MBA

DEPARTMENT OF BUSINESS MANAGEMENT

DIGITAL NOTES

MANAGEMENT INFORMATION SYSTEMS

&

ENTERPRISE RESOURCE PLANNING

MBA I YEAR II SEMESTER

R20MBA17

A Y 2020-22

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution-UGC, Govt. of India)

MBA I YEAR II SEM

R20MBA17 MANAGEMENT INFORMATION SYSTEM & ERP

Course Aim:
- To enable students on importance of information systems in the decision making and management of organizations, the foundations of Enterprise planning and ERP System Options.

Learning Outcomes:
- The students will understand the MIS concepts its applications, challenges in implementation of ERP system, ERP System Implementation options, and functional modules of ERP

Unit-I: Introduction
MIS importance, definition, nature and scope of MIS, Structure and Classification of MIS, Information and Systems Concept, Types of Information, Information systems for competitive advantage.

Unit-II: Business Applications of Information Systems
E-Commerce: E-commerce features & Business Models - Decision Support Systems - Business Process Reengineering - Business Intelligence and Knowledge Management System.

Unit-III: Management of Information Systems
Information system planning, system acquisition, systems implementation, evaluation & maintenance of IS, IS Security and Control. Global perspective on cybercrime - Cybercrime era.

Unit-IV: Introduction to ERP
ERP System: Overview of ERP Systems, Business benefits of ERP, Vendor Analysis, Challenges of implementing ERP Systems - ERP Maintenance - Emerging Trends in ERP

Unit-V: ERP - Modules
Modules: Business Modules in an ERP Package - Manufacturing, Human Resources, Plant Maintenance, Materials Management, and Supply chain Management (SCM), Sales and Distribution.
Case Study on Banking Sector

REFERENCES:
- D P Goyal, Management Information Systems–Managerial Perspective, MacMillan.
- Laudon & Laudon, Management Information Systems, Pearson.
- Jawadekar, MIS Text and Cases, TMH.
- Mary Sumner "Enterprise Resource Planning" Pearson.
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UNIT-I
MANAGEMENT INFORMATION SYSTEM

Definition: It refers to the processing of information through computers and other intelligent devices to manage and support managerial decisions within an organization.

Management Information Systems (MIS) is the study of people, technology, organizations, and the relationships among them. MIS professionals help firms realize maximum benefit from investment in personnel, equipment, and business processes. MIS is a people-oriented field with an emphasis on service through technology. If you have an interest in technology and have the desire to use technology to improve people's lives, a degree in MIS may be for you.

An automated system designed to provide progress and status information to management as an aid to decision making.

MIS stands for management information system. Business managers at all levels of an organization, from assistant managers to executives, rely on reports generated from these systems to help them evaluate their business' daily activities or problems that arise, make decisions, and track progress.

Management Information System, commonly referred to as MIS is a phrase consisting of three words: management, information and systems. Looking at these three words, it's easy to define Management Information Systems as systems that provide information to management.

That is the simple definition of MIS that generally sums up what a Management Information System is, and what it should do. However, its role and impact on the smooth operation of a company can never be overemphasized. That is the reason why every successful company makes use of these systems in one way or another.

The reason why Management Information Systems are very important in the day to day operation of companies is because these systems work with people, organizations, technology and relationships among the people and organizations affecting the company.

MIS Importance:
Management Information System is formal method of collecting information in summarized form. It is network established within an organization to provide information to managers. It provides systematic and analytical information necessary to all level of managers. It helps managers to take right decision at the right time. Importance of MIS is described as follows;

1. Management Information System is always management oriented and keeps in view every level of management and gets the desired information.

2. Integrated – refers to how different components (sub systems) are actually tied up together. eg: different departments of organization linked together.

3. Useful for planning – as every organization makes log-term and short-term plans with the help of information like sales & production, capital investments, stocks etc management can easily plan..

4. Effective Management Information System helps the management to know deviations of actual performance from pre-set targets and control things.

5. It's important for increasing efficiency.

6. MIS provides updated results of various departments to management.

7. MIS is highly computerized so it provides accurate results.

8. MIS adds to the intelligence, alertness, awareness of managers by providing them information in the form of progress and review reports of an ongoing activity.

9. Helps managers in decision- making.

To gain the maximum benefits from your company's information system, you have to exploit all its capacities. Information systems gain their importance by processing the data from company inputs to generate information that is useful for managing your operations. To increase the information system's effectiveness, you can either add more data to make the information more accurate or use the information in new ways.

Management Information Systems (MIS) not only include software systems, but the entire set of business processes and resources that are used to pull together information from functional or tactical systems. Data is then presented in a user-friendly and timely manner so that mid and upper-level managers can use it to take the right actions. The entire system is designed so that the company will meet its strategic and tactical goals.

Nature and Scope of MIS:

The concept of MIS is interdisciplinary in nature, i.e. it has borrowed its concepts from a large number of disciplines like Accounting, Computers, Organizations, Management, Operations Research and Behavioural Sciences, etc .MIS is neither a pure science nor an art; it is recognized as a combination of both. An information system is a logical system, which is concerned with 'how' something is being accomplished and thus may be differentiated from physical system, which is the process itself and is concerned with the content or 'what' is going on.MIS ,in fact encompasses both physical and information systems. There has been a lot of debate on the issue whether MIS is more management –oriented or computer –oriented. Though there are advocates of both sides, MIS should be considered more of a management subject than of computers because of the simple logic that computers are just tool in the hands of managers. Computers are used for their characteristics like accuracy, speed and capacity to handle large amount of data. Nowadays MIS finds application in all functional areas of every type of business organizations at all levels. MIS caters to information needs of managers in an organization, thus its scope lies in

structured as well as unstructured type of information which could be gathered from internal as well as external sources of the organization. Further, with the advent of computers and communication technology, the scope of MIS has increased manifold.
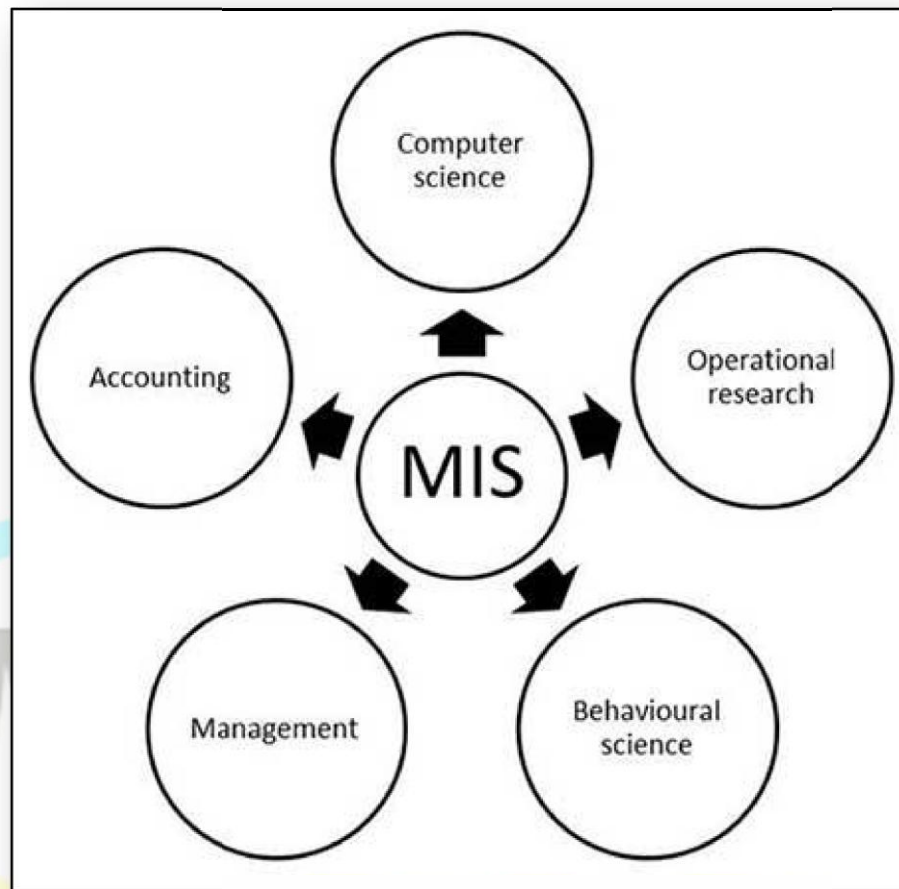
Structure of MIS:

Structure of MIS may be understood by looking at the physical components of the information system in an organization. The physical components of an organizational information system may be hardware, software, database, manual procedures and operating persons. A brief description of these components has been outlined in the following paragraphs:

- ❖ **Hardware**
  Hardware refers to the physical data processing equipment and peripheral devices, For example, CPU, monitor, keyboard, printer, drives, tapes, communication devices, etc.
- ❖ **Software**
  Software is a broad term given to the instructions or programs that direct the operating of the hardware. Software could be of two types, i.e. system software and application software.
- ❖ **Database**

The database consists of all data utilized by application software. Data is stored in files.

❖ **Procedures**

Formal operating procedures, which are required to operate a system, such as manuals, are also regarded as physical elements.

❖ **Operating Personnel**

Personnel like Computer Operators, Computer Programmers, System Analysts, System Managers, etc., are the operating people of the information systems.

❖ **Input and Output**

Various physical inputs and outputs from the information system, existing in forms like printout, reports etc.

MIS - Classification of Information:

Information can be classified in a number of ways:

1. Classification by Characteristic

Based on Anthony's classification of Management, information used in business for decision-making is generally categorized into three types:

✓ **Strategic Information:** Strategic information is concerned with long term policy decisions that defines the objectives of a business and checks how well these objectives are met. For example, acquiring a new plant, a new product, diversification of business etc, comes under strategic information.

✓ **Tactical Information:** Tactical information is concerned with the information needed for exercising control over business resources, like budgeting, quality control, service level, inventory level, productivity level etc.

✓ **Operational Information:** Operational information is concerned with plant/business level information and is used to ensure proper conduction of specific operational tasks as planned/intended. Various operator specific, machine specific and shift specific jobs for quality control checks comes under this category.

2. Classification by Application

In terms of applications, information can be categorized as:

✓ **Planning Information:** These are the information needed for establishing standard norms and specifications in an organization. This information is used in strategic, tactical, and operation planning of any activity. Examples of such information are time standards, design standards.

✓ **Control Information:** This information is needed for establishing control over all business activities through feedback mechanism. This information is used for controlling attainment, nature and utilization of important processes in a system. When such information reflects a deviation from the established standards, the system should induce a decision or an action leading to control.

✓ **Knowledge Information:** Knowledge is defined as "information about information". Knowledge information is acquired through experience and learning, and collected from archival data and research studies.

✓ **Organizational Information:** Organizational information deals with an organization's environment, culture in the light of its objectives. Karl Weick's Organizational Information Theory emphasizes that an organization reduces its equivocality or uncertainty by collecting, managing and using these information prudently. This information is used by everybody in the organization; examples of such information are employee and payroll information.

✓ **Functional/Operational Information:** This is operation specific information. For example, daily schedules in a manufacturing plant that refers to the detailed assignment of jobs to machines or machines to operators. In a service oriented business, it would be the duty roster of various personnel. This information is mostly internal to the organization.

