UNIT 3   MANAGEMENT SYSTEMS

Structure   **Page No.**

3.0   INTRODUCTION

In the previous unit, we discussed the diverse requirements which the management has to meet for achieving the goals of the organisation. In this unit, we will carry this discussion further to discuss what assistance information systems can provide to the manager for efficiently discharging his responsibilities. A manager has to carry out the role of a functional expert, carry out decisions, plan and co-ordinate for which he/she has to perform the role of a communicator and control all the activities under his/her responsibility. Depending upon his/her position/level in the hierarchy a manager has to carry out strategic, managerial or operational responsibilities. We will discuss how by providing an appropriate system a manager can be helped.

3.1   OBJECTIVES

After going through this unit, you should be able to:

* understand basics of management systems and their types;
* describe the management systems for the roles a manager has to fulfil, and
* design the Information systems required at various levels of management.

3.2   MANAGEMENT SYSTEM TYPES

Management systems are the formal, observable ways in which an organisation administers its operations. We can also say a management system provides the framework of processes and procedures used to ensure that an organisation can fulfil all tasks required to achieve its objectives. For instance, an environmental management system enables organisations to improve their environmental performance through a process of continuous improvement. An oversimplification is "Plan, Do, Check, Act." A more complete system would include accountability (an assignment of personal responsibility) and a schedule of activities to be completed, as well as auditing tools to implement corrective actions in addition to scheduled activities, creating an upward spiral of continuous improvement.

Because there are different interests, specialities, and levels in an organisation, there are different **management systems types**. No single system can provide all the information an organisation needs. More and more of these management systems are being covered under computerization; some of the management systems that have been computerised in various organisations are given below:

* Administrative management system

- Human resources management system
- Accounting management system
- Customer relationship management system
- Knowledge management system
- Logistics management system
- Marketing management system
- Operations management system
- Project management system
- Process management system
- Personal management system
- Product management system
- Quality management system
- Resource management system
- Risk management system
- Supply chain management system
- Time management system.

Some of these Management Systems operate only at a specific management level, whereas, some operate across management levels. Some operate within one management function, whereas some operate across management functions.

3.3 MANAGEMENT SYSTEM REQUIREMENTS

Efficient and effective operation of a business requires a management system, which can support business processes and operations, decision-making, and competitive strategies.

In the unit 2.2, we discussed using the functional approach and tried to answer the question, what do managers do? We observed that the managers plan, organise, coordinate, direct and control. Now let us look at what functions management systems do? or why management systems are required? In addition to the broad categories of management functions, managers at different levels of the hierarchy fill different managerial roles. Let us look at these roles:

The functional support role

Business processes and operations support function are the most basic. They involve collecting, recording, storing, and basic processing of data. Information systems support business processes and operations by:

- Recording and storing *accounting records* including sales data, purchase data, investment data, and payroll data,
- Processing such records into financial statements such as income statements, balance sheets, ledgers, and management reports, etc.
- Recording and storing inventory data, work in process data, equipment repair and maintenance data, supply chain data, and other production/operations records,
- Processing these operations records into production schedules, production controllers, inventory systems, and production monitoring systems,
- Recording and storing such human resource records as personnel data, salary data, and employment histories,
- Processing these human resources records into employee expense reports, and performance based reports,
- Recording and storing market data, customer profiles, customer purchase histories,
  marketing research data, advertising data, and other marketing records,
- Processing these marketing records into advertising elasticity reports, marketing plans, and sales activity reports,
- Recording and storing business intelligence data, competitor analysis data, industry data, corporate objectives, and other strategic management records, and

- Processing these strategic management records into industry trends reports, market share reports, mission statements, and portfolio models.

The bottom line is that the information systems use all of the above to implement, control, and monitor plans, strategies, tactics, new products, new business models or new business ventures.

The decision role

Decisional roles require managers to plan strategies and utilise resources. There are four specific roles that are decisional. The *entrepreneur* role requires the manager to assign resources to develop innovative goods and services, or to expand a business. Most of these roles will be held by top-level managers, although middle managers may be given some power to make such decisions. The *disturbance handler* corrects unanticipated problems facing the organisation from the internal or external environment. Managers at all levels may take this role. For example, first-line managers may correct a problem halting the assembly line or a middle level manager may attempt to address the aftermath of a fire in the store. Top managers are more likely to deal with major crises, such as requiring a recall of defective products. The third decisional role, that of *resource allocator,* involves determining which work units will get which resources. Top managers are likely to make large, overall budget decisions, while middle managers may make more specific allocations. In some organisations, supervisory managers are responsible to determine allocation of salary raises to employees. Finally, the *negotiator* works with others, such as suppliers, distributors, or labour unions, to reach agreements regarding products and services. First-level managers may negotiate with employees on issues of salary increases or overtime hours, or they may work with other supervisory managers when needed resources must be shared. Middle managers also negotiate with other managers and are likely to work to secure preferred prices from suppliers and distributors. Top managers negotiate on larger issues, such as labor contracts, or even on mergers and acquisitions of other companies.

The interpersonal role

Interpersonal roles require managers to direct and supervise employees and the organisation. The *figurehead* is typically a top of middle manager. This manager may communicate future organisational goals or ethical guidelines to employees at company meetings. A *leader* acts as an example for other employees to follow, gives commands and directions to subordinates, makes decisions, and mobilises employee support. Managers must be leaders at all levels of the organisation; often lower-level managers look to top management for this leadership example. In the role of *liaison,* a manager must coordinate the work of others in different work units, establish alliances between others, and work to share resources. This role is particularly critical for middle managers, who must often compete with other managers for important resources, yet must maintain successful working relationships with them for long time periods.

The communication role

Information systems can support a company's competitive positioning. Here are three levels of analysis:

1) The supports for help in piloting the chain of internal value. They are the most recent and the most pragmatic systems within the reach of the manager. They are the solutions to reductions of costs and management of performance. They are typically named "Business Workflow Analysis" (BWA) or "Business Management Systems (BMS)". They ensure control over piloting the set functions of a company. The real-time mastery in the costs of dysfunctions, cause distances from accounts, evaluation and accounting that are presented in the evaluation and qualitative reports.

