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Mr. Vijesh Shukla | Dr. Sindhu S. Pandya | Ms. Khushbu A. Patel

# UNIT-3

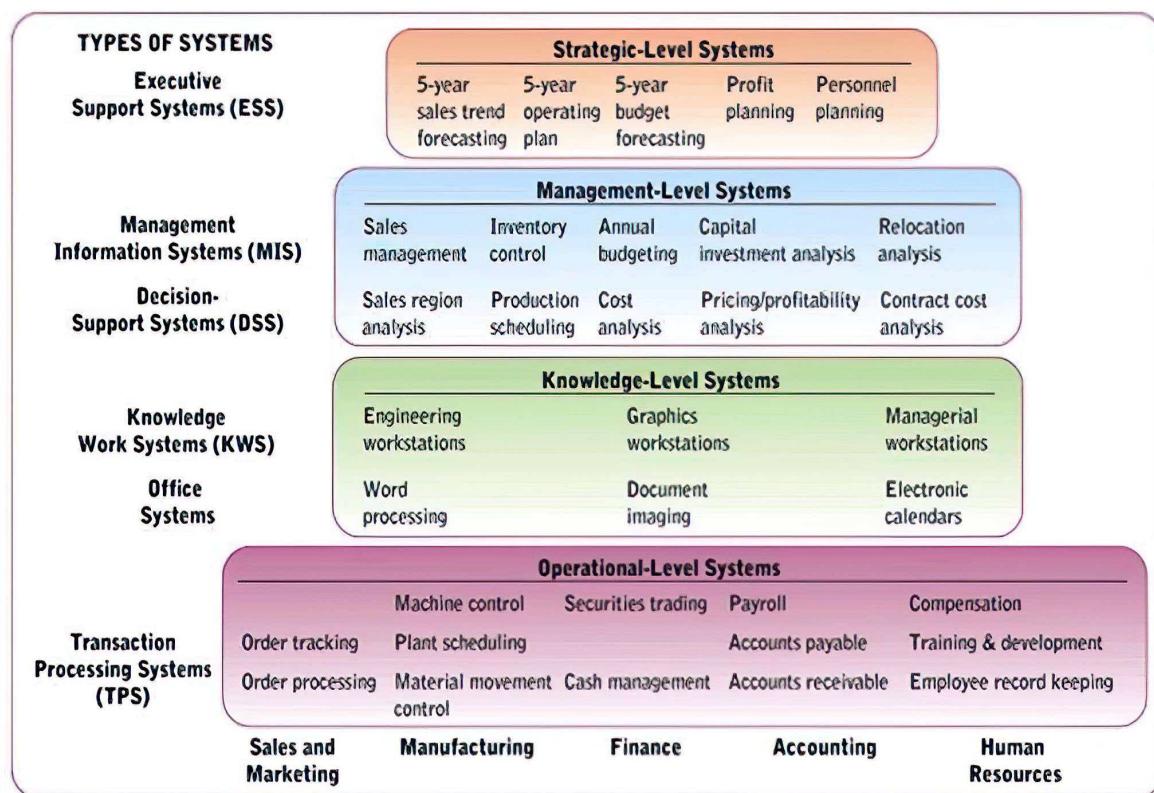
## INTRODUCTION TO INFORMATION SYSTEM

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### 3.1. BUSINESS INFORMATION SYSTEMS:

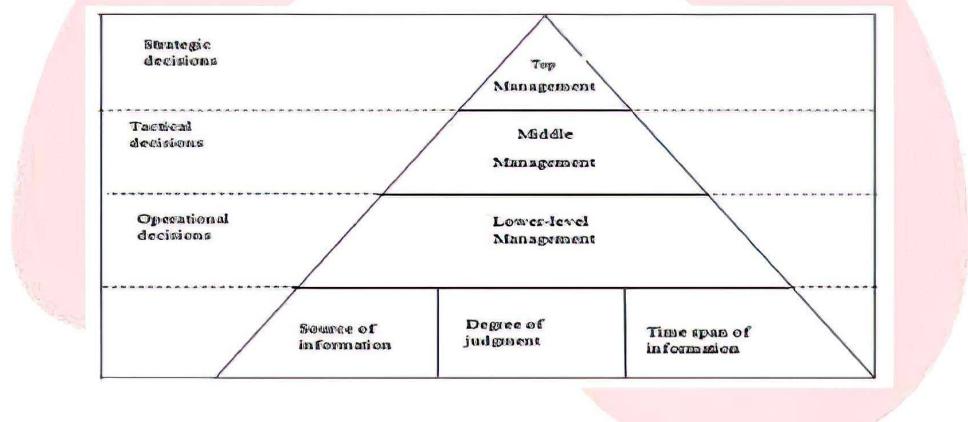


[Fig.3.1 Types of System]

Business information system as a group of interrelated components that work collectively to carry out input, processing, output, storage and control actions in order to convert data into information products that can be used to support forecasting, planning, control, coordination, decision making and operational activities in an organization. In terms of the components that undertake this activity, they can be classified into five basic resources of people, hardware, software, communications and data. People resources include the users and developers of an information system and those who help maintain and operate the system such as IS managers and technical support staff. Hardware resources include computers and other items such as printers. Software resources refer to computer programs known as software and associated instruction manuals. Communications resources include networks and the hardware and

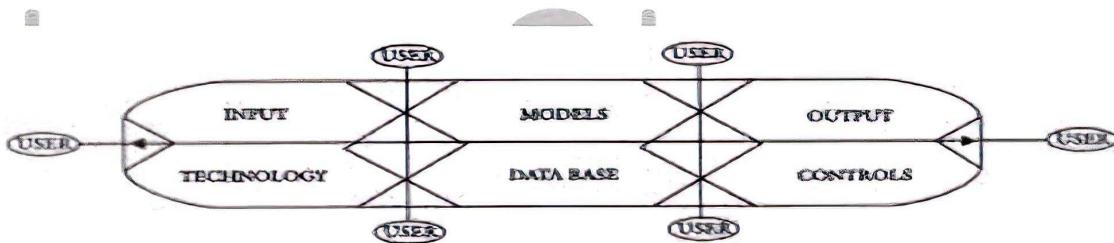
software needed to support them. Data resources cover the data that an organization has access to such as computer databases and paper files.

In most organizations Business Information Systems (BIS) make extensive use of information technology, such as personal computers. The reasons why computerized BIS have become widespread are evident in their advantages such as speed, accuracy and dependability. They also have a high degree of flexibility due to their ability to be programmed to carry out a wide variety of tasks. There are, however, some disadvantages to BIS such as their lack of creativity that humans possess and the difficulty of incorporating other factors into their decision making such as innovation and intuition.



[Fig.3.2 Business Information System at Several levels]

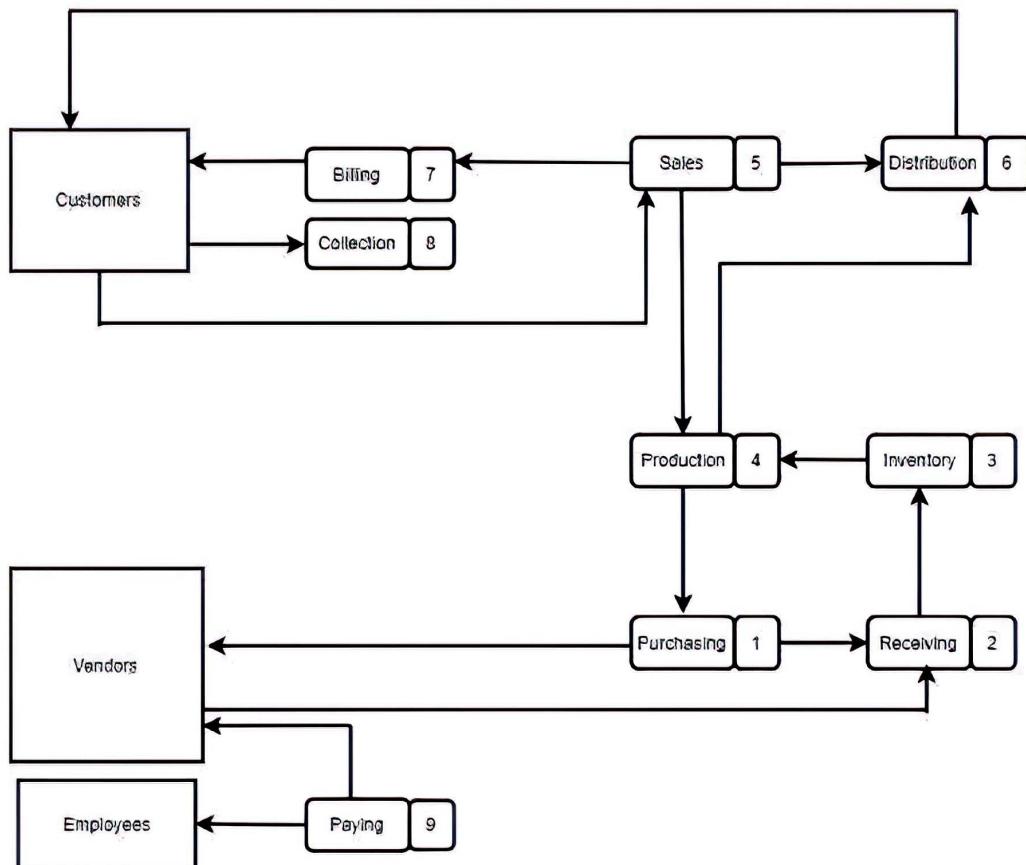
### **Building Blocks of Information System**



[Fig.3.3 The information building block]

### 3.1.1. Principal Function System in Business:

In most of manufacturing enterprise principal functional system follows Purchasing, Receiving, Inventory, Production, Sales, Distribution, Billing, Payment Collection etc.