✓ **Database Information:** Database information construes large quantities of information that has multiple usage and application. Such information is stored, retrieved and managed to create databases. For example, material specification or supplier information is stored for multiple users.
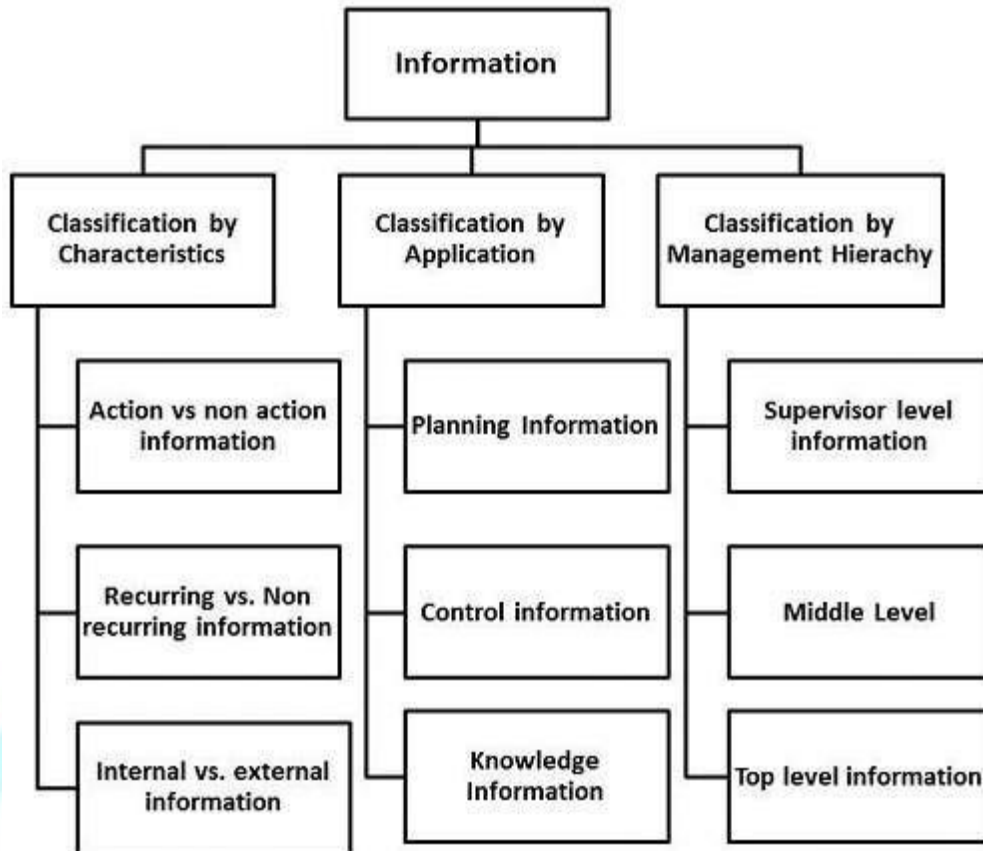
Information and Systems Concept:

An information system (IS) is an organized system for the collection, organization, storage and communication of information. More specifically, it is the study of complementary networks that people and organizations use to collect, filters, and process, create and distribute data.

The concept that information is the message has different meanings in different contexts. Thus the concept of information becomes closely related to notions of constraint, communication, control, data, form, education, knowledge, meaning, understanding, mental stimuli, pattern, perception, representation, and entropy.
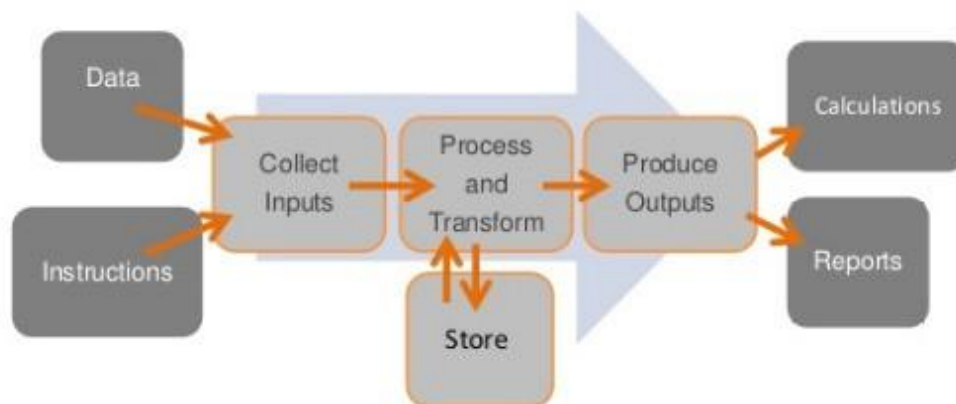
Types of Information Systems:

1. TPS   Transaction Processing System
2. MIS   Management Information System
3. DSS   Decision Support system
4. ESS   Executive Support System
5. OAS   Office Automation System

1. TPS are used primarily for structured operational, and to a lesser degree, management control applications.

2. MIS are used for semi--structured, management control applications. It also overlaps into the operational and strategic planning realms as well.

3. DSS are used primarily for unstructured decision-making whether that occurs at the operational, management and strategic planning levels.

4. ESS is used primarily for structured management and strategic planning applications.

5. OAS are used as a facilitator of office correspondence and communication, underlies all of this activity.

A typical organization is divided into operational, middle, and upper level. The information requirements for users at each level differ. Towards that end, there are number of information systems that support each level in an organization.

- ✓ Pyramid Diagram of Organizational levels and information requirements
- ✓ Transaction Processing System (TPS)
- ✓ Management Information System (MIS)
- ✓ Decision Support System (DSS)
- ✓ Artificial intelligence techniques in business
- ✓ Online Analytical Processing (OLAP)

Pyramid Diagram of Organizational levels and information requirements
Understanding the various levels of an organization is essential to understand the information required by the users who operate at their respective levels.
The following diagram illustrates the various levels of a typical organization.
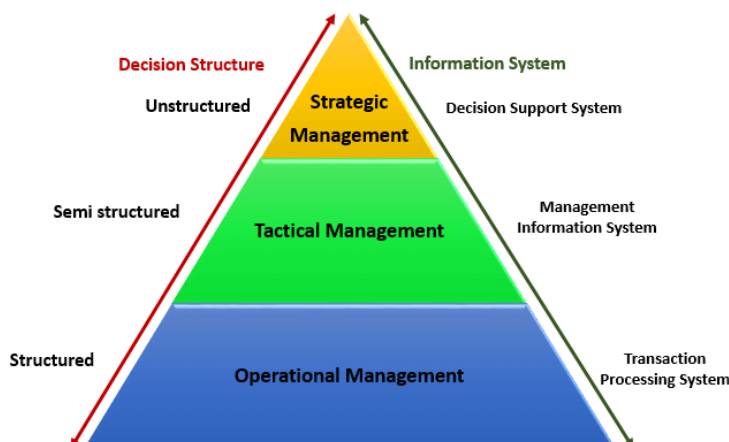
Operational Management Level

The operational level is concerned with performing day to day business transactions of the organization.

Examples of users at this level of management include cashiers at a point of sale, bank tellers, nurses in a hospital, customer care staff, etc.

Users at this level use make structured decisions. This means that they have defined rules that guides them while making decisions.

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

Tactical Management Level

This organization level is dominated by middle-level managers, heads of departments, supervisors, etc. The users at this level usually oversee the activities of the users at the operational management level.

Tactical users make semi-structured decisions. The decisions are partly based on set guidelines and judgmental calls. As an example, a tactical manager can check the credit limit and payments history of a customer and decide to make an exception to raise the credit limit for a particular customer. The decision is partly structured in the sense that the tactical manager has to use existing information to identify a payments history that benefits the organization and an allowed increase percentage.

Strategic Management Level

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

Transaction Processing System (TPS)

Transaction processing systems are used to record day to day business transactions of the organization. They are used by users at the operational management level. The main objective of a transaction processing system is to answer routine questions such as;

- ✓ How printers were sold today?
- ✓ How much inventory do we have at hand?
- ✓ What is the outstanding due for John Doe?

By recording the day to day business transactions, TPS system provides answers to the above questions in a timely manner.

- The decisions made by operational managers are routine and highly structured.
- The information produced from the transaction processing system is very detailed.

For example, banks that give out loans require that the company that a person works for should have a memorandum of understanding (MoU) with the bank. If a person whose employer has a MoU with the bank applies for a loan, all that the operational staff has to do is verify the submitted documents. If they meet the requirements, then the loan application documents are processed. If they do not meet the requirements, then the client is advised to see tactical management staff to see the possibility of signing a MoU.

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

Management Information System (MIS)

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

The MIS system analyzes the input with routine algorithms i.e. aggregate, compare and summarizes the results to produced reports that tactical managers use to monitor, control and predict future performance.

For example, input from a point of sale system can be used to analyze trends of products that are performing well and those that are not performing well. This information can be used to make future inventory orders i.e. increasing orders for well-performing products and reduce the orders of products that are not performing well.

Examples of management information systems include
- **Sales management systems** – they get input from the point of sale system
- **Budgeting systems** – gives an overview of how much money is spent within the organization for the short and long terms.
- **Human resource management system** – overall welfare of the employees, staff turnover, etc.

Tactical managers are responsible for the semi-structured decision. MIS systems provide the information needed to make the structured decision and based on the experience of the tactical managers, they make judgement calls i.e. predict how much of goods or inventory should be ordered for the second quarter based on the sales of the first quarter.

Decision Support System (DSS)

Decision support systems are used by senior management to make non-routine decisions. Decision support systems use input from internal systems (transaction processing systems and management information systems) and external systems.

The main objective of decision support systems is to provide solutions to problems that are unique and change frequently. Decision support systems answer questions such as;

✓ What would be the impact of employees' performance if we double the production lot at the factory?
✓ What would happen to our sales if a new competitor entered the market?

Decision support systems use sophisticated mathematical models, and statistical techniques (probability, predictive modeling, etc.) to provide solutions, and they are very interactive.

Examples of decision support systems include

- **Financial planning systems –** it enables managers to evaluate alternative ways of achieving goals. The objective is to find the optimal way of achieving the goal. For example, the net profit for a business is calculated using the formula Total Sales less (Cost of Goods + Expenses). A financial planning system will enable senior executives to ask what if questions and adjust the values for total sales, the cost of goods, etc. to see the effect of the decision and on the net profit and find the most optimal way.
- **Bank loan management systems –** it is used to verify the credit of the loan applicant and predict the likelihood of the loan being recovered.

Artificial intelligence techniques in business

Artificial intelligence systems mimic human expertise to identify patterns in large data sets. Companies such as Amazon, Facebook, and Google, etc. use artificial intelligence techniques to identify data that is most relevant to you.

Let's use Facebook as an example, Facebook usually makes very accurate predictions of people that you might know or went with to school. They use the data that you provide to them, the data that your friends provide and based on this information make predictions of people that you might know.

Amazon uses artificial intelligence techniques too to suggest products that you should buy also based on what you are currently getting.

Google also uses artificial intelligence to give you the most relevant search results based on your interactions with Google and your location.

These techniques have greatly contributed in making these companies very successful because they are able to provide value to their customers.

Online Analytical Processing (OLAP)

Online analytical processing (OLAP) is used to query and analyze multi-dimensional data and produce information that can be viewed in different ways using multiple dimensions.

Let's say a company sells laptops, desktops, and Mobile device. They have four (4) branches A, B, C and D. OLAP can be used to view the total sales of each product in all regions and compare the actual sales with the projected sales.

Each piece of information such as product, number of sales, sales value represents a different dimension

The main objective of OLAP systems is to provide answers to ad hoc queries within the shortest possible time regardless of the size of the datasets being used.

Information Systems for Competitive Advantage

In Management Information Systems by Effy Oz (2008), there are eight ways to gain competitive advantage: Reducing cost, raising barriers to market entrants, establishing high switching costs, creating new products or services, differentiating products or services, enhancing products or services, establishing alliances.

Locking in suppliers or buyers Competitive Advantage in any industry or business venture is achieved when one particular organization performs more effectively and/or efficiently than the others in the same category. This Competitive Advantage does not have to be all encompassing of the industry and may only cover small segments. A Competitive Advantage is achieved when an organization can do any one thing, process, function, etc. more effectively and or efficiently than others in that industry segment or in some cases across the entire industry.

According to the authors W.R. King, V. Grove, and E.H. Hufnagel (1989), information technology is used as a strategic tool for companies to increase their competitive advantage at a time when uncertainty is growing. The idea that information technology can contribute to the optimization of enterprise resources, enhances, enable and enhance business performance. This idea was accepted and supported by many empirical studies (V. Sethi and WR King, 1994), (Chan, SL Huff, DW Barclay, 1997), (AM Croteau and F. Bergeron, 2001).

Authors Rackoff, Wiseman, and Ullrich (1985) have identified several factors that ensure computerization of competitive advantage of enterprises. They are:

• Modification, differentiation or changes that make the company stand out with its products and services or weaken competition and reduce the competitive advantages;

• Adapting and adjusting supply cutting costs, reducing consumer spending and increasing competition expenses;

• Company being introduced innovative products or services that result in changes in the way business is passed then in the industry;

• Improving growth and development by increasing volume, expanding geographically and being harmonized with suppliers and customers;

• Forms of mergers and alliances through various agreements in marketing etc.