2) All successful companies have one (or two) business functions that they do better than the competition. These are called core competencies. If a company's core competency gives it a long-term advantage in the marketplace, it is referred to as a sustainable competitive advantage. For a core competency to

become a sustainable competitive advantage it must be difficult to mimic, unique, sustainable, superior to the competition, and applicable to multiple situations. For a small or medium business a nice alternative is a MSP or a Managed Service Provider such as Virtual IT Solution, This is a cost effective solution compared to paying for IT staff or local technicians. Other examples of company characteristics that could constitute a sustainable competitive advantage include: superior product quality, extensive distribution contracts, accumulated brand equity and positive company reputation, low cost production techniques, patents and copyrights, government protected monopoly, and superior employees and management team. The list of potential sustainable competitive advantage characteristics is very long. However, some experts hold that in today's changing and competitive world, no advantage can be sustained in the long run. They argue that the only truly sustainable competitive advantage is to build an organisation that is so alert and so agile that it will always be able to find an advantage, no matter what changes occur.

3) Information systems often support and occasionally constitute these competitive advantages. The rapid change has made access to timely and current information critical in a competitive environment. Information systems, like business environmental scanning systems, support almost all sustainable competitive advantages. Occasionally, the information system itself is the competitive advantage. One example is Wal-Mart. They used an extranet to integrate their whole supply chain. This use of information systems gave Sam Walton a competitive advantage for two decades. Another example is Dell Computer. They used the Internet to market custom assembled PCs. Michael Dell is still benefiting from this low-cost promotion and distribution technique. Other examples are eBay, Amazon.com, Federal Express, and Business Workflow Analysis.

The performance monitoring role

MIS are not just statistics and data analysis. They have to be used as an MBO (Management by objectives) tool. They help:

- To establish relevant and measurable objectives
- To monitor results and performances (reach ratios)
- To send alerts, in some cases daily, to managers at each level of the organisation, on all deviations between results and pre-established objectives and budgets.

Check Your Progress 1

1) Answer the following:

   i) Define Management systems and list any five management systems.
   ……………………………………………………………………………
   ……………………………………………………………………………
   ……………………………………………………………………………
   ……………………………………………………………………………

   ii) Which are the three levels of analysis for which Information systems can support a company's competitive positioning? Explain these briefly.
   ……………………………………………………………………………
   ……………………………………………………………………………
   ……………………………………………………………………………
   ……………………………………………………………………………

2) Indicate True / False.

   i) The functional support role requires the enhanced ability to explore "what if" questions which is central to analysing the likely results of possible decisions and choosing those most likely to shape the future as desired. True ☐ False ☐

   ii) The functional support role requires processing of accounting records into financial statements such as income statements, balance sheets, ledgers, True ☐ False ☐

iii) The decision support role also allows users to deal with contingencies. True ☐ False ☐

iv) The performance monitoring role help to establish relevant and measurable objectives. True ☐ False ☐

v) Management systems are the formal, observable ways in which an organisation administers its operations. True ☐ False ☐

and management reports, etc.

3.4 LEVELS OF MANAGEMENT ACTIVITIES

At different levels of Management, different Information systems are required to support the types of decisions of the organisational hierarchy. While operational managers mostly make structured decisions, senior managers deal with unstructured decisions; middle managers are often faced with semi-structured decisions.
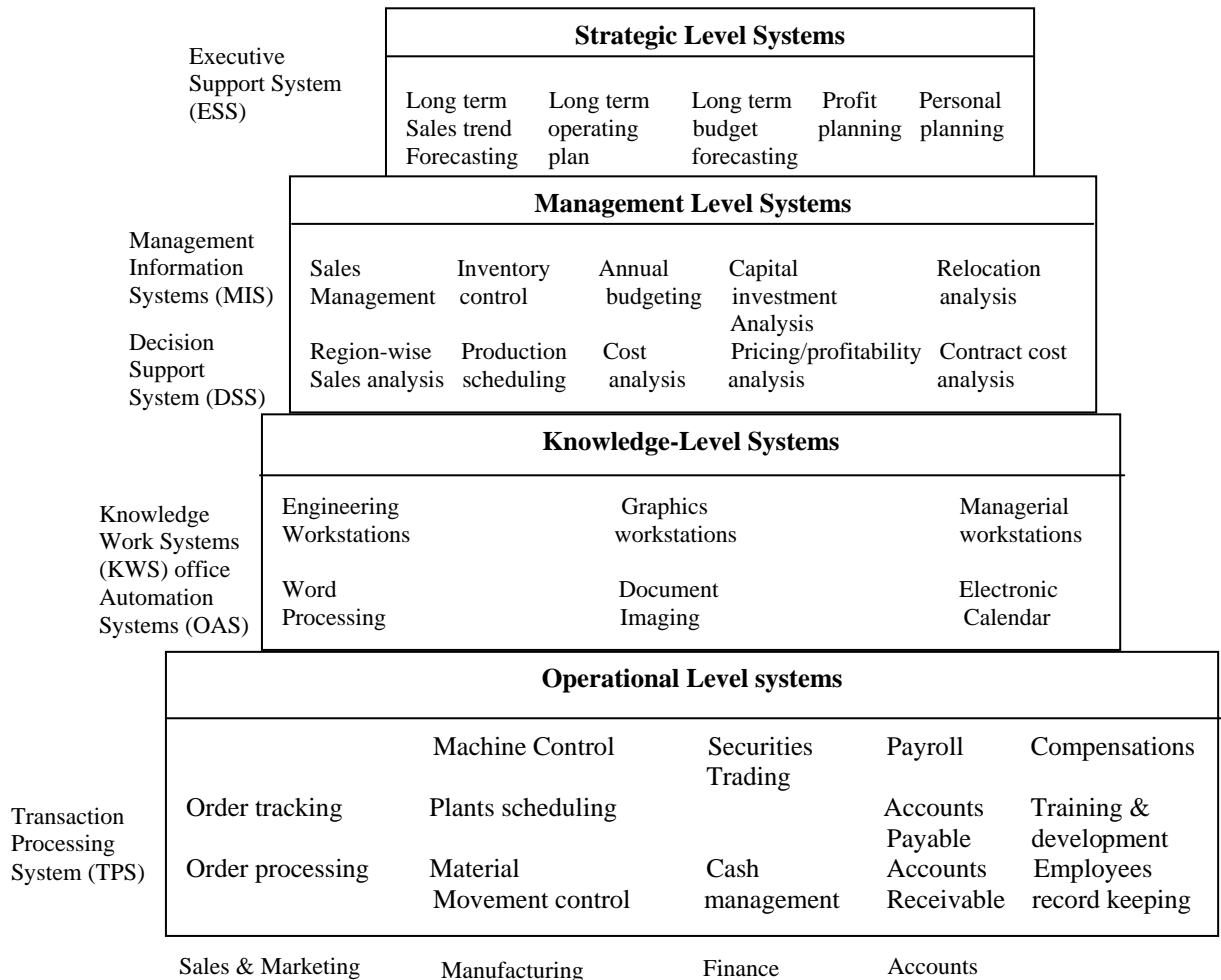
Figure 1: Types of systems

