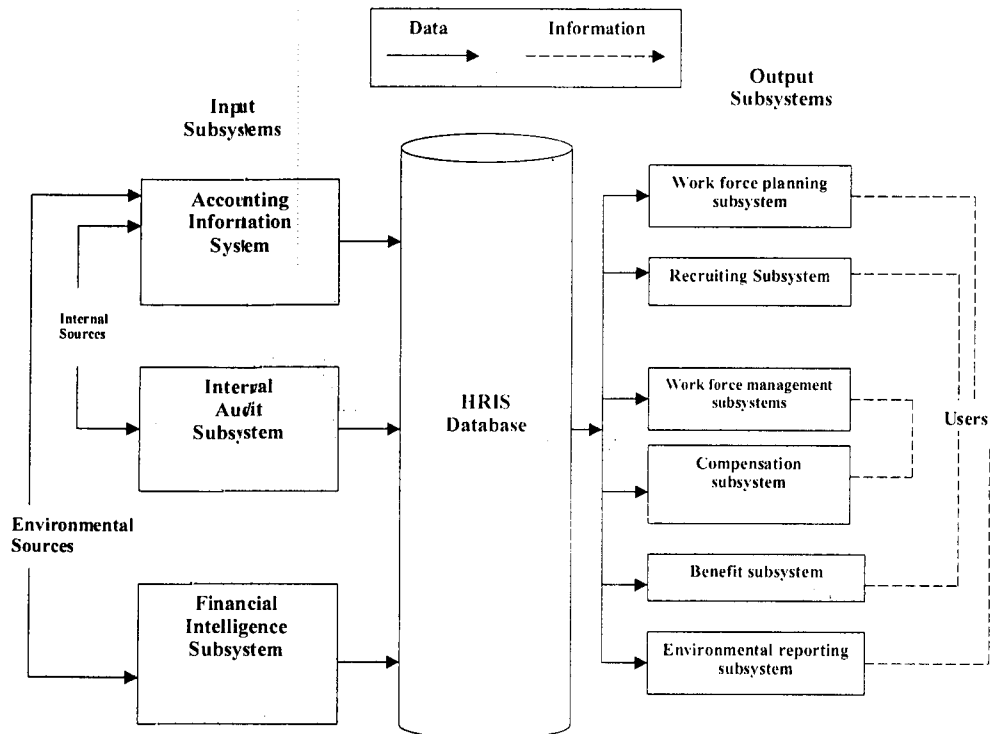The data that is handled by the HRIS is a blending of personnel and data elements.

Fig . : A model of a human recourses information system

- Personnel data elements are relatively permanent and are non-financial is nature. Example are employee name, sex, data of the birth, education, and number of dependents. These personnel data elements are created by HR at the time of employment and are kept currents as long as the employee work for the firm Similar data is also kept for retired employees.

- Accounting data elements are primarily financial and tend to be more dynamic than personnel data. Examples of accounting data elements are hourly rate, monthly, current gross earning, and year-to-date income tax.

The AIS makes the accounting data available to the HRIS so that the database contains a complete picture of the personnel resource – financial as well as non-financial.

13.4 HUMAN RESOURCES RESEARCH SUBSYSTEM

The human resources research subsystem gathers data by means of special research projects. Examples of such research are succession studies job analyses and evaluations, and grievance studies.

- Succession studies are conducted for the purpose of identifying persons in the firm who are candidates for positions that become available. Perhaps a department head is retiring and top management wants to know who can be considered for promotion to that position.

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- Job analyses and evolution study each job in an area for the purpose of defining its scope and identifying the knowledge and skills that are required.

- Grievance studies follow up on complaints filed by employ6ees for a variety of reasons.

In each of these examples, a need exists for certain information that cannot be produced from the HRIS database, and a special study is conducted to gather the data.

13.5 HUMAN RESOURCES INTELIGENCE SUBSYSTEM:-

The human resources intelligence subsystem gathers data relating to human resources from the firm's environment. Environmental elements that provide this data include the government, suppliers, labour unions, the global community the financial community and competitors.

- Governmental Intelligence : The government provide data and information that assist the firm in complying with the various employment laws.

- Supplier Intelligence. The suppliers include such firms as insurance companies, which provide employee benefits, and university placement centre and employment agencies. Which serve as sources of new employees. These suppliers provide data and information that enable the firm to perform its recruiting and hiring functions.

- Labour Union Intelligence. Labour unions provide data and information that are used in administering the labour contracts between the unions and the firm.

- Global Community Intelligence. The global community provides information that describes such local resources as housing education, and <u>recreation</u>. This information is used in recruiting employees on an area, national and international scale, and in integrating current employees into their local communities.

- Financial Community Intelligence. The financial community provides economic data and information that is used in personnel planning.

- Competitor Intelligence. In certain industries where highly specialized knowledge and skills are required, such as a the computer industry, there is a frequent flow of personnel from one firm to another. Some firms regard their competitors as excellent sources of new employees, and they thus father information concerning

- their competitors personnel practices and perhaps even information on individuals who are potential recruits.

Much of this environmental intelligence is gathered by means of informal system, such as word of mouth, but an increasing volume is being provided by formal computer-based system.

13.6 HRIS DATABASE:-

Increasing complexity of personnel-related issues, which is caused by mounting governmental legislation and an expanding selection of benefits, has made it almost a necessity to maintain the data in the computer. For the computer-based HR database, several alternatives exist in terms of contents location, management, and data entry.

Database Contents:- HRIS database can contain data describing not only employee but also organizations and individuals in the firm's environment. The environmental elements are those that influence human resources in some way.

Employees Data:- Most of the HRIS database contains data concerning the firm's current employees. In 82.5 percent of the HRSP firms responding to the 1990-91 survey , employee data was the only type that was maintained, but hunded of data elements can be stored for each employee.

Non-employee Data:- When asked to describe non-employee data in their databases, 8 percent of the HRSP respondents identified data that describes such organizations in the firm's environment as employment agencies, colleges and universities, labour unions, and governments. Also identified was data describing such individuals as applicants, dependents, beneficiaries, and survivors.

Location of the HRIS Database:- In the HRSP firms, most of the HRIS databases were housed in the firm's central computers, but other databases resided in HR, in other operating divisions, and in outside service centers As the trend to organizational and end-used computing continues, it is expected that more databases will be shifted from their central location to HR.

Data Entry:- Data is entered into the database from several sources, according to the HRSP study. Non-managers within HR were the most popular sources (86.9 percent of the firms), followed by non-managers outside of HR (36.1 percent), managers within HR (30.8 percent), and mangers outside HR (7.8 percent). Data entry from the environment was relatively rare, being reported by only 24 percent of the firms.

HRIS output:- In the HRSP firms , 65.3 percent of the users were located within HR, 29.1 percent were elsewhere in the firm, and 10.2 percent were in the firm's environment. Figure 4 shows that HR managers, including the HR director, use the HRIS more frequently than did the firm's executive and managers outside of HR. The HR managers tended to use the HRIS on a weekly basis, where the firm's other managers were more likely to follow a monthly route.

Basic Forms of Output:- HRIS uses usually received their output in the form of periodic reports and responses to database queries. Mathematical model were used to some extent, and there was some use of expert system.

HRIS Software:- The output subsystem used by the HRSP firms was sometimes in a prewritten form that was purchased form software suppliers, or it was sometimes developed within the firm. More custom software was developed jointly by HR and IS than by HR or IS alone. And it was least likely to be produced by outside firms.

Output Subsystems:- HRIS mode includes six output subsystem each containing a number of applications. Here an attempt is made to illustrate the applications with tables and comment on those that are exceptional in one way another.

13. 7 WORK FORCE PLANNING SUBSYSTEM:-

Work force planning involves all of those activities that enable management to identify future personnel needs. Table 1 lists the applications in this subsystem in sequence based on the number of firms that have put them into use. The table also identifies the number of firms that were in the process of implementing the applications. The figure at the bottom of the table indicates the percentage of firms that had operational applications. This percentage provides an indication of relative popularity of the subsystem. This tabular format will be followed for all of the output subsystems.

We see that the most popular work force planning applications were organization charting, salary forecasting, and job analysis / evaluation. Most of the development! Effect was aimed at job analysis / evaluation, planning and organization charting. Of all applications, the two that received the least attention – planning and work force modeling – appear to be fundamental to work force planning.

Their relatively low use indicates that there is still much room for application development in this subsystem.

13.8 RECRUITING SUBSYSTEM:-

Firms bring new employees into the organization by means of the recruiting subsystem. Identities the two recruiting application in terms number of application, this is the smallest of the output subsystems. However, applicant tracking has been implemented quite extensively, and it also account for a high level of development activity. Tracking job applications before they are hired was much more widely practiced than conducing internal searches to find job candidates. This indicates that the firm's efforts to fill job openings are focused more on the environment than on current employees.

13.9 WORK FORCE MANAGEMENT SUBSYSTEM:-

In terms of the number of applications, this was the largest subsystem, with seven listed in Table 3. However in terms of the percentage of applications in use, work force management ranked last. Only two-third of the reporting HRSP firms put these applications in use. By scanning the in-use figures it becomes clear that performance appraisal and training are the only ones to register strong support. There is quite bit of development effort underway. However, in position control, skills / competency, training and succession.

One could speculate on the reasons for the relatively low level of implementation. Relocation, for example, may be very difficult to achieve, and a disciplinary application may not be well-suited to a computer-based system. But, n the whole, the applications do not appear to be beyond the reach of the HRIS information specialists.

13.10 COMPENSATION SUBSYSTEM:-

The final three subsystems represent the areas where the HRIS has been the most successful, with multiple applications and in-use percentages in the 80 percent range.

The compensation applications have been achieved at the highest level as shown in The merit increase application has been implemented more widely than any other HRIS application – in 404 of the 513 HRSP firms. All of the other applications also enjoy high rates of implementation. Attendance is the only area significant development effort is being expanded.

Perhaps one reason for the popularity of these applications is that they area easy to implement. They all have a "payroll" flavour, and payroll is probably the most established of the computer applications in business. Although HR has given up payroll to the AIS in many firms, it is clearly that much processing is still being done.

13.11 BENEFITS SUBSYSTEM:-

The benefit applications have been implemented on a large scale, with six separate applications and an 84 percent in use rate. Table 5 paints the picture of firms relying heavily on their

HR units for support in providing both current and retired employees with a good benefits package.

The applications in this subsystems are generally very complex and difficult to perform. Defined contribution and defined benefits plans allow an employee to accumulate retirement funds to meet a specified standard of living which is determined by actuarial calculations. Flexible benefits plan are recent innovation that enable employees to individually select the benefits that they want from a "menu", thus promoting the name cafeteria-style benefit plans. This area is the most solid evidence that HR has made real accomplishments in achieving end-user computing.