Since the business environment is constantly changing and evolving, the business itself changes all the time and with the growth and development information needs to ask businesses will vary. At the same time computing system needs to support growth, change and development. (Vakola and Wilson, 2004). The findings of the authors mentioned above clearly show that businesses

invest in computing technology, because they believe that this technology will enable them to be more competitive (Malaga A. Ross, 2001).

Some other authors Urwiller and Florick (2008) noted that to create competitive difference as a result of computerization first condition are innovations in information technology, which today have become an integral part of organizational strategy and planning processes. Information Technology is not only possible, but is streamlined entity and the way to create competitive edge. To achieve competitive difference information technology and its use in business processes results in a new way of doing business (e-business) as well as providing products and services electronically. So information technology plays a crucial role in supporting the business by creating competitive advantage (Competitive Advantage), offering services and products so that customers appreciate more than the competition. This technology is able to provide operational excellence (Operational excellence), initiatives in key business branches (Major Business Initiatives) then the decision (Decision Making) and organizational transformation (Organizational Transformation). In what manner is information technology provides operational perfection (Operational Excellence) being efficient in what we do, using transaction-processing systems within the organization Transaction processing system (TPS) using Customer self-service system (CSS) to make their offer customers their transaction processing etc.

UNIT-II
BUSINESS APPLICATIONS OF INFORMATION SYSTEMS

Introduction:

Business software or a business application is any software or set of computer programs used by business users to perform various business functions. These business applications are used to increase productivity, to measure productivity and to perform other business functions accurately.

Technology has important effects on business operations. No matter the size of your enterprise, technology has both tangible and intangible benefits that will help you make money and produce the results your customers demand. Technological infrastructure affects the culture, efficiency and relationships of a business.

For example, office software suites might include word processing, spreadsheet, database, presentation, and email applications. Graphics suites such as Adobe Creative Suite include applications for creating and editing images, while Sony Audio Master Suite is used for audio production etc.

E-Commerce:

E-Commerce or Electronics Commerce is a methodology of modern business, which addresses the requirements of business organizations. It can be broadly defined as the process of buying or selling of goods or services using an electronic medium such as the Internet.

E-Commerce or Electronics Commerce is a methodology of modern business, which addresses the need of business organizations, vendors and customers to reduce cost and improve the quality of goods and services while increasing the speed of delivery. Ecommerce refers to the paperless exchange of business information using the following ways −

- ✓ Electronic Data Exchange (EDI)
- ✓ Electronic Mail (e-mail)
- ✓ Electronic Bulletin Boards
- ✓ Electronic Fund Transfer (EFT)
- ✓ Other Network-based technologies

Features of E-Commerce:

1. **Non-Cash Payment** − E-Commerce enables the use of credit cards, debit cards, smart cards, electronic fund transfer via bank's website, and other modes of electronics payment.
2. **24x7 Service availability** − E-commerce automates the business of enterprises and the way they provide services to their customers. It is available anytime, anywhere.
3. Advertising / Marketing − E-commerce increases the reach of advertising of products and services of businesses. It helps in better marketing management of products/services.
4. **Improved Sales** − Using e-commerce, orders for the products can be generated anytime, anywhere without any human intervention. It gives a big boost to existing sales volumes.

5. **Support** − E-commerce provides various ways to provide pre-sales and post-sales assistance to provide better services to customers.
6. **Inventory Management** − E-commerce automates inventory management. Reports get generated instantly when required. Product inventory management becomes very efficient and easy to maintain.
7. **Communication improvement** − E-commerce provides ways for faster, efficient, reliable communication with customers and partners.

E-commerce business models can generally be categorized into the following categories.
- ❖ Business - to - Business (B2B)
- ❖ Business - to - Consumer (B2C)
- ❖ Consumer - to - Consumer (C2C)
- ❖ Consumer - to - Business (C2B)
- ❖ Business - to - Government (B2G)
- ❖ Government - to - Business (G2B)
- ❖ Government - to - Citizen (G2C)

Business - to - Business
A website following the B2B business model sells its products to an intermediate buyer who then sells the product to the final customer. As an example, a wholesaler places an order from a company's website and after receiving the consignment, sells the end product to the final customer who comes to buy the product at one of its retail outlets.
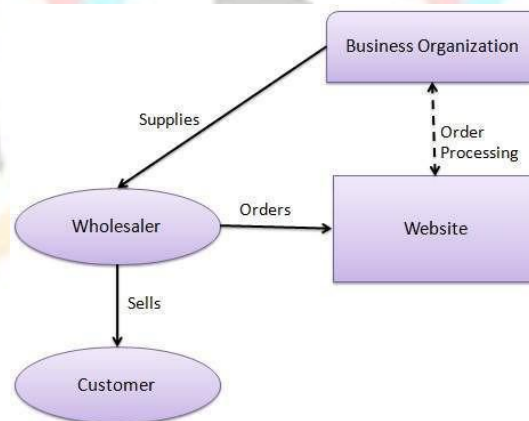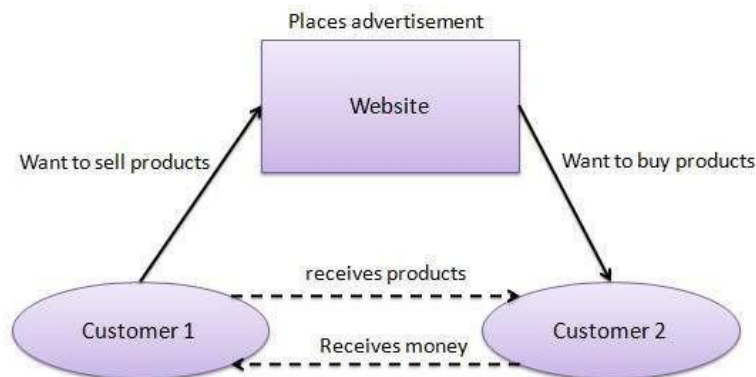

Business - to - Consumer
A website following the B2C business model sells its products directly to a customer. A customer can view the products shown on the website. The customer can choose a product and order the same. The website will then send a notification to the business organization via email and the organization will dispatch the product/goods to the customer.
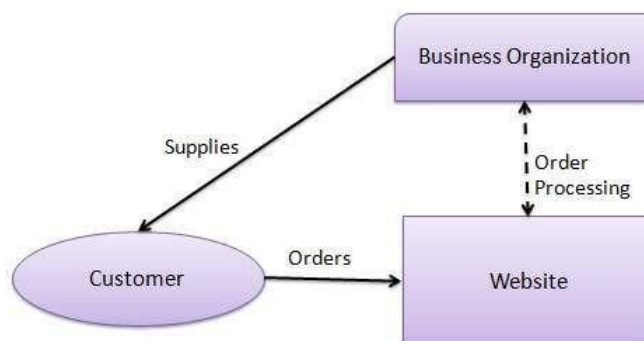
Consumer - to - Consumer

A website following the C2C business model helps consumers to sell their assets like residential property, cars, motorcycles, etc., or rent a room by publishing their information on the website. Website may or may not charge the consumer for its services. Another consumer may opt to buy the product of the first customer by viewing the post/advertisement on the website.

Consumer - to - Business

In this model, a consumer approaches a website showing multiple business organizations for a particular service. The consumer places an estimate of amount he/she wants to spend for a particular service. For example, the comparison of interest rates of personal loan/car loan provided by various banks via websites. A business organization who fulfils the consumer's requirement within the specified budget, approaches the customer and provides its services.
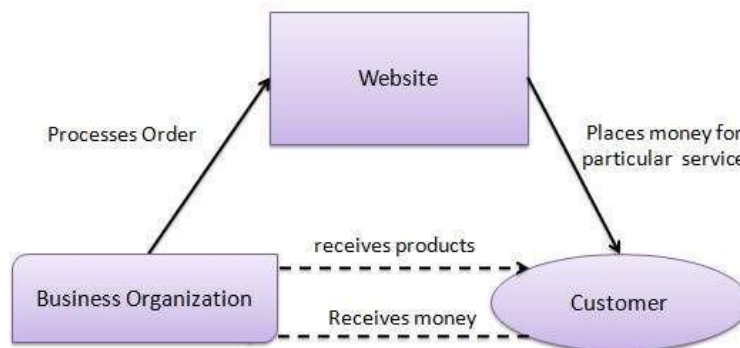
Business - to - Government

B2G model is a variant of B2B model. Such websites are used by governments to trade and exchange information with various business organizations. Such websites are accredited by the government and provide a medium to businesses to submit application forms to the government.

Government - to – Business

Governments use B2G model websites to approach business organizations. Such websites support auctions, tenders, and application submission functionalities.

Government - to - Citizen

Governments use G2C model websites to approach citizen in general. Such websites support auctions of vehicles, machinery, or any other material. Such website also provides services like registration for birth, marriage or death certificates. The main objective of G2C websites is to reduce the average time for fulfilling citizen's requests for various government services.

E-Commerce advantages can be broadly classified in three major categories −
1. **Advantages to Organizations**
2. **Advantages to Consumers**
3. **Advantages to Society**

1. Advantages to Organizations

Using e-commerce, organizations can expand their market to national and international markets with minimum capital investment. An organization can easily locate more customers, best suppliers, and suitable business partners across the globe.

- ✓ E-commerce helps organizations to reduce the cost to create process, distribute, retrieve and manage the paper based information by digitizing the information.
- ✓ E-commerce improves the brand image of the company.
- ✓ E-commerce helps organization to provide better customer services.
- ✓ E-commerce helps to simplify the business processes and makes them faster and efficient.
- ✓ E-commerce reduces the paper work.
- ✓ E-commerce increases the productivity of organizations. It supports "pull" type supply management. In "pull" type supply management, a business process starts when a request comes from a customer and it uses just-in-time manufacturing way.

2. Advantages to Customers
- ✓ It provides 24x7 supports. Customers can enquire about a product or service and place orders anytime, anywhere from any location.
- ✓ E-commerce application provides users with more options and quicker delivery of products.
- ✓ E-commerce application provides users with more options to compare and select the cheaper and better options.
- ✓ A customer can put review comments about a product and can see what others are buying, or see the review comments of other customers before making a final purchase.
- ✓ E-commerce provides options of virtual auctions.
- ✓ It provides readily available information. A customer can see the relevant detailed information within seconds, rather than waiting for days or weeks.

✓ E-Commerce increases the competition among organizations and as a result, organizations provide substantial discounts to customers.

3. Advantages to Society
Customers need not travel to shop a product, thus less traffic on road and low air pollution.

- ✓ E-commerce helps in reducing the cost of products, so less affluent people can also afford the products.
- ✓ E-commerce has enabled rural areas to access services and products, which are otherwise not available to them.
- ✓ E-commerce helps the government to deliver public services such as healthcare, education, social services at a reduced cost and in an improved manner.

The disadvantages of e-commerce can be broadly classified into two major categories −
1. **Technical disadvantages**
2. **Non-Technical disadvantages**

1. Technical Disadvantages
There can be lack of system security, reliability or standards owing to poor implementation of e-commerce.

- ✓ The software development industry is still evolving and keeps changing rapidly.
- ✓ In many countries, network bandwidth might cause an issue.
- ✓ Special types of web servers or other software might be required by the vendor, setting the e-commerce environment apart from network servers.
- ✓ Sometimes, it becomes difficult to integrate an e-commerce software or website with existing applications or databases.
- ✓ There could be software/hardware compatibility issues, as some e-commerce software may be incompatible with some operating system or any other component.

Non-Technical Disadvantages
- ✓ Initial cost − The cost of creating/building an e-commerce application in-house may be very high. There could be delays in launching an e-Commerce application due to mistakes, and lack of experience.
- ✓ User resistance − Users may not trust the site being an unknown faceless seller. Such mistrust makes it difficult to convince traditional users to switch from physical stores to online/virtual stores.
- ✓ Security/ Privacy − It is difficult to ensure the security or privacy on online transactions.
- ✓ Lack of touch or feel of products during online shopping is a drawback.
- ✓ E-commerce applications are still evolving and changing rapidly.
- ✓ Internet access is still not cheaper and is inconvenient to use for many potential customers, for example, those living in remote villages.