For each functional area in the organisation, four levels of organisational hierarchy can be identified: the operational level, knowledge level, management level and strategic level. Each of these levels is served by different types of information systems as shown above in *Figure 1*. Organisations have transaction processing systems (TPS) at the operational level; knowledge work systems (KWS) and office automation systems (OAS) at the knowledge level; management information systems (MIS) and decision-support systems (DSS) at the management level; and executive support systems (ESS) at the strategic level. Each of the major functional areas of sales and marketing, manufacturing, finance, accounting, and human resources, in turn is served by specialised Systems at each level.

The typical features of these six types of information systems are summarized in

Table 1. It should be noted that each of the different kinds of systems might have components that are used by organisational levels and groups other than their main constituencies; for example; a middle manager may need to extract data from a TPS.
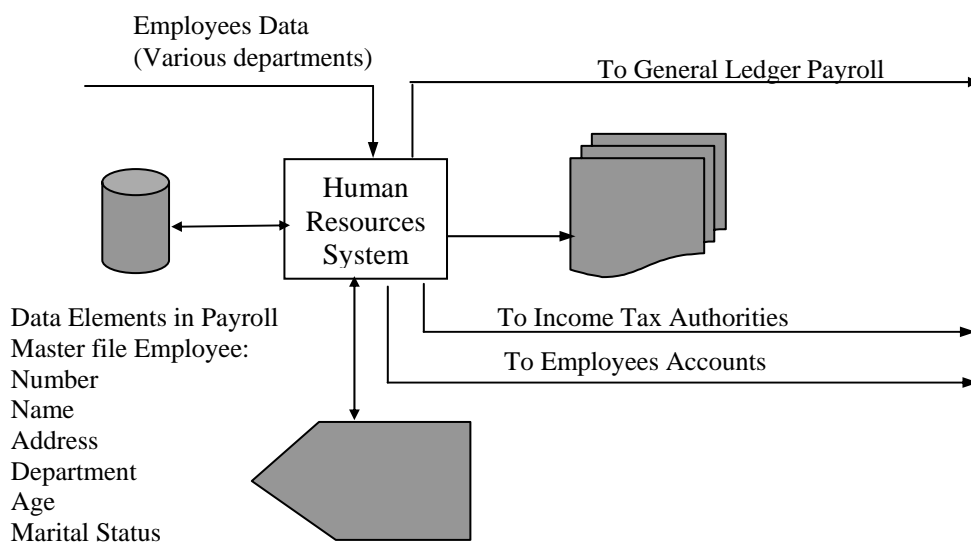
Table 1: Features of the six types of information systems

Type of System	Information Inputs	Processing	Information Outputs	Users
ESS	Aggregate data; external, internal	Graphics; simulations; interactive	Projections; responses to queries	Senior managers
DSS	Low-volume data or massive databases optimised for data analysis; analytic models and data analysis tools	Interactive; simulations analysis;	Special reports; decision analyses; responses to queries	Professionals; staff managers
MIS	Summary transaction data; high- volume data; simple models	Routine reports; simple models; low-level analysis	Summary and exception reports	Middle managers
KWS	Design specifications; knowledge-base	Modeling; simulations	Models; graphics	Professionals; technical staff
Office systems	Documents; schedules	Document management; scheduling; communication	Documents; schedules; mail	Clerical workers
TPS	Transactions; events	Sorting; listing; merging; updating	Detailed reports; lists; summaries	Operations personnel; supervisors

3.4.1 Transaction Processing Systems (TPS)

TPS record daily routine transactions such as sales orders from customers, or bank deposits and withdrawals. TPS are vital for the organisation, as they gather all the input necessary for other types of systems. Think about how one could generate a monthly sales report for middle management or critical marketing information to senior managers without TPS. TPS provide the basic input to the company's database. A failure in the TPS often means disaster for the organisation. Imagine what happens when the reservation system at Air India fails: all operations stop, no transactions can be carried out until the system is up again. Long queues form in front of ATMs and tellers when a bank's TPS crashes.

Employees Data
(Various departments)

To General Ledger Payroll

Human Resources System

Data Elements in Payroll
Master file Employee:
Number
Name
Address
Department
Age
Marital Status

To Income Tax Authorities

To Employees Accounts

Figure 2: Payroll System (TPS) — a Symbolic Representation

At the operational level, tasks, resources, and goals are predefined and highly structured. The decision to grant credit to a customer, for instance, is made by a lower-level supervisor according to predefined criteria. All that must be determined is whether the customer meets the criteria.

Payroll processing is a typical TPS by HR or Finance and Accounts department and is required by almost all firms. A payroll system keeps track of the money paid to employees. The master file is composed of several pieces of information (such as a name, address, or employee number) called data elements. Data are keyed into the system, updating the data elements. The elements on the master file are combined in different ways to create reports of interest to management and Tax / PF Authorities and to send paychecks to employees. These TPS can generate other report combinations of existing data elements. A typical pay processing is shown in *Figure 2* above.

Typical TPS applications for five functions that is for sales/ marketing, manufacturing / production, finance/ accounting, human resources are shown in *Table 2*:

Table 2: Types of Transaction Processing Systems

	Marketing System	Manufacturing / Production system	Finance / Accounting system	Human Resource system	Other types (Institutes)
Major Functions of Systems	Sales Management	Scheduling	Budgeting	Personnel records	Course records
	Sales Promotion	Purchasing	Billing	Perks	Admissions
	Market Research	Shipping/ Receiving	General ledger	Pay scales	Grade records
	New products	Operations	Cost accounting	Labour relations	Alumni
	Pricing	Engineering		Training	
Major Application Systems	Sales order information system	Machine Control system	Accounts receivable/pay able	Leave Record system	Registration system
	Sales commission system	Quality control system	Machine Control system	Payroll	Curriculum control
	Market research system	Purchase order system	Quality control system	Training Details	Classes time table
	Warehousing		Machine Control system	Career Path details	Faculty occupancy
Table 2 Typical applications of TPS. There are five functional categories of TPS: sales/marketing, manufacturing/production, finance/accounting, human resources, and other types of systems specific to a particular industry. Within each of these major functions are sub-functions. For each of these sub-functions (e.g., sales management) there is a major application system.					