13.12 ENVIRONMENTAL REPORTING SUBSYSTEM:-

These applications were the one that got the HRIS going – the reporting of the firm's personnel policies and practices to the government. Table 6 shows the two EEO applications that are widely implemented that that tare supplemented by other information directed to both the government and labour unions. These applications are aimed at meeting the responsibilities of the firm to its external constituencies rather than to management.

13.13 APPLICATION INTEGRATION:-

Surprisingly the HRSP respondents reported that only 70.9 percent of their applications were computer-based. This leaves a large number that are still being performed manually or with non-computer technology.

In most of the firms. The application that are on the computer are integrated in the form of a core HRIS. In a core HRIS, the applications function as a unit., sharing a common database and the output of one system provide the inputs for another. This structure contrasts to the use of Stand-alone HRIS applications, which operate independently of each other. Fifty-three firms (10.3 percent) reporte all applications to be integrated and 227 firms (44.2 percent) claimed that most were . Firm size had no affect on the integration, but age of the HRIS did. The newer HRIS s are more likely to be integrated.

13.14 CURRENT STATUS OF HRIS:-

When asked how top management viewed the HRIS, the HRSP respondents gave the answer shown in figure 6. In 242 (47.2 percent) of the firms, the executives value the HRIS on a par with other functional systems. This is a healthy situation, and the twenty-nine firms in which the HRIS enjoyed a preferred position in encouraging. But the 225 firms in which the HRIS was viewed as having less value than the other systems is distressing to those who regard the firm's personnel as its most valuable source.

Since HRIS was relatively late in jumping on the computer badwagon, it could well be the functional area with the greatest potential for applying the computer to problem solving. The HRIS is aimed at Fayol's management functions of organising, staffing, and directing functions that have been largely ignored by other information systems. Perhaps when top management sees how the HRIS can assist in these areas, its status will improve.

13.15 HOW MANAGERS USE THE HRIS:-

HRIS is similar to the financial information system, because its contents are of interst to managers throughout the firm. Just as all managers have an interest in their money resources, they also have an interest in their personal resources.

identifies the HRIS uses. The HR director uses information from all of the output subsystems, so too do other executives, the manager of EEO/AA within HR, and other manager throughout the firm, Managers of units within HR have particular interest in those subsystems that bear on their operations. For example, the manager of the HR planning unit is primarily interested in the work force planning subsystem. Two managers outside of HR also have an especially strong interest. The manager of accounting has a special interest because of the impact of compensation and benefit programs on the firm's status. The manager of the payroll section of the accounting department has a special interest in the compensation subsystem.

Every day managers throughout the firm use personnel information.

13.16 Summary: - In all large-scale organizations human recourse function is performed by personnel department, which is known as Human Resource Development System or (HRIS). HRIS conforms the same basic format as other financial system. Although it is easy to think of the HRIS as a computer-based system, this view can be misleading-for two reasons. First, a relatively large number of HRISs are non-computer-based, and second the term also applies to the people who work with the computer. The HR organization typically includes and HRIS section that has the responsibility for managing the conceptual system of human resource data and information.

In devising our mode, we use the same general format of input subsystems, database, and output subsystems that we have used for other functional areas. The input subsystems are the standard combination of data processing research, and intelligence. In most firms, the database is housed in computer storage. Only 5.7 percent of the HRSP firms reported using a non-computer database. The manager of the payroll section of the accounting department has a special interest in the compensation subsystem. Every day managers throughout the firm use personnel information. Firms bring new employees into the organization by means of the recruiting subsystem. Identities the two recruiting application in terms number of application, this is the smallest of the output subsystems.

13.17 Technical Terms:-

1. intelligence : a) the ability to learn or understand from experience; ability to acquire and retain knowledge; mental ability b) the ability to respond quickly and successfully to a new situation; use of the faculty of reason in solving problems, directing conduct, etc. effectively c) Psychol. measured success in using these abilities to perform certain tasks d) generally, any degree of keenness of mind, cleverness, shrewdness, etc.; news or information ; a) the gathering of secret information, as for military or police purposes b) the persons or agency employed at this ; an intelligent spirit or being

2. Cultivate   : to prepare and use (soil or land) for growing crops; till ; to break up the surface soil around (plants) in order to destroy weeds, prevent crusting, and preserve moisture ; to grow (plants or crops) from seeds, bulbs, shoots, etc. ; to improve or develop (plants) by various horticultural techniques ; to improve by care, training, or study; refine !to cultivate one's mind" ; to promote the development or growth of; acquire and develop !to cultivate a taste for music" ; to seek to develop familiarity with; give one's attention to; pursue

3. Hiring : the amount paid to get the services of a person or the use of a thing ; a hiring or being hired ; to get the services of (a person) or the use of (a thing) in return for payment; employ or engage ; to give the use of (a thing) or the services of (oneself or another) in return for payment:

often with out ; to pay for (work to be done); **for hire** available for work or use in return for payment: also **on hire** ; **hire out** to work, esp. as a laborer, for payment ; **SYN.**—to **hire**, in strict usage, means to get, and **let** means to give, the use of something in return for payment, although **hire**, which is also applied to persons or their services, may be used in either sense [to hire a hall, a worker, etc., rooms to let]; **lease** implies the letting or, in loose usage, the hiring of property (usually real property) by written contract; **rent** implies payment of a specific amount, usually at fixed intervals, for hiring or letting a house, land, or other property; **charter** implies the hiring or leasing of a ship, bus, etc.

4. Conceptual : of conception or concepts

5. Devising : to work out or create (something) by thinking; contrive; plan; invent ; Law to bequeath (real property) by will ; [Archaic] to make secret plans for; plot ; [Obs.] to guess or imagine ; a gift of real property by will ; a will, or clause in a will, granting such a gift ; the property so granted

6. Succession : the act of succeeding or coming after another in order or sequence or to an office, estate, throne, etc. ; the right to succeed to an office, estate, etc. ; a number of persons or things coming one after another in time or space; series; sequence !a succession of delays" ; a) a series of heirs or rightful successors of any kind b) the order or line of such a series; Ecol. the slow, regular sequence of changes in the regional development of communities of plants and associated animals, culminating in a climax characteristic of a specific geographical environment ; **in succession** one after another in a regular series or sequence; successively

7. Recreation : refreshment in body or mind, as after work, by some form of play, amusement, or relaxation ; any form of play, amusement, or relaxation used for this purpose, as games, sports, or hobbies

8. Queries : a question; inquiry ; a doubt ; a question mark (?) placed after a question or used to question the accuracy of written or printed matter ; to call in question; ask about ; to question (a person) ; to mark with a QUERY (sense 3) ; to ask questions or express doubt

9. housed : a building for human beings to live in; specif., a) the building or part of a building occupied by one family or tenant; dwelling place b) [Brit.] a college in a university c) an inn; tavern; hotel d) a building where a group of people live as a unit !a fraternity house" e) a monastery, nunnery, or similar religious establishment >f) [Colloq.] a brothel ; the people who live in a house, considered as a unit; social group; esp., a family or household ; [often **H3**] a family as including kin, ancestors, and descendants, esp. a royal or noble family !the House of Tudor" ; something regarded as a house; place that provides ; shelter, living space, etc.; specif., a) the habitation of an animal, as the shell of a mollusk b) a building or shelter where animals are kept !the monkey house in a zoo" c) a building where things are kept when not in use !a carriage house" ; any place where something is thought of as living, resting, etc. ; a) a theater b) the audience in a theater ; a) a place of business b) a business firm; commercial establishment ; the management of a gambling establishment ; a church, temple, or synagogue !house of worship" ; [often **H3**] a) the building or rooms where a legislature or branch of a legislature meets b) a legislative assembly or governing body ; Astrol. a) any of the twelve parts into which the heavens are divided by great circles through the north and south points of the horizon b) a sign of the zodiac considered as the seat of a planet's greatest influence ;

designating or of a salad dressing, brand of liquor, etc. served at a particular bar or restaurant ; to provide, or serve as, a house or lodgings for ;to store in a house ; to cover, harbor, or shelter by or as if by putting in a house ; Archit., Mech. to insert into a housing ; to take shelter ; to reside; live ; **bring down the house** [Colloq.] to receive enthusiastic applause from the audience ; **clean house** to clean and put a home in order ; to get rid of all unwanted things, undesirable conditions, etc.

10. Forecasting : [Archaic] to foresee; to estimate or calculate in advance; predict or seek to predict (weather, business conditions, etc.); to serve as a prediction or prophecy of; to make a forecast ; [Archaic] foresight; forethought ; a prediction, as of weather conditions

13.18 Self Assessment Questions:

1. Explain the following terms:

    (a). WORK FORCE PLANNING SUBSYSTEM

    (b) RECRUITING SUBSYSTEM

    (c) WORK FORCE MANAGEMENT SUBSYSTEM

2. Explain about human resource information system?

3. Explain about model of HRIS with a neat diagram?

4. Explain the following terms:

    (a) COMPENSATION SUBSYSTEM

    (b) BENEFITS SUBSYSTEM

    (c) ENVIRONMENTAL REPORTING SUBSYSTEM

5. Explain the following:

    (a) APPLICATION INTEGRATION

    (b) CURRENT STATUS OF HRIS

    (c) HOW MANAGERS USE THE HRIS

6. Explain about HUMAN RESOURCES RESEARCH SUBSYSTEM, HUMAN RESOURCES INTELIGENCE SUBSYSTEM, HRIS DATABASE?

13.19 Reference Books

    1. CSV. Murthy – Management Information Systems

    2. VARMA & AGARWAL – Management Information System

- S.PRABHAKAR

LESSON – 14

DECISION SUPPORT SYSTEM

14.0 Objective: - This lesson consists of decision support system regarding the management in IT, means how this decision support system will be implemented by the management in MIS.

Structure:-

141. Introduction of DSS

14.2. Definition of D.S.S

14.3. Evolution of D.S.S

14.4. Characteristics of D.S.S

14.5. DSS Model Management

14.6. Components of DSS

14.7. Types of DSS

14.8. Functions of DSS

14.9. Summary

14.10 Technical Terms

14.11 Self Assessment Questions

14.12 Reference Books

14.1. Introduction of DSS:-

The data oriented electronic data processing (EDP) systems of the 60s evolved into the information centered MIS systems of the 70s with a distinct and mature philosophy of MIS. The next stage of the evolution was to combine the power of information with the modeling capability of the information processing machines, viz., the computer. Quantitative modeling tools under the names of management science and operations research were well developed in the 60s and 70s. UN fortunately, the models spoke the language of mathematics and not that of the decision maker. The data requirements of the models could not be matched by the EDP systems of the 60s. They had to wait for the MIS systems of the 70s. the hardware and software technologies available in the 60s and 70s were no match for the modeling power to be useful to the decision maker.

