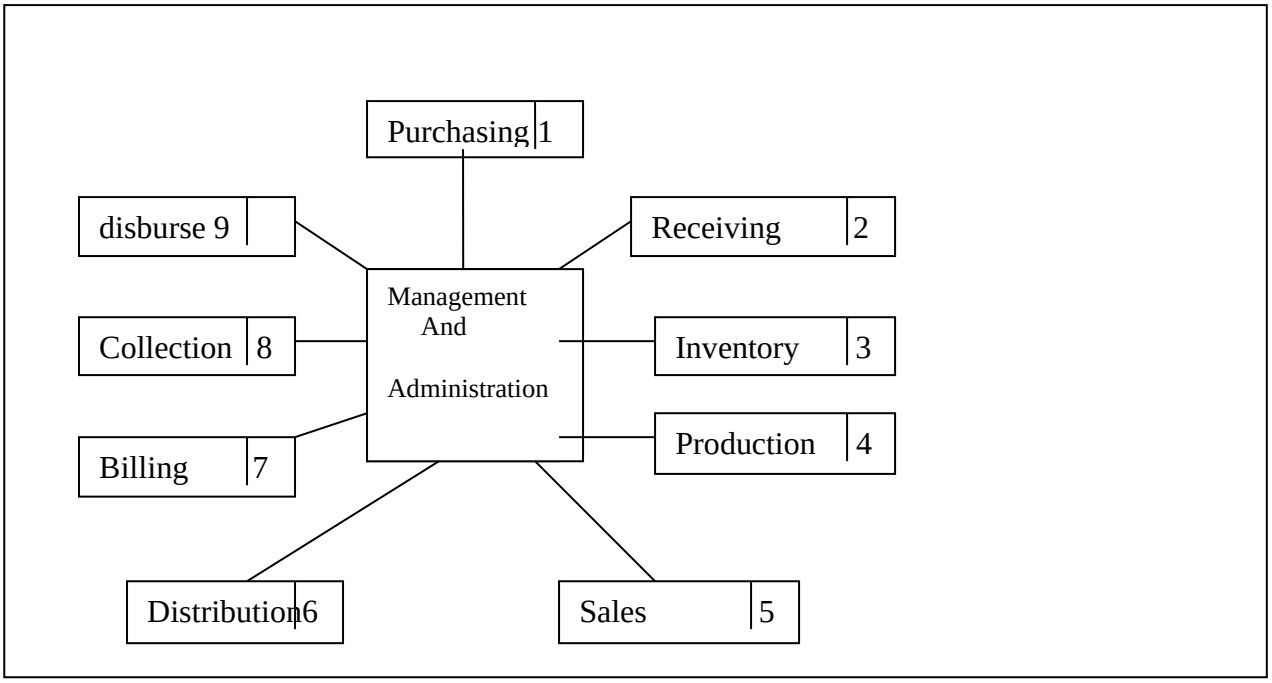
3.1 Business information systems

- Workers at all levels, in all kinds of firms, and in all industries are using information system to improve their own effectiveness.

- At the **corporate level**, the most common types of is used in business are E - Commerce system, transaction processing system, management information system and decision support system.

3.1.1 Principal Functional systems in a business

There are nine principal functional systems in most product-oriented enterprises. Nine principal functional systems are **Purchasing, Receiving, Inventory, Production, Sales, Distribution, Billing, Collection, and Paying**



1. **Purchasing: -** Purchasing from the vendor the goods and materials required for the business.

2. **Receiving: -** Inspecting and accepting delivered goods and materials.
3. **Inventory: -** Storing the received goods and materials.
4. **Production: -** Production of goods as per the plans.
5. **Sales: -** Marketing the goods produced.
6. **Distribution: -** Supplying the customer with the goods sold from a Produced goods inventory.
7. **Billing: -** Sending statements of the account owed to customer.
8. **Collection: -** Receiving payments from customers.
9. **Disburse (Paying): -** Making payments to those whom the business owes money such as vendors and employee.

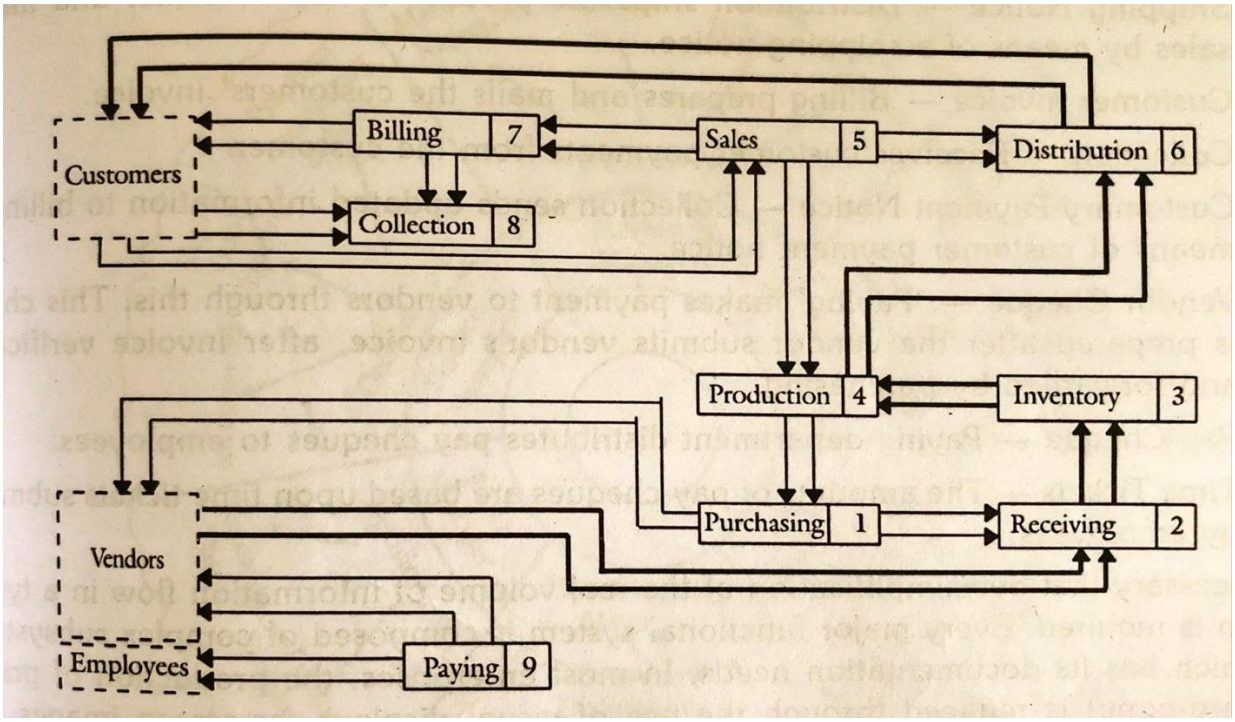
- Each of the above function system produce one or more output in the form of product and document. There outputs are an indication of the relationship of each system to other system and to a business as a whole.
- Since the systems are assigning their own necessary resources they are relatively in dependent elements of the resources.

A system is a combination of the resources working together to convert input into output.
A system produces outputs. A business integrates the outputs of its components system to accomplish objectives and to achieve goals.

3.1.2. Product flow and Information Flow

Product flow is the flow of raw materials into components, components into sub- assemblies, then into assemblies and finally into finished goods. Information flow consists of creation and movement of the administrative and operational documentation necessary for product flow. The latter is more difficult to visualize, because its physical manifestation is a vast network of data carriers, forms, or electronic communications. Yet it is this network that the analyst must understand. Although their actions must be governed by the physical reality of the goods that the company is producing, system analysts deal primarily with the creation and management of documentation. Hence, it is necessary that the information flows be known in those segments of business for which the analyst has assigned responsibilities.

To distinguish information flow from product flow, the figure of nine principal systems is redrawn as shown in figure below. **The heavy flow** lines trace the product flow path. The **lighter lines** indicate paths by which information flows among the nine major functional business systems.



3.1.3. Principal Document Associated with Information Flow

The principal documents associated with the information flow are:
(1) Purchase Order — Prepared by purchasing — original sent to the vendor, retains a copy, second copy to receiving.

(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 through a receiving report.

(3) Inventory Transfer — Also by receiving departments Transfers the inventory accompanied by an inventory transfer.

(4) Purchase Requisition — By inventory departments — request purchasing to order those materials not on hand and of insufficient quantity.

(5) Production Documents — Designs and develops the product. The components that are in-house built are combined with the components or sub-assemblies that are procured from outside sources.
(6) Material Requisition — By production department. Material requisition is to request needed materials from inventory. Inventory notifies the

availability of the requisitioned materials by retaining a copy of the requisitioned material requirement.

(7) Sales Order — Sales contact the customers, sells the product, prepare the sales order. A copy of the sales order. (sales notice) is sent to billing and to production.
An additional copy (the shipping order) is sent to distribution.

(8) Warehouse Transfer Notice — By distribution. It receives the finished goods from the production accompanied by warehouse transfer notice.

(9) Shipping Notice — Distribution ships the product to the customer and informs sales by means of a shipping notice.

(10) Customer Invoice — Billing prepares and mails the customers' invoice.

(11) Collection — Receives customer payments from the customer.

(12) Customary Payment Notice — Collection sends updated information to bill, by means of customer payment notice.

(13) Vendor Cheque — 'Paying' makes payment to vendors through this. This cheque is prepared after the vendor submits vendor's invoice, after invoice verification and forwarded by purchasing.

(14) Pay Cheque — Paying department distributes pay cheques to employees.

(15) Time Tickets — The amounts of pay-cheques are based upon time tickets submitted by employees.

It is necessary that oversimplification of the real volume of information flow in a typical corporation is required. Every major functional system is composed of complex subsystems each of which has its documentation needs. In most enterprises, the production of printed reports (hard copy) is reduced using visual displays, or screen images (soft copy).