Managers need TPS to monitor the status of internal operations and the firm's relations with the external environment. TPS are also major producers of information for the other types of systems. Failure of a TPS will lead to the failure of IS of an organisation. (For example, the payroll system illustrated in *Figure 2*, along with other accounting TPS, supplies data to the company's general ledger system, which is responsible for maintaining records of the firm's income and expenses and for producing reports such as income statements and balance sheets).

Features of Transaction Processing Systems

a) *Rapid Response*

Fast performance with a rapid response time is critical. Businesses cannot afford to have customers waiting for a TPS to respond, the turnaround time from the input of the transaction to the production for the output must be a few seconds or less.

b) *Reliability*

Many organisations rely heavily on their TPS; a breakdown will disrupt operations or even stop the business. For a TPS to be effective its failure rate must be very low. If a TPS does fail, then quick and accurate recovery must be possible. This makes well–designed backup and recovery procedures essential.

c) *Inflexibility*

A TPS wants every transaction to be processed in the same way regardless of the user, the customer or the time of day. If a TPS were flexible, there would be too many opportunities for non-standard operations, for example, a commercial airline needs to consistently accept airline reservations from a range of travel agents, accepting different transactions data from different travel agents would be a problem.

(d) *Controlled processing*

The processing in a TPS must support an organisation's operations. For example if an organisation allocates roles and responsibilities to particular employees, then the TPS should enforce and maintain this requirement.

e) *ACID Test Properties*

i) **Atomicity:** A transaction's changes to the state are atomic: either all happen or none happen. These changes include database changes, messages, and actions on transducers.

ii) **Consistency:** A transaction is a correct transformation of the state. The actions taken as a group do not violate any of the integrity constraints associated with the state. This requires that the transaction be a correct program.

iii) **Isolation:** Even though transactions execute concurrently, it appears to each transaction T, that others executed either before T or after T, but not both.

iv) **Durability:** Once a transaction completes successfully (commits), its changes to the state survive failures.

3.4.2 Knowledge Work Systems (KWS)

Knowledge Work Systems (KWS) support highly skilled knowledge workers in the creation and integration of new knowledge into the company. Computer Aided Design (CAD) systems used by product designers not only allow them to easily make modifications without having to redraw the entire object (just like word processors for documents), but also enable them to test the product without having to build physical prototypes. Three dimensional graphical simulation systems like GRASP (Graphical Robotics Applications Simulation Package) are used by British Aerospace and Rolls Royce for evaluating and programming industrial robots. Architects use CAD software to create, modify, evaluate and test their designs; such systems can generate photorealistic pictures, simulating the lighting in rooms at different times of the day, perform calculations, for instance on the amount of paint required. Surgeons use sophisticated CAD systems to design operations.

Financial institutions are using knowledge work systems to support trading and portfolio management with powerful high-end PCs. These allow managers to get instantaneous analysed results on huge amounts of financial data and provide access to external databases.

Knowledge work systems (KWS) and office systems serve the information needs at the knowledge level of the organisation. Knowledge work systems aid knowledge workers, whereas office automation systems primarily aid data workers (although they are also used extensively by knowledge workers).

In general, *knowledge workers* are people who hold formal university degrees and who are often members of a recognized profession, such as engineers, doctors, lawyers, and scientists. Their jobs consist primarily of creating new information and knowledge. Knowledge work systems (KWS), such as scientific or engineering design workstations, promote the creation of new knowledge and ensure that new knowledge and technical expertise are properly integrated into the business. *Data workers* typically have less formal, advanced educational degrees and tend to process rather than create information. They consist primarily of secretaries, accountants, filing clerks, or managers whose jobs are principally to use, manipulate, or disseminate information. Office systems are information technology applications designed to increase data workers' productivity by supporting the coordinating and communicating activities of the typical office. Office systems coordinate diverse information workers, geographic units, and functional areas: The systems communicate with customers, suppliers, and other organisations outside the firm and serve as a clearinghouse for information and knowledge flows.

3.4.3 Office Automation System (OAS)

Office Systems or Office Automation Systems (OAS) support general office work for handling and managing documents and facilitating communication. Text and image

processing systems evolved from word processors to desktop publishing, enabling the creation of professional documents with graphics and special layout features. Spreadsheets, presentation packages like PowerPoint, personal database systems and note-taking systems (appointment book, notepad, card file) are part of OAS.

In addition OAS include communication systems for transmitting messages and documents (*e-mail*) and teleconferencing capabilities.
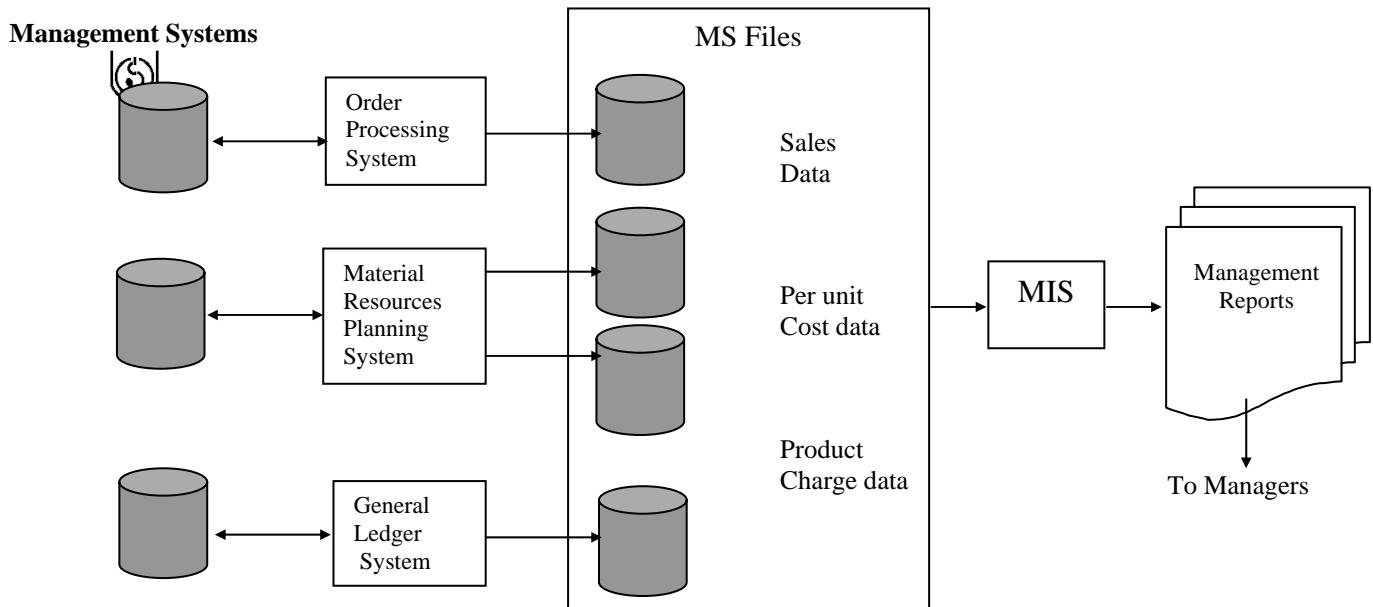
3.4.4 Management Information Systems