The micro – processor revolution that led to desktop computing along with the end users came to take an important place, before decision makers could adopt the modeling approach. Such combinations, fortuitously, provided the foundation of Decision Support Systems (DSS). As the name suggests, DSS represents systems that support decision making. The support role of the computers in decision making is quite obvious. Clearly, computers were aimed not to supplant, but to merely support the human decision maker. The mistaken motion that managers would lose their jobs proved to be wrong. It was the maturity of the researchers in Artificial Intelligence that clearly established the supremacy of the human intelligence and the limitations of machine (artificial) intelligence. Such a non – intimidating approach provided a very high level of acceptance from the end users without any fear or threat to their role.

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14.2 Definition of D.S.S:-
Systems that support decisions are Decision Support Systems (DSS). While any system that supports decisions qualifies for decision support, take only those systems that support non – trivial, practical decision – making situations. For example, planning a way to spend the ten rupees in your pocket in a crowded market place, and choosing your life partner – both are clearly out of the scope of decision support, the former being too trivial and the latter too demanding on your intellect, often involving emotions that are out of reach of modeling! Similarly, a calculator on the executive desk or the telephone and fax machine in the office do support decision making, but they are not DSS per se due to their simplistic nature. One would only consider the systems as opposed to components that help in decision making involving real – world, non – trivial, organizational decisions, like the location of a new plant or the introduction of a new technology.

Decision support systems are systems that support decision making using flexible access to data and models for use by end users; the systems should provide flexible interfaces to support non – routine, unstructured decisions often involving uncertain decision situations an multiple objectives with provision for incorporating the decision maker's individual style of decision making.

14.3 Evolution of D.S.S:-
The first generation of modeling techniques employed by managers was statistical techniques like regression analysis and analysis of variance.

A number of mathematical techniques, notably optimization and simulation techniques, were also employed. While the techniques were immensely useful, the software environment of the 70s and early 80s did not permit flexible access either to the data used in the models or the models themselves. Generally, the data was stored in large mainframe database needing learning curve in order to use them. The models were stand alone programs, typically FORTRAN routines, in the form of libraries that had to be modified and linked for every execution. The standard mode of operation was batch mode through interactive terminals. The software emphasized processor efficiency and not user friendliness. Obviously, the models had to be run for the managers by program analysis.

The availability of personal computers like apple computer and IBM PC completely changed the scene in the 80s Microcomputer database products like database provided a far more flexible access to data; spreadsheet software like Lotus 1 – 2 – 3 gave interactive, friendly, but flexible access to model though limited in modeling capability.

Scott Morton, in his seminal paper in 1971 is generally credited with first using the term decision support. In his work, he elaborated this idea by further giving shape to a body of thinking that is widely referred to as decision support. Alter's dissertation and the Addison – Wesley series of texts in decision support provided the solid body of knowledge for the broad area of decision support, including well thought – out, successful applications in the corporate world. The biennial and later annual conferences on DSS, jointly organized by the or society of American and ACM (Association of Computing Machinery), starting from 1984 and the DSS journal started in 1987 formally established this area as a distinct interdisciplinary area involving operations research, management science, computing science, organization theory and organizational psychology disciplines. In fact, the impact of DSS is so profound that many of the quantitative courses in MBA curriculum are referred to as Decision Support Courses in leading business schools around the world today.

14.4. Characteristics of D.S.S:-
There are several ways of characterizing the DSS approach to building systems. The notable are as follows:

1. Decision aid

2. Semi – Structured decision support

3. What if analysis

4. Effectiveness vs. efficiency

5. Satisfying principle

6. Heuristic problem solving

7. Individual preferences and decision style

8. Trade – off analysis

These are discussed in brief, DSS emphasizes support to the decision maker and does not supplant him. This has helped the easy acceptance of DSS approach by end users, there by enabling thousands of real world meaningful systems to be built and used in such diverse areas as education, justice, environment, manufacturing, public policy, etc. most of these systems, concentrate on semi – structured decisions, leaving the fully structured decisions to the domain of MIS. Structured decisions admit automation of the situations; once an algorithm is implemented in the form of a computer code, checked out and implemented in the form of a computer code, checked out and implemented; there is little scope for the decision maker to contribute. Semi – structured decisions, on the other hand, need continuous input from the decision maker by way of preferences, trade – offs, and value judgments that must be incorporated at different stages before the final result is produced by the system. While the scope of MIS is to provide answers to a number of questions by routine computation, DSS concentrates on insight into the system by providing what – if sensitivity questions.

To many end users, what if analysis is the major contribution of DSS. The interface of DSS permits such questioning in a flexible manner by the decision maker. Many of these questions cannot be anticipated and built into the system. Many of the what – if questions would be guided by the result up to a particular stage, which obviously would be unknown before reaching that stage. Though many DSS have built – in optimization capabilities, the decision makers prefer a satisfying solution, assisted by a series of what if questions. This appears more natural the way decision makers accept DSS and is consistent with the observations made by simon

The following are the desirable characteristics for a DSS:

- DSS helps the decision maker in the decision making process

- DSS is designed to solve semi structured and unstructured problems

- DSS supports decision makers at all levels, but is most effective at the tactical and strategic levels

- DSS makes general purpose models, simulation capabilities and other analytical tools available to the decision maker

- DSS is an interactive, user friendly system that can be used by the decision maker with little or no assistance from an MIS Professional

- DSS can be readily adapted to meet the information requirements for any decision environment
- DSS provides the mechanisms to enable a rapid response to a decision makers request for information
- DSS has the capability to interface with the corporate database
- DSS is not executed in accordance with pre – established production schedule
- DSS is flexible enough to accommodate a variety of management styles
- DSS facilitates communication between levels of decision making

14.5 DSS Model Management: -
Model Management is a relatively new term that has emerged from the increasing interest in Decision Support Systems. Just as the data management approach highlights the need for treating the data as a valuable resource to be managed systematically by the organization, the DSS Philosophy advocates for an equivalent approach to models. Models are instruments which transform data into information that in turn aids decision making.

Generally, a powerful DSS software supplies facilitates for modeling model management, data handling linking models and data and interaction between the users and the system. The model management system dynamically constructs a decision supports in response to a particular problem. The process is accomplished by drawing on the knowledge base of models that reflect the technical expertise of a management scientist, coupled with the activities involved in a given decision – making environment.
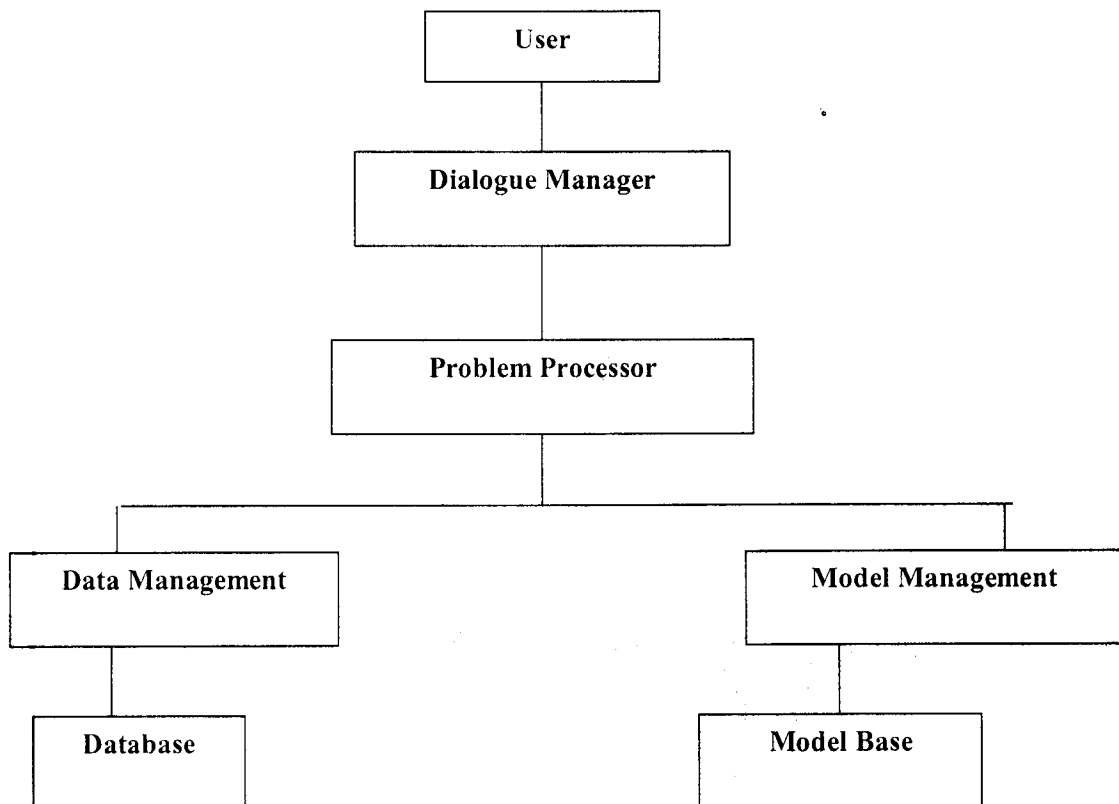

Fig. Structure of a model management system.

14.6. Components of DSS:- Generally, a DSS has three main components:

(a) The Language System:- It is the sum total of all linguistic facilities made available to the decision maker for data retrieval and computation. The DSS user will be involved in decision making based on the data and models available to him. The language system also provides help facilities.

(b) The Knowledge System:- It represents a body of the knowledge regarding a specific problem domain. The knowledge is expressed in two different ways – one regarding the model that fits the problems, viz., model management system, and the other regarding the data that must be fed to the model, viz., data management system.

(c) The Problem Processing System:- It is the mediating mechanism between expression of knowledge in the knowledge system and expressions of problems in the language system. This system uses algorithms for techniques like liner programming, regression analysis and discrete event simulation.

The purpose of the model management system, therefore, is to make available a wide variety of models management system, therefore, is to make available a wide variety of models to decision makers so that they can apply them to appropriate areas of applications.

14.7. Types of DSS:- The different types of decision support system are as follows:-

(a) Status inquiry systems:- The number of decisions in the operational management and some at the middle management are such that they are based on one or two aspects of a decision making situation. It does not call for any elaborate computations, analysis, choice etc. for decision making. If the status is known, the decision is automatic i.e.; status and solution is a unique relation.

(b) Data analysis systems:- These decision systems are based on comparative analysis and makes use of a formula or an algorithm. But, these processes are not structured and therefore, vary. The cash flow analysis, inventory analysis and the personnel inventory systems are examples of the analysis systems. The use of simple data processing tools and business rules are required to develop this system.

(c) Information analysis system:- In this system, the data is analyzed and the information reports are generated. The reports might be having some exceptions as a feature. 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.

(d) 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 or a function. The content of these systems is more of data processing, which leads to formal reporting, with exceptions if necessary. These systems account items such as cash, inventory, personnel and so on, and relate it to norms developed by the management for control and decision making.

(e) Model based systems:- These system are simulation models or optimization models for decision making. These decisions, generally are one time and infrequent, and provide general guidelines for operation or management. The product decision mix decision, material mix, job scheduling rules, resource or asset or facilities planning systems are the examples.