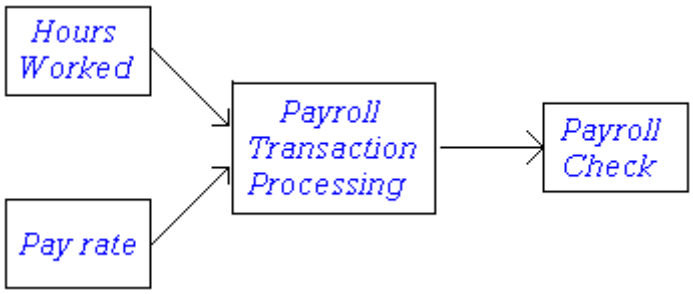
It may be noted just as in product enterprises, service enterprises also have information flow, and it exists in different reporting levels within the organization.

Transaction Processing System: -

- A transaction is any business-related exchange such as payments to employees, sales to customers and payments to suppliers.

- Thus, processing business transaction was the first application of computer for most organization.

- A transaction processing system is an organized collection of people, procedures, software, database and devices used to record completed business transaction.



- The primary inputs for a payroll transaction processing system are the numbers of employee hours worked during the week and pay rate.The primary output consists of **pay checks.**

- Early payroll systems were able to produce employee pay checks along with important employee related reports.
- In improved forms, these systems are still very important to most modern organization.

Workflow System: -

- A workflow system is **ruled based management software** that directs, coordinates and monitors execution of an interrelated set of task arranged to form a business process.
- The primary purpose of workflow system is to provide employees with tracking, rooting, document imaging and other capabilities designed to improve business process.
- Transactional workflow system holds the assure of improving the productivity & dependability of business processes.
- The system streamlines the reimbursement process by simplifying expense entries & automating the approval process.

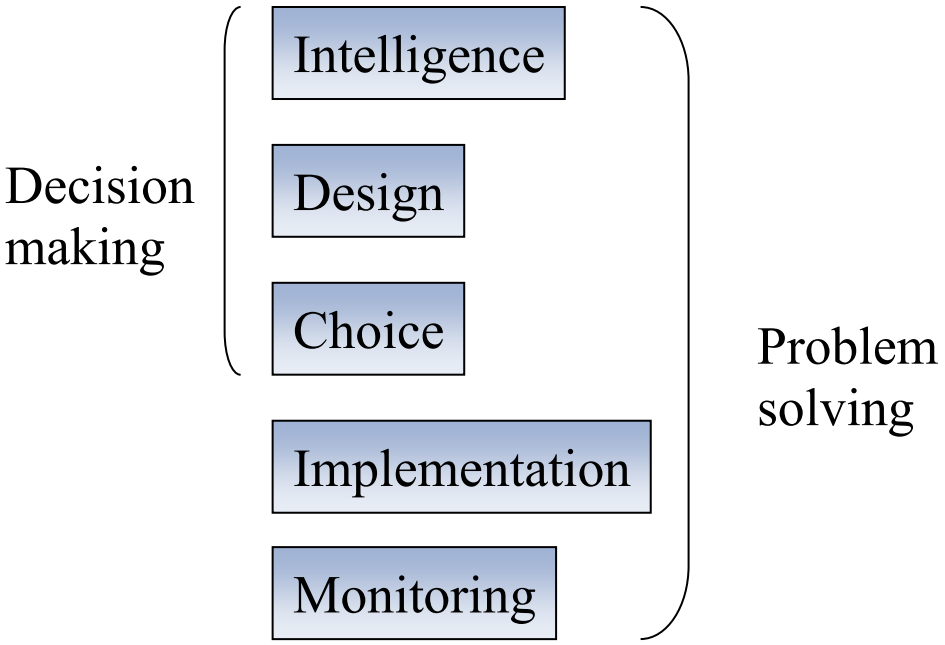
3.2 Enterprise Resource Planning [ERP]

- An enterprise resource planning system is a set of integrated programs capable of managing a company's vital business operations for an entire multi side, global organization.
- The scope of an enterprise resource planning system may vary from company to company; most enterprise resource planning system provides **integrated software to support the manufacturing and finance business function of an organization**.
- The enterprise resource planning system checks what is already avail in finished product inventory to meet the projected demand.
- The enterprise resource planning system checks the raw material & packing material inventory & determines what needs to be ordered to meet the planned production schedule.
- The primary benefits of implementing an enterprise resource planning system include adopting & improved work processes & improving access to timely data for operational decision making.

❖ Decision making and problem solving [Herbert Simon model]:

- Every organization needs effective decision making.
- In most cases, strategic planning and the overall goals of the organization set the course for decision making, helping employees and business units achieve their objectives and goals.
- Often, information systems also assist with problem solving, helping people make better decisions and save lives.
- Decision making as a Component of Problem Solving In business, one of the highest compliments you can receive is to be recognized by your colleagues and peers as a **"real problem solver."**
- Problem solving is a critical activity for any business organization. After identifying a problem, the process of solving the problem begins with decision making.

A well-known model developed by **Herbert Simon** divides the decision-making phase of the problem-solving process into three stages: **intelligence, design, and choice**. This model was later incorporated by George Huber into an expanded model of



(1) ***Intelligence stage:*** During this stage potential problem or opportunities are identified and defined. Information is gathered that relates to the cause and scope of the problem. During the intelligence stage, resource and environmental constraints are investigated.

(2) ***Design stage:*** Alternate solutions to the problem are developed. In addition, the feasibility of these alternatives is evaluated.

(3) ***Choice stage:*** Selecting a course of action (i.e. choose best alternative from the possible solutions).

(4) ***Implementation stage:*** The solution is put into effect.

(5) ***Monitoring stage:*** In this stage, a decision-maker evaluates the implementation to determine whether the anticipated results were achieved and to modify the process in light of new information. Monitoring can involve feedback and adjustment.

For Example:

Consider a problem of shipping apple from a farm in J&K to stores Surat would be done during the **intelligence stage**. The perishability (destruction) of the fruit and the maximum price consumers in surat are willing to pay for the fruit are problem constrains. Aspects of the problem environment that must be considered in this case include federal and state regulations regarding the shipment of food products.

In design stage, the alternative methods of shipment, including the transportation times and costs associated with each, would be considered. During this stage the problem solver might determine that shipment by cargo

to Baroda and then by truck to surat is not feasible because the fruit would spoil.

In choice stage, the J&K farm might select the method of shipping by air to surat as its solution.

In implementation stage, if the J&K farmer's decision is to ship the fruit to surat as air freight using a specific air freight company, implementation involves informing the farming staff of the new activity, getting the fruit to the airport, and actually shipping the product to surat.
In monitoring stage, after the first shipment of fruit, the J&K farmer might learn that the flight firm routinely makes a stopover in delhi, Mumbai, where the plane sites exposed on the runaway for a number of hours while loading additional cargo.

If this unforeseen fluctuation in temperature and humidity adversely affect the fruit, the farmer might have to readjust his solution to include a new air-freight firm that does not make such a stopover, or perhaps he would consider a change in fruit packaging.

Programmed versus Nonprogrammed Decisions

- In the choice stage, various factors influence the decision maker's selection of a solution.

- One such factor is whether the **decision can be programmed**.

- Programmed decisions are made using a **rule, procedure, or quantitative method. In other words, they are structured problems**.

- For example, to say that inventory should be ordered when inventory levels drop to 100 units is a programmed decision because it adheres to a rule.

- Programmed decisions are easy to computerize using traditional information systems. For example, you can easily program a computer to order more inventories when levels for a certain item reach 100 units or less.

Most of the processes automated through enterprise resource planning or transaction processing systems share this characteristic:

Non-programmed decisions

- Deal with **unusual or exceptional situations**. In many cases, these decisions are **difficult to quantify**.

- Determining the appropriate training program for a new employee, deciding whether to develop a new type of product line, and weighing the benefits and drawbacks of installing an upgraded **pollution control system** are examples. Each of these decisions contains unique characteristics, and standard rules or procedures might not apply to them.

- Today, decision support systems help solve many nonprogrammed decisions, in which the problem is not routine and rules and relationships are not well defined (**unstructured or ill-structured problems).**

3.3 Management Information System [MIS]: -

- A management information system (MIS) is an integrated collection of people, procedures, databases, and devices that provides managers and decision makers with information to help achieve organizational goals.

- MISs can often give companies and other organizations a competitive advantage by providing the **right information to the right people in the right format and at the right time**.

For example,

- A shipping department could develop a spreadsheet to generate a report on possible delays that must be addressed to increase the number of on time deliveries for the day.

- A music store might use a database system to develop a report that summarizes profits and losses for the month to make sure that the store is on track to make a 10 percent profit for the year.

- The focus of a management information system is primarily on operational efficiency.

- Marketing, production, finance and other functional areas are supported by management information system and linked through a common database.

- Management information systems are characterized by the use of information system to produce **managerial reports**.

- In most cases these reports periodically daily, weekly, monthly or yearly. They were called **scheduled reports**.

3.2.1 Characteristics of MIS

The basic characteristics of the MIS are as follows:

(1) It provides reports with fixed and standard formats.

Reports which are generated in the fixed and standard format are used by different managers or persons for different purposes.

For example: Inventory reports with the same information may be used by different managers of different departments for different purposes.

(2) It produces hard-copy and soft-copy reports.

MIS always provides the reports in both the formats Hard-copy as well as Soft-copy. The information which appears in both types of reports are same where the only difference is that soft-copy is being displayed on the computer screen. Though this advantage the hard-copy is more preferred in companies.

(3) It uses internal data stored in the computer system.

The MIS reports are normally generated from internal data of the computerized databases. Some MISs use external sources of data i.e. market positions, competitors information etc. Internet is used widely as such type of external sources for MIS reports.

(4) It allows the end users to develop their own custom reports.

Basically when any system is designed and developed by analyst or programmers they provide some complex MIS reports which may be useful for the end users. End users of the MIS are able to program some reports from the databases which may be stored on the system by performing some queries on the databases. It results in more total expended time and additional storage requirements comparing to the original MIS programmed by analyst for all users.

(5) It requires user requests for reports developed by systems personnel.

User interaction is highly required at the time of system development. System analyst generally communicates with the end users at time of development for knowing the exact needs of information from the system. So that system personnel can generate the reports accordingly.

3.2.2 Development Process of MIS

➢ Inputs of The Management Information System:

- Data that enters a management information system originates from both internal & external sources.

- The most significant internal source of data for the management information system is the organizations various transaction processing systems.

- One of the major activities of the transaction processing system is to capture & store the data resulting from on going business transaction.