Management Information Systems (MIS) generate information for monitoring performance (e.g., productivity information) and maintaining coordination (e.g., between purchasing and accounts payable).

MIS extract process and summarise data from the TPS and provide periodic (weekly, monthly, quarterly) reports to managers.

Today MIS are becoming more flexible by providing access to information whenever needed (rather than prespecified reports on a periodic basis). Users can often generate more customized reports by selecting subsets of data (such as listing the products with 2% increase in sales over the past month), using different sorting options (by sales region, by salesperson, by highest volume of sales) and different display choices (graphical, tabular).

Management information systems can be defined as the study of information systems in business and management. The term *management information systems (MIS)* also designates a specific category of information systems serving management-level functions. Management information systems (MIS) serve the management level of the organisation, providing managers with reports and, in some cases, with on-line access to the organisation's current performance and historical records. Typically, they are oriented almost exclusively to internal, not environmental or external, events. MIS primarily serve the functions of planning, controlling, and decision making at the management level. Generally, they depend on underlying transaction processing systems for their data.

MIS summarize and report on the company's basic operations. The basic transaction data from TPS are compressed and are usually presented in long reports that are produced on a regular schedule. *Figure 3* shows how a typical MIS transforms transaction-level data from inventory, production, and accounting into MIS files that are used to provide managers with reports. *Table 3* shows a sample report from this system.

Figure 3: This diagram illustrates how management information systems obtain their data from the organisation's TPS. In this system, three TPS supply summarise transaction data at the end of the time period to the MIS reporting system. Managers obtain the organisational data through the MIS, which provides them with the appropriate reports.

Table 3: A Sample Report that Might be Produced by the MIS of Figure 3

PRODUCT CODE	PRODUCT DESCRIPTION	SALES REGION	ACTUAL SALES	PLANNED	ACTUAL VS PLANNED
4469	Carpet Cleaner	Northeast	4.066.700	4.800.000	0.85
		South	3.778.112	3.750.000	1.01
		Midwest	4.867.001	4.600.000	1.06
		West	4.003.440	4.400.000	0.91
	TOTAL		16.715.253	17.550.000	0.95
5674	Room Freshener	Northeast	3.676.700	3.900.000	0.94
		South	5.608.112	4.700.000	1.19
		Midwest	4.711.001	4.200.000	1.12
		West	4.563.440	4.900.000	0.93
	TOTAL		18.559.253	17.700.000	1.05

Another example of MIS is available from the sales TPS wherein transaction data (name of salesperson, customer name and address, name and quantity of item sold, line sales amount, total sales amount, form of payment) are stored on every sale made. The MIS then generates reports (the frequency of the report being specified by users) such as:

- total sales for each item
- total sales for region
- sales for each salesperson.

MIS reports can be classified by content or time. In terms of content, reports may be comprehensive (listing each sales transaction over a specified period in a given sales region), summary (showing the total sales of each item sold in a given region) or exception reports (listing items that have shown a drop in sales by over 20% in a given region since the last period).

In terms of time, MIS produce historical reports (comparing past sales information with the present); status reports (only showing current sales); and predictive reports (forecasts of next months sales).

MIS are not just statistics and data analysis, but also assessment of human capabilities. They have to be used as an MBO (Management by objectives) tool. They help:

- to establish relevant and measurable objectives

- to monitor results and performances (reach ratios)
- to send alerts, in some cases daily, to managers at each level of the organisation, on all deviations between results and pre-established objectives and budgets.

3.4.5 Decision-Support Systems

Decision-support systems (DSS) also serve the management level of the organisation. DSS help managers make decisions that are unique, rapidly changing, and not easily specified in advance. They address problems where the procedure for arriving at a solution may not be fully predefined in advance. Although DSS use internal information from TPS and MIS, they often bring in information from external sources, such as current stock prices or product prices of competitors.

Clearly, by design, DSS have more analytical power than other systems. They are built explicitly with a variety of models to analyse data, or they condense large amounts of data into a form where they can be analysed by decision makers. DSS are designed so that users can work with them directly; these systems explicitly include user-friendly software. DSS are interactive; the user can change assumptions, ask new questions, and include new data.

As mentioned above, there are theoretical possibilities of building such systems in any knowledge domain. One example is the Clinical decision support system for medical diagnosis. Other examples include a bank loan officer verifying the credit of a loan applicant or an engineering firm that has bids on several projects and wants to know if they can be competitive with their costs.

A specific example concerns the Canadian National Railway system, which tests its equipment on a regular basis using a decision support system. A problem faced by any railroad is worn-out or defective rails, which can result in hundreds of derailments per year. Under a DSS, CN managed to decrease the incidence of derailments at the same time other companies were experiencing an increase.

DSS has many applications that have already been spoken about. However, it can be used in any field where an organisation finds its necessity. Additionally, a DSS can be designed to help make decisions on the stock market, or deciding which area or segment to market a product toward.