14.8. Functions of DSS: - There are five functions of a DSS facilitating managerial decision making. They are:

- Model building

- 'What if' analysis

- Goal Seeking

- Risk analysis

- Graphical analysis

(a) Model building:- This allows decision makers to identify the most appropriate model for solving the problem on hand. It takes into account input variables, interrelationships among the variables, problem assumptions and constraints.

(b) 'What – if' analysis:- This 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 judgment in predicting the long – term implications 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)

(c) Goal Seeking :- It is the process of determining the input values required to achieve a certain goal.

(d) Risk analysis:- It is a function of DSS that allows managers to assess the risks associated with various alternatives. Decisions can be classified as low risk, medium risk, and high risk. A DSS is particularly useful in medium risk and high risk environments.

(e) Graphical analysis:- This helps managers to quickly digest large volumes of data and visualize the impacts of various courses of action. S.L. Jarvenpaa and G.W. Dickson studied the relative advantages and disadvantages of tabular and graphic output. They recommended the use of graphs when:

- Seeking a quick summary of data

- Detecting trends over time

- Comparing points and patterns at different variables

- Forecasting activities

- Seeking relatively simple impressions from a vast amount of information

The researchers suggested that a tabular presentation be used when it is necessary to read individual data values.

Jarvenpaa and Dickson has also offered the following tips when choosing between the various types of graphs:

- Line or bar charts are preferred for summarizing data

- Grouped line or bar charts are good for showing trends over time.

- Grouped bar charts are better than pie charts for presenting parts of a whole

- Grouped line or bar charts are good for comparing patterns of variables

- Use horizontal rather than vertical bars when comparing variables

- Use single line or bar charts to compare individual data points between variables

- Put data values on the top of the bars in a bar charts for easier reading.

14.9 Summary: -

The data oriented electronic data processing (EDP) systems of the 60s evolved into the information centered MIS systems of the 70s with a distinct and mature philosophy of MIS. Systems that support decisions are Decision Support Systems (DSS). While any system that supports decisions qualifies for decision support, take only those systems that support non – trivial, practical decision – making situations. A number of mathematical techniques, notably optimization and simulation techniques, were also employed. To many end users, what if analysis is the major contribution of DSS. The interface of DSS permits such questioning in a flexible manner by the decision maker. Many of these questions cannot be anticipated and built into the system.

Generally, a powerful DSS software supplies facilitates for modeling model management, data handling linking models and data and interaction between the users and the system. The model management system dynamically constructs a decision supports in response to a particular problem. The process is accomplished by drawing on the knowledge base of models that reflect the technical expertise of a management scientist, coupled with the activities involved in a given decision – making environment. The purpose of the model management system, therefore, is to make available a wide variety of models management system, therefore, is to make available a wide variety of models to decision makers so that they can apply them to appropriate areas of applications.

14.10 Technical Terms:-

1. Evolved : to develop by gradual changes; unfold ; to set free or give off (gas, heat, etc.) ; to produce or change by evolution ; to develop gradually by a process of growth and change ; to become disclosed; unfold

2. Mature : a) full-grown, as plants or animals b) ripe, as fruits c) fully developed, as a person, a mind, etc. ; fully or highly developed, perfected, worked out, considered, etc. !a mature scheme" ; of a state of full development !a person of mature age" ; due; payable: said of a note, bond, etc. ; Geol. having reached maximum development of topographical form or vigor of action, as

with streams that have no plains and that have begun to widen rather than deepen their valleys ; to bring to full growth or development, or to ripeness ; to develop or work out fully ; to become fully grown, developed, or ripe ; to become due: said of a note, etc.

3. modeling : a) a small copy or imitation of an existing object, as a ship, building, etc., made to scale b) a preliminary representation of something, serving as the plan from which the final, usually larger, object is to be constructed c) ARCHETYPE (sense 1) d) a hypothetical or stylized representation, as of an atom e) a generalized, hypothetical description, often based on an analogy, used in analyzing or explaining something f) a piece of sculpture in wax or clay from which a finished work in bronze, marble, etc. is to be made ; a person or thing considered as a standard of excellence to be imitated ; a style or design; specif., any of a series of different styles or designs of a particular product !a two-door model, a heavy-duty model, a 1969 model" ; a) a person who poses for an artist or photographer b) any person or thing serving as a subject for an artist or writer c) a person employed to display clothes by wearing them; mannequin ; serving as a model, pattern, or standard of excellence !a model student" ; representative of others of the same kind, style, etc. !a model home" ; a) to make a model of b) to plan, form, or design after a model c) to make conform to a standard of excellence !to model one's behavior on that of one's elders" ; to shape or form in or as in clay, wax, etc. ; t o display (a dress, suit, etc.) by wearing ; Drawing, Painting, etc. to create a three-dimensional image of on a flat surface through the use of color, shading, etc. ; to make a model or models !to model in clay" ; to serve as a MODEL (sense 4) ;

SYN.—model refers to a representation made to be copied or, more generally, to any person or thing to be followed or imitated because of excellence, worth, etc.; **example** suggests that which is presented as a sample, or that which sets a precedent for imitation, whether good or bad; a **pattern** is a model, guide, plan, etc. to be strictly followed; **paradigm** is common now only in its grammatical sense of an example of a declension or conjugation, giving all the inflectional forms of a word; **archetype** applies to the original pattern serving as the model for all later things of the same kind; **standard** refers to something established for use as a rule or a basis of comparison in judging quality, etc.

4. Quantitative : having to do with quantity ; capable of being measured ; having to do with the quantity of a speech sound ; having to do with a system, as in classical prosody, in which syllables are classified as long and short

5. Match : orig., a wick or cord prepared to burn at a uniform rate, used for firing guns or explosives ; a slender piece of wood, cardboard, waxed cord, etc. tipped with a composition that catches fire by friction, sometimes only when rubbed on a specially prepared surface ; any person or thing equal or similar to another in some way; specif., a) a person, group, or thing able to cope with or oppose another as an equal in power, size, etc.; peer b) a counterpart or facsimile c) either of two corresponding things or persons; one of a pair ; two or more persons or things that go together in appearance, size, or other quality; pair !a purse and shoes that are a good match" ; a contest or game involving two or more contestants ; a) an agreement to marry or mate b) a marriage or mating !to make a good match" ; a person regarded as a suitable or possible mate ; to join in marriage; get a (suitable) match for; mate ; a) [Now Rare] to meet as an antagonist b) to compete with successfully ; to put in opposition (with); pit (against) ; to be

equal, similar, suitable, or corresponding to in some way !his looks match his character" ; to make, show, produce, or get a competitor, counterpart, or equivalent to !to match a piece of cloth" ; to suit or fit (one thing) to another ; to fit (things) together; make similar or corresponding ; to compare ; a) to flip or reveal (coins) as a form of gambling or to decide something contested, the winner being determined by the combination of faces thus exposed b) to match coins with (another person), usually betting that the same faces will be exposed ; to be equal, similar, suitable, or corresponding in some way ; [Obs.] to mate

6. Revolution : a) the movement of an orbiting celestial object, as a star or planet, completely around another object (cf. ROTATION, sense 2) b) apparent movement of the sun and stars around the earth c) the time taken for a body to go around an orbit and return to its original position ; a) a turning or spinning motion of a body around a center or axis; rotation b) one complete turn of such a rotating body ; a complete cycle of events ! the revolution of the seasons" ; a complete or radical change of any kind !a revolution in modern physics" ; overthrow of a government, form of government, or social system by those governed and usually by forceful means, with another government or system taking its place !the American Revolution (1775), the French Revolution (1789), the Chinese Revolution (1911), the Russian Revolution (1917)"

7. Approach : to come closer or draw nearer ; to come near or nearer to ; to be like or similar to; approximate ; to make advances, a proposal, or a request to

    to begin dealing with [To approach a task" ; a coming closer or drawing nearer ; an approximation or similarity ; an advance or overture (to someone): usually used in pl. ; a path, road, or other means of reaching a person or place; access ; a means of attaining a goal or purpose !let's take a new approach to the problem" ; Aeron. the act of bringing an aircraft into position for landing, bombing a target, etc. ; Golf a shot from the fairway, meant to knock the ball onto the putting green

8. Seminal : of or containing seed or semen ; of reproduction !seminal power" ; like seed in being a source or a first stage in development; germinal; originative !a seminal book" ; being the first or earliest of something that is later recognized as having been of primary influence !a seminal jazz band" ; of essential importance; specif., a) basic; central; principal b) crucial; critical; pivotal

9. Biennial : happening every two years ; lasting or living two years ; a biennial event or occurrence ; Bot. a plant that lasts two years, usually producing flowers and seed the second year

10. Curriculum : a fixed series of studies required, as in a college, for graduation, qualification in a major field of study, etc.; all of the courses, collectively, offered in a school, college, etc., or in a particular subject

14.11 Self Assessment Questions:

1. What is meant by decision support system? Explain its evaluation?

2. Define decision support system? Explain its features?

3. Explain DSS Model management with its structure?

4. What are the components of DSS? Explain?

5. Explain the types of DSS?

6. Explain the functions of DSS?

14.12 Reference Books

1. CSV. Murthy – Management Information Systems

2. VARMA & AGARWAL – Management Information System

- S.PRABHAKAR

LESSON – 15

OFFICE AUTOMATION SYSTEM

15.0 Objective:- The whole lesson contains about office, how the computers will be useful in office and in management information system.

Structure:-

15.1.   **Office Information System**

15.2.   **Nature of Office**

15.3.   **Types of Office Automation Systems**

15.4   **Summary**

15.5   **Technical Terms**

15.6.   **Self Assessment Questions**

15.7.   **Reference Books**

15.1. Office Information System:- The movement towards automation in office work is known as office automation. Office automation includes new hardware and software packages like word processors, spread sheets etc. The combinations of information technologies that have a <u>dramatic</u> impact on day to day office operations are called office information systems.

15.2. Nature of Office: - In general there are 5 types of employees can be found in an office:

(1)   **Managers:** - Managers generally spend most of their time in planning, organizing, directing and controlling the activities of people working in the organization.

(2)   **Staff Professionals:** - Staff Professionals will support the activities of managers. Such professionals do not have direct line responsibility that is their role is mostly one of planning, analyzing and informing management of their findings.

(3)   **Line Professionals:** - These include sales persons; purchasing agents etc. such people <u>interact</u> daily with outside groups as organizations customers and suppliers.

(4)   **Secretaries:** - They are normally assigned to one or more knowledge employees in an office. They perform tasks such as typing, <u>filling</u>, answering phones, etc.

(5)   **Clerical Personnel:** - They are usually not assigned to any one in general, but they support the entire department and section and division.