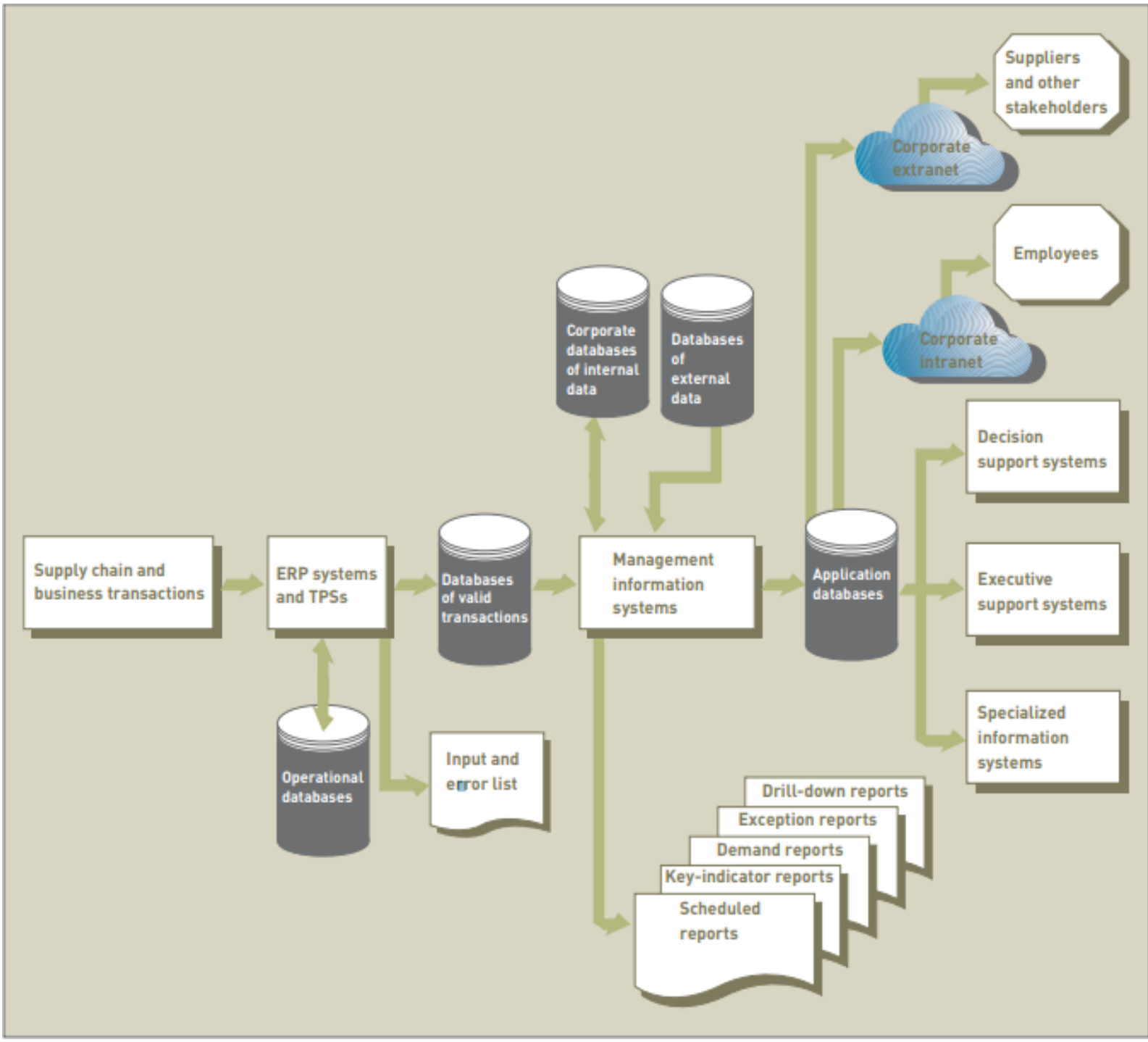
- With every business transactions, various transactions processing systems application make changes to & update the organization database.

- E.g. billing application, these updated databases are primary internal sources of data or the management information system.

- Other internal data comes from specific functional areas throughout the firm.

- External sources of data can include customers, suppliers, competitors and stockholders whose data is not already captured by the transaction processing system, as well as other sources such as an internet.

- The management information system uses the data obtained from these sources and processes it into information more usable to managers, primarily in the form of predetermined reports.


Suppliers and other stakeholders
Corporate extranet
Employees
Corporate intranet
Corporate databases of internal data
Databases of external data
Decision support systems
Executive support systems
Specialized information systems
Supply chain and business transactions
ERP systems and TPSs
Databases of valid transactions
Management information systems
Application databases
Operational databases
Input and error list
Drill-down reports
Exception reports
Demand reports
Key-indicator reports
Scheduled reports

➢ Outputs of The Management Information System:

The output of most management information system is a collection of reports that are distributed to managers.

1. Schedule Reports:

These reports are produced **periodically, or on a schedule, such as daily, weekly, or monthly**.

E.g. a production manager could use a weekly summary report that lists total payroll costs to monitor and control labor and job costs.

A manufacturing report produced once a day to monitor the production of a new product is another example of scheduled reports.

Other schedule can help managers control customer credit the performance of sales representatives inventory levels and more.

Daily Sales Detail Report Prepared: 08/10/xx						
Order #	Customer ID	Sales Rep ID	Ship Date	Quantity	Item #	Amount
P12453	C89321	CAR	08/12/96	144	P1234	$3,214
P12453	C89321	CAR	08/12/96	288	P3214	$5,660
P12453	C03214	GWA	08/13/96	12	P4902	$1,224
P12455	C52313	SAK	08/12/96	24	P4012	$2,448
P12456	C34123	JMW	08J/13/96	144	P3214	$720

2. Key Indicator Reports:

It summarizes the previous **day's critical activities** and is typically available at the beginning of each workday. These reports can summarize inventory levels, production activity, sales volume and the like.

Key indicator reports are used by managers & executives to **take quick corrective action** on significant aspects of the business.

Daily Sales Key Indicator Report			
	This Month	Last Month	Last Year
Total Orders Month to Date	$1,808	$1,694	$1,014
Forecasted Sales for the Month	$2,406	$2,224	$2,608

3. Demand Reports:

These are developed to give certain information of the **manager's request**. In other words, these reports are produced on demand.

E.g. an executive may want to know the production of a particular item; a demand report can be generated to give the requested information. Other example of demand reports include reports requested by executives to show the hours worked by particular employee total sales to date for a product and so on.

Daily Sales Key Indicator Report			
	This Month	Last Month	Last Year
Total Orders Month to Date	$1,808	$1,694	$1,014
Forecasted Sales for the Month	$2,406	$2,224	$2,608

4. Exception Reports:

These are the reports **that are automatically produced when a situation is unusual or requires management action**.

E.g. a manager might set a parameter that generates a report of all inventory items with fewer than the equivalent of five days of sales on hand.

This unusual situation requires prompt action to avoid running out of stock on the item. The exception report generated by this parameter would contain only items with fewer than five days of sales in inventory. As with key indicator reports, exception reports are most often used to monitor aspects

important to an organization success. In general, when an exception report is produced a manager or executive takes an action.

Daily Sales Exception Report – ORDERS OVER $10,000 Prepared: 08/10/xx						
Order #	Customer ID	Sales Rep ID	ShipDate	Quantity	Item #	Amount
P12453	C89321	CAR	08/12/96	144	P1234	$13,214
P12453	C89321	CAR	08/12/96	288	P3214	$15,660
P12453	C03214	GWA	08/13/96	12	P4902	$11,224
…	…	…	…	…	…	…
…	…	…	…	…	…	…

5. Drill Down Reports:

Drill down reports provides increasingly detailed data about a situation. Though the use of drill down reports, analysis can see data at **a high level first** (sales of entire company), then at a more **detailed level**(product sold by one salesman) and then at a very detailed level.

Earnings by Quarter (Millions)			
	Actual	**Forecast**	**Variance**
2ND Qtr 1999	**$12.6**	**$11.8**	**6.8%**
1st Qtr 1999	**$10.8**	**$10.7**	**0.9%**
4th Qtr 1998	**$14.3**	**$14.5**	**-1.4%**
3rd Qtr 1998	**$12.8**	**$13.3**	**-3.0%**

Functional aspect of the Management Information System:

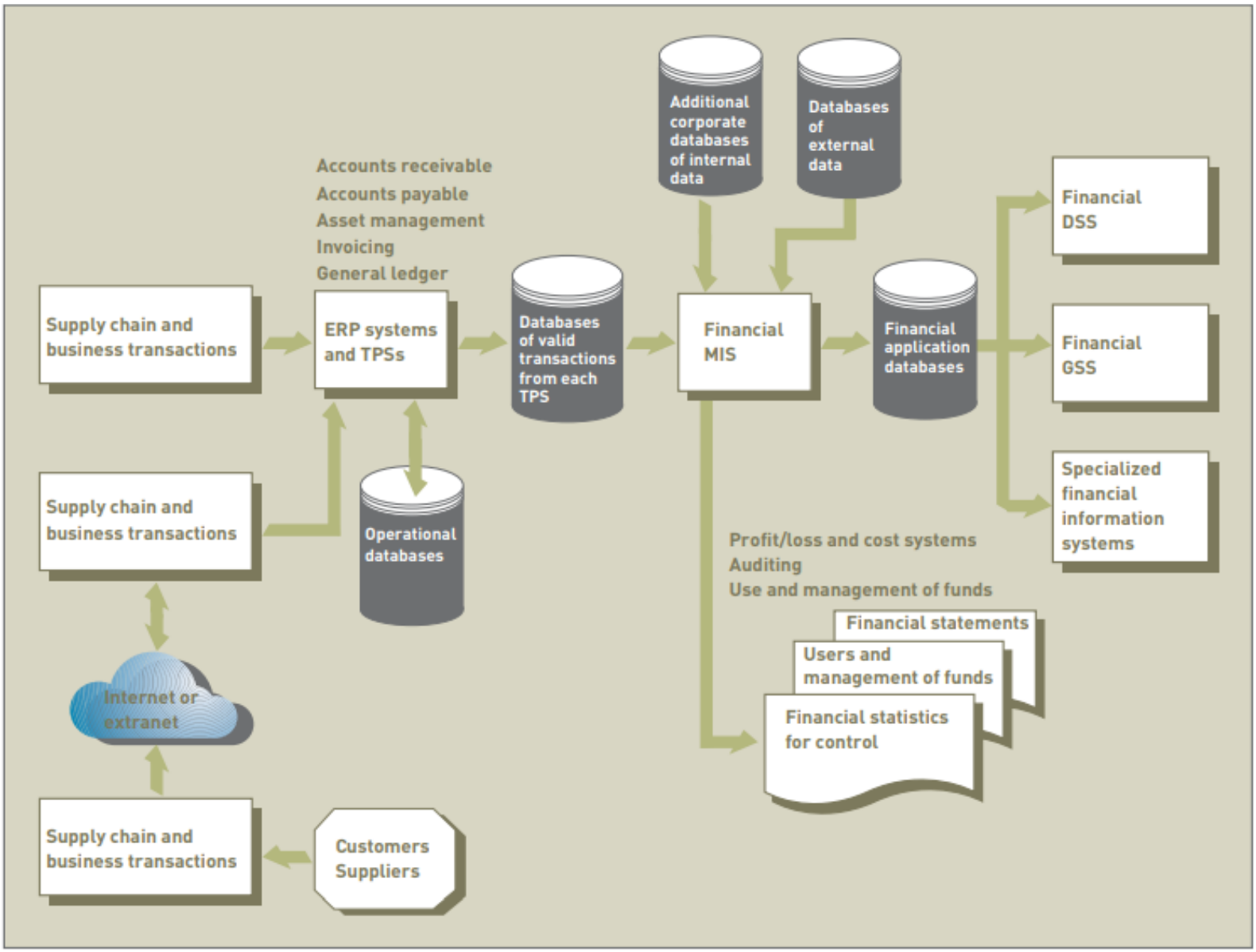
❖ Financial Management Information System:

Financial MIS provides financial information not only for executives but also for a broader set of people who need to make better decisions on a daily basis. Financial MISs is often used to streamline reports of transactions.

The financial MIS performs following functions.

- **Integrates financial and operational information** from multiple sources, including the internet, into a single management information system.
- **Provide easy access to data** for **both** financial and non financial users, often through use of the corporate internet to access corporate web pages of financial data and information.
- Makes **financial data available on a timely basis** to shorten analysis turnaround time.
- **Enable analysis of financial data along multiple dimensions** such ad time, geography, product, plant and customer.
- Analysis historical and current financial activity.
- Monitors and controls the use of funds over time.

Figure shows typical inputs, function-specific subsystems, and outputs of a financial MIS, including profit and loss, auditing, and uses and management of funds. Some of the financial MIS subsystems and outputs are outlined below.



Following are the sub systems and outputs of financial MIS:

- **Profit/loss and cost systems**.

Many departments within an organization are **profit centers**, which mean that they focus on generating profits. An investment division of a large insurance or credit card company is an example of a profit center.

Other departments can be **revenue centers**, which are divisions within the company that focus primarily on sales or revenues, such as a marketing or sales department.

Still other departments can be **cost centers**, which are divisions within a company that do not directly generate revenue, such as manufacturing or research and development.

In most cases, information systems are used to compute revenues, costs, and profits..

- **Auditing:**

Auditing involves analyzing the financial condition of an organization and determining whether financial statements and reports produced by the financial management information system are accurate. Auditing can reveal potential fraud such as credit card fraud. It can also reveal false or misleading information.

1) Internal Auditing:

It is performed by individual within the organizations. E.g. financial department of a corporation may use a team of employees to perform an audit. It is conduct to see how well the organization is doing in terms of meeting established company goals and objectives.

2) External Auditing:

It is performed by an outside group like an accounting or consulting firms. The purpose of an external audit is to provide an unbiased picture of the financial condition of an organization.

- **Uses and management of funds in Financial MIS**

1) Internal uses

Internal use of funds include purchasing additional products, updating plants and equipment, hiring new employees, acquiring other companies, buying new computer systems, increasing marketing and advertising, purchasing raw materials or land, investing in new products, and increasing research and development.

2) External uses

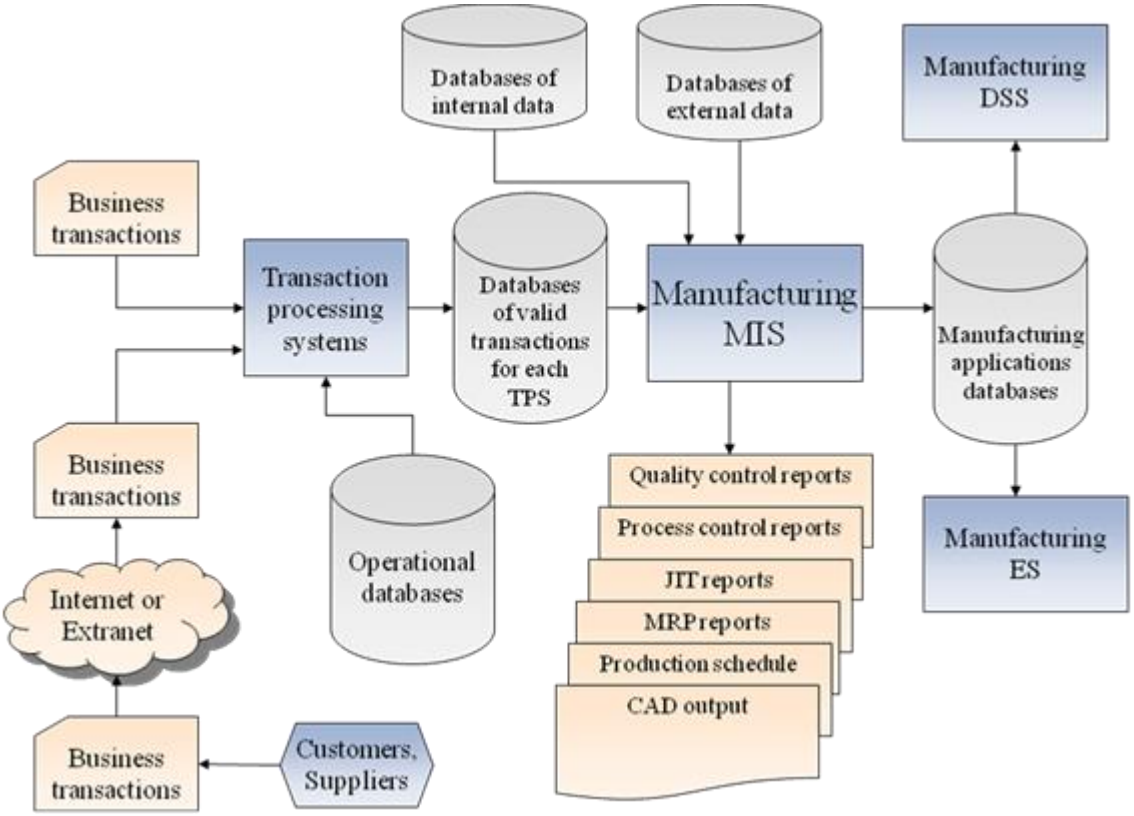
External Use of funds is typically **investment** related. Companies often invest excess funds in such external revenue generators as bank accounts, stocks, bonds, bills, notes, futures, options, and foreign currency using financial MISs.

Manufacturing Management Information System: -

- The objective of manufacturing management information system is to produce products that **meet <u>customer needs</u>** from the raw materials provided by suppliers to finished goods & services delivered to customers at the lowest possible cost.

- The activities of the manufacturing management information system and subsystems support **value added business processes (eg. After sales support, collecting feedback etc . . .)**.

- As raw materials are converted to finished goods, the manufacturing management information system **monitors** the process at almost every stage.



Following are the subsystems and outputs used in Manufacturing MIS:

➢ Design & Engineering:

- During the early stages of product development engineering departments are involved in many aspects of design.

- **The size & shape of parts, the way electrical components are attached** to equipment, the placement of control on a product.

- **Computer Assisted Design (CAD**) is the design software which helps salesmen selects the right colors, styles and configurations.

- In some cases **Computer Assisted Design** (CAD is inexpensive and very effective in developing attractive & functional offices.

- CAD can be used to determine how a product will respond to various conditions.

Master Production Scheduling:

- The overall objective of master production scheduling is to provide **detailed plans** for both short term and long range scheduling of **manufacturing facilities.**

- Master production scheduling software packages can include forecasting techniques that attempt to determine **current and future demand for products and services.**

- Master production scheduling package can determine the **best way to engage the manufacturing facility** and all its related equipment.

- Most programs also perform sensitivity analysis which allows a manager to determine **how the production schedule would change with different assumptions concerning demand forecasts or cost figures.**

- Inventory control, labor force planning, product delivery and maintenance programs depend on information generated from the master production schedule.

Inventory Control:

- An important key to the manufacturing process is inventory control.

- Inventory control program and software packages allows:

  - **Automatic reordering of products,**
  - **Forecasting, generation of shop documents and reports,**
  - **Determination of manufacturing costs,**
  - **Analysis of budgeted costs versus actual cost,**
  - **The development of master manufacturing schedulers resources requirements and plans**.

- One method of determining how much inventory to order is called the **Economic Order Quantity (EOQ).** This quantity is determined in such a way as to minimize the total inventory cost.

- The **"When to Order?"** is based on usage over a time which is called **Reorder Point (ROP)** which is a critical inventory quantity level.

- Some inventory items are dependent on one another. This technique is called **Material Requirement Planning (MRP).**

- The basic goal of MRP is to determining when finished products are needed, then to work backward in determining deadlines & resources needed to **complete the final product on schedule**.

➢ Just-in-time Inventory and Manufacturing:

- High inventory levels on the factory floor means higher cost, the possibility of damage & an effective manufacturing process.

- Thus, one objective of a manufacturing management information system is to control inventory to the lowest levels.

- One way to do this is to adopt **the JIT approach.**

- With this approach inventory and materials are delivered just before they are used in a product.

- Although JIT has many advantages, it also renders firms more vulnerable to process disruption.