A very useful, small, but powerful DSS is the voyage-estimating system of a company that exists primarily to carry bulk cargoes of coal, oil, ores, and finished products for another company with which it has a long term contract. The firm owns some vessels, charters others, and bids for shipping contracts in the open market to carry general cargo. A voyage-estimating system calculates financial and technical voyage details. Financial calculations include ship/time costs (fuel, labour, capital), freight rates for various types of cargo, and port expenses. Technical details include a myriad of factors such as ship cargo capacity, speed, port distances, fuel and water consumption, and loading patterns (location of cargo for different ports). The system can answer questions such as the following: Given a customer delivery schedule and an offered freight rate, which vessel should be assigned at what rate to maximize profits? What is the optimum speed at which a particular vessel can optimize its profit and still meet its delivery schedule? What is the optimal loading pattern for a ship bound for Mumbai from London? *Figure 4* illustrates the DSS built for this company. The system operates on a powerful desktop personal computer, providing a system of menus that makes it easy for users to enter data or obtain information
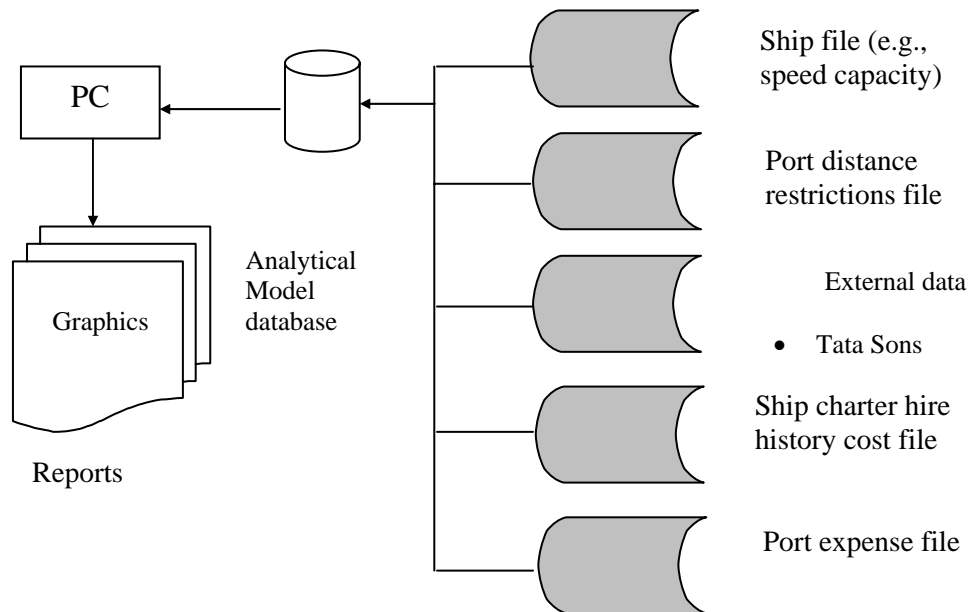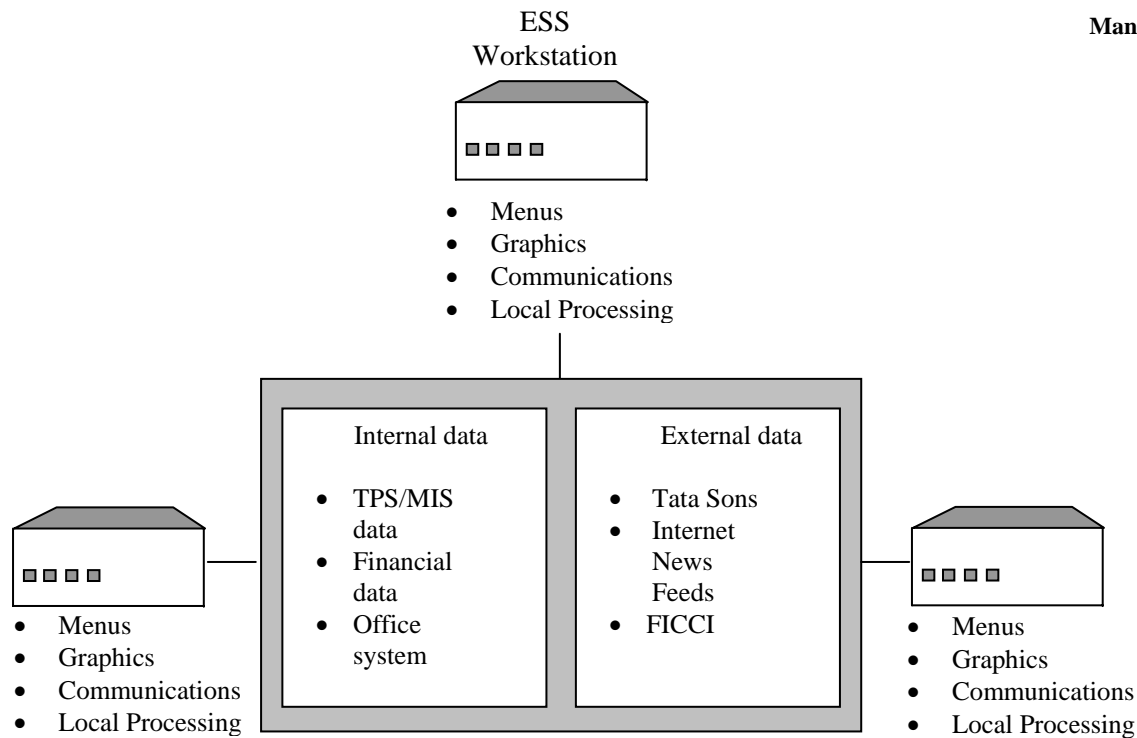
Figure 4: Decision support system for voyage estimation

3.4.6 Executive Support Systems (ESS)

Senior managers use executive support systems (ESS) to make decisions. ESS serves the strategic level of the organisation. They address non-routine decisions requiring judgment, evaluation, and insight because there is no agreed-on procedure for arriving at a solution. ESS creates a generalised computing and communications environment rather than providing any fixed application or specific capability. ESS is designed to incorporate data about external events such as new tax laws or competitors, but they also draw summarized information from internal MIS and DSS. They filter, compress, and track critical data, emphasizing the reduction of time and effort required to obtain information useful to executives. ESS employ the most advanced graphics software and can deliver graphs and data from many sources immediately to a senior executive's office or to a boardroom.

Unlike the other types of information systems, ESS is not designed primarily to solve specific problems. Instead, ESS provides a generalised computing and telecommunications capacity that can be applied to a changing array of problems. Whereas many DSS are designed to be highly analytical, ESS tends to make less use of analytical models.