15.3. Types of Office Automation Systems:-

There are 4 types of office automation systems. They are:

(1)   Document Management systems

(2)   Communication Systems

(3)   Teleconferencing Systems

(4)   Office support systems

(1) Document management systems:- There are computer based tools like text, graphics, images etc or location. The retrieved documents can be displayed in different formats, edited, distributed and integrated using other communication systems. These communication systems include word processing, desktop publishing, archival storage, imaging etc. such systems enable knowledge workers to be in better control, coordinate and manage the various electronic documents used in decision making.

§   Word processing is one of the most widely used and recognized office system technologies. It involves hardware and software tools that allow the computer system to become more than just a powerful typewriting device.

§   Desktop Publishing is also known as DTP, it is the use of a computer to prepare printed output. DTP applications can be categorized into three areas those are :

   (1)   Administrative applications

   (2)   Technical applications

   (3)   Corporate graphics

§   Archival storage is one of the key functions in office storage. To save expense associated with storage space, handling and paper costs, archival data was placed onto various media and stored off line. The most common technologies used to store archival materials are:

1.   Magnetic tape

2.   Computer output microfilm (COM)

3.   Optical disks

4.   Diskettes

§   Reprographics is a process of reproducing multiple copies of a document.

§   Imaging is a type of document management system that converts paper, microfilm and electronic data into digital images that can be printed, faxed or viewed on a computer screen.

§   Multimedia encompasses a group of computer technologies that integrate different types of media such as text, graphics, animation, audio and video, to generate information.

(2) Communication systems:- The various written communication being used in automation are electronic data interchange (EDI), electronic mail (E – mail), voice mail, facsimile and internet.

§ EDI can be defined as the transfer of electronic data from one organizations computer system to another organizations computer system in a commonly agreed format so that it is directly usable by receiving organizations computer system.

§ Electronic mail is a system that allows a person or a group of persons to communicate electronically with others through a network, in written form, anytime anywhere in the world. E – Mail is a popular form of business communication with the majority of organizations possessing an email address.

§ Voice mail facilitates oral communication. In This system, the Sender dictates a message by speaking them over the telephone rather than typing them. A special device called a codec, converts the analog signal of the senders voice into a digital message. The message is transmitted over a network and stored in a server at the receivers' network. When the receivers choose, the digitized message is retrieved from the server, reconverted into analog form, using a codec at the receivers end, and the receivers it over the phone.

§ Facsimile popularly known as fax, systems are common place in most organizations. This technology uses telephones, modems and scanners to transmit text and graphics to an individual or organization any where in the world. The scanner in the fax machine scans the document at one end and at the other end, a built in modern receives the message so the message can be then printed out using a printer. They can send the same document to multiple users.

§ The internet is a global network of millions of computers that are linked by various communication channels.

(3) **Teleconferencing systems:-** These consists of tools and techniques that allow a group of people, separated by time and distance, to exchange ideas using audio, video and other teleconferencing media. The main features of this are that they reduce operating costs and increases productivity because decision makers do not have to travel face meetings.

§ 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 that two people to participate in a telephone conversation, was the first form of audio conferencing it is best suited to firms that are spread over a wide area.

§ This video conferencing is another type of teleconferencing systems that uses telephones, Tv Monitors, computers etc. to link geographically separated decision makers to hear and see each other.

A computer digitizes sound and video images, then converts them to analog signals and transmits them over telephone lines to the receiver's computer, which reconverts the analog signals to digital signals. These are then translated onto audio and video messages, and then presented on the Tv monitor and sound system. There are 3 basic types of video conferencing:

• One way video and one way audio

• One way video and two way audio

• Two way video with two way video

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§ Computer conferencing is the use of a networked computer to allow members of a problem solving team to exchange information concerning the problem that is being solved. In this system, a group can consist of a large number of participants. It differs from audio and video conferencing in that it can be used within a single geographic site. A person can use computer conferencing to communicate with a person in the next office.

§ In house television system, an organization invests in studio, a period of time on a satellite and a satellite transmitter for broadcasting company sites or even customers are given satellite dishes so that they can view the broadcast. This technology has already shown potential in the areas of competitive advantage, cost cutting and employee motivation.

§ Telecommuting system is the system in this system people use communications technology to work at home or in a remote city, to avoid the usual physical commute to work using a remote communications terminal or a microcomputer workstation, a person can do his / her work at home instead of at the office.

(4) Office support systems: - The various office support system are groupware, desktop organizers, computer aided design and electronic bulletin boards.

§ Groupware consists of software packages designed to support the collaborative efforts of a group of co workers. Such packages often provide integrated support for many of the typical activities of work groups already identified. This includes: word processing services, e – mail, voice mail, fax, computer conferencing, video and audio conferencing etc. The essential components of groupware are linking group members who are geographically separated, using networks. It eliminates the barrier of time and space, and allows different group members to work on the same documents at the same time.

§ Desktop organizers are software packages that provide users with the electronic equivalent of the organizing and coordination tools found on a typical office desk. Among many features, it includes electronic calendar, card file, notepad, clock, calculator etc.

§ Computer aided design (CAD) refers to computer systems that enable designers to work with a display screen interface and specifications database to design various products. It is widely used in engineering environments.

§ Electronic bulletin boards allow members to post their data and elicit responses from other group members. The primary benefits are increased responsiveness to market forces and significant improvement in the quality of business processes such as product development, account management and customer service.

15.4 Summary: -

The movement towards automation in office work is known as office automation. Office automation includes new hardware and software packages like word processors, spread sheets etc. In general there are 5 types of employees can be found in an office: Managers, Staff Professionals, Line Professionals, Secretaries, and Clerical Personnel? There are 4 types of office automation systems. They are: Document Management systems, Communication Systems, Teleconferencing Systems, Office support systems.

15.5 Technical Terms:-

1. Dramatic : of or connected with drama ; a) having the characteristics of a drama, esp. conflict; like a play b) filled with action, emotion, or exciting qualities; vivid, striking, etc. Also [Archaic]

2. Interact : to act on one another; act reciprocally

3. Filling : the act of one that fills ; a thing used to fill something else or to supply what is lacking; specif., a) the metal, plastic, etc. inserted by a dentist into a prepared cavity in a tooth b) the foodstuff used between the slices of a sandwich, in a pastry shell, etc.; the horizontal threads, or woof, in a woven fabric

4. Integrated : to make whole or complete by adding or bringing together parts; to put or bring (parts) together into a whole; unify ; to give or indicate the whole, sum, or total of; a) to remove the legal and social barriers imposing segregation upon (racial groups) so as to permit free and equal association b) to abolish segregation in; desegregate (a school, neighborhood, etc.) ; a) to calculate the integral or integrals of (a function, equation, etc.) b) to perform the process of integration upon ; Psychol. to cause to undergo integration ; to become integrated

5. Archival : of, in, or containing archives

6. Microfilm : film on which documents, printed pages, etc. are photographed in a reduced size for convenience in storage and transportation: enlarged prints can be made from such film, or the film can be viewed by projection ; reproductions on microfilm ; to photograph on microfilm

7. Encompasses : to shut in all around; surround; encircle ; to contain; include ; to bring about; achieve; contrive !to encompass its destruction"

8. Possessing : to hold as property or occupy in person; have as something that belongs to one; own ; to have as an attribute, quality, faculty, etc. !to possess wisdom" ; to have knowledge or mastery of (a language, etc.) ;   to gain strong influence or control over; dominate !possessed by an idea" ; to keep control over or maintain (oneself, one's mind, etc.) ; to manage to have sexual intercourse with (a woman) ; to put (someone) in possession of property, facts, etc.; cause to have something specified: usually with of ; [Archaic] to seize or win

9. Analog : of a system of measurement in which a continuously varying value, as sound, temperature, etc., corresponds proportionally to another value, esp. a voltage ; of or by means of an analog computer ; designating or of electronic equipment, recordings, etc. in which the signal corresponds to a physical change, as sound to a groove in a phonograph record ; using hands, dials, etc. to show numerical amounts, as on a clock: cf. DIGITAL (sense 5)

10. Digital : of, like, or constituting a digit, esp. a finger ; having digits ; performed with a finger ; using numbers that are digits to represent all the variables involved in calculation ; using a row of digits, rather than numbers on a dial, to provide numerical information !a digital watch, a digital thermometer": cf. ANALOG (sense 4) ; of or by means of a digital computer ; designating or of a recording technique in which sounds or images are converted into groups of electronic bits and stored on a magnetic medium: the groups of bits are read electronically, as by a laser beam, for reproduction ; a finger ; a key played with a finger, as on the piano

11. transmit : to send or cause to go from one person or place to another, esp. across intervening space or distance; transfer; dispatch; convey ; to pass along; impart (a disease, et.) ; to hand down to others by heredity, inheritance, etc. ; to communicate (news, etc.) ;) to cause (light, heat, sound, etc.) to pass through air or some other medium !the sun transnts heat and light" b) to allow the passage of; conduct !water transmits sound" ; to convey (force, movement, etc.) from one mechanical part to another ; to send out (radio or television broadcasts, etc.) by electromagnetic waves ; to send out radio or television sigials

12. Geographically   : of or according to geography ; with reference to the geography of a particular region Also

13. Dispersed : to break up and scatter in all directions; spread about; distribute widely ; to dispel (mist, etc.) ; to break up (light) into its component colored rays ; to break up and move in different directions; scatter

14. Conference : the act of conversing or consulting on a serious matter ; a formal meeting of a number of people for discussion or consultation ; a meeting of committees from both branches of a legislature to reconcile the differences between bills passed by both branches ; a) a national or district governing body of the Methodist Church b) a national or distrit association of Mennonite or certain other Protestant churches c) a district governed or represented by a conference ;   a national or regional association, as of colleges or their athltic teams ; conferment; bestowal:

15. Satellite   : a) a follower or attendant attached to a prince or other person of importance b) any obsequious or fawning follower or dependent; a) a moon revolving around a larger planet b) a man-made object rocketed into orbit around the earth, the moon, etc. ; something subordinate or dependent; specif., a small state that is economically or politically dependent on, and hence adjusts its policies to, a larger, more powerful state

16. Broadcasting : to scatter (seed) over a broad area rather than sow in drills ; to spread (information, gossip, etc.) widely ; to transmit, as to a large audience, by radio or television ; to broadcast radio or television programs ; widely scattered ; of, for, or by radio or television broadcasting ; the act of broadcasting ; a radio or television program

17. dishes : a) any container, generally shallow and concave and of porcelain, earthenware, glass, plastic, etc. for serving or holding food b) [pl.] plates, bowls, saucers, cups, etc., collectively ; a) the food in a dish b) a particular kind of food, or food prepared in a certain way !one's favorite dish" ; a dishful ; a dish-shaped object, as the reflector of a dish antenna ; a dishlike concavity, or the amount of this ; a) [Slang] a sexually attractive person, esp. a young woman b) [Colloq.] a favorite thing; preference ; to serve (food) in a dish: usually with up or out ; to shape (an object, surface, or hole) like a dish: make concave: usually with out ; Slang, Chiefly Brit.] to cheat, frustrate, ruin, etc. ; to be or become dish-shaped; cave in ; **dish it out** [Slang] to subject others to difficulty, criticism, hardship, ridicule, etc.