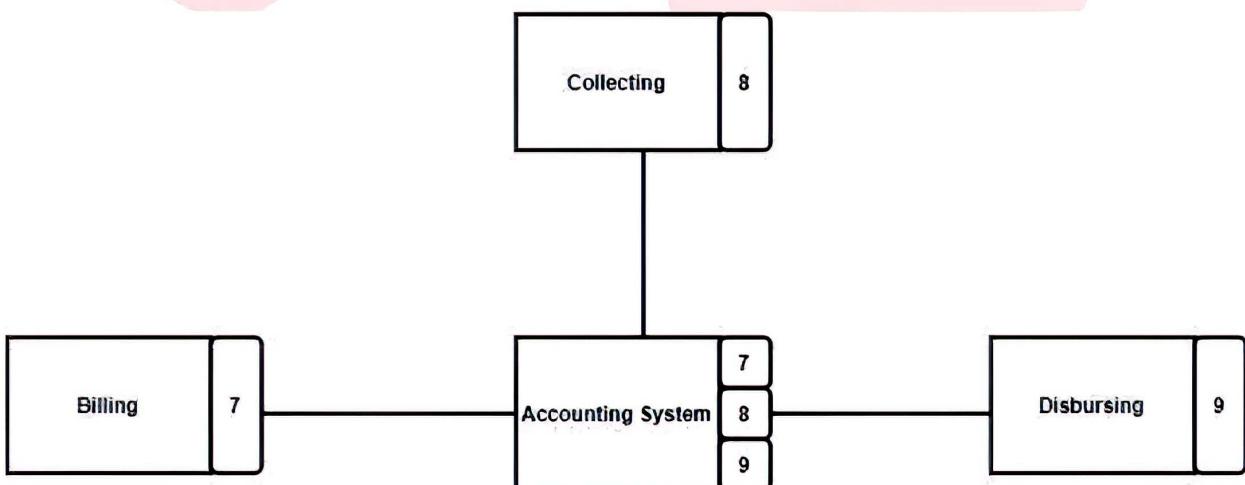


[Fig.3.4 Nine principal system associated with production oriented business]

- 1) **Purchasing:** Purchasing from Vendor goods and material required for business
- 2) **Receiving:** Checking the goods and material delivered by vendor after inspecting and taking delivery

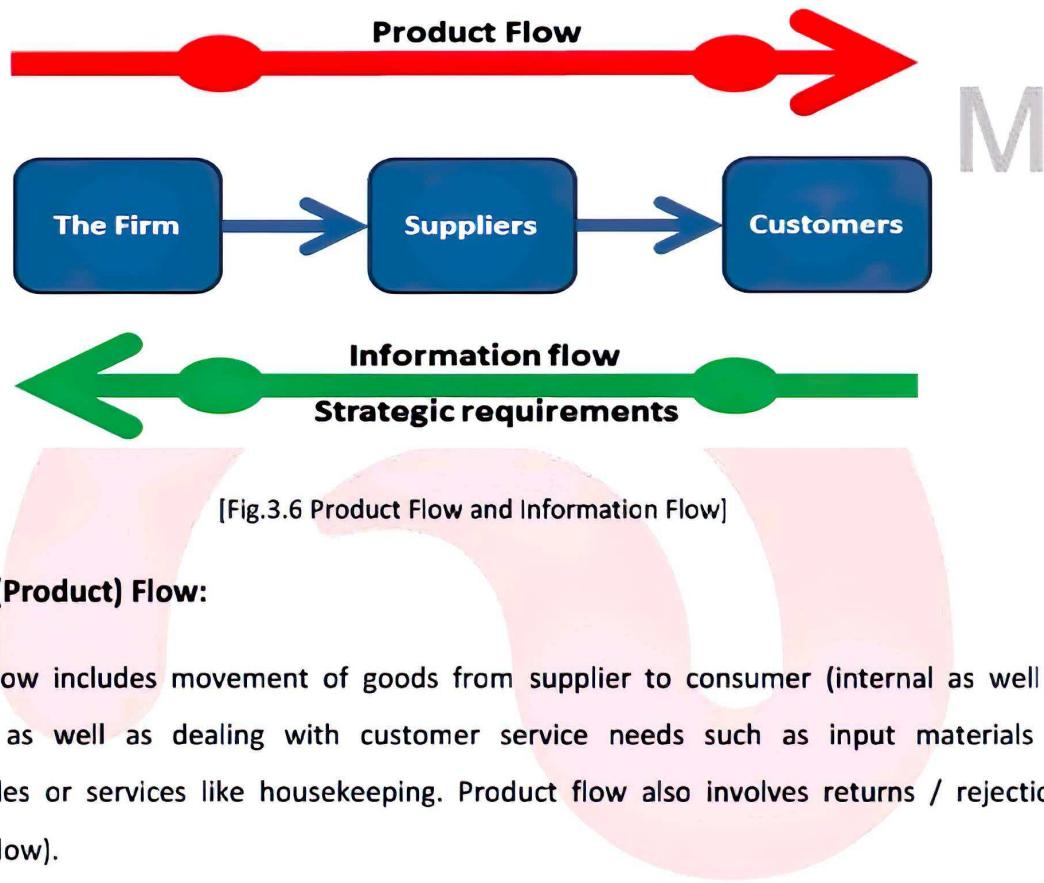
- 3) **Inventory:** Storing the received goods and material which have been received from vendor
- 4) **Production:** Manufacturing of goods as per the plans
- 5) **Sales:** Marketing the goods produced.
- 6) **Distribution:** Supplying the customer with goods sold from product which is produced from finished goods inventory.
- 7) **Billing:** Sending the statement of account owed to customer
- 8) **Payment Collection:** To received payments from customer through various mode of payment
- 9) **Paying:** Making payment to the people those whom the business owes the money like vendors, employees

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[Fig.3.5 (7), (8), (9) Forms the subsystems of accounting system subsystems of accounting system]

### 3.1.2. Product Flow and Information Flow:



#### Material (Product) Flow:

Product Flow includes movement of goods from supplier to consumer (internal as well as external), as well as dealing with customer service needs such as input materials or consumables or services like housekeeping. Product flow also involves returns / rejections (Reverse Flow).

In a typical industry situation, there will be a supplier, manufacturer, distributor, wholesaler, retailer and consumer. The consumer may even be an internal customer in the same organization. For example in a fabrication shop many kinds of raw steel are fabricated into different building components in cutting, general machining, welding centers and then are assembled to order on a flatbed for shipment to a customer. Flow in such plant is from one process / assembly section to the other having relationship as a supplier and consumer (internal). Acquisition is taking place at each stage from the previous stage along the entire flow in the supply chain.

In the supply chain the goods and services generally flow downstream (forward) from the source or point of origin to consumer or point of consumption. There is also a backward (or upstream) flow of materials, mainly associated with product returns.

**Information Flow:**

Supply chain management involves a great deal of diverse information—bills of materials, product data, descriptions and pricing, inventory levels, customer and order information, delivery scheduling, supplier and distributor information, delivery status, commercial documents, title of goods, current cash flow and financial information etc.—and it can require a lot of communication and coordination with suppliers, transportation vendors, subcontractors and other parties. Information flows in the supply chain are bidirectional. Faster and better information flow enhances Supply Chain effectiveness and Information Technology (IT) greatly transformed the performance.

**3.1.3. Principle Document Associated with Information Flow:**

The principle documents associated with the information flow are:

**1) Purchase Order:**

Prepared by purchasing department, original copy is sent to the vendor and second copy is retained by receiver.

**2) Receiving Report:**

When materials ordered arrive, receiving verifies the order against the purchase order copy, inspects material, informs purchase department of its arrival and accounts by a receiving report.

**3) Inventory Transfer:**

It is maintained by inventory and receiving department.

4) **Purchase Requisition:**

It is made by inventory department for the purchasing request for insufficient material.

5) **Production Document:**

It contains the information of designed, developed products.

6) **Material Requisition:**

Material Requisition is to request needed material from inventory.

7) **Sales Order:**

Sales contact the customers, sell the product, and prepare the sale copy. It is sent to production, billing department and also to distributors.

8) **Warehouse transfer Notice:**

It receives the finished goods from the production.

9) **Shipping Notice:**

Distributors ship the products to the customer and inform sales by means of a shipping notice.

10) **Customer Invoice:**

Billing prepares and mails the customer bill.

11) **Collection:**

It receives customer payments from the customer.

12) **Vendor Cheque:**

Paying makes payment to vendor through this.

13) **Pay Cheque:**

Paying department distributes pay cheques to employees.

14) **Time ticket:**

The amount of pay-cheques is based upon time tickets submitted by employees.

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### 3.2. ENTERPRISE RESOURCE PLANNING (ERP):

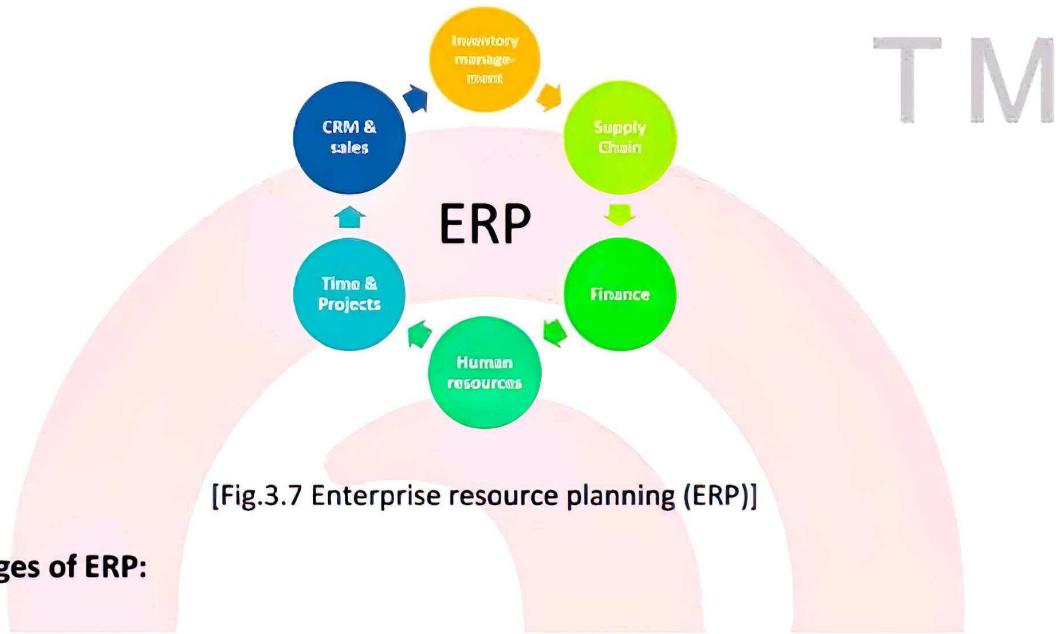
"The ERP is a packaged business software system that enables a company to manage the efficient and effective use of resources (finance, materials, manufacturing capacity and human resource) by providing an integrated solution for the organization."

A collection of software packages, which ties all of an enterprise's various functions into a cohesive database. These packages affect everything from order capture to accounting and procurement (verification) to warehousing.