- The JIT manufacturing approach requires **better coordination and cooperation between suppliers & manufacturing companies, substantially reducing inventory costs.**

➢ Process Control:

- Managers can use number of technologies to control & streamline the manufacturing process.

- E.g. the computer can be used to directly control manufacturing equipment using systems called **Computer Assisted Manufacturing (CAM).**

- **CAM systems** have the ability to control drilling machines, assembly lines, & more.

- Some of them operate quietly are easy to program have self diagnostic routines to test for difficulties with the computer system or the manufacturing equipments.

- **Computer integrated manufacturing** involves the use of computer to link the components of the production process into an effective system.

- **CIM's** goal is to be tie together all aspects of production including order processing product design, manufacturing, inspection & quality control & shipping.

- CIM system also increases efficiency by coordinating the action of various production units.

- A **Flexible Manufacturing** (FMS) is an approach that allows manufacturing facilities to rapidly & efficiently change from making one product to making another.

- *In the middle of a production run* e.g. changes can be made to the production process to make a different product or change manufacturing material.
- By using an FMS, the time and cost to change manufacturing jobs can be substantially reduced and companies can react quickly to market needs competition.
- FMS is normally implemented using computer system, robotics and other automated manufacturing equipment's.

➢ Quality Control & Testing:

➢ The manufacturing organizations are placing more importance on quality control, **a process that ensures that the finished product meets the customer's needs.**

➢ For continues process, control charts are used to measure weight, volume temperature or similar attributes.

➢ When the manufacturing operation is not continuous, sampling plans can be developed that allow the producer or consumer to accept or reject one or more products.

➢ Whether the manufacturing operation is continuous or discrete, the results from quality control are analyzed closely to identify opportunities for improvements.

- Information generated from quality control program can also be used to design better products.

Marketing Management Information System:

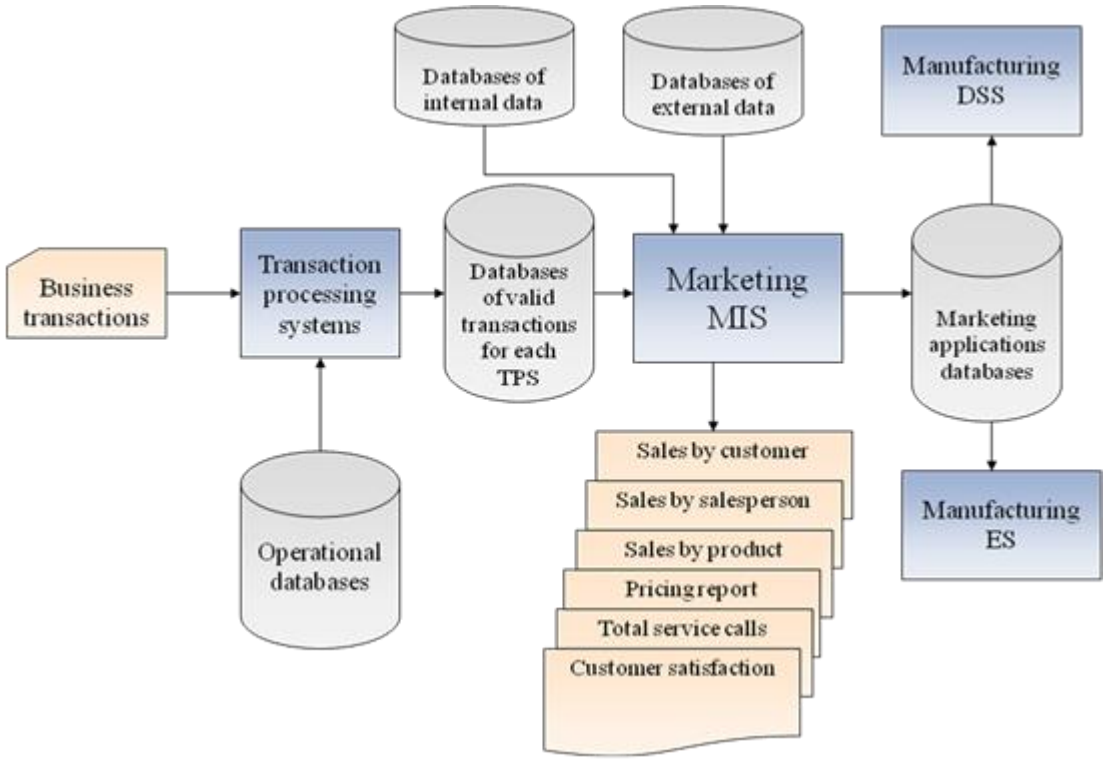
- A marketing management information system supports managerial activities in
  - **product development distribution,**
  - **pricing decision,**
  - **promotional effectiveness &**
  - **Sales forecasting**.

- Marketing functions are increasingly performed on the internet.

- Subsystems for the marketing management information system include
  - **marketing research product development,**
  - **promotion & advertising & product pricing**.

- These subsystems & their output help marketing managers & executives to
  - **increase sales, reduce marketing expenses &**
  - **develop plans for future products & services**

  and to meet the changing needs of customers.



Following are the subsystems and outputs for Marketing MIS:

- **Marketing Research:**

- **Surveys, questionnaires, pilot's studies & interviews are popular marketing research tools**.

- The purpose of marketing research is to conduct a formal study of the market & customer preferences.

- Marketing research can identify prospects as well as the features that current customers really want in a goods or services.

- Once entered into the marketing management information system, data collected from marketing research projects is manipulated to generate reports on key indicators like **customer satisfaction and total service calls**.
- Reports generated by marketing management information system help manager be better informed to help the organization meet its performance goals.

- **Product Development:**

- This involves the conversion **of raw materials into finished goods & services** & focuses primarily on the physical attributes of the product.

- Many factors, including plant capacity, labor skills, engineering factors and materials are important in product development decisions.

- In many cases **computer program is used to analyze these various factors & to select the appro**priate mix of labor, materials, plant & equipment and engineering designs.

- **Promotion & Advertising:**

- One of the most important functions of any marketing effort is promotion & advertising.

- Product success is a direct function of the type of advertising and sales promotion done.

- The size of promotion budget & the allocation of this budget to the various promotional campaigns are important factors in deciding on the type of campaign that will be launched.

- **Product Pricing:**

- Product pricing is another important & complex marketing function. **Retail price, wholesale price and price discounts** must be determined.
- A major factor in determining pricing policy is analysis of **the demand curve** which attempts to determine the relationship between **price and sales**.
- Computer program can help determine price elasticity and various pricing policies, such as **supply and demand curves** for pricing analysis.
- Sales analysis is also important to identify products, sales personnel & customers that contribute to **profit and loss that do no**t. Several reports can be generated to help marketing managers' make **good sales decision.**
- These reports show which products are doing well & which ones need improvement or should be discarded altogether.

Human Resource Management Information System:

- The human resource management information system is also known as *personnel management information system*, is concerned with activities related to **employees and potential employees of the organizations**.

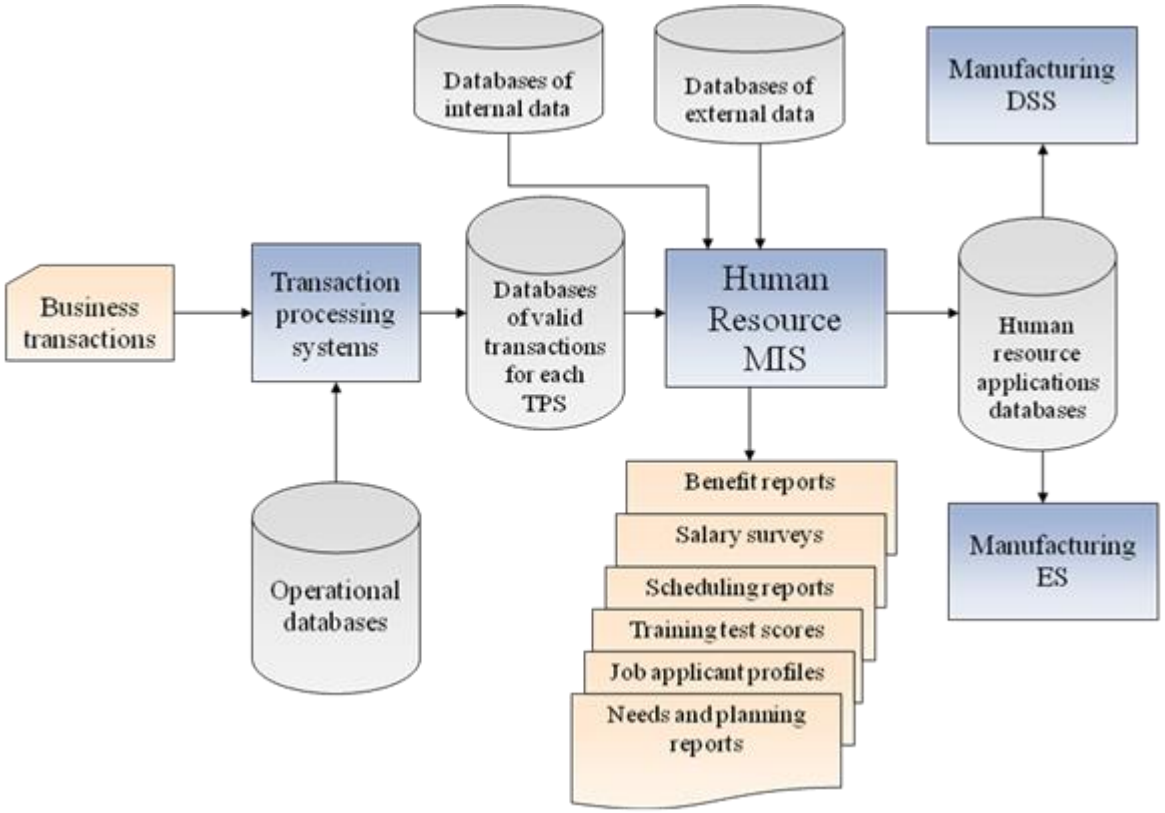
- Because the personnel function relates to all other functional areas in the business, the human resource management information system plays a valuable role in ensuring **organizational success**.

- Some activities performed by this management information system are **work-force analysis and planning; hiring; & training; job & task assignment** etc.