18. Competitive : of, involving, or based on competition likely to succeed in competition !a competitive team"

19. Collaborative : to work together, esp. in some literary, artistic, or scientific undertaking; to cooperate with an enemy invader

20. Integrate : to make whole or complete by adding or bringing together parts ; to put or bring (parts) together into a whole; unify ; to give or indicate the whole, sum, or total of ;   a)   to remove the legal and social barriers imposing segregation upon (racial groups) so as to permit free and equal association b) to abolish segregation in; desegregate (a school, neighborhood, etc.) ; Math. a) to calculate the integral or integrals of (a function, equation, etc.) b) to perform the process of integration upon ; Psychol. to cause to undergo integration ; to become integrated

21. Conferencing the act of conversing or consulting on a serious matter ; a formal meeting of a number of people for discussion or consultation ; a meeting of committees from both branches of a legislature to reconcile the differences between bills passed by both branches ; a) a national or district governing body of the Methodist Church b) a national or district association of Mennonite or certain other Protestant churches c) a district governed or represented by a conference ; a national or regional association, as of colleges or their athletic teams ; conferment; bestowal: also

22. Components : serving as one of the parts of a whole; constituent ; a) an element or ingredient b) any of the main constituent parts, as of a high-fidelity sound system ; any of the elements into which a vector quantity, as force or velocity, may be resolved: any vector is the sum of its elements

23. Eliminates : to take out; remove; get rid of ; to leave out of consideration; reject; omit ; to drop (a person, team, etc. losing a round or match in a contest) from further competition ; Algebra to get rid of (an unknown quantity) by combining equations; Physiol. to expel (waste products) from the body; excrete

24. Barrier : orig., a fortress, stockade, etc. for defending an entrance or gate ; a thing that prevents passage or approach; obstruction, as a fence, wall, etc. ; anything that holds apart, separates, or hinders !racial barriers, barriers to progress" ; a customs gate on a country's border ; a high fence of stakes enclosing the area in which a tournament of knights was held; lists ;Horse Racing the movable gate used to keep the horses in line at the starting point

15.5 Self Assessment Questions:-

1. Explain about Office Information System and its Nature?

2. What are the different types of office automation system? Explain?

15.6 Reference Books

1. CSV. Murthy – Management Information Systems

2. VARMA & AGARWAL – Management Information System

- S.PRABHAKAR

LESSON – 16

DATA TRANSFORMATION PACKAGE
LAN (Local Area Network)

16.0 Objective: - This lesson is mainly about how to transfer the data from one computer to another, from one place to another place, to know this with the help of different types of data transformation packages which is used in information technology.

Structure:-

16.1.   Introduction to LAN

    (a) What Is a LAN?

    (b) LAN Protocols and the OSI Reference Model

    (c) LAN Media-Access Methods

    (d) LAN Transmission Methods

    (e) LAN Topologies

16.2   WAN

    (a) What Is a WAN?

    (b) Point-to-Point Links

    (c) Circuit Switching

    (d) Packet Switching

    (e) WAN Virtual Circuits

    (f) WAN Dialup Services

    (g) WAN Devices

    (h) Modem

16.3   PBX

16.4   FASCIMILE

16.5   VOICE TRANSMISSION DEVICE

16.6   Summary

16.7   Technical Terms

16.8   Self Assessment Questions

16.9   Reference Books

16.1 Introduction to LAN:-

LAN introduces the various media-access methods, transmission methods, topologies, and devices used in a local-area network (LAN). Topics addressed focus on the methods and devices used in Ethernet/IEEE 802.3, Token Ring/IEEE 802.5, and Fiber Distributed Data Interface (FDDI). Subsequent chapters in Part II, "LAN Protocols," address specific protocols in more detail. Figure 2-1 illustrates the basic layout of these three implementations.

Figure 2 – 1: Three LAN Implementations Are Used Most Commonly

Ethernet/IEEE 802.3
100 BaseT

Token Ring/IEEE 802.5
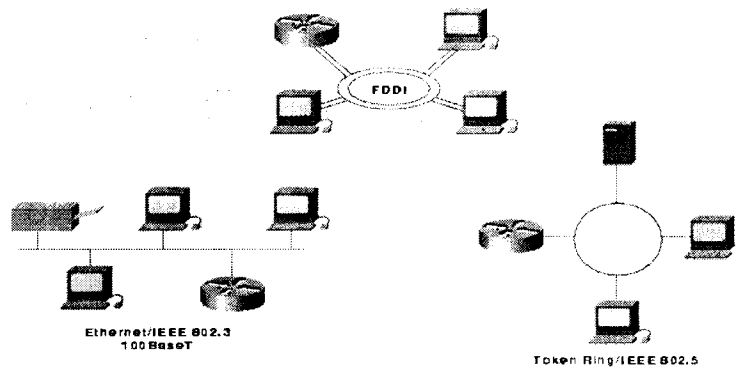
What Is a LAN?

A LAN is a high-speed data network that covers a relatively small geographic area. It typically connects workstations, personal computers, printers, servers, and other devices. LANs offer computer users many advantages, including shared access to devices and applications, file exchange between connected users, and communication between users via electronic mail and other applications.

LAN Protocols and the OSI Reference Model: - LAN protocols function at the lowest two layers of the OSI reference model, , "Internetworking Basics," between the physical layer and the data link layer. The following Figure illustrates how several popular LAN protocols map to the OSI reference model.

Figure 2-2 Popular LAN Protocols Mapped to the OSI Reference Model

OSI layers

LAN specification
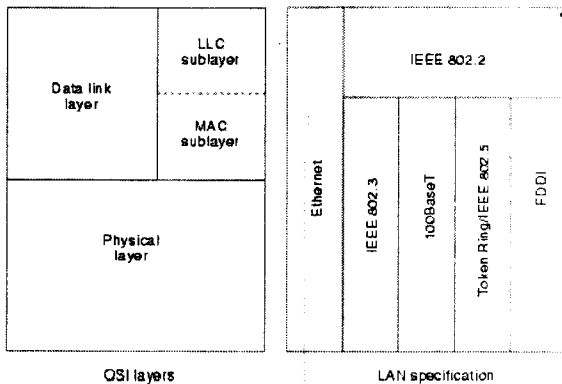
LAN Media-Access Methods

Media contention occurs when two or more network devices have data to send at the same time. Because multiple devices cannot talk on the network simultaneously, some type of method must be used to allow one device access to the network media at a time. This is done in two main ways: carrier sense multiple access collision detects (CSMA/CD) and token passing.

In networks using CSMA/CD technology such as Ethernet, network devices contend for the network media. When a device has data to send, it first listens to see if any other device is currently using the network. If not, it starts sending its data. After finishing its transmission, it listens again to see if a collision occurred. A collision occurs when two devices send data simultaneously. When a collision happens, each device waits a random length of time before resending its data. In most cases, a collision will not occur again between the two devices. Because of this type of network contention, the busier a network becomes, the more collisions occur. This is why performance of Ethernet degrades rapidly as the number of devices on a single network increases.

In token-passing networks such as Token Ring and FDDI, a special network frame called a token is passed around the network from device to device. When a device has data to send, it must wait until it has the token and then sends its data. When the data transmission is complete, the token is released so that other devices may use the network media. The main advantage of token-passing networks is that they are deterministic. In other words, it is easy to calculate the maximum time that will pass before a device has the opportunity to send data. This explains the popularity of token-passing networks in some real-time environments such as factories, where machinery must be capable of communicating at a determinable interval.

For CSMA/CD networks, switches segment the network into multiple collision domains. This reduces the number of devices per network segment that must contend for the media. By creating smaller collision domains, the performance of a network can be increased significantly without requiring addressing changes.

Normally CSMA/CD networks are half-duplex, meaning that while a device sends information, it cannot receive at the time. While that device is talking, it is incapable of also listening for other traffic. This is much like a walkie-talkie. When one person wants to talk, he presses the transmit button and begins speaking. While he is talking, no one else on the same frequency can talk. When the sending person is finished, he releases the transmit button and the frequency is available to others.

When switches are introduced, full-duplex operation is possible. Full-duplex works much like a telephone—you can listen as well as talk at the same time. When a network device is attached directly to the port of a network switch, the two devices may be capable of operating in full-duplex mode. In full-duplex mode, performance can be increased, but not quite as much as some like to claim. A 100-Mbps Ethernet segment is capable of transmitting 200 Mbps of data, but only 100 Mbps can travel in one direction at a time. Because most data connections are asymmetric (with more data traveling in one direction than the other), the gain is not as great as many claim. However, full-duplex operation does increase the throughput of most applications because the network media is no longer shared. Two devices on a full-duplex connection can send data as soon as it is ready.

Token-passing networks such as Token Ring can also benefit from network switches. In large networks, the delay between turns to transmit may be significant because the token is passed around the network.

LAN Transmission Methods

LAN data transmissions fall into three classifications: unicast, multicast, and broadcast. In each type of transmission, a single packet is sent to one or more nodes.

In a unicast transmission, a single packet is sent from the source to a destination on a network. First, the source node addresses the packet by using the address of the destination node. The package is then sent onto the network, and finally, the network passes the packet to its destination.

A multicast transmission consists of a single data packet that is copied and sent to a specific subset of nodes on the network. First, the source node addresses the packet by using a multicast address. The packet is then sent into the network, which makes copies of the packet and sends a copy to each node that is part of the multicast address.

A broadcast transmission consists of a single data packet that is copied and sent to all nodes on the network. In these types of transmissions, the source node addresses the packet by using the broadcast address. The packet is then sent on to the network, which makes copies of the packet and sends a copy to every node on the network.
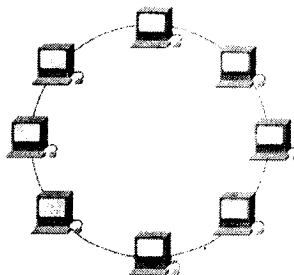
LAN Topologies

LAN topologies define the manner in which network devices are organized. Four common LAN topologies exist: bus, ring, star, and tree. These topologies are logical architectures, but the actual devices need not be physically organized in these configurations. Logical bus and ring topologies, for example, are commonly organized physically as a star. A bus topology is a linear LAN architecture in which transmissions from network stations propagate the length of the medium and are received by all other stations. Of the three most widely used LAN implementations, Ethernet/IEEE 802.3 networks—including 100BaseT—implement a bus topology, which is illustrated in Figure 2-3.

Figure 2-3 Some Networks Implement a Local Bus Topology

A ring topology is a LAN architecture that consists of a series of devices connected to one another by unidirectional transmission links to form a single closed loop. Both Token Ring/IEEE 802.5 and FDDI networks implement a ring topology. Figure 2-4 depicts a logical ring topology.