Decision support systems (DSS)

Decision support systems (DSS) are interactive software-based systems intended to help managers in decision-making by accessing large volumes of information generated from various related information systems involved in organizational business processes, such as office automation system, transaction processing system, etc.

DSS uses the summary information, exceptions, patterns, and trends using the analytical models. A decision support system helps in decision-making but does not necessarily give a decision itself. The decision makers compile useful information from raw data, documents, personal knowledge, and/or business models to identify and solve problems and make decisions.

Characteristics of a DSS
- ✓ Support for decision-makers in semi-structured and unstructured problems.
- ✓ Support for managers at various managerial levels, ranging from top executive to line managers.
- ✓ Support for individuals and groups. Less structured problems often requires the involvement of several individuals from different departments and organization level.
- ✓ Support for interdependent or sequential decisions.
- ✓ Support for intelligence, design, choice, and implementation.
- ✓ Support for variety of decision processes and styles.
- ✓ DSSs are adaptive over time.

Classification of DSS

There are several ways to classify DSS. Hoi Apple and Whinstone classifies DSS as follows:

- **Text Oriented DSS:** It contains textually represented information that could have a bearing on decision. It allows documents to be electronically created, revised and viewed as needed.
- **Database Oriented DSS:** Database plays a major role here; it contains organized and highly structured data.
- **Spreadsheet Oriented DSS:** It contains information in spread sheets that allows create, view, modify procedural knowledge and also instructs the system to execute self-contained instructions. The most popular tool is Excel and Lotus 1-2-3.
- **Solver Oriented DSS:** It is based on a solver, which is an algorithm or procedure written for performing certain calculations and particular program type.
- Rules Oriented DSS: It follows certain procedures adopted as rules.

- **Rules Oriented DSS:** Procedures are adopted in rules oriented DSS. Export system is the example.
- **Compound DSS:** It is built by using two or more of the five structures explained above.

Types of DSS

Following are some typical DSS:

- **Status Inquiry System:** It helps in taking operational, management level, or middle level management decisions, for example daily schedules of jobs to machines or machines to operators.
- **Data Analysis System:** It needs comparative analysis and makes use of formula or an algorithm, for example cash flow analysis, inventory analysis etc.
- **Information Analysis System:** In this system data is analyzed and the information report is generated. For example, sales analysis, accounts receivable systems, market analysis etc.
- **Accounting System:** It keeps track of accounting and finance related information, for example, final account, accounts receivables, accounts payables, etc. that keep track of the major aspects of the business.
- **Model Based System:** Simulation models or optimization models used for decision-making are used infrequently and creates general guidelines for operation or management.

Model of Decision Support System:
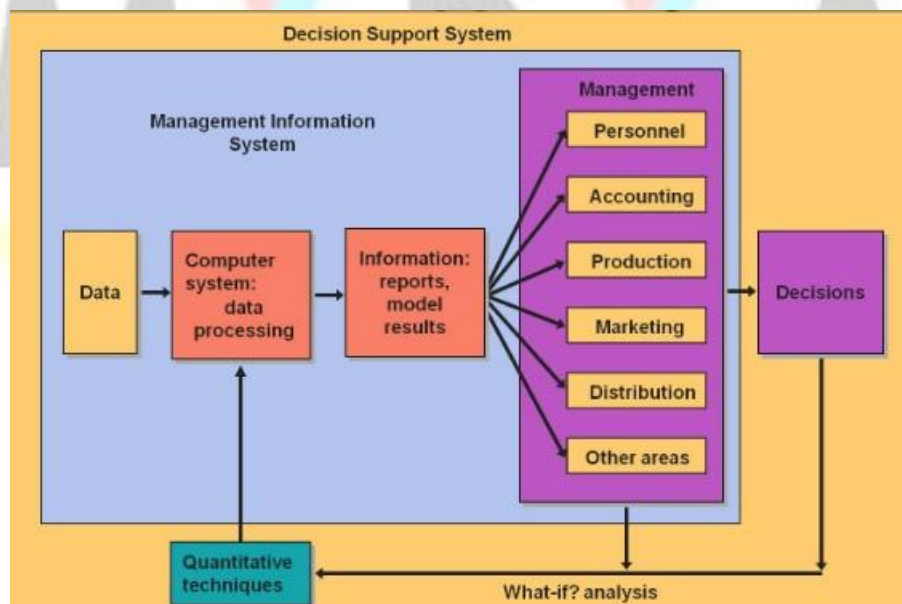
Business Intelligence System:

The term 'Business Intelligence' has evolved from the decision support systems and gained strength with the technology and applications like data warehouses, Executive Information Systems and Online Analytical Processing (OLAP).

Business Intelligence System is basically a system used for finding patterns from existing data from operations.

Characteristics of BIS
- ✓ It is created by procuring data and information for use in decision-making.
- ✓ It is a combination of skills, processes, technologies, applications and practices.
- ✓ It contains background data along with the reporting tools.
- ✓ It is a combination of a set of concepts and methods strengthened by fact-based support systems.
- ✓ It is an extension of Executive Support System or Executive Information System.
- ✓ It collects, integrates, stores, analyzes, and provides access to business information
- ✓ It is an environment in which business users get reliable, secure, consistent, comprehensible, easily manipulated and timely information.
- ✓ It provides business insights that lead to better, faster, more relevant decisions.

Benefits of BIS
- ✓ Improved Management Processes.
- ✓ Planning, controlling, measuring and/or applying changes that results in increased revenues and reduced costs.
- ✓ Improved business operations.
- ✓ Fraud detection, order processing, purchasing that results in increased revenues and reduced costs.
- ✓ Intelligent prediction of future.

Knowledge Management System:
A knowledge management system comprises a range of practices used in an organization to identify, create, represent, distribute, and enable adoption to insight and experience. Such insights and experience comprise knowledge, either embodied in individual or embedded in organizational processes and practices.

Purpose of KMS
- ▪ Improved performance
- ▪ Competitive advantage
- ▪ Innovation
- ▪ Sharing of knowledge
- ▪ Integration
- ▪ Continuous improvement by:
  - ✓ Driving strategy
  - ✓ Starting new lines of business
  - ✓ Solving problems faster

- ✓ Developing professional skills
- ✓ Recruit and retain talent

Activities in Knowledge Management
- ✓ Start with the business problem and the business value to be delivered first.
- ✓ Identify what kind of strategy to pursue to deliver this value and address the KM problem.
- ✓ Think about the system required from a people and process point of view.
- ✓ Finally, think about what kind of technical infrastructure are required to support the people and processes.
- ✓ Implement system and processes with appropriate change management and iterative staged release.

UNIT-III
MANAGEMENT OF INFORMATION RESOURCES

Information Systems Planning:

Information management is term that covers array of the systems and processes within an organisation to create and use of corporate information. Information Systems Planning is critical in developing and executing successful strategic plans in huge firms at global level. It is observed in current business situation that the markets are very uncertain which pushes companies to adopt effective, pro-active strategies in order to gain competitive advantage. The strategy formula is oriented through company's operation and objectives based on a cautious analysis of the involving company. Objectives of information system planning are desired future positions and destinations the organizations intend to reach in order to fulfil its mission. Its policies are a general guideline that directs and constraints decision making within an organization.
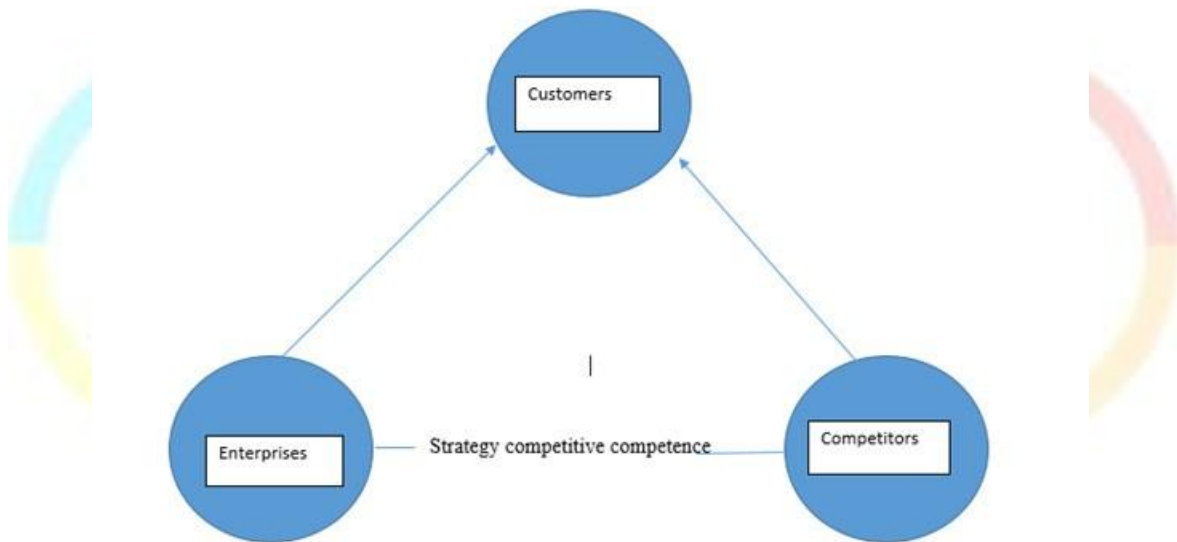
Information technology enables a set of opportunities to gain competitive advantage and to adjust the Information Systems for the benefit of organization.

In present scenario, information system planning is key issue faced by senior executives of company. Information management planning mainly involves in identification of the stage of IS in the organization, identification of the applications of organizational information systems, evaluation of each of these applications, based on established evaluation criteria, establishing a priority ranking for these application and determining the optimum architecture of IS for serving the top priority applications. Theoretical literature of the information systems planning suggests two challenging theories of effective planning in a turbulent environment. One predicts that organizations using a formal, comprehensive planning approach will be more successful. The

other predicts that organizations using an informal, incremental approach will be more successful in such an environment.

Stage model of Information System planning
1. Strategic planning:
   a) Derivation from the organizational plan.
   b) Strategic fit with organizational culture.
   c) Strategy set transformation.

2. Information requirement analysis:
   a) Define underlying organizational requirements.
   b) Develop sub system matrix.
   c) Define and evaluate information requirements for organizational sub-systems.

3. Resource allocation:
   a) Return on investment
   b) Charge out
   c) Portfolio approach
   d) Steering committees.

4. Project planning
   a) Milestones
   b) Critical path method
   c) Gantt chart

Four Stage Models of Information Systems Planning
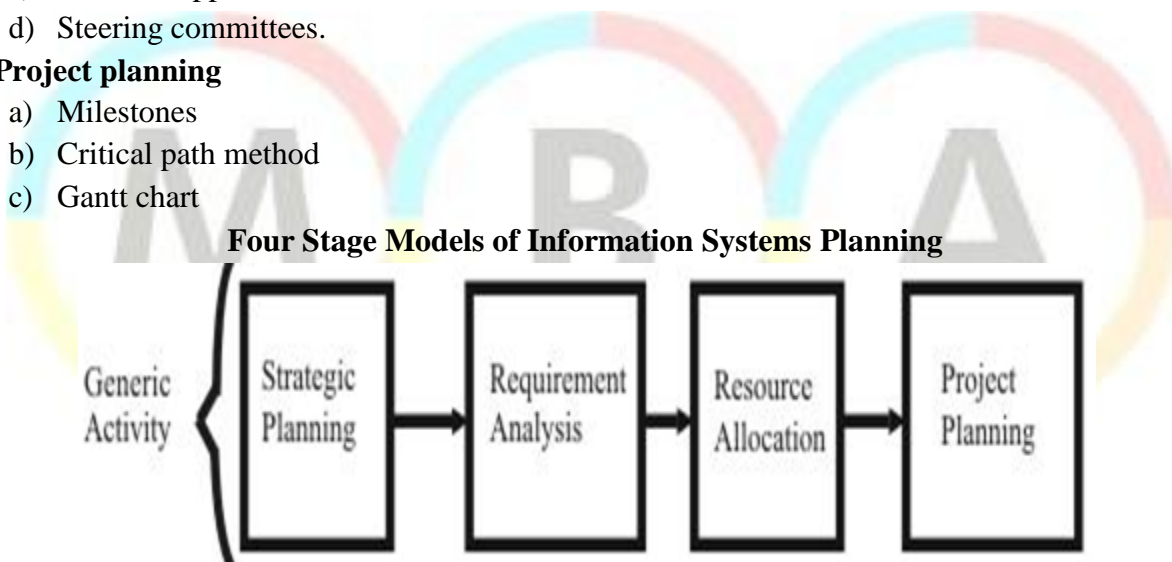
Acquisition of Information Systems:
An acquisition strategy is a top-level roadmap that focuses on highlighting and managing risks to a successful outcome. Business requirements for supporting work processes require integration across multiple systems, spanning multiple business or organizational units.