- Human resource subsystems & output range from the determination of human resource needs & hiring through **retirement** & **out placement**.

- Most medium sized and large organization has computer system to assist with
    - human resource planning;
    - hiring;
    - training & skills inventory and
    - Wages & salary administration.

- Outputs of the human resource management information system include reports such as
    - human resource planning reports,
    - job application review profiles,
    - skill inventory reports and
    - salary surveys.



➢ Human Resource Planning:

- One of the first aspects of any human resource management information system is ***determining personnel needs*.**
- The overall purpose of this management information system subsystem is to put the right number & kinds of employees in the right jobs when they are needed.
- Effective human resource planning requires defining the future number of employees needed & anticipating information future supply of people for these jobs.

➢ Personnel Selection & Recruiting:

- If the human resource plans reveals that additional personnel are required, the next logical step is recruiting & selection o personnel.
- This subsystem performs one of the most important & critical functions of any organization especially in service organizations where employees can define the **company's success.**
- Management information systems can be used to help
  - **Rank & select potential employees for every applicant,**

- **The results of interviews, tests and company visits can be analyzed by the system & printed.**

➢ This report called ***a job applicant review profile***, can assists corporate recruiting teams in find selections.

➢ Training & Skills Inventory:

➢ Some jobs, such as programming, equipment repair & tax preparation, require very specific training.

➢ Other jobs may require general training about the organizational, culture, orientation, dress standards & expectation of the organization.

➢ Today, many organizations conduct their own training with the assistance of information system & technology.

➢ Self paced training can involve computerized tutorials, video programs & CD-ROM books & materials.

➢ This text and supporting material for example can be used in a distance learning environment.

➢ When training is complete, employee may be required to take computer scored tests to reveal their mastery of skills & new material.

➢ The results are given to the employee supervisor or boss in the form of skill inventory reports.

➢ In some cases skill inventory reports are used for job placement.

➢ The skill inventory report would help them evaluate current employees to determine their potential for the position.

➢ Scheduling & Job Placement:

➢ Scheduling people & jobs can be relatively straightforward or extremely complex.

➢ For some service companies, scheduling & job placement are based on which customer walk through the door.

➢ Determining the best schedule for flights & airline pilots, the placement of military recruits to jobs and the truck delivers and equipments that should be used to transport materials across the country require good computer program.

- Employee schedules are developed for each employee showing their job assignments over the next week or month.

- Job placements are often determined based on skill inventory reports, which show which employee might be nest suited to particular task or job.

- **Wage & Salary Administration:**

- The last of the major human resource management information system subsystem involves determining wages, salaries & benefits including medical payments, saving plans etc...

- Retirement accounts, huge data such as industry averages for positions can be taken from the corporate database & manipulated by human resource management information system to provide wage information & reports to higher levels of management.

- These reports are called **salary surveys** can be used to compare salaries with budget plans, the cost of salaries versus sales & the wages required for any one department or office.

- The report help show backup of key positions in the company wage & salary administrator also entails designing retirement program for employee.

Other Management Information System:

In addition to finance, manufacturing, marketing and human resource management information system some companies have other functional management information system.

1. Accounting Management Information System:

- An accounting management information system performs a number of important activities, providing aggregate information on accounts, accounts receivable, payrolls & many other applications.
- The organization's transaction processing system captures accounting data which is also used by most other functional information system.
- Some smaller companies hire outside accounting firms to assist them with their accounting functions.
- These outside companies' produces reports for firm using raw accounting data.
- Depending on the needs of the small organization & its personnel's computer experience, using these **computerized accounting systems** can be very cost effective approach to managing information.

2. Geographic Information System (GIS):

- A geographic information system (GIS) is a computer system capable of assembling, storing, manipulating & displaying geographically referenced information that is data identified according to their location.
- A GIS enables users to pair predawn maps or map outlines with tabular data to describe aspects of a particular geographic region.
- For example sales managers may want to plot total sales for each country in the states they serve.
- Using GIS, they can specify that each county be drawn with a degree of shading that indicates the relative amount of sales.

3.4 Decision Support System [DSS]

A DSS is an organized collection of people, procedures, software, databases, and devices used to help make decisions that solve problems.

The focus of a DSS is on decision-making effectiveness when faced with **unstructured** or **semi structured** business problems.

As with a TPS and an MIS, a DSS should be designed, developed, and used to help an organization achieve its goals and objectives.

Decision support systems offer the potential to generate higher profits, lower costs, and better products and services.

For example, healthcare organizations use DSSs to improve patient care and reduce costs.

➢ Characteristics of Decision Support System:

Decision support systems have a number of characteristics that allow them to effective management support tools.

1. **Handle Large Amount of Data From Different Sources:**

For instance, advanced database management system & **data warehouses** have allowed decision makers to search dbases for information when using a decision support system, even when some data sources reside in different dbases stored in different computer system or network.

2. **Provide Report & Presentation Flexibility:**

Managers can get the information they want, presented in a format that suits their needs. Furthermore output can be presented on computer screens or produced on printers, depending on the needs & desires of the problem solver.

3. **Offer Both Textual & Graphical Orientation:**

Today's decision support systems can producer text, tables, line drawings, pie chart & more. By using their preferred orientation, managers can use decision support system to get a better understanding of a true situation if require & to convey this understanding to other.

4. **Support Drill-Down Analysis:**

A manager can get more levels of detail when needed by drilling down through data. For example a manager can get more detailed information for a project if needed. Here he can view the overall project cost or drill-down & see the cost for each project phase, activity & task.

5. Perform Complex, Sophisticated analysis & Comparisons Using Advanced Software Packages:

Marketing research surveys for example can be analyzed in a verity of ways using analysis program that are part of decision support system. Many of the analytical programs associated with decision support system are actually stand alone program and the decision support system bringing them together.

6. Support Optimization Satisfying & Heuristic Approaches:

By supporting all types of decision making approaches, a decision support system gives the decision maker a great deal of activity in getting computer support for decision making activities. The process of making hypothetical changes to problem data & observing the impact on the results can be used to control inventory with **what-if analysis** a manager can make changes to problem data.

7. Simulation:

It is the ability of the decision support system to duplicate the feature of a real system. In most cases, probability or uncertainty is involved. For example the mean time between failure & the mean time to repair key components of a manufacturing line can be calculated to determine the impact on the number of products that can be produced each shift. Engineers use this data to determine which components need to be reengineered to increase the mean time between failures and which components need to have an ample supply of spare parts to reduce the mean time to repair.

8. Goal Seeking Analysis:

It is a process of determining the problem data require for a given result. For example a financial manager is considering an investment with a certain monthly net income. Furthermore the manager might have a goal to earn a return of 9% on the investment. Goal seeking allows the manager to determine what monthly net income is needed to have return of 9%.

- **Capabilities of Decision Support System:**

Developers of decision support system strive to make them more flexible than management information system & to give them the potential to assist decision makers in a variety of situation. Decision support system approaches can also help at all levels of the decision making process.

1. Support for Problem Solving Phases:

The objective of most decision support system is to assist decision makers with the phases of the problem solving process. As previously discussed these phases **include intelligence and monitoring.** A specific

decision support system might support only one or a few problem solving phases.

2. **Support for Different Decision Frequencies:**

Decision can range on continues from one of kind to repetitive decisions. One of kind decisions are typically handled by an **ad hoc decision** support system. An ad hoc decision support system is concerned with situations or decisions that come up **only a few times during the life of organization** for example a company might be faced with a decision on whether to build a new manufacturing facility in another area of the country.

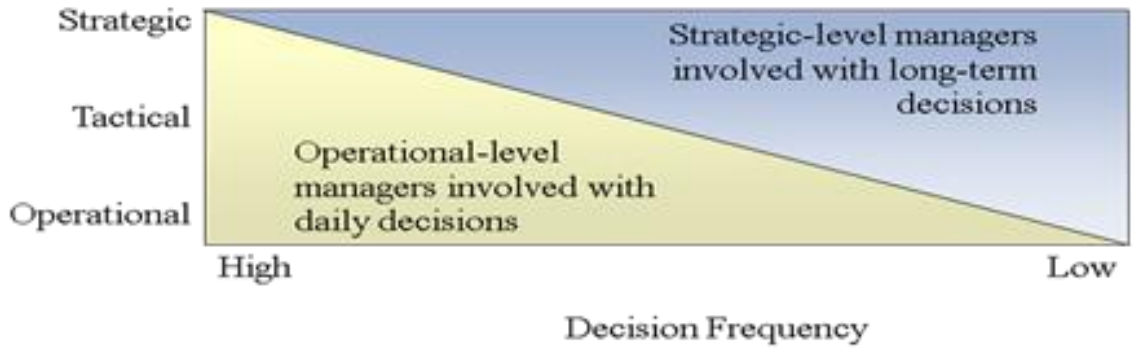
An institutional decision support system handles situations or decisions that occur more than ones, usually several times a year of more. An institutional decision support system is used repeatedly & refined over the years.

3. **Support for Different Problem Structures:**

As discussed previously decisions can range from highly structured & programmed to unstructured & non-programmed. Highly structured problems are straightforward requiring known facts & relationship semi-structured or unstructured problems on the other hand are move complex.

4. **Support for Various Decision Making levels:**

Decision support system can often help for managers at different levels when the organizational operational level managers can be assisted with daily and routine decision making. Tactical level decision makers can be supported with analyzer tools that assist in proper planning and control. At the strategic level decision support system can help managers by providing analysis for long-term decisions required by the internal and external information.



- **Comparison of Decision Support System & Management Information System:**

Decision support system differs from the management information system in numerous ways including the types of problems.