Employees enter information only once and that information is then available to all systems company-wide. This means everyone in the company can make decisions based on accurate, real-time information. It provides real-time monitoring of business functions. Real-time monitoring of business functions, permits timely analysis of Quality, Availability, Customer satisfaction, Performance, Profitability. For e.g.

- The sales force enters an order on a computer, and the transaction propagates through the entire company.
- Inventory lists and parts supplies are updated automatically, worldwide.
- The ERP system determines whether the product should come from current finished goods in a warehouse, work in process, scheduled production, or new production.
- It is a set of integrated programs that manage a company's vital business operations for an entire multisite, global organization.
- ERP systems typically attempt to cover all basic functions of an organization, regardless of the organization's business or charter. Business, not-for-profit organizations, governments, and other large entities utilize ERP.
- At the core of the ERP system is a database that is shared by all users.
- Mid- to large-size businesses with multiple departments and cost centers benefit most significantly from ERP systems.

- Examples of modules in an ERP which formerly would have been stand-alone applications include: Manufacturing, Supply Chain, Financials, CRM, Human Resources, and Warehouse Management.



#### Advantages of ERP:

- 1) **Time-saving integration** and automation: A centralized management solution streamlines and strengthens data management. Data is easily entered, accessed and analysed when it's within easy reach. Workflows, electronic signatures and other audit features save time and protect the integrity of your data.
- 2) **Business intelligence:** Many ERP systems offer powerful business intelligence (BI) features ranging from role-tailored dashboards, advanced analytics, innovative reporting features, and other ways to easily highlight and visualize data.
- 3) **Connect people, processes and data:** Integrated ERP solutions deliver key performance indicators (KPIs) and metrics to leaders. Armed with reliable, real-time data, managers and business leaders can identify new ways to grow the business, improve operations, and work efficiently, improving both productivity and profitability.
- 4) **Increase efficiencies:** ERP systems offer built-in and customizable workflows to streamline common, daily tasks. These automations reduce redundant tasks, optimize labour and

resource use, and improve productivity. ERP also enables mobility so employees can enter, access and use data whether working from the office or in the field.

- 5) **Strengthen strategic decision-making:** Quick access to up-to-the-minute data empowers managers and executives to uncover strategic ways to lower costs, reduce wasteful spending, and protect profit margins through changing marketplace trends and customer behaviours.
- 6) **Improve customer experience:** Centralizing data makes it easier for employees to reach when it's needed. Sales and customer services teams can access product, inventory and customer information on the spot. Responding quickly to customer needs goes a long way toward improving customer satisfaction and their overall experience with your company.

#### **Disadvantages of ERP:**

While it seems clear that ERP systems deliver powerful benefits to businesses, there can also be limitations to the technology. It's important to understand and weigh the advantages and disadvantages of ERP systems before making big changes within your company.

- 1) **ERP doesn't solve policy problems:** Inefficient policies and processes can't be solved by technology alone. Redundant processes, too many layers of managerial oversite, and bottlenecks need to be corrected before new technology is introduced.
- 2) **Choosing the wrong ERP system:** There are many different ERP solutions in the marketplace today. Each offer different features and functions, some can be customized to meet unique needs and others are already tailored for common industry sectors. Choosing too big of a system or skimping on one will cause problems in the long run. It's important to work with a reputable and knowledgeable solutions provider to choose the right ERP system for your unique requirements.
- 3) **User adoption is critical:** Deploying ERP offers no guarantee that your people will use the system or use it properly. Training, buy-in and support from the top down will improve user acceptance and user adoption, ensuring you get the best returns from your ERP investment.

### 3.2.1 ERP ARCHITECTURE

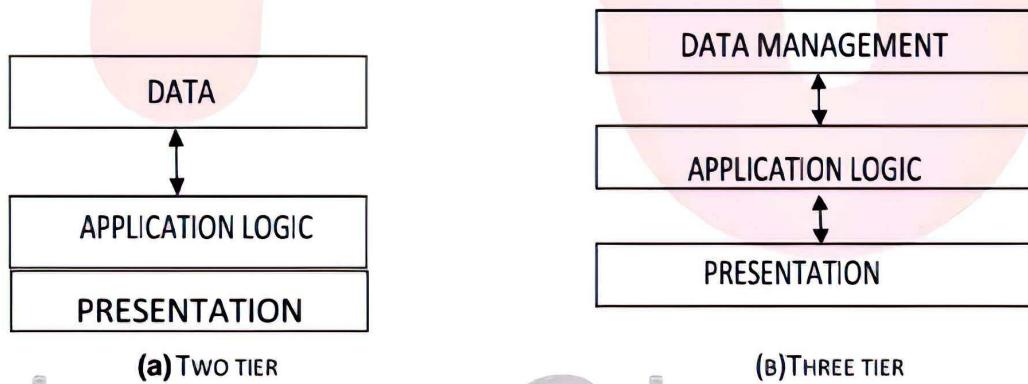
Any information system has three basic components:

- 1. Data Management**
- 2. Application Logic and**
- 3. Presentation**

These components can be building with the client server role definitions.

The client is a user and the server provides the services required by the user to run the system. As the information needs are dynamically changes, the architecture required to separate the data and its management from its application. The user required the choice of using the data as it suits him the most. Hence the application logic has to be separated from the data.

There are changes in how the application logic is developed and presented. The architecture could be a two tier or three tier as shown below:



#### CLIENT/SERVER MODEL-ARCHITECTURE:

In the two tier architecture, there is a strict division of roles. The data management is by the server and its processing is through the application logic by client.

In this architecture all the requirements are sent to the server by all users in the network. This affects the load on the server and response time to the user increases.

There could be a case where the user is dumb and is required to use the system in a guided manner with the ‘help’ assistance. Then the 3 tier architecture is suitable. The client uses the GUI tools for simplicity where the application logic is processed on another machine.

In this 3 tier architecture 3 different roles are defined and 3 hardware platforms are made responsible to perform.



The servers play 2 distinct roles of handling the data and the application logic. This architecture is useful when there is not much change in the application logic and it is complex.

This architecture is useful when the user does not want to change the application logic but want to change the presentation logic.

The third possibility is the golden mix of two architectures. Here the application logic is split into two. The logic which deals with the data more is attached to the server platform, where the data is being managed. The logic which deals most with the presentation and the specific need of the user is left to the client platform as shown below:

It is difficult to recommend one or the other architecture as the solution to overcome a typical requirement problem. User environment and the information needs and how the user handles them are matters in the choice of architecture. The best architecture is one which is user-friendly, easy to understand and maintain.

### **3.2.2 ERP SELECTION**

The market offer a number of ERP packages. The selection can be made on 3 dimensions,

- 1. Vendor**
- 2. Technology**
- 3. The solution scope and architecture**

## 1) VENDOR (wholesalers) EVALUATION

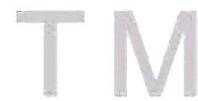
Factors:

1. Business strength of the vendor
2. Product share in total business of the vendor
3. R & D (Research & Development) investment in the product
4. Business viewpoint of the vendor
5. Future plans of the vendor
6. Market reach and resource strength of the vendor
7. Ability to execute the ERP solution
8. Strength in the other technology knowledge and the ability to use them
9. Vendor's plan of the ERP improvement with technology development
10. Image in the business and in the information technology world
11. Financial strength of the vendor
12. Organization for product development and support
13. Global experience of the vendor and commitment to the product

## 2) TECHNOLOGY EVALUATION

Factors:

1. Client/server architecture and its implementation-2 tier or 3 tiers
2. Object orientation in development and methodology
3. Handling of server and client based data and application logic
4. Application and use of standards in all phases of development and in the product.
5. Front end tools and back end DBMS
6. Interface mechanism
7. Use of case tool, screen generator, report writers, screen painter and batch processor
8. Support system technologies like bar-coding, imaging, communication and network.
9. Downloading to PC based packages, MS-Office etc.
10. Operating system and its level of usage
11. Hardware-software configuration management



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### **3) ERP SOLUTION EVALUATION**

Factors:

1. ERP fits for the business of the organization in terms of the functions, features and processes, business scope and so on
2. The degree of deviation from the standard ERP product
3. Ease of use: easy to learn, implement and train
4. Flexible design
5. The level of intelligent usage of “help”, error message, dictionaries.
6. The ability for a quick start on implementation
7. adaptability/flexibility of the solution
8. Rating on performance, response and integration
9. Product quality in terms of security, reliability and precision in results
10. Document handling for system administration and handling
11. Product rating in its class of products
12. Solution architecture and technology

It is advisable for the organization to form a committee for selection of ERP solution. It should have important functional head, a strong IT person and a person from corporate planning function.

The committee should be headed by a CEO or designated authority. this committee should prepare a requirement document showing business goals, futuristic scenario of business, the critical functions, processes, business focus and customer requirements.

When such document is ready, the selected ERP vendors should be called for seeking the ERP offer. The document should be given to the vendors, and they should be allowed to study the organization and its business.

All vendors are asked to submit a technical proposal; the submission will be then scrutinized by the committee. The short listed vendors then asked to give the product presentation to the group of decision makers.

After this, product demonstration should be arranged, which will be checked by the committee.

Then comparative analysis and evaluation is made. Simultaneously the committee gathers information about the vendor.

Once the committee makes the decision, the vendor is asked to resubmit the technical and commercial proposal with prices and offers. The proposal should have following details:

1. Plan of supply
2. Objectives
3. Modules and deliverables
4. Implementation methodology
5. Plan and schedule of hardware and software implementation
6. Resource allocation
7. Responsibility between the organization and vendor
8. Process of implementation
9. Organization of implementation
10. Progress monitoring and control of events
11. Process of resolving the issues of levels
12. Official product literature
13. Vendors purpose
14. Payment terms and price by module and number of users

Once the ERP decision is made the vendor and organization enter into a legal contract.

### 3.2.3 ERP IMPLEMENTATION

The process of implementing an ERP system in an organization is called ERP implementation lifecycle. The phases of an ERP implementation are:

1. Pre-evaluation Screening
2. Package Evaluation
3. Project Planning Phase
4. Gap Analysis
5. Re-engineering
6. Configuration
7. Implementation Team Training
8. Testing
9. Going Live
10. End-User Training
11. Post-Implementation

#### 1) Pre-Evaluation Screening:

It includes examining all the available ERP systems. Among these systems, those which are able to meet the organization's requirements are selected.