The acquisition of information systems can either involve external sourcing or rely on internal development or modification. With today's highly developed IT industry, companies tend to acquire information systems and services from specialized vendors.

Information systems are a major corporate asset, with respect both to the benefits they provide and to their high costs. Therefore, organizations have to plan for the long term when acquiring

information systems and services that will support business initiatives. At the same time, firms have to be responsive to emerging opportunities. On the basis of long-term corporate plans and the requirements of various individuals from data workers to top management, essential applications are identified and project priorities are set. For example, certain projects may have to be carried out immediately to satisfy a new government reporting regulation or to interact with a new customer's information system. Other projects may be given a higher priority because of their strategic role or greater expected benefits.

Once the need for a specific information system has been established, the system has to be acquired. This is generally done in the context of the already existing information systems architecture of the firm. The acquisition of information systems can either involve external sourcing or rely on internal development or modification. With today's highly developed IT industry, companies tend to acquire information systems and services from specialized vendors. The principal tasks of information systems specialists involve modifying the applications for their employer's needs and integrating the applications to create coherent systems architecture for the firm. Generally, only smaller applications are developed internally. Certain applications of a more personal nature may be developed by the end users themselves.

Acquisition from external sources

There are several principal ways to acquire an information system from outside the organization.

- ✓ **Outsourcing:** Outsourcing entails transferring the major components of the firm's systems and operations—such as data centres, telecommunications.
- ✓ **Software:** A specialized company that provides its services under long-term contracts.
- ✓ **Offshoring:** Offshore outsourcing, a type of business process outsourcing (BPO), is the exporting of IT-related work from the United States and other developed countries to areas of the world where there is both political stability and lower labor costs or tax savings.
- ✓ **Cloud Computing:** Cloud computing is a method for delivering information technology (IT) services in which resources are retrieved from the Internet through web-based tools and applications, as opposed to a direct connection to a server.
- ✓ **Internet:** A means of connecting a computer to any other computer anywhere in the world via dedicated routers and servers.
- ✓ **Software-as-a-Service:** SaaS is software licensing model in which access to the software is provided on a subscription basis, with the software being located on external servers rather than on servers located in-house.
- ✓ **Open Source:** Software for which the original source code is made freely available and may be redistributed and modified according to the requirement of the user.

Implementation of Information Systems:

The design of a management information system may seem to management to be an expensive project, the cost of getting the MIS on line satisfactorily may often be comparable to that of its design, and the implementation has been accomplished when the outputs of the MIS are continuously utilized by decision makers.

Once the design has been completed, there are four basic methods for implementing the MIS.

These areas:

1. Install the system in a new operation or organization.

2. Cut off the old system and install the new

This produces a time gap during which no system is in operation. Practically, installation requires one or two days for small companies or small systems.

3. Cut over by segments

This method is also referred as" phasing in" the new system. Small parts or subsystems are substituted for the old. In the case of upgrading old systems, this may be a very desirable method.

4. Operate in parallel and cut over.

The new system is installed and operated in parallel with the current system until it has been checked out, then only the current system is cut out. This method is expensive because of personal and related costs. Its big advantages are that the system is fairly well debugged when it becomes the essential information system.

Implementation Tasks

Plan the implementation

The three main phases in implementation take place in series.

These are

1. The initial installation

2. The test of the system as a whole

3. The evaluation, maintenance and control of the system.

Many implementation activities should be undertaken in parallel to reduce implementation time. Training of personnel and preparation of software may be in parallel with each other and with other implementation activities.

The first step in the implementation procedure is to plan the implementation. Some analyst includes the planning of the implementation with the design of the system, the planning and the action to implement the plan should be bound closely together. Planning is the first step of management, not the last. The MIS design and the urgent need for the system at the time the design is completed will weigh heavily on the plan for implementation.

The major implementation tasks consists of-

1. Planning the implementation activities
2. Acquiring and laying out facilities and offices
3. Organizing the personnel for implementation
4. Developing procedures for installation and testing
5. Developing the training program for operating personnel.
6. Completing the system's software
7. Acquiring required hardware
8. Generating files
9. Designing forms
10. Testing the entire system
11. Completing cutover to the new system
12. Documenting the system
13. Evaluating the MIS
14. Providing system maintenance (debugging and improving)

1. Planning the implementation activities

Establish Relationships among tasks

For small projects, the order of performance may simply be described in text form. A Gantt chart or network diagram makes visualization of the plan and schedule much clearer.

For large projects, many concurrent and sequential activities are interrelated so that a network diagram must be employed in any good plan.

Establish a Schedule

Schedule is prepared by having the system designers estimate the times between the events in the program network. The critical path (longest time through the network) can be calculated. After specifying the starting date, the end date is established.

Cost Schedule to Tasks and Time

The cost for completing each task required to complete is established as part of the plan; then the rate of expenditures should be budgeted.

Reporting and control of the work in progress may be obtained by weekly meetings. The financial personnel must make certain that report formats allow them to show cost and technical progress relationship as well as cost and time.

2. Acquiring and laying out facilities and offices

For the installation of a new system to replace a current one may require a major revision of facilities as well as completely new office, computer room etc.

The MIS project manager must prepare rough layouts and estimates of particular floor areas that feel to be needed. The manager then prepares cost estimates.

Space planning must be done by the space to be occupied by people, the space occupied by equipment and the movement of people and equipment in the work progress. A large investment in good working conditions will repay its cost many times.

3. Organizing the personnel for implementation

As the implementation tasks have been defined, management usually assigns a project manager to guide the implementation.

The purpose of the MIS is to increase the amount and quality of their contributions, the system is their system.

Top management must make the middle managers for their involvement in implementation, besides these, systems specialists, computer programmer; top management should make sure that each people who will operate the system should have active parts in the implementation.

4. Developing procedures for installation and testing

After organizing the personnel for implementation the next task is to develop or prepare the procedures for implementation. As the project leader has the network plan for proceeding with the implementation, this leader calls the key people in the project to prepare more detailed procedures for system installation.

Procedures for evaluating and selecting hardware must be spelled out. Procedures for phasing in parts of the MIS or operating the MIS in parallel must be developed.

The major part of implementing the MIS is the testing of each segment of total system as it is installed.

5. Developing the training program for operating personnel

A program is developed keeping in mind to impress management and support. After developing the program, it is necessary to train operating personnel in their new duties. They must have a thorough understanding of what the new MIS is like and what it is supposed to do. They must learn how it will operate. They are faced with many changes in their work and have to obtain acceptance of changes.

As there are various levels of personnel and these people will be working with only a small part of the MIS, the seminars should be designed to provide them with an understanding of the complete system.

6. Completing the system's software

As the software is developed internally or under contract, in both cases, the software development must take in mind the nature of the hardware required.

As the system designers and programmers provide the flow diagrams and the block diagrams during the detailed design state. Some modification may be required, as the implementation stage progresses.

7. Acquiring required hardware

This acquisition is usually the limiting factor in getting am MIS implementation. These tasks should be started during the design stage.

The decision is to be needed, whether to buy or lease the hardware. Capital expenditure analysis is only one of many factors involved in this decision. Others are prestige, usage etc.

8. Generating files

In the implementation stage, the actual data must be obtained and recorded for the initial testing and operation of the system. This requires format of the data, storage form and format and remarks to indicate when the data have been stored.

The collection of data used in routine operations is often called the master file.

Responsibility for file maintenance for each file item should also be assigned. The development of files or databases belongs to information system designers and storage and retrieval experts.

The translation of specifications for files into computer programs is a function of computer specialists.

9. Designing forms

For controlling the marketing, a salesperson has to fill out the forms summarizing the day's activities. The form ensures the right information to be supplied for computer storage.

Forms are required not just for input and output but also for transmitting data at intermediate stages.

10. Testing the entire system

As the total system is installed, tests should be performed with the test specifications and procedure. A test during installation stage consists of component tests, subsystem tests and total system acceptance tests.

Components may be equipment (that can be new or old), new software programs, new data collection methods, work procedures, reporting formats. Difficulties that occur during component tests may lead t design changes.

As more components are installed, subsystems may be tested. There is a difference between the testing of component and the testing of a system.

System tests require verification of multiple inputs, complex logic systems, and timing aspects of many parts.

11. completing cutover to the new system

Cutover is a point at which the new component replaces the old component to the new system replaces the old system. This involves old forms, old files and old equipment being retried.

The debugging proves associated with the cutover to the new system may extend for several months.

12. Documenting the system

Documentation of the MIS means preparation of written descriptions of the scope, purpose, information flow components, and operating procedures of the system.

Documentation is a necessity for troubleshooting, for replacement of subsystems, for interfacing with other systems, for training new operating personnel and also for evaluating and upgrading the system.

13. Evaluating the system

After the MIS has been operating smoothly for a short period of time, an evaluation of each step in the design and of the final system performance should be made.

Evaluation should not be delayed beyond the time when the system's analysts have completed most of the debugging. The longer the delay, the more difficult it will be for designer to remember important details.

The evaluation should be made by the customer as well as by the designers.

14. Providing system maintenance

Control and maintenance of the system are the responsibilities of the line managers.

Control of the systems means the operation of the system as it was designed to operate. Sometimes, well-intentioned people or operators may make unauthorized changes to improve the system, changes that are not approved or documented.

Maintenance is closely related to control. Maintenance is that ongoing activity that keeps the MIS at the highest levels of effectiveness and efficiency within cost constraints.

Maintenance is directed towards reducing errors due to design, reducing errors due to environmental changes and improving the system's scope and services.

Evaluation of Information Systems:

Evaluation of MIS is an integral part of the management control process, in which the organizations determine or appraise the quality or worth of their information systems. In other words, evaluation of MIS is a process of measuring performance of organizational information systems.

Evaluation Approaches:

There are different approaches to evaluate MIS in an organization. The MIS evaluation approaches provide different means to measure accomplishments of system objectives.

- **Quality Assurance Review:** Quality assurance review or technical review focus on assessing the information system's technical quality.
- **Compliance Audits:** Compliance audits or application control reviews assess the adequacy and completeness of controls for the system inputs, outputs, processing, security and access.

- **Budget Performance Review:** Evaluation of MIS budget performance concentrates on compliance with a predetermined budget expenditure level for the MIS development or operations process.
- **MIS Personnel Productivity Measurements:** The capability of MIS personnel is typically determined in terms of productivity.
- **Computer Performance Evaluation:** The production capability of the computer hardware is typically evaluated in terms of performance efficiencies and bottlenecks that limit production.
- **Service Level Monitoring:** Service level monitoring focuses on assessing the information and support provided to the user, based on the terms established between the MIS user personnel.
- **User Attitude Survey:** This method is used in operational evaluation. Operational considerations refer to whether the input data is adequately provided and the output is usable.
- **Post-Installation Review:** The focus of the post-installation review (PIR) is often on estimating whether the system meets the requirements.
- **Cost Benefit Analysis:** It is also known as economic evaluation. The analysis quantifies the system's effect on organizational performance in terms of dollars.