ESS
Workstation

- Menus
- Graphics
- Communications
- Local Processing

Internal data	External data
- TPS/MIS data - Financial data - Office system	- Tata Sons - Internet News Feeds - FICCI

- Menus
- Graphics
- Communications
- Local Processing

- Menus
- Graphics
- Communications
- Local Processing

Figure 5: Executive support system

Questions ESS assists in answering include the following: In what business should we be? What are the competitors doing? What new acquisitions would protect us from cyclical business swings? Which units should we sell to raise cash for acquisitions? *Figure 5* illustrates a model of an ESS. It consists of workstations with menus, interactive graphics, and communications capabilities that can access historical and competitive data from internal corporate systems and external databases such as Dow Jones News/Retrieval or the Gallup Poll. Because ESS are designed to be used by senior managers who often have little, if any, direct contact or experience with computer-based information systems, they incorporate easy-to-use graphic interfaces.

Relationship of Systems to one Another

Different types of systems exist in organisations. Not all organisations have all of the types of systems described in this unit. Many organisations may not have knowledge work systems, executive support systems or decision support systems. But today most organisations make use of office automation systems and have a portfolio of information system applications based on TPS and MIS (marketing systems, manufacturing systems, human resource systems). Some organisations have hybrid information systems that contain some of the characteristics of different types of systems.

The field of information systems is moving so quickly that the features of one particular type of system are integrated to other types (e.g., MIS having many of the features of ESS). System characteristics evolve and new types of systems emerge. Yet the classification of information systems into these different types is useful because each type of system has certain features that are relevant in particular situations.

Figure 6 illustrates how the systems serving different levels in the organisation are related to one another. TPS are typically a major source of data for other systems, whereas ESS is primarily a recipient of data from lower-level systems. The other types of systems may exchange data with each other as well. Data may also be exchanged among systems serving different functional areas. For example, an order captured by a sales system may be transmitted to a manufacturing system as a transaction for producing or delivering the product specified in the order.

It is definitely advantageous to have some measure of integration among these systems so that information can flow easily between different parts of the organisation. But integration costs money, and integrating many different systems is extremely time consuming and complex. Each organisation must weigh its needs for integrating systems against the difficulties of mounting a large-scale systems integration effort.
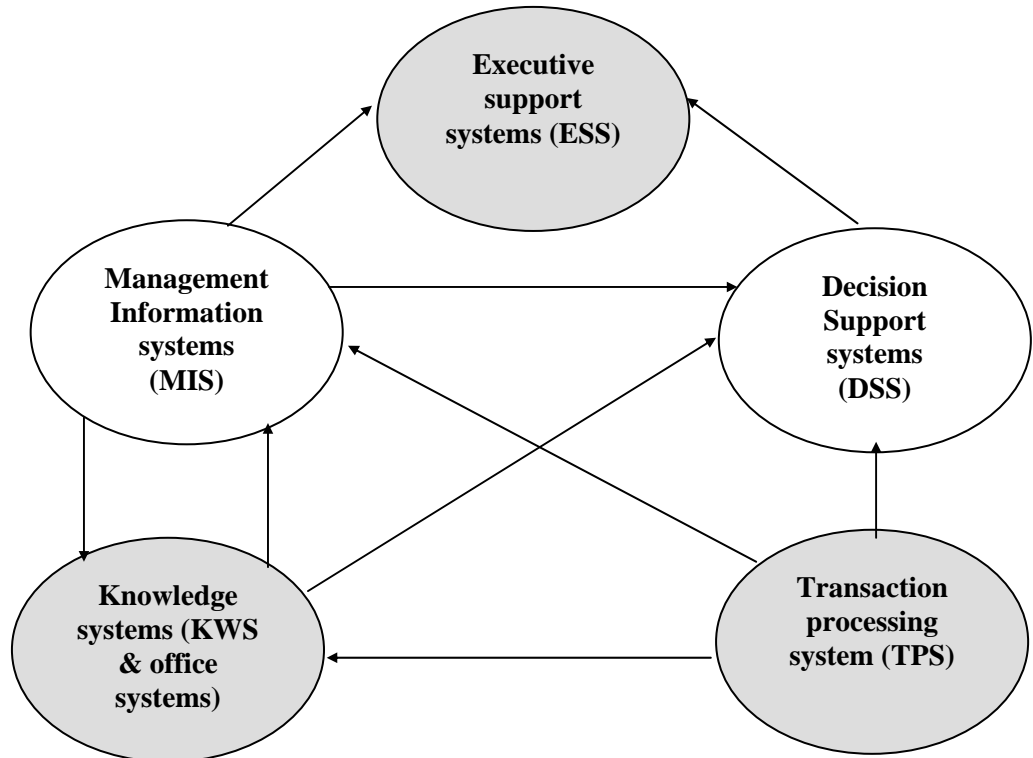

Figure 6: Inter-relationship

Check Your Progress 2

1) Answer the following:

   i) Associate the six kinds of information systems with the groups served.
   ……………………………………………………………………………
   …………………………………………………………………………..
   …………………………………………………………………………

   ii) Identify the five functional categories of TPS.
   ……………………………………………………………………………
   ……………………………………………………………………………
   ……………………………………………………………………………

2) Mark the correct answer:

   a) Information systems that monitor the elementary activities and transactions of the organisations are:

      i) Management-level systems.
      ii) Operational-level systems.
      iii) Knowledge-level systems.
      iv) Strategic-level systems.

   b) Projections and responses to queries are information output characteristics associated with:

      i) DSS
      ii) MIS

        iii)   ESS

        iv)   TPS

c)   Summary transaction data, high-volume data, and simple models are information inputs characteristic of

        i)   DSS

        ii)   MIS

        iii)   ESS

        iv)   TPS

d)   Which of the following individuals typically have less formal, advanced educational degrees and tend to process rather than create information?

        i)   knowledge workers

        ii)   executives

        iii)   systems analysts

        iv)   data workers

e)   Management information systems usually:

        i)   serve managers interested in weekly, monthly, and yearly results, not day-to-day activities.

        ii)   help managers make decisions that are unique, rapidly changing, and not easily specified in advance.

        iii)   provide managers with a generalized computing and telecommunications capacity that can be applied to a changing array of problems.

        iv)   perform and record the daily routine transactions necessary to the conduct of business.

f)   Decision support systems usually:

        i)   serve managers interested in weekly, monthly, and yearly results, not day-to-day

        ii)   activities.

        iii)   help managers make decisions that are unique, rapidly changing, and not easily specified in advance.

        iv)   provide managers with a generalised computing and telecommunications capacity that can be applied to a changing array of problems.

        v)   perform and record the daily routine transactions necessary to the conduct of business.

g)   Identifying customers and markets using data on demographics, markets, consumer behaviour, and trends is an example of

        i)   operational-level sales and marketing information system.

        ii)   knowledge-level sales and marketing information system.

        iii)   management-level sales and marketing information system.

        iv)   strategic-level sales and marketing information system.