#### 2) Package Evaluation:

It involves a deep analysis of all the shortlisted ERP systems to select the final system. It is most important phase, because the success of an ERP implementation highly depends on the selection of the right system.

#### 3) Project Planning Phase:

It involves formulating detailed plan for implementing an ERP system. Project plan specifies the resources required for ERP, the timeline for the completion of ERP implementation process, the targets of ERP system etc.

**4) Gap Analysis:**

In this phase organization develops a model that states its current status and future targets. Using this model; organization can anticipate any functional gaps and cover them.

**5) Re-Engineering:**

This involves the complete restructuring of business processes, technology, functions etc. re-engineering is used as a downsizing tool because it results in cost-cutting and modification of employee's responsibility as ERP automates many business activities.

Re-engineering also used to signify the integration of business process reengineering (BPR) with the ERP system. BPR brings changes in the roles and responsibilities of employees.

**6) Configuration:**

It is the functional phase of the ERP implementation lifecycle. In this phase the ERP system is synchronized with the existing system. For this, the organization should properly analyze all its business processes, so that it can achieve its overall objectives.

**7) Implementation Team Training.**

In this phase the implementation team is trained for implementing the ERP system successfully. The training is given on the working of ERP system. After implementation of ERP system the vendors and external consultants leave the organization.

**8) Testing:**

In this ERP system is verified with the real situations. Situations may include system overload, invalid data entry, hacking attacks, etc. if the ERP system fails in the testing phase, the required changes should be made to the system.

**9) Going Live:**

In this the ERP system is made available to all the employees in the organization. In this phase the ERP system is ready to be used technically and functionally. In this phase the old system will be replaced with the new ERP system.

**10) End user training:**

In this phase the employees who need to work with the ERP system are identified and divided into groups, so that they can be trained to work on the new system. This training also focuses on the methods an employee needs to use in case the ERP system does not work properly.

**11) Post-Implementation:**

The post implementation phase involves continuous evaluation of the ERP system implemented in the organization. To receive the full benefits of the ERP, it is important that the system is accepted in the entire organization. The system should be upgraded time to time.

### 3.3 Management Information System

MIS is the use of information technology, people, and business processes to record, store and process data to produce information that decision makers can use to make day to day decisions. The full form of MIS is **Management Information Systems**. The purpose of MIS is to extract data from varied sources and derive insights that drive business growth.

Management information system can thus be analyzed as follows –

**Management:** Management covers the planning, control, and administration of the operations of a concern. The top management handles planning; the middle management concentrates on controlling; and the lower management is concerned with actual administration.

**Information:** Information, in MIS, means the processed data that helps the management in planning, controlling and operations. Data means all the facts arising out of the operations of the concern. Data is processed i.e. recorded, summarized, compared and finally presented to the management in the form of MIS report.

**System:** Data is processed into information with the help of a system. A system is made up of inputs, processing, output and feedback or control.

Thus MIS means a system for processing data in order to give proper information to the management for performing its functions.

#### Definition

Management Information System or 'MIS' is a planned system of collecting, storing, and disseminating data in the form of information needed to carry out the functions of management.

### 3.3.1 Objectives of MIS

The goals of an MIS are to implement the organizational structure and dynamics of the enterprise for the purpose of managing the organization in a better way and capturing the potential of the information system for competitive advantage.

Following are the basic objectives of an MIS –

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- **Capturing Data** – Capturing contextual data, or operational information that will contribute in decision making from various internal and external sources of organization.
- **Processing Data** – The captured data is processed into information needed for planning, organizing, coordinating, directing and controlling functionalities at strategic, tactical and operational level. Processing data means –
  - ✓ making calculations with the data
  - ✓ sorting data
  - ✓ classifying data
  - ✓ summarizing data
- **Information Storage** – Information or processed data need to be stored for future use.
- **Information Retrieval** – System should be able to retrieve this information from the storage as and when required by various users.
- **Information Propagation** – Information or the finished product of the MIS should be circulated to its users periodically using the organizational network.

### 3.3.2 Components of MIS

The major components of a typical MIS are:

**People** – these are the users who use the information system to record the day to day business transactions. The users are usually qualified professionals such as accountants, human resource managers, etc. The ICT department usually has the support staff that ensures that the system is running properly.

**Business Procedures** – these are agreed upon best practices that guide the users and all other components on how to work efficiently. Business procedures are developed by the people i.e. users, consultants, etc.

**Data** – the recorded day to day business transactions. For a bank, data is collected from activities such as deposits, withdrawals, etc.

**Hardware** – hardware is made up of the computers, printers, networking devices, etc. The hardware provides the computing power for processing data. It also provides networking and printing capabilities. The hardware speeds up the processing of data into information.

**Software** – these are programs that run on the hardware. The software is broken down into two major categories namely system software and applications software. System software refers to the operating system i.e. Windows, Mac OS, and Ubuntu, etc. Applications software refers to specialized software for accomplishing business tasks such as a Payroll program, banking system, point of sale system, etc.

### 3.3.3 Characteristics of MIS

Following are the characteristics of an MIS –

- It should be based on a long-term planning.
- It should provide a holistic view of the dynamics and the structure of the organization.
- It should work as a complete and comprehensive system covering all interconnecting sub-systems within the organization.
- It should be planned in a top-down way, as the decision makers or the management should actively take part and provide clear direction at the development stage of the MIS.
- It should be based on need of strategic, operational and tactical information of managers of an organization.
- It should also take care of exceptional situations by reporting such situations.
- It should be able to make forecasts and estimates, and generate advanced information, thus providing a competitive advantage. Decision makers can take actions on the basis of such predictions.
- It should create linkage between all sub-systems within the organization, so that the decision makers can take the right decision based on an integrated view.
- It should allow easy flow of information through various sub-systems, thus avoiding redundancy and duplicity of data. It should simplify the operations with as much practicability as possible.

- Although the MIS is an integrated, complete system, it should be made in such a flexible way that it could be easily split into smaller sub-systems as and when required.
- A central database is the backbone of a well-built MIS.

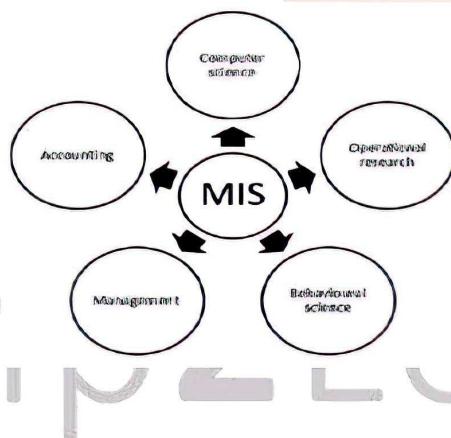
### 3.3.4 Characteristics of Computerized MIS

Following are the characteristics of a well-designed computerized MIS –

- It should be able to process data accurately and with high speed, using various techniques like operations research, simulation, heuristics, etc.
- It should be able to collect, organize, manipulate, and update large amount of raw data of both related and unrelated nature, coming from various internal and external sources at different periods of time.
- It should provide real time information on ongoing events without any delay.
- It should support various output formats and follow latest rules and regulations in practice.
- It should provide organized and relevant information for all levels of management: strategic, operational, and tactical.
- It should aim at extreme flexibility in data storage and retrieval.

### 3.3.5 Nature and Scope of MIS

The following diagram shows the nature and scope of MIS –



### 3.3.6 Types of Information Systems

The type of information system that a user uses depends on their level in an organization. The following diagram shows the three major levels of users in an organization and the type of information system that they use.



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### **Operational management level:**

The operational level is concerned with performing day to day business transactions of the organization. Examples of users at this level of management include cashiers at a point of sale, bank tellers, nurses in a hospital, customer care staff, etc. Users at this level use make structured decisions. This means that they have defined rules that guide them while making decisions.

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

### **Tactical Management Level:**

This organization level is dominated by middle-level managers, heads of departments, supervisors, etc. The users at this level usually oversee the activities of the users at the operational management level. Tactical users make semi-structured decisions. The decisions are partly based on set guidelines and judgmental calls. Example, a tactical manager can check the credit limit and payments history of a customer and decide to make an exception to raise the credit limit for a particular customer. The decision is partly structured in the sense that the tactical manager has to use existing information to identify a payments history that benefits the organization and an allowed increase percentage.

### **Strategic Management Level:**

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

### Transaction Processing System (TPS)

Transaction processing systems are used to record day to day business transactions of the organization. They are used by users at the operational management level. The decisions made by operational managers are routine and highly structured.

Examples of transaction processing systems include;

- Point of Sale Systems – records daily sales
- Payroll systems – processing employees salary, loans management, etc.
- Stock Control systems – keeping track of inventory levels
- Airline booking systems – flights booking management



### Management Information System (MIS)

Management Information Systems (MIS) are used by tactical managers to monitor the organization's current performance status. The output from a transaction processing system is used as input to a management information system.

Examples of management information systems include;

- Sales management systems – they get input from the point of sale system
- Budgeting systems – gives an overview of how much money is spent within the organization for the short and long terms.

### Decision Support System (DSS)

Decision support systems are used by senior management to make non-routine decisions. Decision support systems use input from internal systems (transaction processing systems and management information systems) and external systems. The main objective of decision support systems is to provide solutions to problems that are unique and change frequently.

Examples of decision support systems include;

- Financial planning systems: it enables managers to evaluate alternative ways of achieving goals
- Bank loan management systems: it is used to verify the credit of the loan applicant and predict the likelihood of the loan being recovered.

#### 3.3.7 MIS - Development Process

In order to develop a system successfully, it is managed by breaking the total development process into smaller basic activities or phases.

Any system development process is understood to have the following phases.

- Investigation
- Analysis

- Design
- Construction and testing
- Implementation
- Maintenance

### System Investigation

Some problem may be bothering a business organization. The managers in the organization (user) may not be very clear about the problem. Preliminary investigation is the first step in the system development project. The preliminary investigation is a way of handling the user's request to change, improve or enhance an existing system.

System investigation includes the following two sub-stages.

- Problem definition, and
- Feasibility study.

### System Analysis

Analysis is a detailed study of the various operations of a business activity (system), along with its boundaries. The objective of this phase is to determine exactly what must be done to solve the problem. Many system analysts have a technical background. The temptation of many technically trained people is to move too quickly to program design, to become pre-maturely physical. System analysis involves a detailed study of:

- The information needs of the organization and its end users.
- Existing information systems (their activities, resources and products).
- The expected information system (in terms of capabilities of IS required to meet the information needs of users).