Evaluation of Performance:

1. **Effectiveness:** This refers to the quality of the outputs from the systems. Effectiveness means doing the right thing in the right manner so that desired result may be achieved. Information system is said to be effective if its product (i.e. output) is of quality, and the process of producing output is right (effective).
2. **Efficiency:** It is a measure of the amount of resources required to achieve the output, i.e. the use of system resources to get results. Being efficient implies the system is operating the right way.
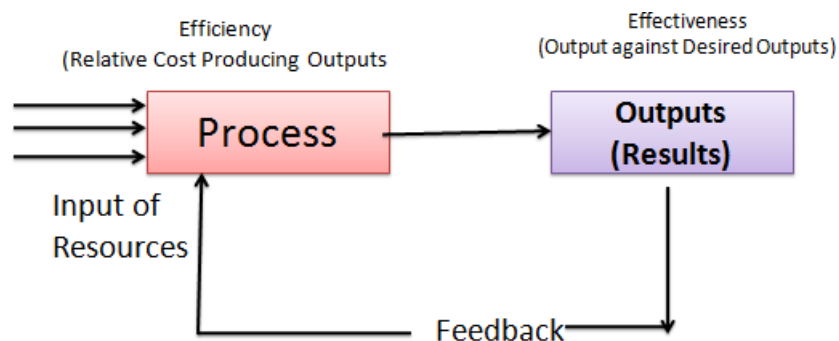
Relationship between Efficiency and Effectiveness

Product-Based MIS Evaluation:

Since the focus of the product-based evaluation is on the product or the output from the system, the evaluation may be termed as effectiveness evaluation. For assessing the effectiveness of output form MIS, the following model may be used.

Model Structure:
- ✓ Timeliness
- ✓ Relevance
- ✓ Accuracy
- ✓ Completeness
- ✓ Adequacy
- ✓ Explicitness
- ✓ Exception-based

Cost-Benefit-Based MIS Evaluation:

In cost/benefit evaluation, a thorough study of various expected costs, the benefits to be expected from the system and expected savings, if any, is done. It is an economic evaluation of the system, in which costs to be incurred for developing, implementing and operating a system are to be justified against the expected benefits from the system.

In other words, cost/benefit analysis determines the cost-effectiveness of the firms.

Cost Elements:
- **Initial Development Cost:** it incurred in developing an information system. Various elements of development cost include project planning cost, feasibility study cost, design cost, conversation cost, implementation cost etc.
- **Capital Cost:** It is also one-time cost. It is the cost incurred in facilities and in procuring various equipment, including hardware etc.
- **Annual Operating Cost:** It is the cost incurred in operating the system. It includes computer and equipment maintenance cost, personnel cost, overheads, and supplies cost.
- **Identification of Cost and Benefits:** Certain costs and benefits are more easily identifiable than others. For example, direct cost.
- **Classification of Cost and Benefits:** The various categories of costs and benefits are important to make a cost/benefit analysis. These categories may be tangible or intangible, direct or indirect, fixed or variable.

Evaluation Models:

Having identified and categorised various costs and benefits, monetary value of each and every cost as well as benefit is estimated. A system analyst/user manager may evaluate the costs and benefits so estimated. For evaluation, there are several models, which are available, namely:

i. Net Benefit Analysis
ii. Present Value Analysis
iii. Net Present Value

iv.   Payback Method
v.   Cash-flow Analysis
vi.   Break-even Analysis etc.

Maintenance of Information systems:
The results obtained from the evaluation process help the organization to determine whether its information systems are effective and efficient or otherwise. The process of monitoring, evaluating, and modifying of existing information systems to make required or desirable improvements may be termed as System Maintenance.

System maintenance is an ongoing activity, which covers a wide variety of activities, including removing program and design errors, updating documentation and test data and updating user support. For the purpose of convenience, maintenance may be categorized into three classes, namely:

i) Corrective Maintenance: This type of maintenance implies removing errors in a program, which might have crept in the system due to faulty design or wrong assumptions. Thus, in corrective maintenance, processing or performance failures are repaired.

ii) Adaptive Maintenance: In adaptive maintenance, program functions are changed to enable the information system to satisfy the information needs of the user. This type of maintenance may become necessary because of organizational changes which may include:
a) Change in the organizational procedures,
b) Change in organizational objectives, goals, policies, etc.
c) Change in forms,
d) Change in information needs of managers.
e) Change in system controls and security needs, etc.

iii)Perfective Maintenance: Perfective maintenance means adding new programs or modifying the existing programs to enhance the performance of the information system. This type of maintenance undertaken to respond to user's additional needs which may be due to the changes within or outside of the organization. Outside changes are primarily environmental changes, which may in the absence of system maintenance; render the information system ineffective and inefficient. These environmental changes include:
a) Changes in governmental policies, laws, etc.,
b) Economic and competitive conditions, and
c) New technology.

IS SECURITY and CONTROL:
Today, organizations are increasingly becoming dependent on information systems/technology. However these systems are vulnerable to a large number of potential hazards, especially due to

networked computing. Therefore, IS control and security is an important issue of concern for the management. Some of the major threats to the information systems are as follows:

- Error in handling, entering, transferring, or programming data
- Equipment malfunctions
- Accidental or malicious damage to computer resources
- Destruction from virus
- Theft of equipment and/or programs
- Inappropriate use of data
- Loss, theft, or changes of data,
- Fire or any other natural calamity

The advances in telecommunications and computer software have further increased the potential of computer threats. Telecommunications network are highly vulnerable to natural failures of hardware and software and to misuse by computer professionals and other end users. It is possible to tap communications lines and illegally intercept data. Such offences can also be performed by an outsider, called *hacker,* who penetrates a computer system. Computer criminals use various innovative methods for attacking the information systems.

IS security refers to the policies, procedures, and technical measures used to prevent potential threats to IS resources.

Methods of Attack

The following approaches are used in deliberate attacks on computer systems:

(a) Data Tampering; and
(b) Programming Techniques

(a) *Data Tampering* is also called as 'data diddling', which is the most common approach and is often used by insiders. It involves entering false, fabricated, or fraudulent data into the computer, or changing or deleting existing data. For example operator may transfer some amount to his own account and try to cover up the transfer with some take-debit and credit-debit and debit and credit transactions.

(b) *Programming Techniques* is another approach used by computer criminals to modify a computer program. There are many types of programming fraud schemes which are known by different names. The more knowing attack method is the use of a virus.

Programming Techniques	Definition
Virus	Secret instructions inserted into programs (or data) that are innocently run during ordinary tasks. The secret instructions may destroy or alter data, as well as spared within or between computer systems.
Worm	A program which replicates itself and penetrates a valid computer system. It may spread within a network, penetrating all connected computers.
Trojan house	An illegal program, contained within another program, that 'sleeps' until some specific event occurs, then triggers the illegal program to be activated and cause damage.
Salami slicing	A program designed to siphon-off small amounts of money from a number of larger transactions, so the quantity taken is not readily apparent.
Super zapping	A method of using a utility 'zap' program that can bypass controls to modify programs or data.
Trap door	A technique that allows for breaking into a program code, making it possible to insert additional instructions.

12.6 PROTECTING INFORMATION SYSTEM

Having known the major potential threats to information systems, it is critical to understand the ways to defend IS against these threats. Defending information systems is a difficult as well as an expensive task because of the following reasons:

- A large number of potential threats exist.
- Information assets are controlled by many persons.
- Computer networks can be outside the organisation and difficult to protect.
- Advances in technology can make some controls obsolete immediately after they are installed.
- Many computer crimes are undetected for a long period of time, so it is difficult to 'learn from experience'.
- Many a times procedures are inconvenient and thus people tend to violate security procedures.
- Many computer criminals who are caught go unpunished, so there is no deterrent effect.
- The amount of computer knowledge necessary to commit computer crimes is usually minimal. Hacking tools are available for free on the Internet.
- The cost of preventing hazards can be very high. Therefore, most organisations simply cannot afford to protect against all possible hazards.
- It is difficult to conduct a cost-benefit justification for controls before an attack occurs since it is difficult to assess the value of a hypothetical attack.

Defense Strategies

1. *Controls for prevention and deterrence:* Properly designed controls would help prevent errors from occurring, deter criminals from attacking the system, and deny access to unauthorised people.
2. *Detection:* It may not be economically feasible to prevent all hazards, and deterring measures may not work. Therefore, unprotected systems are vulnerable to attack. In many cases, special diagnostic software can be used for detection.
3. *Limitation:* It refers to minimise losses once a malfunction has occurred. Users want their systems back in operation as early as possible. This can be accomplished by including a fault-tolerant system that permits operation in a degraded mode until full recovery is made. If a fault-tolerant system does not exist, a quick recovery must take place.
4. *Recovery:* A recovery plan explains how to fix a damaged information system as quickly as possible. Replacing rather than repairing components is one route to fast recovery.
5. *Correction:* Correcting damaged system can prevent the problem form occurring again.

12.7 IS CONTROLS

Information System (IS) Controls can be grouped under two categories, as given below:

- (a) General Controls
- (b) Application Controls

(a) General Controls

These types of controls are established to protect the system regardless of the specific application, for example, protecting hardware, access control, etc. The major categories of general controls are physical controls, access controls, data security controls, communications (networks) controls, and administrative controls. A brief description of these controls is given as below:

Physical Controls

Physical security refers to the protection of computer facilities and resources. This includes protecting computers, data centres, Software, manuals, and networks. Appropriate physical security may include several controls such as the following:

1. Design of the computer centre, for example, the site should be non-combustible and waterproof.
2. Good fire prevention, detection, and extinguishing systems, including sprinkler system, water pumps, and adequate drainage facilities.
3. Emergency power shutoff and backup batteries must be maintained in operational condition.
4. Properly designed, maintained, and operated airconditioning systems.

Access Controls

These refer to the restriction of unauthorised user access to the system. In other word, a user, in order to gain access, must be authorised and before he is given an access, must be authenticated. Access control software is commercially available for all types of information systems. User identification is accomplished with a unique user identifier (UID) like the password; a smart card; digital signature, voice fingerprint, or retinal (eye) scan. It is implemented via *bio-meter controls*, which refer to an automated method of verifying the identity of a person, based on physiological or behavioural characteristics.

Data Security Controls

These controls are concerned with protected data form accidental or intentional disclosure to unauthorised person, or from unauthorised changes or destruction. These controls can be accomplished through operating systems, database security, access control programmes, backup and recovery procedures, etc.

Communication Controls

These refer to network protections which have become critical with an increased use of the Internet, intranet and electronic commerce. For example, Access control; Encryption; Firewalls are the most common communication controls.

Administrative Controls

Besides the technical controls, administrative controls are also important in protecting IS. These controls refer to clear guidelines, policies of the organisations with regards to the use and deployment of IT in the organisation. For example, immediately revoking access privileges of dismissed, resigned, or transferred employees; developing programming and documentation standards, etc.

Other Controls

There are still other types of controls, which are understood under general controls. These controls are also implemented so as to ensure that IS is protected from various potential threats. For example, system development controls like budgeting, schedule, quality, etc., are meant to ensure that a system is developed as per the pre-defined policies, procedures and other standards.

(b) Application Controls

Besides the general control there are many application controls which are generally built into the applications and are usually written as validation rules. The application controls may be known as input controls processing controls and output controls.

Global Perspective on Cybercrime

Cybercrime also called computer crime, the use of a computer as an instrument to further illegal ends, such as committing fraud, trafficking in child pornography and intellectual property, stealing identities, or violating privacy. Cybercrime, especially through the Internet, has grown in importance as the computer has become central to commerce, entertainment, and government.

Cybercrime is a term used to broadly describe criminal activity in which computers or computer networks are a tool, a target, or a place of criminal activity and include everything from electronic cracking to denial of service attacks. It is also used to include traditional crimes in which computers or networks are used to enable the illicit activity. "The range of technology-enabled crime is always evolving; both as a function of technological change and in terms of social interaction with new technologies"

Origin of Cyber Crime:

It is believed the first recorded cybercrime took place in the year 1820.This can be true with the fact that, computer did exist since 3500 BC in India, China and Japan. The modern computer began with the analytical engine of Charles Babbage. Banks and other financial institutions were amongst the first large scale computer users in the private sector, for automate payroll and accounting functions. Therefore, fraud in a computer scheme merged. One of the first cases cited as an instance of the computer fraud involved equity-funding Corporation in the US, fraud was simple. The frauds succeed because the auditors and regulators accepted computer printouts as definitive evidence of policies and did not ask original documentation. When the fraud was discovered, some 64,000 out of 97,000 policies allegedly issued by the company proved to be

false, almost 1 Billion pounds estimated to be the loss. Therefore as the technological advance, the number of cybercrime cases increased. There is no reliable and precise statistics of the losses the victims gain as the fact that victims do not detect many of these crimes. Therefore, fights against computer crime began. Several individuals were engaged in the fight against computer crime from the early development. The founder and father of the knowledge of computer crimes are by many observers considered to be Donn B.Parker, USA. He was involved in the research of computer crime and security from the early 1970ties. He served as a Senior Computer Security Consultant at the SRI International (Stanford Research Institute), and was the main author of the first basic federal manual for law enforcement in the USA: _Computer Crime –Criminal Justice Resource Manual' (1979). This manual became so on an encyclopaedia also for law enforcement outside US.