Figure 2-4 Some Networks Implement a Logical Ring Topology

A star topology is a LAN architecture in which the endpoints on a network are connected to a common central hub, or switch, by dedicated links. Logical bus and ring topologies are often implemented physically in a star topology, which is illustrated in Figure 2-5.

A tree topology is a LAN architecture that is identical to the bus topology, except that branches with multiple nodes are possible in this case. Figure 2-5 illustrates a logical tree topology.

Figure 2-5 A Logical Tree Topology Can Contain Multiple Nodes
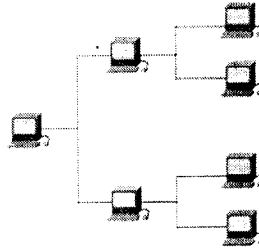
Figure 2-5 A Logical Tree Topology Can Contain Multiple Nodes

LAN Devices

Devices commonly used in LANs include repeaters, hubs, LAN extenders, bridges, LAN switches, and routers.

Note : Repeters, hubs , and LAN extenders are discussed briefly in this selection.The function and operation of bridges, switches, and routes and discussed generally in chapter a "Bridging and Switching Basics ", and Chapter 5, "Routing Basics".

A repeater is a physical layer device used to interconnect the media segments of an extended network. A repeater essentially enables a series of cable segments to be treated as a single cable. Repeaters receive signals from one network segment and amplify, retime, and retransmit those signals to another network segment. These actions prevent signal deterioration caused by long cable lengths and large numbers of connected devices. Repeaters are incapable of performing complex filtering and other traffic processing. In addition, all electrical signals, including electrical disturbances and other errors, are repeated and amplified. The total number of repeaters and network segments that can be connected is limited due to timing and other issues. Figure 2-6 illustrates a repeater connecting two network segments.

Repeater
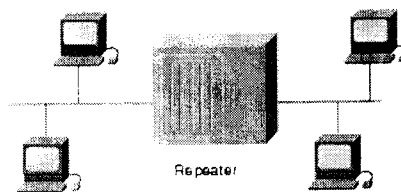
A hub is a physical layer device that connects multiple user stations, each via a dedicated cable. Electrical interconnections are established inside the hub. Hubs are used to create a physical star network while maintaining the logical bus or ring configuration of the LAN. In some respects, a hub functions as a multiport repeater.

A LAN extender is a remote-access multilayer switch that connects to a host router. LAN extenders forward traffic from all the standard network layer protocols (such as IP, IPX, and AppleTalk) and filter traffic based on the MAC address or network layer protocol type. LAN extenders scale well because the host router filters out unwanted broadcasts and multicasts. However, LAN extenders are not capable of segmenting traffic or creating security firewalls. Figure 2-7 illustrates multiple LAN extenders connected to the host router through a WAN.

Figure 2-7 Multiple   WAN
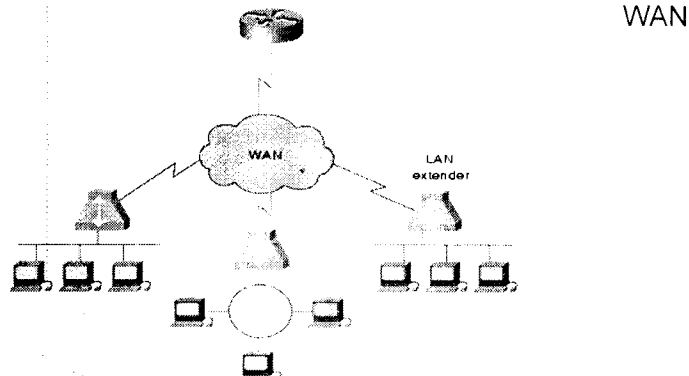
A local area network (LAN) is a computer network covering a small geographic area, like a home, office, or group of buildings. The defining characteristics of LANs, in contrast to Wide Area Networks (WANs), include their much higher data transfer rates, smaller geographic range, and lack of a need for leased telecommunication lines.

Ethernet over unshielded twisted pair cabling, and Wi-Fi are the two most common technologies currently, but ARCNET, Token Ring and many others have been used in the past.

16.2 WAN (Wide Area Network)

What Is a WAN?

A WAN is a data communications network that covers a relatively broad geographic area and that often uses transmission facilities provided by common carriers, such as telephone companies. WAN technologies generally function at the lower three layers of the OSI reference model: the physical layer, the data link layer, and the network layer. Figure 3-1 illustrates the relationship between the common WAN technologies and the OSI model.

Figure 3-1 WAN Technologies Operate at the Lowest Levels of the OSI Model
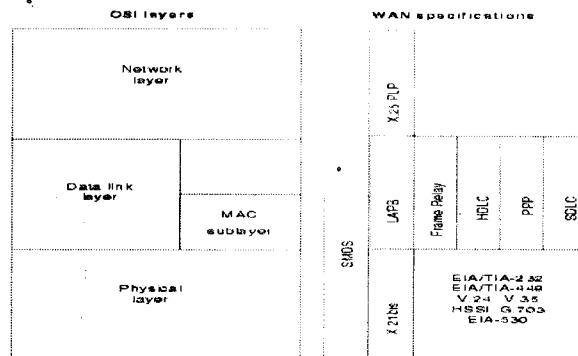
Point-to-Point Links

A point-to-point link provides a single, pre-established WAN communications path from the customer premises through a carrier network, such as a telephone company, to a remote network. Point-to-point lines are usually leased from a carrier and thus are often called leased lines. For a point-to-point line, the carrier allocates pairs of wire and facility hardware to your line only. These circuits are generally priced based on bandwidth required and distance between the two connected points. Point-to-point links are generally more expensive than shared services such as Frame Relay. Figure 3-2 illustrates a typical point-to-point link through a WAN.

Figure 3-2 A Typical Point-to-Point Link Operates Through a WAN to a Remote Network

Circuit Switching

Switched circuits allow data connections that can be initiated when needed and terminated when communication is complete. This works much like a normal telephone line works for voice communication. Integrated Services Digital Network (ISDN) is a good example of circuit switching. When a router has data for a remote site, the switched circuit is initiated with the circuit number of the remote network. In the case of ISDN circuits, the device actually places a call to the telephone number of the remote ISDN circuit. When the two networks are connected and authenticated, they can transfer data. When the data transmission is complete, the call can be terminated. Figure 3-3 illustrates an example of this type of circuit.

Figure 3-3 A Circuit-Switched WAN Undergoes a Process Similar to That Used for a Telephone Call
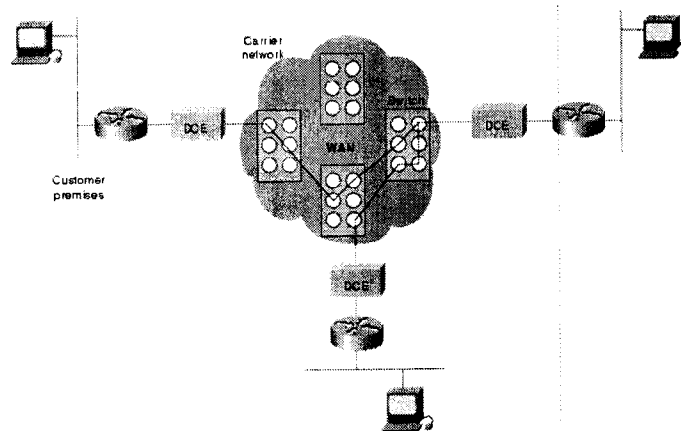
Packet Switching

Packet switching is a WAN technology in which users share common carrier resources. Because this allows the carrier to make more efficient use of its infrastructure, the cost to the customer is generally much better than with point-to-point lines. In a packet switching setup, networks have connections into the carrier's network, and many customers share the carrier's network. The carrier can then create virtual circuits between customers' sites by which packets of data are

delivered from one to the other through the network. The section of the carrier's network that is shared is often referred to as a cloud.

Some examples of packet-switching networks include Asynchronous Transfer Mode (ATM), Frame Relay, Switched Multimegabit Data Services (SMDS), and X.25.

Figure 3-4 shows an example packet-switched cirouit.

The virtual connections between customer sites are often referred to as a virtual circuit.

Figure 3-4 Packet Switching Transfers Packets Across a Carrier Network
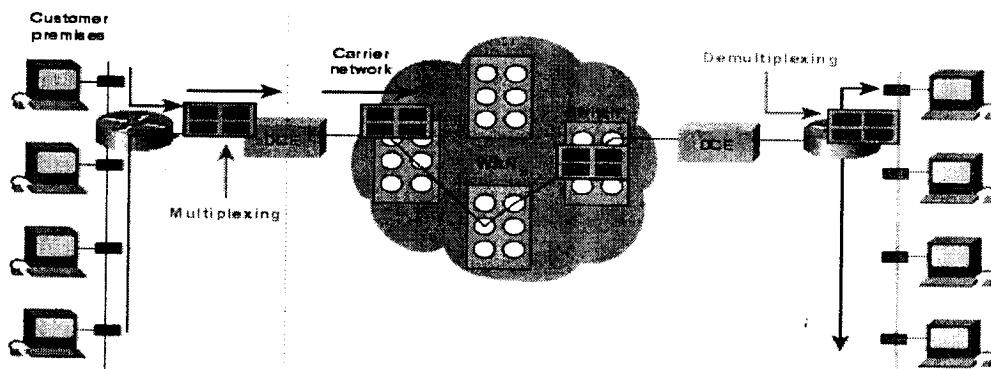
WAN Virtual Circuits

A virtual circuit is a logical circuit created within a shared network between two network devices. Two types of virtual circuits exist: switched virtual circuits (SVCs) and permanent virtual circuits (PVCs).

SVCs are virtual circuits that are dynamically established on demand and terminated when transmission is complete. Communication over an SVC consists of three phases: circuit establishment, data transfer, and circuit termination. The establishment phase involves creating the virtual circuit between the source and destination devices. Data transfer involves transmitting data between the devices over the virtual circuit, and the circuit termination phase involves tearing down the virtual circuit between the source and destination devices. SVCs are used in situations in which data transmission between devices is sporadic, largely because SVCs increase bandwidth used due to the circuit establishment and termination phases, but they decrease the cost associated with constant virtual circuit availability.

PVC is a permanently established virtual circuit that consists of one mode: data transfer. PVCs are used in situations in which data transfer between devices is constant. PVCs decrease the bandwidth use associated with the establishment and termination of virtual circuits, but they increase costs due to constant virtual circuit availability. PVCs are generally configured by the service provider when an order is placed for service.

WAN Dialup Services

Dialup services offer cost-effective methods for connectivity across WANs. Two popular dialup implementations are dial-on-demand routing (DDR) and dial backup.

DDR is a technique whereby a router can dynamically initiate a call on a switched circuit when it needs to send data. In a DDR setup, the router is configured to initiate the call when certain criteria

are met, such as a particular type of network traffic needing to be transmitted. When the connection is made, traffic passes over the line. The router configuration specifies an idle timer that tells the router to drop the connection when the circuit has remained idle for a certain period.