### System Design

System analysis describes WHAT a system should do to meet the information needs of users. System design specifies HOW the system will accomplish this objective. The designing of the system refers to the technical specification that will be implied in constructing the system. The output of the system analysis phase is the input to the system design phase.

The System design should stress on the following three activities.

- User interface
- Data design
- Process design

### Construction and Testing

Once the system specifications are understood, the system is physically created. The required programs are coded, debugged, and documented. The system should be tested with some test data to ensure its accuracy and reliability. In fact, construction of the system takes place on the basis of the system design specifications.

### Implementation

The system implementation stage involves hardware and software acquisition, site preparation, user training and installation of the system. Then testing of the system, involving all components and procedures should be done. It must be realized that implementation may be the most crucial phase of system.

### Maintenance

System maintenance involves the monitoring, evaluating and modifying of a system to make desirable or necessary improvements. In other words, maintenance includes enhancements, modifications or any change from the original specifications.

#### 3.3.8 MIS Reports

MIS stands for Management Information system. In the simplest terms, an MIS report can be described as a system that provides important information for the management of your company. MIS collaborates with people, technology, and business processes within an organization. It also describes how the relationship with other organizations and people affect your company.

An MIS report is used to highlight the day to day business activities, which enables you to monitor your organization's progress. These reports provide critical insights during decision making. It serves as a reference point to monitor your business and communication. In this new era of emerging technologies, management information systems have become a vital part of successfully running a company.

#### Importance of MIS Reports

- MIS reports are crucial for the smooth functioning and growth of your company. Here are a few key points that highlight the importance of an MIS report:
- MIS reports are used to collect data from various sources. These include employees, management, documents, executives as well as the raw numbers for business sales. All of these are beneficial for identifying and solving problems within your company.
- They can help in making important decisions.
- The data collected from the above-mentioned sources is then visualized. This includes presenting the data in the form of bars, graphs, and charts. This

provides ease of analysis and helps to gain faster insights from the available data.

- An MIS report also helps to track a company's financial growth and financial health. It is often used to track, analyze, and report business income.
- An MIS report also serves as an effective tool for communication between employees and their employers, or between employees.

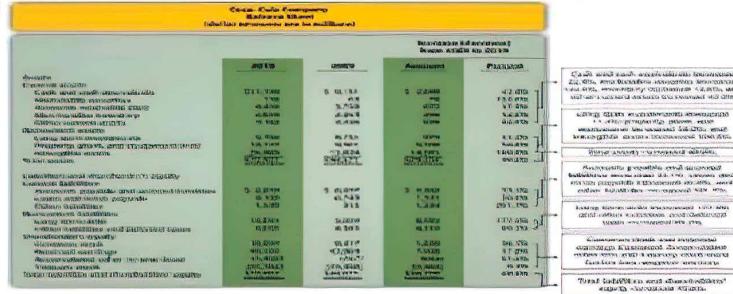


### Types of MIS Reports

**1. The Summary Reports:** Summary reports are a type of MIS reports used to visualize aggregate data and provide a summary. The report is presented in a format that can be understood by the company's management. Example, an inventory summary, which summarizes the cost of stocking inventory and their purchase value.

Test Summary Report							
Test case Identifier	Total No. of Test cases executed	No. of Test cases run	Defects/ Deviations / Problems [Priority]	No. of Tests		Approval Time/Date	Aggregated by
				Pass	Fail		

**2. The Trend Reports:** Trend Reports are types of MIS reports that allow your company to see the trends and patterns among different categories. Trend reports are also used to compare different products or services. Example, a sales trend report, which will highlight the product sales across different demographics and different time periods.



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**3. The Exception Reports:** An exception report is a type of MIS reports that is an aggregate report of exceptions, which are abnormal or unusual circumstances within a company. The exceptions report will collect instances of all such conditions within different departments in your company, and present them to the management in a uniform format. Example, an inventory that is seriously under stocked, which has to be refilled on an urgent basis; or a product which is underperforming and needs to be scrapped.

#### Exception Report Example

Daily Sales Exception Report – ORDERS OVER Rs.10,000						
Prepared 03/08/2012						
Order #	Customer ID	Sales Rep ID	Ship Date	Quantity	Item #	Amount
P12453	C00321	CAR	03/12/01	144	P1234	Rs.13,214
P12453	C00321	CAR	03/12/05	200	P1214	Rs.15,910
P12453	C003214	CWA	03/13/00	12	P4502	Rs.11,224
...	...	...	...	...	...	...
...	...	...	...	...	...	...

**4. On-Demand Reports:** The on-demand report is a type of MIS reports that are produced on specific demands from your company's management team. There is no fixed criteria or format that must be included in an on-demand report. Example, a sales manager may want to know the peak sales season for a particular product in a particular location.

#### Demand Report Example

Daily Sales by Sales Rep Summary Report	
Prepared 03/08/2012	
Sales Rep ID	Amount
CAR	Rs.42,905
CWA	Rs.38,950
SAK	Rs.22,100
JAN	Rs.12,850

**5. Financial Reports:** Financial reports are types of MIS reports that can be used to determine the financial condition of an organization. A financial report often includes a company's balance sheets, income, and expense details, and cash flow statements. Example, your company might report finance numbers quarterly, semi-annually, or annually.



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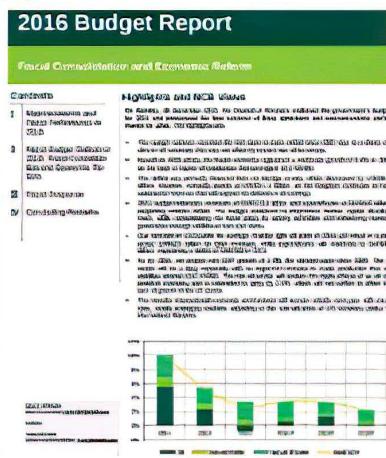
**6. Inventory Reports:** Inventory reports are a type of MIS report that is used to manage and keep a track of all the products in your inventory. The inventory report includes details about the number of products left in stock, the best selling products, the top-selling categories of products and how they vary by demographic, etc. Example, your inventory report might highlight that a particular product sells better in a particular area as compared to others.

Shipping Exception					
Date	Description	Item Status	Quantity	Weight	Dimensions
2023-01-15 10:00:00	Item A	In Progress	1	10	10x10x10
2023-01-15 10:00:00	Item B	In Progress	1	10	10x10x10
2023-01-15 10:00:00	Item C	In Progress	10	20	10x10x10

**7. Sales Reports:** The sales report is prepared by the marketing and sales division of your organization. It includes a visualization of products that have been sold during the last quarter/month in your organization. The sales data is often visualized by taking into account the budgeted and actual sales numbers. Example, during the peak shopping season, your company might sell more products than anticipated, which will reflect in your sales report during the next quarter.



**8. Budget Reports:** An MIS budget report contains internal information about your organization. It is used to maintain your company's financial health while driving growth. Example, Your Company's marketing budget during a new marketing campaign is an example of the budget report.



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**9. Production Reports:** Production report is a types of MIS report that contains information about the raw production numbers in your company. The manufacturing division within your company will prepare this report, and provide details of the production targets that were achieved or missed. Example, your production report might highlight an increase in the speed of production due to new machines being allocated.

Product	Quarterly Production Data				Sales Analysis				Inventory Management			
	Q1	Q2	Q3	Q4	Revenue	Profit	Gross Margin	Net Profit	Stock Level	Inventory	Reorder Point	Delivery Status
Product A	1000	1200	1100	1300	12000	3000	60%	2000	500	1000	1000	On Track
Product B	800	900	1000	1100	10000	2000	50%	1500	400	800	800	On Track
Product C	600	700	800	900	8000	1500	40%	1200	300	600	600	On Track
Product D	400	500	600	700	6000	1000	30%	900	200	400	400	On Track

**SAMPLE TEMPLATE BY [www.jump2learn.com](http://www.jump2learn.com)**

**10. Cash Flow Statements:** Cash flow statements are a Types of MIS report that underlines the exact amount of cash inflow versus the cash outflow in your organization. The cash flow statements include the cash flows from your company's operations (the core business), investments (capital investments), and financing(external investors). Example, a cash flow report would detail the exact amount of expenditure versus profits obtained from an advertising campaign.

<b>Statement of Cash Flows</b>	
Pengrahan Industries For the year ended 31 March 2016	
<b>Cash Flows from Operating Activities</b>	2015 2016
Receivables and advances	\$16,185.40 \$14,779.95
Payments to suppliers and employees	(20,000.00) (20,500.00)
Interest received	1,021.40 581.90
Interest paid	(1,000.00) (481.90)
Net cash from operating activities	\$1,021.40 \$(2,436.00)
<b>Cash Flows from Investing Activities</b>	
Proceeds from disposal of plant	400.00 -
Investments in long-term assets	(2,400.00) (200.00)
Net cash used in investing activities	(2,000.00) (200.00)
<b>Net Cash Flow</b>	\$(1,978.60) \$(2,636.90)
<b>Cash Disbursements</b>	
Trade and other operating expenses payable	\$84,165.40 \$1,921.95
Trade creditors recognised as current	(80,165.40) (25,170.95)
Total cash used in operating activities	\$8,000.00 \$(23,249.00)

### 3.3.9 Supply Chain Management (SCM)

Supply chain management is the systemic, strategic coordination of the traditional business functions and tactics across these business functions - both within a particular company and across businesses within the supply chain- all coordinated to improve the long-term performance of the individual companies and the supply chain as a whole.

In a traditional manufacturing environment, supply chain management meant managing movement and storage of raw materials, work-in-progress inventory, and finished goods from point of origin to point of consumption.

It involves managing the network of interconnected smaller business units, networks of channels that take part in producing a merchandise or a service package required by the end users or customers.

With businesses crossing the barriers of local markets and reaching out to a global scenario, SCM is now defined as –

**Design, planning, execution, control, and monitoring of supply chain activities with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand and measuring performance globally.**



### 3.3.9.1 Components of SCM:

There are 5 basic components of SCM:

- 1) Planning
- 2) Sourcing
- 3) Making
- 4) Delivering
- 5) Return

**Planning:** Planning is the first step of SCM. It is a strategic activity. An organization must have a perfect plan for managing all resources for fulfilling customer's demand. Plan should be cost effective and deliver high quality products and values to customer.