Taking a global perspective on cyber threats, the bottom line up front is as follows:
- ✓ The threat spectrum includes a wide array of actors with different intentions, motivations, and capabilities.
- ✓ Nation-states and their proxies continue to present the greatest— meaning most advanced and persistent— threat in the cyber domain.
- ✓ Foreign terrorist organizations certainly possess the motivation and intent but fortunately, they have yet to fully develop a sustained cyber attack capability.
- ✓ Yet other entities such as "hacktivists" may also possess considerable skills and abilities; and when their special interests or core concerns are perceived to be in play, these individuals can be a significant disruptive force whether acting alone or loosely in tandem, essentially as a leaderless movement. Their motive is often to cause maximum embarrassment to their targets and to bring attention to their cause.
- ✓ In reference to any threat vector, a worst-case scenario would combine kinetic and cyber-attacks; and the cyber component would serve as a force multiplier to increase the lethality or impact of the physical attack.
- ✓ Finally, banking and financial services are primary targets for cyber attacks and cybercrimes.

Cyber Laws Globally:

The IT Act 2000 attempts to change outdated laws and provides ways to deal with cyber crimes. We need such laws so that people can perform purchase transactions over the Net through credit cards without fear of misuse. The Act offers the much-needed legal framework so that information is not denied legal effect, validity or enforceability, solely on the ground that it is in the form of electronic records.

In view of the growth in transactions and communications carried out through electronic records, the Act seeks to empower government departments to accept filing, creating and retention of official documents in the digital format. The Act has also proposed a legal framework for the authentication and origin of electronic records / communications through digital signature.

- From the perspective of e-commerce in India, the IT Act 2000 and its provisions contain many positive aspects. Firstly, the implications of these provisions for the e-businesses would be that email would now be a valid and legal form of communication in our country that can be duly produced and approved in a court of law.
- Companies shall now be able to carry out electronic commerce using the legal infrastructure provided by the Act.
- Digital signatures have been given legal validity and sanction in the Act.
- The Act throws open the doors for the entry of corporate companies in the business of being Certifying Authorities for issuing Digital Signatures Certificates.
- The Act now allows Government to issue notification on the web thus heralding e-governance.
- The Act enables the companies to file any form, application or any other document with any office, authority, body or agency owned or controlled by the appropriate Government in electronic form by means of such electronic form as may be prescribed by the appropriate Government.
- The IT Act also addresses the important issues of security, which are so critical to the success of electronic transactions. The Act has given a legal definition to the concept of secure digital signatures that would be required to have been passed through a system of a security procedure, as stipulated by the Government at a later date.
- Under the IT Act, 2000, it shall now be possible for corporates to have a statutory remedy in case if anyone breaks into their computer systems or network and causes damages or copies data. The remedy provided by the Act is in the form of monetary damages, not exceeding Rs. 1 crore.

Aim of the Act

This Act aims to provide the legal infrastructure for e-commerce in India. And the cyber laws have a major impact for e-businesses and the new economy in India. So, it is important to understand what are the various perspectives of the IT Act, 2000 and what it offers.

The Information Technology Act, 2000 also aims to provide for the legal framework so that legal sanctity is accorded to all electronic records and other activities carried out by electronic means. The Act states that unless otherwise agreed, an acceptance of contract may be expressed by electronic means of communication and the same shall have legal validity and enforceability.

UNIT-IV
INTRODUCTION TO ENTERPRISE RESOURCE PLANNING (ERP)

Introduction:

Enterprise Resource Planning (ERP) is a software that is built to organizations belonging to different industrial sectors, regardless of their size and strength.

The ERP package is designed to support and integrate almost every functional area of a business process such as procurement of goods and services, sale and distribution, finance, accountings, human resource, manufacturing, production planning, logistics & warehouse management.

Functional Areas

ERP is a business management software is usually a suite of integrated applications that a company can use to collect, store, manage, and interpret data from many functional areas including −

- Financial Accounting − Deals with financial transactions and data.
- Human Resource − Deals with information related to employee of an organization.

- Customer Relationship Management − Deals with capturing and managing customer's relationship, facilitating the use of customer experience to evaluate the knowledge database.
- Sales and Distribution − Deals with order placement, delivery, shipment and invoicing.
- Logistics and Warehouse Management − Deals with storage of products and shipment.
- Manufacturing and Material Management − Deals with the production and production planning activities.
- Supply Change Management − Deals with the movement of products, storing, managing, and controlling supplies.
- Business Intelligence − Analyzes data and converts the same to information.

Computers have become so complex and commonplace in organizations, it is much easier to integrate all of the data and processing software modules and hardware into one large unit that is easier to access and control. This is called Enterprise Resource Planning, or ERP. Normally ERP systems use the same database throughout an entire company to store various types of data for different computerized functions. When first developed, ERP systems were used only for large manufacturing companies. Today, they benefit all sizes of companies, even those that are quite small.

Foundation for Understanding ERP Systems:
During early phases of development, integrated solutions were designed for particular process areas such as −
- Material Management − the integrated system was known as Material Requirement Planning (MRP)
- Manufacturing − the integrated system was known as Manufacturing Resource Planning

However none of the integrated systems came with a complete solution for an organization covering major business process areas. In early 1990's, the Gartner Group first used the acronym ERP. By mid–1990's, ERP systems addressed all the core enterprise functions.

In the early stages, most of the ERP solutions were focused on automating back office functions that were not directly affecting customers or general public. Later, front office functions such as customer relationship management and e–business systems were integrated.

What is ERP software?
ERP software has its roots in the Nineties manufacturing industry, where earlier forms of the applications were used for manufacturing resource planning (MRP) and computer integrated manufacturing (CIM).

However, ERP has grown to cover all core functions of a business, regardless of its industry sector. As a result, both private and public sector organisations now use ERP systems in some form or other.

ERP applications tend to be modular in nature, sharing vital business information which is held on a central database repository, or repositories.

What does ERP software do?

ERP systems typically carry out financial and business planning functions, which might formerly have been carried out by many smaller standalone applications.

Examples of ERP system modules include: product lifecycle management, supply chain management (for example purchasing, manufacturing and distribution), warehouse management, customer relationship management (CRM), sales order processing, online sales, financials, human resources, and decision support system.

Why use ERP software?

One major benefit of having a single modular ERP system is that it can unite and link together multiple processes and parts of the business, making the business run more efficiently.

By automating various functions, you can also benefit from having, for example, good order tracking, from acceptance through to fulfilment. In terms of the revenue cycle, you can track invoices through to cash receipts.

ERP systems also centralise the data in one place, which can eliminate the problem of synchronising changes between multiple systems, and allows business managers to get a more accurate view of the business's information.

Having a single data repository can also lower the risk of losing sensitive data, if you use appropriate data security and authorisation.

What are the drawbacks of ERP systems?

ERP systems can prove to be complex and difficult to customise, keeping in mind the actual complexities and idiosyncrasies of each individual business itself.

Many firms fail to adequately invest in ongoing training for the involved IT personnel, and there is often a lack of corporate policy to protect the integrity of the data in the ERP systems and the ways in which it is used.

Business processes frequently have to be re-engineered to fit the new ERP system, and this can lead to problems with processes and staff.

Also, ERP systems can be very expensive. This has led to a newer breed of simpler ERP systems for smaller enterprises which carry a lower cost, and many established ERP vendors now offer managed ERP services, offered over the web.

Finally, the fact that ERP systems centralise the data in one place can increase the risk of loss of sensitive information in the event of a security breach.

Popular ERP Vendors

Microsoft Dynamics
The Microsoft Dynamics ERP suite includes Microsoft Dynamics AX, an accounting and finance, HR and CRM tool; Microsoft Dynamics GP, a mid-market accounting suite; and Microsoft Dynamics NAV and Microsoft Dynamics SL, both SME ERP platform.

Oracle e-Business Suite
A modular ERP platform, the Oracle e-Business Suite has many elements including Oracle CRM, Oracle Financials, Oracle Logistics, Oracle Order Management and Oracle Warehouse Management Systems. The software makes use of the Oracle database.

SAGE
Sage Line 500 and Sage 1000 are the cornerstone ERP solutions for thousands of UK businesses. Developed for the UK mid-market from day one, the Sage Line 500 and Sage 1000 Suites offer customers a broad range of capabilities including CRM, HR, Payroll and Business Intelligence.

SAP Business One
Aimed at SMEs, SAP Business One contains over a dozen core modules, such as Financials, Sales Opportunities, Purchasing Banking, Human Resources, E-commerce and WebCRM.

Infor Global Solutions
Infor is a large business software provider which has several ERP suites, such as Infor ERP LN, Infor ERP SyteLine, Infor ERP VISUAL, Infor ERP Adage and Infor ERP LX. They are built on an open, flexible, service-oriented architecture (SOA) with web-based user interfaces.

NetERP from NetSuite
NetSuite supplies on-demand, integrated business management software suites aimed at mid-market enterprises and divisions of large companies. It offers hosted accounting, CRM, ERP, e-commerce and web site development software.

Lawson Software
Lawson merged with business software firm Intentia International in 2006, to offer mid-market business an alternative to larger ERP vendors. The vendor's ERP packages are Lawson S3 (broadly for service firms) and Lawson M3 (broadly for manufacturers and distributors.

Business benefits of ERP:
There are many advantages to implementing an Enterprise Resource Planning (ERP) software solution. Among countless other advantages, implementing ERP software can improve productivity, increase efficiencies, decrease costs and streamline processes.

1. **Competition:** It's true that ERP software requires a major investment, but there's also an even bigger cost in not making the investment. While some manufacturers choose to stick to the tried and true methods of the past, others seek technology solutions. Manufacturers cannot afford to put off an ERP implementation while their competition invests in ERP and starts reaping the many benefits we'll touch on below.

2. **Efficiency:** An ERP solution eliminates repetitive processes and greatly reduces the need to manually enter information. The system will also streamline business processes and make it easier and more efficient for companies to collect data, no matter what department they're working in.

3. **Forecasting:** Enterprise resource planning software gives your users, and especially managers, the tools they need to create more accurate forecasts. Since the information within ERP is as accurate as possible, businesses can make realistic estimates and more effective forecasts.

4. **Collaboration:** Nobody wants to run a soloed business with each department functioning separate from the other. Collaboration between departments is a crucial and often necessary part of the business. With the data entered into ERP systems being centralized and consistent, there's no reason why departments can't work together. The software also touches on almost every aspect of a business, thus naturally encouraging collaborative, interdepartmental efforts.

5. **Scalability:** Did you know? Structured ERP systems allow the addition of new users and functions to grow the initially implemented solution over time. When your business is ready to grow or needs more resources, enterprise resource planning software should be able to facilitate that growth.

6. **Integrated Information:** No more issues with data spread across separate databases; all information will be housed in a single location. This means you can integrate platforms like your CRM software with the ERP system, keeping data consistent, accurate, and unique. Know your customer, their orders, and your inventory, all in one place.

7. **Cost Savings:** With one source of accurate, real-time information, ERP software reduces administrative and operations costs. It allows manufacturers to proactively manage operations, prevents disruptions and delays, breaks up information logjams and helps users make decisions more quickly. If you've chosen the right solution for your business, and the right vendor who meets your needs, you're bound to see a powerful ROI.

8. **Streamlined Processes:** As manufacturers grow, their operations become more and more complex. Manufacturing software automates business operations cross-departmentally, providing accurate, real-time information to everyone utilizing the solution. ERP increases efficiency and productivity by helping users navigate complex processes, preventing data re-entry, and improving functions such as production, order completion and delivery. Streamlined, efficient processes throughout.