Factor	Decision support system	Management information system
Problem Types	A decision support system is good at handling unstructured problems that cannot be easily programmed.	The management information system is normally used only with more structured problems.
Users	A decision support system supports individual small groups and the entire organization. In the short run user typically have more control over a decision support system.	The management information system supports primarily the organization. In the short run users have less control over on management information system.
Support	A decision support system support 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 management information system some make automatic decision and replace the decision maker.
Emphasis	A decision support system emphasis actual decision and decision making styles.	The management information system usually emphasized information only.
Approach	A decision support system is direct support system that provides interactive support on the computer screen.	The management information system is typically an indirect support system that uses regularly produced reports.
Systems	A decision support system provides decisions support is usually on-line & related to real time.	The management information system using printed reports that maybe delivered to managers once a week no immediate results.
Speed	Decision support system is flexible & can be implemented by users to usually take time to develop & is better able to respond to user request.	The management information system response time is usually longer.
Output	Decision support system reports are usually screen	The management information system however typically is

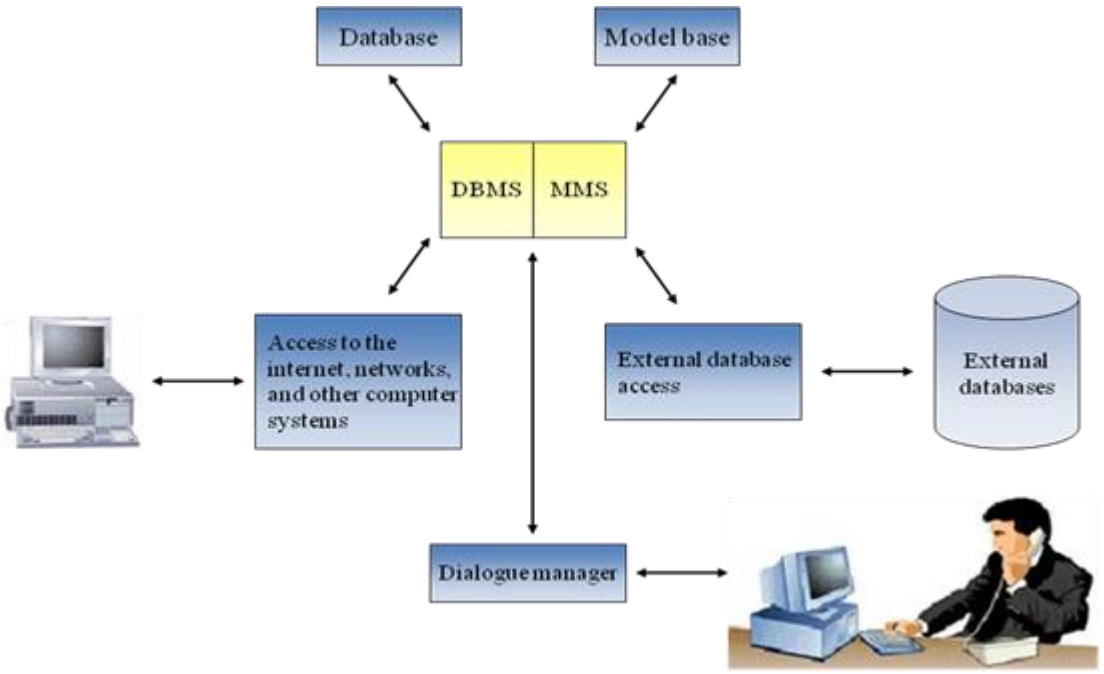
	oriented with the ability to print the reports with device.	oriented towards printed reports and documents.
Development	Users are usually more directly involves units' developments. User involvement usually means better system that provides superior supports.	The management information system is several years old and often writes a shell script that can develops for people who are no longer performing the work supported by the management information system.

➢ Components of Decision Support System:

At the core of a DSS are a **database** and a **model base**. In addition, a typical DSS contains a **user interface**, also called **dialogue manager** that allows decision makers to easily access and manipulate the DSS and to use common business terms and phrases.

Finally, access to the Internet, networks, and other computer-based systems permits the DSS to tie into other powerful systems, including the TPS or function-specific subsystems.

Internet software agents, for example, can be used in creating powerful decision support systems. Figure 10.16 shows a conceptual model of DSS



➢ The Database

The database management system allows managers and decision makers to perform **qualitative analysis** on the **company's vast stores of data in databases, data warehouses, and data marts.**

A **data-driven DSS** primarily performs qualitative analysis based on the company's databases. Data-driven DSSs tap into vast stores of information contained in the **corporate database, retrieving information on inventory, sales, personnel, production, finance, accounting, and other areas.**

A database management system can also connect to **external databases** to give managers and decision makers even more information and decision support.

External databases can include the **Internet, libraries, government databases, and more**. The combination of internal and external database access can give key decision makers a better **understanding of the company and its environment**

➢ The Model Base:

The purpose of the model base in a decision support system is to give decision makers access to **variety of model** and assist them in the decision making process. The model base can include **Model Management Software** (MMS) that coordinates the use of models in a decision support system including **financial statistical analysis graphical and project management model**.

1. **Financial Model:**

It provides cash flow, internal rate of return and other investment analysis spreadsheet programs such as excel is often used for this purpose. In addition more sophisticated financial planning and modeling programs can be employed. Some organization develops customized financial models to handle the unique situation and problems faced by the organization.

2. **Statistical Analysis Model:**

It can provide **summary statistics trend projections, hypothesis testing and more**. These programs are available on both personnel & mainframe system. Many software packages including **SPSS & SAS** provide outstanding statistical analysis for organization of all sizes. **These statistical problems can compute averages, standard deviation, correlation & coefficient and regression analysis; do hypotheses testing.** Some statistical programs also have the ability to produce graphic displays that reveal the relationship between variables or quantities.

3. **Graphical Model:**

These are software packages that assist decision makers' decision making in designing, developing & using graphic displays of data & information PC programs that can perform this type of analysis.

4. **Project Management Model:**

These are used to handle and coordinate large project; they are also used to identify critical activities and tasks that could delay or risk an entire project if they are not completed in time & cost effectively. Some of these programs can also determine the best way to speed up a project by using additional resources, including cash, labor & equipment. This allows managers to keep tight control over projects of all size & types.

➢ The Dialogue Manager:

The dialogue manager allows users to interact with the decision support system to obtain information.

It assists with all aspects of communications between the user & the hardware and software that constitute the decision support system.

In a practical sense to most decision support system users the dialogue manager is the decision support system.

Upper-level decision makers are often less interested in where the information come from or how it write a shell script that can gathered than that the information is both understandable & accessible.

❖ Advantages and Disadvantages of Modeling

❖ Advantages

1. Less expensive than custom approaches or real systems.
2. Faster to construct than real systems
3. Less risky than real systems
4. Provides learning experience (trial and error)
5. Future projections are possible
6. Can test assumptions

❖ Disadvantages

1. Assumptions about reality may be incorrect
2. Accuracy of predications often unreliable
3. Requires abstract thinking

❖ Limitation of DSS:

It has several basic limitations

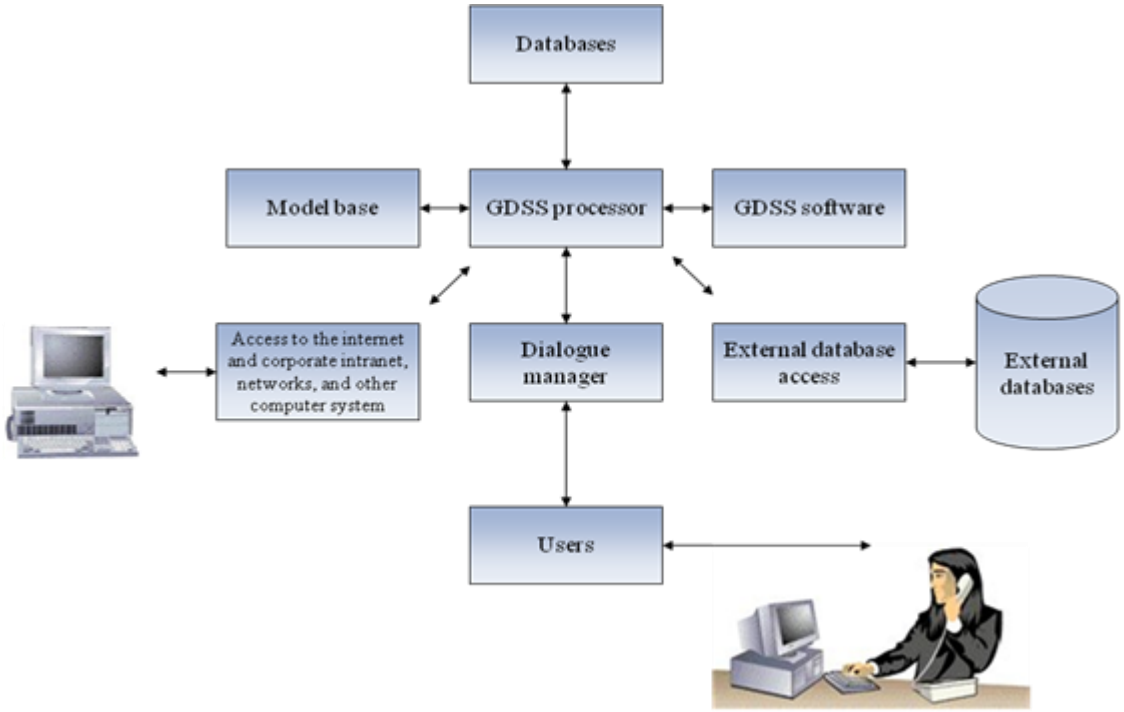
(i) Due to its small memories and limited storage capacities, DSS has definite computational constraints.

(ii) It is slow, compared to the speed of large mainframes.

(iii) Most DSSs are designed for individual use but they can be designed so that several computers can be linked for limited information sharing.

Group Decision Support System (GDSS):

- The decision support system approach has resulted in better decision making for all levels of individual users.
- However many decision support system approaches & techniques are not suitable for a group decision making environment.
- Although not all workers & managers are involved in committee meets and group decision making sessions. Some tactical and strategic level managers can spend time for group decision. This can be done by group decision support system.



➢ Characteristics of Group Decision Support System:

The following are the characteristics of the group decision support system.

➢ Special Design:

The group decision support system approach acknowledges that special procedure devices and approaches are needed in group decision making settings. These procedures must faster, creative thinking, effective communication and group decision making technique.

➢ Ease of Use:

Like an individual decision support system, a group decision support system must be easy to learn and use. Systems that are complex and hard to operate will seldom be used. Many groups have less tolerance that does individual decisions makers for poorly developed systems.

- **Flexibility:**

Two or more decision makers working on the **same problem** may have different decision making styles and preferences. Each managers makes decisions in a unique way, an effective group decision support system not only has to support the different approaches that managers perspectives into a common view of the task at hand.