**Sourcing:** The suppliers and vendors chosen for delivering the goods and services must be reliable and chosen with care. Good interpersonal should be developed with vendors. Mutual agreement should be established for setting of price, delivery margin, and payment process.

**Making:** This step involves manufacturing of the required product from the procured raw material this component takes care of production, testing the end product, packaging it and preparing it for delivery to the customer. Organization can measure the product quality level, production output and worker productivity during this step.

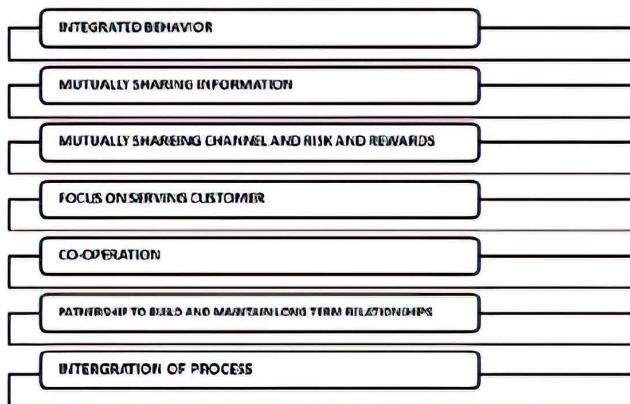
**Delivering:** This step involves selecting an efficient channel for delivering the finished goods stored in the warehouse to the customers. It also involves preparation of an invoice for delivered good to receive payments from the customer.

**Return:** This phase considers the defective and excess products back from the customers. A responsive and flexible network has to be made to handle return situations. It should be handled carefully so as not to affect the relations with the customer.

### 3.3.9.2 Objectives of SCM

- To decrease inventory cost by more accurately predicting demand and scheduling production to match it.
- To reduce overall production cost by streamlining production and by improving information flow.
- To improve customer satisfaction.

### 3.3.9.3 Features of SCM



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### 3.3.9.4 Scope of SCM



### 3.3.9.5 SCM Processes

- Customer Relationship Management
- Customer Service Management
- Demand Management
- Customer Order Fulfillment
- Manufacturing Flow Management
- Procurement Management
- Product Development and Commercialization
- Returns Management

### 3.3.9.6 Advantages of SCM

SCM have multi-dimensional advantages –

To the suppliers –

- Help in giving clear-cut instruction
- Online data transfer reduce paper work

Inventory Economy –

- Low cost of handling inventory
- Low cost of stock outage by deciding optimum size of replenishment orders
- Achieve excellent logistical performance such as just in time

Distribution Point –

- Satisfied distributor and whole seller ensure that the right products reach the right place at right time
- Clear business processes subject to fewer errors
- Easy accounting of stock and cost of stock

Channel Management –

- Reduce total number of transactions required to provide product assortment
- Organization is logically capable of performing customization requirements

Financial management –

- Low cost
- Realistic analysis

Operational performance –

- It involves delivery speed and consistency.

External customer –

- Conformance of product and services to their requirements
- Competitive prices
- Quality and reliability
- Delivery
- After sales services

To employees and internal customers –

- Teamwork and cooperation
- Efficient structure and system
- Quality work
- Delivery

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### Difference between Logistics & SCM

S. No	Logistics Management	SCM
1	It is concerned with providing goods and services when and where required.	It encompasses all the activities associated with movement of goods from raw material stage to the end user.
2	It is a subset of SCM	It is an extension of logistics management
3	This concept is relatively old.	This concept is relatively new.
4	It is a narrower concept	It is a broader concept

### 3.3.10 Customer Relationships Management (CRM)

CRM is an enterprise application module that manages a company's interactions with current and future customers by organizing and coordinating, sales and marketing, and providing better customer services along with technical support.

Atul Parvatiyar and Jagdish N. Sheth provide an excellent definition for customer relationship management in their work titled - 'Customer Relationship Management: Emerging Practice, Process, and Discipline' –

**The art of managing the organization's relationship with the customers and prospective clients refer to customer relationship management.**

#### 3.3.10.1 Why CRM?

- To keep track of all present and future customers.
- To identify and target the best customers.
- To let the customers know about the existing as well as the new products and services.
- To provide real-time and personalized services based on the needs and habits of the existing customers.
- To provide superior service and consistent customer experience.
- To implement a feedback system.

### 3.3.10.2 Implementation of CRM

CRM is implemented in 3 phases:

1. Acquire
2. Retain
3. Develop

**Acquire:** A new customer is an important source of revenue for an organization. Therefore it is essential for any organization to acquire new customers. It refers to the process of obtaining new customers. It involves process and procedure to locate, qualify and win new customers.

**Retain:** Customer retention is all about maintaining long term business relationship with customers. This process reduces customer defections. For this an organization has to focus on fulfilling the requirements of customers and exceeding their expectation. For customer retention product quality, relationship with customers, product reputation should be considered.

**Develop:** It is the process of increasing the value of retained customers. For this organizations provide products at lower cost, sell additional products or services to existing customers

### 3.3.10.3 Steps to Customer Relationship Management

- It is essential for the sales representatives to understand the needs, interest as well as budget of the customers.
- Never tell lies to the customers.
- It is a sin to make customers waiting.
- A sales professional should think from the customer's perspective.
- Don't oversell.
- An individual needs time to develop trust in you and your product.
- Never be rude to customers.
- Attend sales meeting with a cool mind.
- Keep in touch with the customers even after the deal.

### 3.3.10.4 Scope of CRM



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### 3.3.10.5 Advantages of CRM

- Provides better customer service and increases customer revenues.
- Discovers new customers.
- Cross-sells and up-sells products more effectively.
- Helps sales staff to close deals faster.
- Makes call centers more efficient.
- Simplifies marketing and sales processes.

### 3.3.10.6 Disadvantages of CRM

- Sometimes record loss is a major problem.
- Overhead costs.
- Giving training to employees is an issue in small organizations.

## 3.4 DECISION SUPPORT SYSTEM

### 3.4.1 DEFINITIONS OF DSS

Decision support systems couple the intellectual resources of individuals with the capabilities of the computer to improve the quality of decisions. It is a computer-based support system for management decision makers who deal with semi-structured problems.

The 3 Parts that make up DSS/Decision Analysis by Analytical Modeling:

### **1) Sensitivity analysis:**

It is the study of how different variables affect, when change only one variable is changed and rest are kept unchanged.

For example, Amazon, when DVD players become cheaper due to a new technology such as a blu-ray player, DVD sales are affected. A change in the sales of DVD's, will affect the sale of DVD players. Sales could decrease due to the new technology, or sales could increase due to the falling price on DVD players. This analysis helps to understand the significance of variable in decision making and improves the quality of decision making.

### **2) What-If analysis :**

It is the process of making hypothetical changes to problem data and observing the impact on the results. In what-if analysis you test the effect on solution by changing the value of number of variables or changing the relations between them. For example, say that I aim to sell 1,000 blu-ray players, within one month, overAmazon.com. In addition, say that I aim to lower, the prices of the players by 20% to increase the sales and reach my quota.

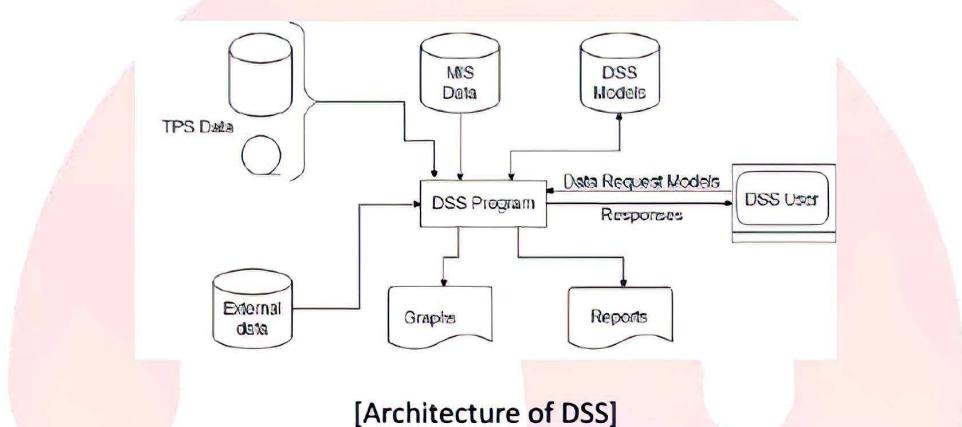
What-if analysis comes into play, but showing what the possible outcomes could be. Blu-ray could become more popular or less popular and sales could remain constant regardless of the given discount.

### **3) Goal-Seeking analysis**

It collects all of the given data and determines what inputs and constraints are required to reach specific goals. The decision makers can use this analysis to work on constraints and resources and find ways to improve upon solutions to seek highest goal.

### 3.4.2 Architecture of DSS

Various data of organization pertaining of MIS and TPS application works as the input to the DSS program along with data from external sources like government data of that industry , competitor data and DSS Model data. DSS may store and reprocess its own model as well as data. The user interacts with the DSS application online, request for model from model database is made and data is manipulated. The output of DSS is either text, structured reports or graphics.



Different types of programs are supported in DSS which can include spreadsheet programme, model base management systems, word processing, graphic generator, statistical package.

DSS are often used on adhoc based problem and opportunities. In DSS Flexibility and adaptability is crucial for evolvement of DSS.

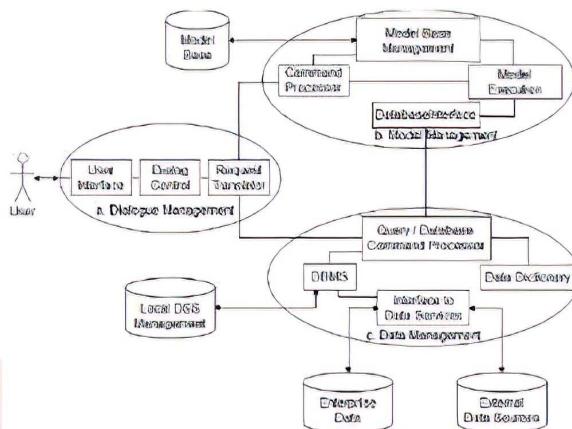
### 3.4.3 COMPONENTS OF DSS:

DSS facilitates the decision-making process of an organization due to the various components involved in it. These components perform different types of work.