3.5 SUMMARY

With this unit, we complete our discussion on various roles a manger has to play and how information systems can assist him/has in for these roles. In this unit you have also learned that depending upon the position / level in the hierarchy, a manager has to carry out strategic, managerial or operational responsibilities and there are appropriate information systems for these levels. Decision support and strategic support information systems have very large scope for implementation in various organisations. Students therefore, must further study case studies in these areas.

3.6 SOLUTIONS / ANSWERS

Check Your Progress 1

i) Management systems can be defined as formal, observable ways in which an organisation administers its operations. A management system provides the framework of processes and procedures used to ensure that the organisation can fulfill all tasks required to achieve its objectives. Five management systems are listed below:

- Change management system
- Cost management system
- Crisis management system
- Facility management system
- Knowledge management system

ii) The three levels of analysis in which Information systems can support, a company's competitive positioning are: (a) Internal Business Management Systems, (b) Company's Core competence, and (c) Competitive environment Information systems.

a) **Internal Business Management Systems:** These systems provide the solutions for reduction of costs and for enhancement of management of performance. Control over piloting the set functions of the company can be carried out, by using these systems. The system output provides evaluation and qualitative reports.

b) **Company's Core competence:** To ensure that a company's core competency remains in an advantageous position / sustainable it must be difficult to mimic, unique, sustainable, superior to the competition, and applicable to multiple situations. This advantage could come from superior product quality, extensive distribution contracts, accumulated brand equity and positive company reputation, low cost production techniques, patents and copyrights, government protected monopoly, and superior employees and management team. In today's changing and competitive world the only truly sustainable competitive advantage is to build an organisation backed by an information system, that is so alert and so agile that it will always be able to find an advantage, no matter what changes occur.

c) **Competitive environment Information systems:** These are the Information systems which provide business environmental scanning, and implementation of business processes to ensure competitive advantages. These systems need to provide access to timely and current information critical in a competitive environment.

2) True / False.

i) False,   ii) True,   iii) True,   iv) True,   v) True.

Check Your Progress 2

1) Answers:

a) Six kinds of information systems with the particular groups served are as shown below:

Sl. No.	Information System	Group served
1	Executive Support System (ESS)	Top / Strategic level managers
2	Management Information System (MIS)	Managers
3	Decision Support System (DSS)	Managers / Professionals
4	Knowledge Work System (KWS)	Professionals / Technical Staff
5	Office Information System (OIS)	Clerical workers
6	Transaction Processing Systems (TPS)	Jr. Managers / Operational supervisors

b) Five functional categories of TPS are:

i) Sales / Marketing
ii) Manufacturing / Production
iii) Finance / Accounts
iv) Human Resource
v) Other types – specific to particular industry; for example, Materials Management for manufacturing industry.

2) Mark the correct answer:

a) Information systems that monitor the elementary activities and transactions of the organisations are:

i) Management-level systems.
ii) Operational-level systems.
iii) Knowledge-level systems.
iv) Strategic-level systems.

Y

b) Projections and responses to queries are information output characteristics associated with :

i) DSS
ii) MIS
iii) ESS
iv) TPS

Y

c) Summary transaction data, high-volume data, and simple models are information inputs characteristic of

i) DSS
ii) MIS
iii) ESS
iv) TPS

Y

d) Which of the following individuals typically have less formal, advanced educational degrees and tend to process rather than create information?

i) knowledge workers
ii) executives
iii) systems analysts
iv) data workers

Y

e) Management information systems usually:

i)   serve managers interested in weekly, monthly, and yearly results, not day-to-day activities.
ii)   help managers make decisions that are unique, rapidly changing, and not easily specified in advance.
iii) provide managers with a generalized computing and telecommunications capacity that can be applied to a changing array of problems.
iv)   perform and record the daily routine transactions necessary to the conduct of business.

Y

f) Decision support systems usually:

i)   serve managers interested in weekly, monthly, and yearly results, not day-to-day
ii)   activities.
iii) help managers make decisions that are unique, rapidly changing, and not easily specified in advance.
iv)   provide managers with a generalised computing and telecommunications capacity that can be applied to a changing array of problems.
v)   perform and record the daily routine transactions necessary to the conduct of business.

Y

g) Identifying customers and markets using data on demographics, markets, consumer behavior, and trends is an example of

i)   operational-level sales and marketing information system.
ii)   knowledge-level sales and marketing information system.
iii) management-level sales and marketing information system.
iv)   strategic-level sales and marketing information system.

Y

3.7   FURTHER READINGS/REFERENCES

1. K.C. Laudon. and J.P. Laudon. *Management Information Systems*: Managing the Digital Firm (8th Edition). Prentice Hall.

2. E. Turban, E. McLean and J. Wetherbe. *Information Technology for Management: Transforming Organisations in the Digital Economy* (4th edition). Wiley.

3. J. O'Brian. *Management Information Systems: Managing Information Technology in the Networked Enterprise* (3rd Ed), Irwin, 1996

4. J.R. Hicks. *Management Information Systems: a User Perspective* (3rd Ed). West, 1993.

5. Robert Schultheis & Mary Sumner, *Management Information Systems:* The Manager's View, Tata McGraw Hill

6. Royce W., *Software Project Management: A unified Framework*, Addison Wesley

7. Sadagopan S., *Management Information Systems*, Prentice Hall of India

8. Basandra S.K., *Management Information Systems*, Wheeler Publishing

9. Alter S., *Information Systems: A Management Perspective*, 3/e, Addison Wesley

10. Koontz H., O'Donnel C. & Weihrich H., *Essentials of Management,* Fourth Edition, McGraw Hill Book Company

11. http://www-users.cs.york.ac.uk/~kimble/teaching/mis/mis_links.html

12. http://www.techbooksforfree.com/