- **Decision Making Support:**

A group decision support system can support different decision making approaches including the **Delphi approach** in which group decision makers are geographically dispersed throughout the country or the world. This approach encourages diversity among group members and fosters creativity and original thinking in decision making. **Brain storming**, in which members offer ideas "off the top of their heads," fosters creativity and free thinking".

The group consensus forces members in the group to reach common decisions. With **nominal group technique**, each decision maker can participate; this technique encourages feedback from individual group members , and the final decision is made by voting, similar to a system for electing public officials.

- **Anonymous Input:**

Many group decision support systems allow **anonymous input,** where the person giving the **input is not known to other group members**. For example some organizations use a group decision support system to help rank the performance of managers. Anonymous input allows the group decision makers to concentrate on the merits of the input without considering who gave it. In other words input given by a top-level manager is giving the same consider action as input from lower-level employees to other members of the group.

- **Reduction of Effective Group Behavior:**

One key Character of any group decision support system is the ability to suppress or eliminate group behavior that **is counter productive or harmful to effective decision making**. In some group settings dominant individuals can take over the discussion which can prevent other member of the group from presenting creative alternative.

- **Parallel Communications:**

With traditional group meeting people must take turns addressing various issues. **One person normally tasks at a time with group decision support system it's possible for every group member to address issue or make comments at the same time by entering them to PC or workstation**. These comments and issues are displayed on every group member's PC or

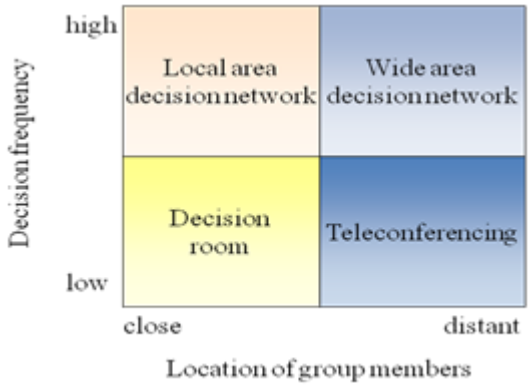
workstation immediately Parallel communication can speed meeting times and result in better decisions

- **Automated Record Keeping:**

Most group decision support system have the ability to keep detailed records of a meeting automatically. Each comment that is meeting into a group member's PC or workstation can be anonymously recorded.

- **Group Decision Support System Software:**

Group decision support system software often called **groupware or workgroup software helps with joint workgroup scheduling, communication and management**. One popular package **Lotus Notes** can capture, store, manipulate and distribute memos and communication that are developed working group project. This software allows users to **setup electronic bulletin boards, schedule, and group meetings and use email in a group setting.** Other software is Collabra Share, Open Mind and Team Ware.



- **Group Decision Support System Alternatives: -**

Group decision support system can take on a number of alternative network configurations depending on the needs of group. people located around the world work on the same project, documents, and files, efficiently and at the same time

1. **The Decision Room:**

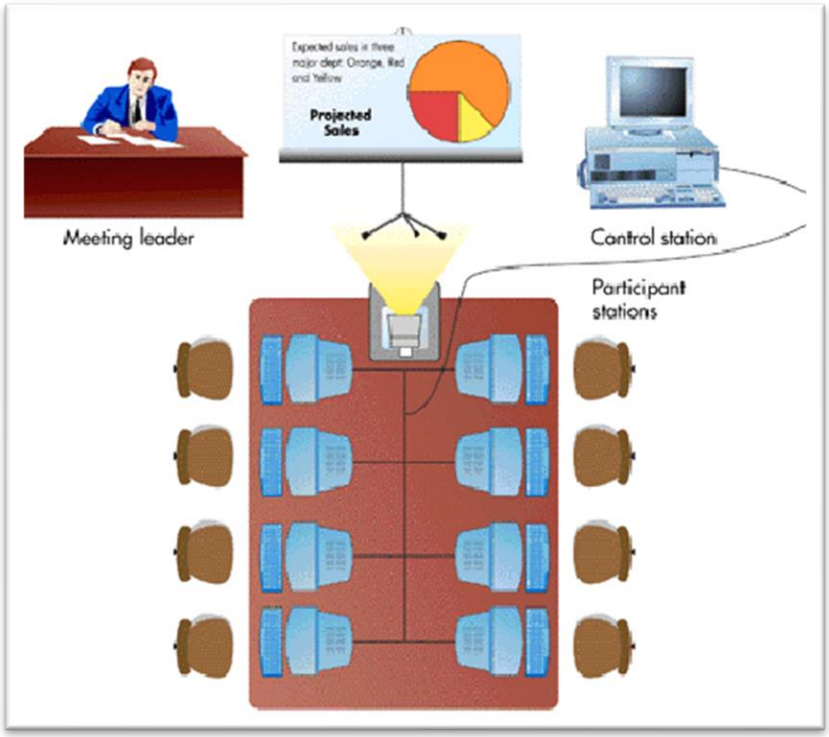
This is ideal for situation in which decision makers are located in the same building or geographic are and decision makers are occasional users of group decision support system. The decision room alternative combines face-to-face verbal interaction with the client.

2. **The Local Area Decision Network:**

The local area decision network can be used when group members are located in the same buildings or geographic area and under conditions in which group decision making is frequent.

3. The Teleconferencing Alternative:

The teleconferencing alternative is used for situations in which the decision frequency is low and location of group member is distant.



Using **long distance communication** technology there decisions rooms are electronically connected in teleconference and video conference. This provides high degree of flexibility.

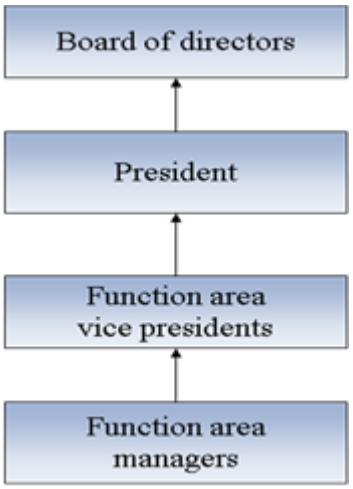
4. The Wide Area Decision Network:

The wide area decision network is under for situations in which the decision frequency is high and the location of group member is distant. This group decision support system alternative allows people to work in virtual work groups where teams of people **located around the world** can work on common problem.

➢ The Executive Support System (ESS):

Because top-level executives often require specialized support when making **strategic decisions**, many companies have developed system to assist executive decisions making. This type of system called an **executive support system** is a specialized decision support system that includes all hardware, software, data, procedures and people used to assist senior level execution within the organization. In some levels **executive support system is also known as EIS**.

An executive support system can also be used by individuals further down in the organizational structure. Once targeted at the top-level executive decision makers. Executive support systems are now marketed for & used by employees at other levels in the organization. In the traditional view, executive support system gives top executives a means of tracking critical success factors.



➢ Executive Support System In Perspective:

An executive support system is a special type of decision support system, and like a decision support system, an executive support system is designed to **support higher-level decision making in the organization.**

The decision support system provides a verity of modeling and analysis tools to enable user to thoroughly analyzed problems.

Executive support system prevents structured information about aspects of the organization that executives consider important.

It is for asking right question and decision support system is to answer questions.

➢ Characteristics of an Executive Support System:

1. Tailored to Individual Executives:

Executive support systems are typically tailored to individual executives. Decision support systems are not tailored to particular users. As such, executive support systems are truly representative of overall objective

of information system to **deliver the right information to the right person at the right time**. Executive support system allows an executive to focus, filter & organize data and information.

2. **Easy to Use:**

The top-level executive's most critical resource can be his or her time. Thus, an executive support system must be easy to learn & use and not overly complex.

3. **Have Drilldown Abilities:**

The executive support system allows executive to "drilldown" into the company to determine how certain data was produced. The drilldown allows an executive to get more detailed information if needed.

4. **Support the Need for External Data:**

The data need to make effective top-level decisions is often external information from competitors. An effective executive support system is able to extract data useful to decision maker from wide verity of resources.

5. **Can Help With Situations that Have a High Degree of Uncertainty:**

There is a high degree of uncertainly with most executive decisions **what will happen if a new plant is started?** The answer to this question is lying in executive support system. Executive support system procedures help top-level managers measure the amount of risk in decision.

6. **Have a Future Orientation:**

Executive decisions are future oriented, meaning that decisions will have a broad impact for years or decades. The information sources to support future oriented decision making are usually informal.

7. **Are Linked with Value Added Business Process:**

Like other information system, executive support systems are linked with executive decision system can be used by different firms. By detecting which firms generate enough business to be worth a certain discount can be done through executive support system.

- **Capabilities of an Executive Support System:**

The responsibility gives to top-level executives and decision makers bring unique problems and pressers to their job. An effective executive support system should have the capability to support executive decisions with many of these capabilities.

1. **Support for Defining an Overall Vision:**

One of the key voles of senior executive is to provide a broad vision for entire organization. This vision includes the organization's major product lines and services, the types of business it support today and in future and its overriding goals.

2. **Support for Strategic Planning:**

This involves determining long term objectives by analyzing the strengths and weakness of the organization, predicting future trends and projective the development of new product lines.

3. **Support for Strategic Organizing & Staffing:**

Top-level executives are concerned with organizational structure for example decisions concerning the creation of new departments or downsizing the labor force are made by top-level managers should the information system department be placed under new leadership? This & similar questions can affect the overall effectiveness of organization and should be supported by an executive support system.

Overall direction for staffing decisions and effective communication with labor unions are major decision areas for top-level, middle and lower level managers make staffing decision about the number of employees.

4. **Support for Strategic Control:**

Another type of executive decision relates to strategic control, which involves monitoring & managing overall operation of the organization. Goal seeking can be done for each major area to determine what performance these areas need to achieve to reach corporate exceptions.

5. **Support for Crisis Management:**

Even with careful strategic planning, a crisis can occur major disasters including hurricanes, tornadoes; floods etc. can totally shutdown the part of organization. Handling these emergencies is another responsibility for top-level executives. In many cases, strategic emergency plans can be put into place with the help of an executive support system. This helps the organization to recover quickly if an emergency or crisis occurs.