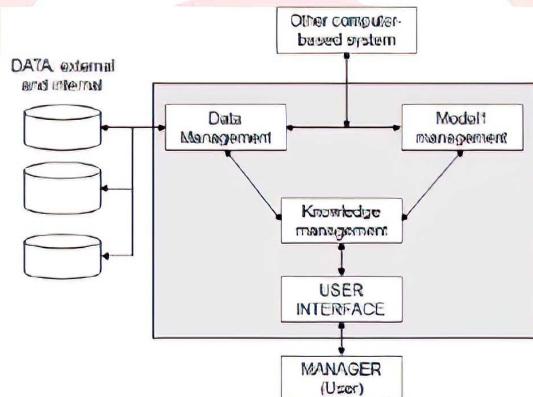
The components of DSS are:

1. Database management system.
2. Knowledge-base management system.
3. Model Management system.
4. User Interface Management System.

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[Component of DSS]



The different components of DSS are discussed as follows:

### DATABASE MANAGEMENT SYSTEM:

Database is a collection of data obtained from various internal and external sources by an organization. Managing huge database manually is not possible so organizations use DBMS for huge data. DBMS helps in reducing cost and data redundancy and increase data control and sharing.

There are different data model for the database like, network model, relational model, hierarchical model.

**KNOWLEDGE-BASE MANAGEMENT SYSTEM:**

It provides intelligence and support for collecting useful information. A large number of decisions are made on a day-to day basis, which range from simple to complex. These decisions involves the use of knowledge, which forms the basis of the decision making process. A billing and document management system is an example of knowledge-base management system.

**MODEL MANAGEMENT SYSTEM:**

It provides various techniques and skills to produce reliable, insightful, and useful results. A model is the abstract representation for any subject or thing. The modeling component gives decision maker the ability to analyze the problem. It supports by giving access to various models for decision support. Various techniques provided by DSS may include statistical method, sensitivity analysis and computer simulation.

**USER INTERFACE MANAGEMENT SYSTEM:**

It is a framework where an interaction between human beings and computers takes place. User interface refers to a system that provides a means of:

Input: allows users to manipulate the system.

Output: allows the system to give the results of the user's manipulation.

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### 3.4.4 MIS and DSS Difference

Factor	DSS	MIS
Problem type	A DSS is good at handling unstructured problems that can not be easily programmed.	An MIS is normally used only with more structured programs.
Users	A DSS supports individuals, small groups and the entire organization. In the short run, users typically have more control over a DSS.	An MIS supports primarily the organization. In the short run, users have less control over an MIS.
Support	A DSS supports all aspects and phases of decision making; it does not replace the decision maker - people, still make the decisions.	This is not true of all MIS systems – some make automatic decisions and replace the decision-maker.
Emphasis	A DSS emphasizes actual decisions and decision-making styles.	An MIS usually emphasizes information only.
Approach	A DSS is a direct support system that provides interactive reports on computer screen.	An MIS is typically an indirect support system that uses regularly produced reports
System	The computer equipment that provides decision support is usually on-line (directly connected to the computer system) and related to real time (providing immediate results). Computer terminals and display screens are examples- these devices	An MIS, using printed reports that may be delivered to managers once a week, may not provide immediate results.

	can provide immediate information and answers to questions.	
Speed	Because a DSS is flexible and can be implemented by users, it usually takes less time to develop and is better able to respond to user requests.	An MIS's response time is usually larger.  TM
Output	DSS reports are usually screen oriented, with the ability to generate reports on a printer.	An MIS, however typically is oriented towards printed reports and documents.
Development	DSS users are usually more directly involved in its development. User involvement usually means better systems that provide superior support. For all systems, user involvement is the most important factor for the development of successful system.	An MIS is frequently several years old and often was developed for people who are no longer performing the work supported by the MIS.

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### 3.4.5 Types of decisions

Organizational decisions differ in a number of ways. The following basis is used to classify the decisions:

#### A) PURPOSE (REASON) OF DECISION-MAKING

On the basis of the purpose of decision-making activities, the organizational decisions are divided into 3 categories:

##### 1. UNSTRUCTURED DECISION/STRATEGIC LEVEL DECISIONS:

Such decisions are taken by top level managers. These decisions define the broad objectives and strategic planning of an organization for profit making. These are called unstructured because they are not well defined, and there is ample scope of various sub decisions based on these decisions. There is no specific set of rules and procedure followed in these decisions. Instead the focus is on solving the problems, which are complex, non routine, and are long term requirements of the organization. The decision maker at this level includes President, Chief Executive Officer (CEO), and board of directors.

Example: the decision of entry into a new market segment.

##### 2. SEMI-STRUCTURED DECISION/MANAGERIAL DECISIONS:

Management control decisions are taken by managers at the control level (middle level) of business. The decisions at this level are neither structured nor unstructured, because these can be pre-specified to the extent their nature allows. Decision making at this level is said to be semi structured because problems and solutions are clear, and expertise is also required in taking these decisions. Managers at this level focus on monitoring and controlling activities of operational level and providing information to the business level management.

For example: introduction of a new feature in an existing product.

**3. STRUCTURED /OPERATIONAL DECISIONS:**

These decisions are taken by the managers at operational level (bottom level) of the organization. The decisions taken at this level are based on certain rules and predefined procedures which are specified in advance before taking the decisions. Decisions taken at this level are highly structured, repetitive and are related to day to day activities.

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Example: determination of quantity of raw material.

**B) LEVELS OF PROGRAMMABILITY**

Simon, on the basis of level of the programmability of a decision, proposed two types of decisions:

**1) PROGRAMMED/STRUCTURED DECISIONS:**

Programmed or structured are those decisions, which are well defined and some specified procedure or some decision rule might be applied to reach a decision. Such decisions are routine and repetitive and require little time for developing alternatives in the design phase.

**2) NON-PROGRAMMED /UNSTRUCTURED DECISION:**

Decisions, which are not well defined and have not pre-specified decision procedure rule, are known as unstructured or non-programmed decisions.

**C) KNOWLEDGE (FACTS) OF OUTCOMES:**

On the basis of the level of knowledge of outcomes, decision-making can be classified into three categories.

**1. DECISION UNDER CERTAINTY:**

Decision-making under certainty takes place when the outcome of each alternative is fully known. There is only one outcome for each alternative.

## **2. DECISION UNDER RISK:**

Decision-making under risk occurs when there is a possibility of multiple outcomes of each alternative and a probability of occurrence can be attached to each outcome.

## **3. DECISION UNDER UNCERTAINTY:**

Decision-making under uncertainty takes place when there are a number of outcomes for each alternative & the probabilities of their occurrences are not known.

### **3.4.6 CHARACTERISTICS OF A DSS**

- Support for decision-makers in semi-structured and unstructured problems.
- Support for managers at various managerial levels, ranging from top executive to line managers.
- Support for individuals and groups. Less structured problems often require the involvement of several individuals from different departments and organization level.
- DSS helps in analyzing the future. Example: DSS can forecast the market bulls and bears in the coming month.
- DSS Support for interdependent or sequential decisions.
- DSS Support for intelligence, design, choice, and implementation.
- DSS Support for variety of decision processes and styles.
- DSSs are adaptive over time.
- DSS is able to interact with the end user while providing information.
- DSS is a knowledge-based system.
- DSS maintains the integrity, flexibility, consistency and accuracy of data.
- DSS stores information in a powerful database.

### **3.4.7 BENEFITS OF DSS**

- DSS Improves efficiency and speed of decision-making activities.
- DSS helps in Increasing Organizational Control and capability of futuristic decision making of the organization.
- DSS Facilitates interpersonal communication.
- DSS Encourages learning or training.
- DSS allows the organization to perform a what-if analysis.
- DSS helps automate managerial processes.
- DSS will Improve Efficiency and increase productivity of the organization.

### **3.4.8 LIMITATIONS OF DSS**

1. DSS have small memories and limited storage capacities.
2. It is comparatively slow.
3. DSS provides limited information sharing.

### **3.4.9 FUNCTIONS OF DSS APPLICATIONS**

Major functions are

1. DSS can be used to identify relationship among various key elements of the problem
2. Determine the sensitivity of the results with respect to changes in decision variables
3. Identifying the patterns using both statistical techniques which with the help of quantitative data analyst will be able to identify some pattern in input data or output data
4. Predicting the decision outcomes for e.g. estimating the sales of a product on basis of increasing the advertisement or introducing new product in the market
5. Computing the optimum mixes i.e. allocating the people job according the matching of the skills. Availability of job. In this case linear programming can be used to find the optimal solutions.

### **3.4.10 HERBERT SIMON'S MODEL:**

Herbert Simon made key contributions to enhance understanding of the decision-making process. In fact, he pioneered (master) the field of decision support systems. According to (Simon 1960) and his later work with (Newell 1972), decision-making is a process with distinct stages.



He suggested for the first time the decision-making model of human beings. His model of decision-making has three stages:

#### **1. INTELLIGENCE:**

It deals with the problem identification and the data collection on the problem.

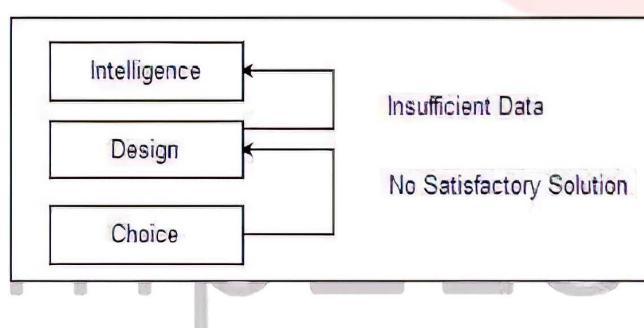
#### **2. DESIGN:**

It deals with the generation of alternative solutions to the problem at hand.

#### **3. CHOICE:**

It deals with the selection the 'best' solution from amongst the alternative solutions using some criterion.

The figure given below depicts Simon's decision-making model clearly.



### **1) Intelligence Phase:**

This is the first step towards the decision-making process. In this step the decision-maker identifies the problem.

A problem in the managerial context is detecting anything that is not according to the plan, rule or standard. An example of problem is the detection of sudden very high cut for the present month by a HR manager among workers.

Opportunity seeking on the other hand is the identification of a capable circumstance (opportunity) that might lead to better results. An example of identification of opportunity is-a marketing manager gets to know that two of his competitors will shut down operations (demand being constant) for some reason in the next three months, this means that he will be able to sell more in the market.

Thus, we see that either in the case of a problem or for the purpose of opportunity seeking the decision-making process is initiated .The first stage deals with the complete understanding of the problem/opportunity.