Dial backup is another way of configuring DDR. However, in dial backup, the switched circuit is used to provide backup service for another type of circuit, such as point-to-point or packet switching. The router is configured so that when a failure is detected on the primary circuit, the dial backup line is initiated. The dial backup line then supports the WAN connection until the primary circuit is restored. When this occurs, the dial backup connection is terminated.

WAN Devices

WANs use numerous types of devices that are specific to WAN environments. WAN switches, access servers, modems, CSU/DSUs, and ISDN terminal adapters are discussed in the following sections. Other devices found in WAN environments that are used in WAN implementations include routers, ATM switches, and multiplexers.

Modem

A *modem* is a device that interprets digital and analog signals, enabling data to be transmitted over voice-grade telephone lines. At the source, digital signals are converted to a form suitable for transmission over analog communication facilities. At the destination, these analog signals are returned to their digital form. Figure 3-7 illustrates a simple modem-to-modem connection through a WAN.

Figure 3-7 A Modem Connection through a WAN Handles Analog and Digital Signals

16.3 PBX

PBX Operators:-
- Providing instant access to the guest list for the current day, including arrivals and guests already checked out.
- Providing on – demand access to the guest list for any future or past date.
- Taking messages for guests and track their delivery.

16.4 FASCIMILE

(**FACS**imile) Originally called "telecopying," it is the communication of a printed page between remote locations. Fax machines scan a paper form and transmit a coded image over the telephone system. The receiving machine prints a facsimile of the original. A fax machine is made up of a scanner, printer and modem with fax signaling. Fax standards were developed starting in 1968 and are classified by Groups. Groups 1 and 2, used until the late 1980s, transmitted a page in six and three minutes respectively. Group 3 transmits at less than one minute per page and uses data compression at 9,600 bps. The Group 3 speed increase led to the extraordinary rise in usage in the

late 1980s. Group 3 resolution is 203x98 dpi in standard mode, 203x196 in fine mode and 203x392 in super fine mode. Group 3 is still the standard today, but Group 4 machines can transmit a page in just a few seconds and provide up to 400x400 resolution. Group 4 requires 56 to 64 Kbps bandwidth and needs ISDN or Switched 56 circuits.

16.5 VOICE TRANSMISSION DEVICE

A voice transmission device characterized by comprising: a noise canceller for removing a noise contained in a voice call signal inputted from a subscriber terminal through a subscriber side interface part; voiced/unvoiced detection means for judging a voiced part and an unvoiced part from the voice call signal after the noise removal; voice coding means for coding the voiced part of the voice call signal outputted by the noise canceller after the noise removal and for outputting it to outside through a line interface part; voice decoding means for decoding voice data inputted from the outside through the line interface part; pattern bit generation means for outputting an establishment bit pattern indicating establishment of a multistage connection state and for, after a control signal is inputted from tandem pass through state judgment means, generating and outputting a detected bit pattern which is different from the establishment bit pattern in a bit pattern and indicates a state where multistage connection is occurring; signal synthesis means for synthesizing an output of the voice decoding means and the establishment bit pattern or the detected bit pattern and for outputting to outside through the subscriber side interface part; and the tandem pass through state judgment means for, in a case where the establishment bit pattern is contained in the voice call signal inputted from the outside through the subscriber side interface part, outputting the control signal to the pattern bit generation means, and for, in a case where after the control signal is outputted and the detected bit pattern is contained in the voice call signal inputted through the subscriber side interface, stopping operations of the noise canceller, the voice coding means, and the voice decoding means, and switching them into operations to output the inputted voice call signal as it is.
2. A voice transmission system comprising plural pairs of voice transmission devices, characterized in that each pair of voice transmission devices include two voice transmission devices in which line interface parts thereof are connected to each other by wire, between one pair of the voice transmission devices and the other pair of the voice transmission devices, subscriber side interface parts thereof are connected to each other by wire, and each of the voice transmission devices comprises: a noise canceller for removing a noise contained in a voice call signal inputted from a subscriber terminal through a subscriber side interface part; voiced/unvoiced detection means for judging a voiced part and an unvoiced part from the voice call signal after the noise removal; voice coding means for coding the voiced part of the voice call signal outputted by the noise canceller after the noise removal and for outputting it to outside through a line interface part; voice decoding means for decoding voice data inputted from the outside through the line interface part; pattern bit generation means for outputting an establishment bit pattern indicating establishment of a multistage connection state and for, after a control signal is inputted from tandem pass through state judgment means, generating and outputting a detected bit pattern which is different from the establishment bit pattern in a bit pattern and indicates a state where multistage connection is occurring; signal synthesis means for synthesizing an output of the voice decoding means and the establishment bit pattern or the detected bit pattern and for outputting to outside through the subscriber side interface part; and the tandem pass through state judgment means for, in a case where the establishment bit pattern is contained in the voice call signal inputted from the outside through the subscriber side interface part, outputting the control signal to the pattern bit generation means, and for, in a case where after the control signal is outputted and the detected bit pattern is contained in the voice call signal inputted through the subscriber side interface, stopping operations of the noise canceller, the voice coding means, and the voice decoding means, and switching them into operations to output the inputted voice call signal as it is.

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16.6 Summary: - A LAN is a high-speed data network that covers a relatively small geographic area. It typically connects workstations, personal computers, printers, servers, and other devices. LANs offer computer users many advantages, including shared access to devices and applications, file exchange between connected users, and communication between users via electronic mail and other applications. A virtual circuit is a logical circuit created within a shared network between two network devices. Two types of virtual circuits exist: switched virtual circuits (SVCs) and permanent virtual circuits (PVCs). Dialup services offer cost-effective methods for connectivity across WANs. Two popular dialup implementations are dial-on-demand routing (DDR) and dial backup. *DDR* is a technique whereby a router can dynamically initiate a call on a switched circuit when it needs to send data. In a DDR setup, the router is configured to initiate the call when certain criteria are met, such as a particular type of network traffic needing to be transmitted. When the connection is made, traffic passes over the line. The router configuration specifies an idle timer that tells the router to drop the connection when the circuit has remained idle for a certain period.

Providing instant access to the guest list for the current day, including arrivals and guests already checked out. Providing on – demand access to the guest list for any future or past date. Taking messages for guests and track their delivery. (**FACS**imile) Originally called "telecopying," it is the communication of a printed page between remote locations. Fax machines scan a paper form and transmit a coded image over the telephone system. The receiving machine prints a facsimile of the original. A fax machine is made up of a scanner, printer and modem with fax signaling. A voice transmission system comprising plural pairs of voice transmission devices, characterized in that each pair of voice transmission devices include two voice transmission devices in which line interface parts thereof are connected to each other by wire, between one pair of the voice transmission devices and the other pair of the voice transmission devices, subscriber side interface parts thereof are connected to each other by wire, and each of the voice transmission devices comprises: a noise canceller for removing a noise contained in a voice call signal inputted from a subscriber terminal through a subscriber side interface part; voiced/unvoiced detection means for judging a voiced part and an unvoiced part from the voice call signal after the noise removal; voice coding means for coding the voiced part of the voice call signal outputted by the noise canceller after the noise removal and for outputting it to outside through a line interface part; voice decoding means for decoding voice data inputted from the outside through the line interface part; pattern bit generation means for outputting an establishment bit pattern indicating establishment of a multistage connection state and for, after a control signal is inputted from tandem pass through state judgment means, generating and outputting a detected bit pattern which is different from the establishment bit pattern in a bit pattern and indicates a state where multistage connection is occurring; signal synthesis means for synthesizing an output of the voice decoding means and the establishment bit pattern or the detected bit pattern and for outputting to outside through the subscriber side interface part; and the tandem pass through state judgment means for, in a case where the establishment bit pattern is contained in the voice call signal inputted from the outside through the subscriber side interface part, outputting the control signal to the pattern bit generation means, and for, in a case where after the control signal is outputted and the detected bit pattern is contained in the voice call signal inputted through the subscriber side interface, stopping operations of the noise canceller, the voice coding means, and the voice decoding means, and switching them into operations to output the inputted voice call signal as it is.

16.7 Technical Terms:-

1. Collision   : the act of colliding, or coming together with sudden, violent force ; a clash or conflict of opinions, interest, etc.

2. Duplex : double; twofold ; designating or of a system of telegraphy in which two messages may be sent simultaneously in opposite directions over a single circuit ;   *M a c h i n e r y*

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having two units operating in the same way or simultaneously

3. Topologies : a topographical study of a specific object, entity, place, etc. !the *topology* of the mind" ; *Math.* the study of those properties of geometric figures that remain unchanged even when under distortion, so long as no surfaces are torn, as with a M;bius strip *Med.* the topographic anatomy of a body region

4. pattern : a person or thing considered worthy of imitation or copying ; a model or plan used as a guide in making things; set of forms to the shape of which material is cut for assembly into the finished article !a dress *pattern*" ; the full-scale model used in making a sand mold for casting metal ; something representing a class or type; example; sample ; an arrangement of form; disposition of parts or elements; design !wallpaper *patterns*, the *pattern* of a novel" ; a regular, mainly unvarying way of acting or doing !behavior *patterns*" ; a predictable or prescribed route, movement, etc. !traffic *pattern*, landing *pattern*" ; a) grouping or distribution, as of a number of bullets fired at a mark b) something, as a diagram, showing such distribution ; [Now Rare] sufficient material for making a garment ; to make, do, shape, or plan in imitation of a model or pattern: with *on*, *upon*, or *after* ; to supply with a pattern or design; mark or decorate with a pattern

5. coding : a body of laws, as of a nation or city, organized for easy reference ; any set of principles or rules of conduct !a moral *code*" ; a) a set of signals representing letters or numerals, used to send messages, as by telegraph or flags b) GENETIC CODE ; a) a system of symbols used as in secret writing or information processing, in which letters, figures, etc. are arbitrarily given certain meanings b) the symbols in such a system ; to put in the form or symbols of a code

16.8 Self Assessment Questions:

1. What is LAN? Explain different kinds of topologies in it?

2. Explain the following:

    (a)   LAN Protocols and the OSI Reference Model

    (b)   LAN Media-Access Methods

    (c)   LAN Transmission Methods

3. What is WAN? Explain its WAN Dialup Services, WAN Devices & Modem?

4. Explain the following

    (a) Point-to-Point Links, (b) Circuit Switching, (c) Packet Switching, (d) WAN Virtual Circuits

5. Explain about PBX, FASCIMILE & VOICE TRANSMISSION DEVICE?

16.9 Reference Books

    1. Introduction to computers with Ms – Office by Alexis Leon, Mathews Leon

    2. Microsoft windows server 2003 by Rand H. Morimoto, Michael, Noel, Alex Lewis

    3. Computer Science Hand Book by Allen B. Tucker

- S.PRABHAKAR