Intelligence phase of decision-making process involves:

- a. Problem-Searching
- b. Problem Formulation

#### **a. Problem-Searching**

For searching the problem, the reality or actual is compared to some standards. Differences are measured & the differences are evaluated to determine whether there is any problem or not.

#### **b. Problem Formulation:**

When the problem is identified, there is always a risk of solving the wrong problem. In problem we compare the found problem to previous problem to get rid of solving wrong problem.

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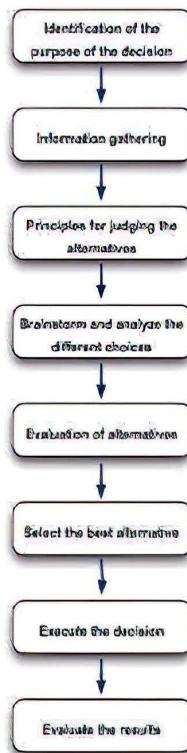
### **2) Design Phase:**

Design is the process of designing solution outlines for the problem. Alternative solutions are designed to solve the same problem. Each alternative solution is evaluated after gathering data about the solution. The evaluation is done on the basic of criteria to identify the positive and negative aspects of each solution. Quantitative tools and models are used to get solutions. At this stage a lot of creativity and innovation is required to design solutions.

### **3) Choice Phase:**

It is the stage in which the possible solutions are compared against one another to find out the most suitable solution. The 'best' solution may be identified using quantitative tools like decision tree analysis or qualitative tools like the six thinking hats technique, force field analysis, etc. This is not as easy as it sounds because each solution presents a scenario and the

problem itself may have multiple objectives making the choice process a very difficult one.



### 3.4.11 Problem solving process Using Decision Making

Decision-making has three stages:

Here give intelligence, design and choice phase given above then write

Following are the important steps of the decision-making process which are the expanded form of above 3 phases. Each step may be supported by different tools and techniques.

#### Step 1: Identification of the Purpose of the Decision

In this step, the problem is thoroughly analyzed. There are a couple of questions one should ask when it comes to identifying the purpose of the decision.

- What exactly is the problem?
- Why the problem should be solved?
- Who are the affected parties of the problem?
- Does the problem have a deadline or a specific time-line?

#### Step 2: Information Gathering

A problem of an organization will have many stakeholders. In addition, there can be dozens of factors involved and affected by the problem. In the process of solving the problem, you will have to gather as much as information related to the factors and stakeholders involved in the problem. For the process of information gathering, tools like 'Check Sheets' can be effectively used.

#### Step 3: Principles for Judging the Alternatives

In this step, the baseline criteria for judging the alternatives should be set up. When it comes to defining the criteria, organizational goals as well as the corporate culture should be taken into consideration. As an example, profit is one of the main concerns in every decision making process. Companies usually do not make decisions that reduce profits, unless it

is an exceptional case. Likewise, baseline principles should be identified related to the problem in hand.

#### **Step 4: Brainstorm and Analyze the Choices**

For this step, brainstorming to list down all the ideas is the best option. Before the idea generation step, it is vital to understand the causes of the problem and prioritization of causes. For this, you can make use of Cause-and-Effect diagrams and Pareto Chart tool. Cause-and-Effect diagram helps you to identify all possible causes of the problem and Pareto chart helps you to prioritize and identify the causes with the highest effect. Then, you can move on generating all possible solutions (alternatives) for the problem in hand.

#### **Step 5: Evaluation of Alternatives**

Use your judgment principles and decision-making criteria to evaluate each alternative. In this step, experience and effectiveness of the judgment principles come into play. You need to compare each alternative for their positives and negatives.

#### **Step 6: Select the Best Alternative**

Once you go through from Step 1 to Step 5, this step is easy. In addition, the selection of the best alternative is an informed decision since you have already followed a methodology to derive and select the best alternative.

#### **Step 7: Execute the decision:**

Convert your decision into a plan or a sequence of activities. Execute your plan by yourself or with the help of subordinates.

#### **Step 8: Evaluate the Results:**

Evaluate the outcome of your decision. See whether there is anything you should learn and then correct in future decision making. This is one of the best practices that will improve your decision-making skills.

### **3.4.12 GROUP DECISION SUPPORT SYSTEM (GDSS)**

In group decision-making, various individuals in a group take part in joint decision-making. Group Decision Support System (GDSS) is a decision support system that provides support in decision making by a group of people. It facilitates the free flow and exchange of ideas and information among the group members.

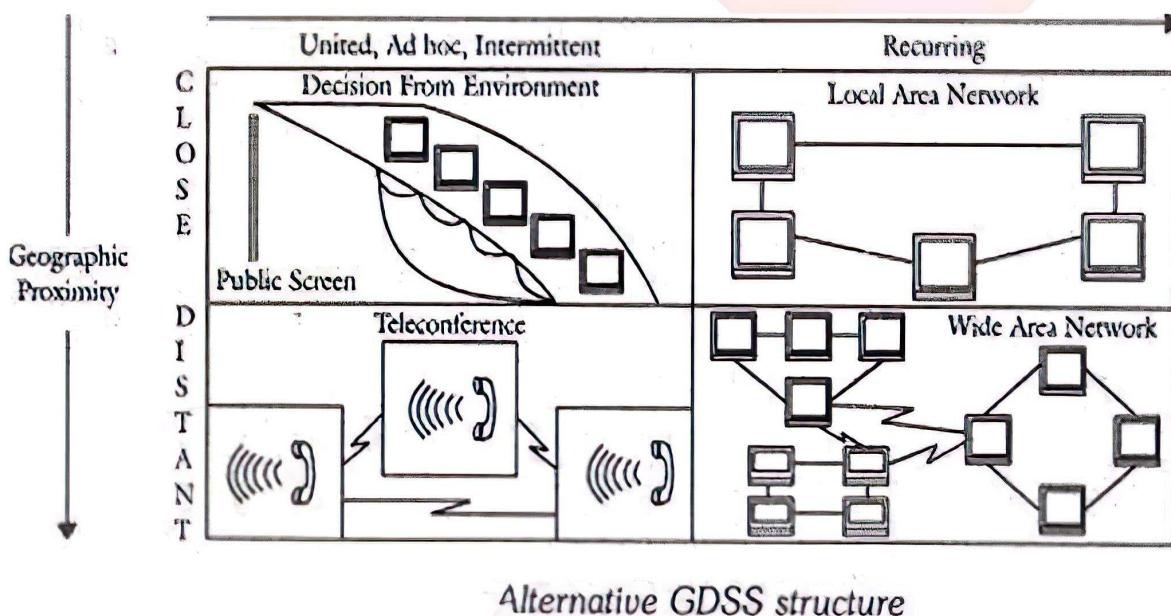


Decisions are made with a higher degree of agreement resulting in a higher possibility of implementation.

An organization can design GDSS according to the requirements of the decision-making group.

GDSS enables group communication; it provides interactive support to the whole group or team of decision makers.

A number of different architectures are there for GDSS are developed. The architecture which is to be used depends upon the task, recurrence and geographic proximity of the problem. Here we are discussing few of them.



(1) For limited adhoc and intermittent group DSS when members can meet in same physical location, decision room environment can be recommended. In this case members each a computer station that can use used to communicate with one another, to store the data obtained and to alter the display on the screen.

(2) For limited adhoc and intermittent group DSS where members physically distributed in this case teleconferencing is recommended. In this case different rooms are connected with video displays.

(3) For recurring GDSS where the members are in same physical locations, microcomputer workstations connected with LAN or WAN can be recommended. The recurring need for GDSS justifies the expenses of maintaining the LAN and WAN connections.

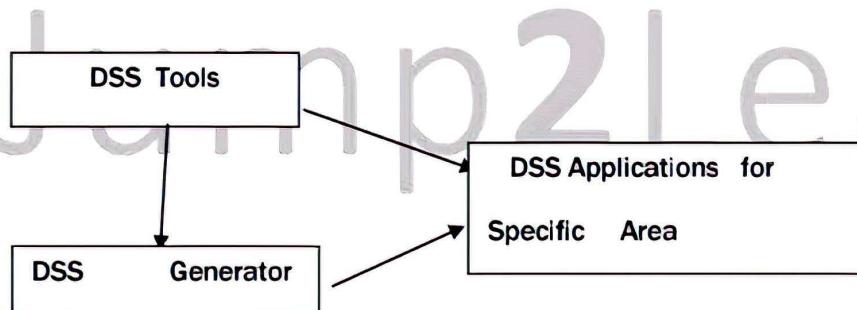
(4) For recurring GDSS where the members are geographically disbursed users, uninterrupted communication between remote decision stations can be recommended. In this case WAN is preferred.

### **Components of GDSS**

Components of GDSS include hardware, software, people, and procedures. These components are arranged in order to support people in context of supporting the decisions making meeting.

Components of GDSS are

- (1) DSS Tools    (2) DSS Generator    (3) DSS software for specific application



Specific DSS application can be constructed using DSS generator supported by DSS tools.

**(1) DSS Tools:** - Construction of DSS applications or DSS generator is facilitated by special software elements which are called DSS tools. These tools can include

- (a) Colour Graphics (b) Software (c) Special Editors, (d) Random number generator

**(2) DSS Generators:-** DSS Generators is a package of software which used to build special DSS applications.

**(3) DSS Software:-** DSS software can be developed in many areas like

- (a) Industry oriented e.g. Hospital and financial planning, banks portfolio management, airlines planning and control
- (b) Marketing area, operation Management areas of Industries etc

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**Question Bank:****Short Questions:**

1. Define ERP.
2. List out reports generated in MIS.
3. What is CBIS?
4. List out the characteristics of MIS.
5. Define SCM.
6. Define DSS.
7. What is sensitivity analysis?
8. Define what if analysis.
9. What is goal seek analysis.
10. Explain architecture of DSS.
11. List the components of DSS.
12. Explain characteristics of DSS.
13. Give the benefits and limitation of DSS.
14. Discuss the functions of DSS.

**Long Questions:**

1. Define ERP. Explain its advantages and disadvantages in detail.
2. Explain characteristics of MIS.
3. Write short note on Development process of MIS.
4. Explain CBIS with its components.
5. Explain different reports generated by MIS.
6. Write short note on Levels of Information System.
7. Explain Benefits of MIS.
8. Explain the components of DSS in detail.
9. Give Difference between MIS and DSS.
10. Explain types of decisions.
11. Explain Herbert Simon Model.
12. Explain problem solving process using decisions making.
13. Explain GDSS in detail.

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