9. **Mobility:** An advantage of ERP solutions like WorkWise ERP software is having access to a centralized database from anywhere you work. Home, office, wherever, through our mobile-friendly solution and application.

10. **Reporting:** ERP software helps make reporting easier and more customizable. With improved reporting capabilities, your company can respond to complex data requests more easily. Users can also run their own reports without relying on help from IT, saving your users time to use toward other projects.

11. **Productivity:** Save time and increase productivity levels. Sound too good to be true? It's not with ERP software. By having redundant processes automated, users have more time to work on other pressing projects and tasks. They'll also be able to work easier since the solution was designed for ease-of-use.

12. **Regulatory Compliance:** A benefit of ERP software which sometimes goes unnoticed is how it ties well into regulatory compliance in the manufacturing industry. Powerful ERP solutions will keep track of regulations within the industry and monitor changes in compliance.

13. **Flexibility:** Modern ERP software systems are robust, flexible, and configurable. They are not a one-size-fits-all proposition but can be tailored to the unique needs of a business. ERP systems also can adapt to the ever-changing needs of a growing business, ensuring you won't have to buy a new solution once your needs change or your business grows.

14. **Customer Service:** It's easier to provide high-quality customer service using an enterprise solution, especially when you're using one as well-equipped as Work Wise ERP. Sales and customer service people can interact with customers better and improve relationships with them through faster, more accurate access to customers' information and history. You'll also have access to marketing automation and contact center software, ensuring your customers are being interacted with consistently.

15. **Security:** Data security isn't a worry when you have an enterprise resource planning solution in place. A new system will improve the accuracy, consistency, and security of data, all through built-in resources and firewalls. Restrictions to data can also be enhanced by managers of the solution, so you can make your own software as secure as you'd like.

The challenges of implementing ERP system:

With the rise of e-business and the need to be more productive, ERP systems are gaining extensive interest from entrepreneurs. An ERP system allows an organization to run a synchronized configuration that connects all the business processes .It helps an enterprise to gain competitive advantage by saving resources and responding to an ever changing business environment. But, there are some challenges that one needs to take into account before implementing an ERP system.

1. ERP Vendors

In this competitive environment, selection of the perfect product is necessary to achieve productivity gains. There are over 500 ERP applications in market. While selecting the perfect ERP application for a business, one should know the vendor's previous projects, industry vertical and experience.

2. Commitment from the Top Management

Senior managers play a crucial role in any ERP implementation. Their involvement is extremely necessary for the success of a project. Any form of ignorance may cause ineffective decisions and delayed operations.

3. Adequate Training

After the implementation of an ERP system, resentment from employees is common. This could heavily degrade the productivity of processes. Special training and motivation before the implementation is very helpful. This would give the teams, some time to get familiar with the software.

4. Implementation Time

Many companies don't realize the time consumption of an ERP implementation process. An ERP system is implemented step by step and because it is very standard, it needs to be designed to a particular business, to handle the processes just the way the company needs them.

5. Proper Project Management

Companies, who want to implement the ERP system, need to assign their best employees for successful implementation. Generally companies appoint external help as well but internal employees are preferred.

6. Implementation Cost

The entire cost of an ERP implementation is much greater than the initial costs. The total cost depends on customization cost. Greater the customization, higher will be the final implementation cost.

7. Employee Retention

It's been observed that despite of training, many employees leave the organization after the implementation of ERP system. This can immensely affect the growth rate of a company.

8. Sufficient Testing

Testing of ERP system doesn't mean whether it's working smoothly or not, but to be delighted by its performance and to see whether it's up to your needs. Insufficient testing of the system can attract costly unplanned updating.

9. Maintenance Cost

An ERP system has maintenance costs attached to it. If managed casually, it has the power to fracture an organization. It requires time to time maintenance which adds up to the recurring cost.

10. Investment in Internal Hardware

Working on a slow system can be very unproductive and frustrating. ERP applications require sufficient storage and high work performance. Low investment in internal hardware may result in various software issues.ERP has gained recognition because of competitive factors, such as an ever-increasing number of mergers and globally aggressive rivals. A successfully planned and managed ERP system can increase customer satisfaction and enhance employee productivity. It can adequately increase the company profits with minimum resources.

ERP modules and Historical Development:

Enterprise Resource Planning System (ERP), just by considering name we can simply define ERP as System or software that used to manage all the resources of whole enterprise. Right from employee payments to single screw coming into the enterprise, everything can be managed & tracked by using ERP Systems. ERP is a cross functional software that supports all the business processes within the organization.

In organization, ERP helps to manage business processes of various departments & functions through centralized application. We can make all the major decisions by screening the information provided by ERP.

There are many vendors in market which are providing traditional ERP solutions or Cloud based ERP solutions. Though implementation platforms or technologies are different, there are common & basic modules of ERP which can be found in any ERP System. Depending on organizations need required components are integrated & customized ERP system is formed. All the below mentioned modules can be found in any ERP system:

1. Human Resource
2. Inventory
3. Sales & Marketing
4. Purchase
5. Finance & Accounting
6. Customer Relationship Management (CRM)
7. Engineering/ Production
8. Supply Chain Management (SCM)

Each component mentioned above is specialized to handle defined business processes of organization. Let us go through the introduction of the various modules.

1. Human Resource Module (HR):

Human Resource module helps to HR team for efficient management of human resources. HR module helps to manage employee information, track employee records like performance reviews, designations, job descriptions, skill matrix, time & attendance tracking. One of the important sub module in HR module is Payroll System which helps to manage salaries, payment reports etc. It can also include Travel Expenses & Reimbursement tracking. Employee Training tracking can also managed by ERP.

2. Inventory Module:

Inventory module can be used to track the stock of items. Items can be identified by unique serial numbers. Using that unique numbers inventory system can keep track of item and trace its current location in organization.

e.g. you have purchased 100 hard disk , so using inventory system you can track how many hard disks are installed , where they are installed, how many hard disks are remaining etc.

Inventory module includes functionalities like inventory control, master units , stock utilization reporting etc.

There may be integration of inventory module with purchase module of ERP.

3. Sales Module:

Typical sales process includes processes like Sales queries & enquiry analysis & handling, quotation drafting, accepting sales orders, drafting sales invoices with proper taxation, dispatch/Shipment of material or service, tracking pending sales order. All these sales transactions are managed by sales module of ERP. CRM module can take help of Sales module for future opportunity creation & lead generation.

4. Purchase Module:

As name indicates, purchase modules take care of all the processes that are part of procurement of items or raw materials that are required for organization. Purchase module consist of functionalities like supplier/vendor listing, supplier & item linking, sending quotation request to vendors, receiving & recording quotations, analysis of quotations, preparing purchase orders, tracking the purchase items, preparing GRNs(Good Receipt Notes) & updating stocks & various reports . Purchase module is integrated with Inventory module & Engineering/production module for updating of stocks.

5. Finance & Accounting module:

Whole inflow & outflow of money/capital is managed by finance module. This module keeps track of all account related transactions like expenditures, Balance sheet, account ledgers, budgeting, bank statements ,payment receipts, tax management etc. Financial reporting is easy task for this module of ERP. Any Financial data that is required for running business is available on one click in Finance module.

6. Customer Relationship Management (CRM) module:

CRM department is helps to boost the sales performance through better customer service & establishing the healthy relationship with customers. All the stored details of customer is available in CRM module.

CRM module helps to manage & track detailed information of the customer like communication history ,calls, meetings, details of purchases made by customer, contract duration etc. CRM module can be integrated with Sales module to enhance sales opportunities.

6. Engineering / Production module:

Production module is great help for manufacturing industry for delivering product.

This module consist of functionalities like production planning, machine scheduling, raw material usage,(Bill of material)preparation, track daily production progress production forecasting & actual production reporting.

7. Supply Chain Management (SCM):

SCM module manages the flow of product items from manufacturer to consumer & consumer to manufacturer.

Common roles involved are manufacturer, Super Stockiest, Stockiest, distributors, retailers etc. SCM involves demand & supply management, sales returns & replacing process, shipping & transportation tracking etc.

Today many SMBs face challenges in their process automation. ERP is the great help for such organizations. ERP can efficiently streamline the business operations of organization. Above introduction of modules can help you to choose & customize the ERP modules depending on your organizations requirements.

A Brief History of ERP

The term ERP was coined in 1990 by Gartner, but its roots date to the 1960s. Back then, the concept applied to inventory management and control in the manufacturing sector. Software engineers created programs to monitor inventory, reconcile balances, and report on status. By the 1970s, this had evolved into Material Requirements Planning (MRP) systems for scheduling production processes.

In the 1980s, MRP grew to encompass more manufacturing processes, prompting many to call it MRP-II or Manufacturing Resource Planning. By 1990, these systems had expanded beyond inventory control and other operational processes to other back-office functions like accounting and human resources, setting the stage for ERP as we've come to know it.

Today, ERP has expanded to encompass business intelligence while also handling "front-office" functions such as sales force automation (SFA), marketing automation and ecommerce. With these product advancements and the success stories coming out of these systems, companies in a broad range of industries—from wholesale distribution to ecommerce—use ERP solutions.

Moreover, even though the "e" in ERP stands for "enterprise," high-growth and mid-size companies are now rapidly adopting ERP systems. Software-as-a-Service (SaaS) solutions—also referred to as "cloud computing"—have helped fuel this growth. Cloud-based solutions not only make ERP software more affordable, they also make these systems easier to implement and manage. Perhaps even more importantly, cloud ERP enables real-time reporting and BI, making them even valuable to executives and staff seeking visibility into the business.

As a result, companies of all sizes and a wide range of industries are transitioning to cloud ERP systems. In fact, Forrester predicts that SaaS-based ERP adoption will rise 21 percent annually through 2015. When you stop to consider the benefits of ERP, it's easy to see why it's become so popular and why its use will continue to grow so rapidly.

UNIT-V
ERP - SALES AND MARKETING

Introduction:

Sales management facilitates the directions of activities and functions which are involved in the distribution of goods and services. According to Philip Kotler, "Marketing management is the analysis, planning implementation and control of programmes designed to bring about desired exchanges with target markets for the purpose of achieving organisational objectives.

It relies heavily on designing the organisations' offering in terms of the target markets needs and desires and using effective pricing, communication and distribution to inform, motivate and service the market."

Sales or marketing management is concerned with the chalking out of a definite programme, after careful analysis and forecasting of the market situations and the ultimate execution of these plans to achieve the objectives of the organisation. Further their sales plans to a greater extent rest upon the requirements and motives of the consumers in the market aimed at.

To achieve this objective the organisation has to give heed to the right pricing, effective advertising and sales promotion, discerning distribution and stimulating the consumer's through the best services. To sum up, marketing management may be defined as the process of management of marketing programmes for accomplishing organisational goals and objectives. It involves planning, implementation and control of marketing programmes or campaigns.

Objectives:
- Examine the sales and marketing modules
- Understand the interrelationships among business processes

Sales Order Process Management in ERP

A sales order is an official agreement between a business association and a sold-to party concerning the delivery of products or provision of services. It includes defined costs, item amounts, and conveyance dates.

Every timely delivered sales order establishes you as a trustworthy name in the market. When the number of sales orders starts soaring, it becomes challenging for traditional business applications to manage the load.

It is your basic responsibility towards customers to deliver orders on time. Apart from that, order delivery process should be smooth making it an exciting experience for customers to deal with you.

An organized order management process is indicative of your operational efficiency, minimize inventory load and saves both time and money. All this is possible to achieve with the implementation of ERP solution.

The role of ERP

A typical order begins through generation of purchase order of customer by sales team with data variables like customer number, product number, order size, delivery dates etc.

This information is processed through ERP order management solution and order entry is created. With this begins a chain of automated events to allow order process monitoring and control.

Every department in the organization is alerted about the order so that they can collectively work in real-time to timely process the order.

a) Sales order processing

Order processing is the most important function in order management. As soon as the sales order is generated, resource allocation begins to procure raw material from inventory stock.

The order then reaches production stage and well-guided through ERP solution till the end of assembly line. The order consequently reaches packaging and shipping department. Here, it is processed for packing with customer label and bar code on top of it.

Finally, when the sales order is ready for dispatch to customers, automated invoice is generated taking into consideration freight charges and taxes.

Therefore, the whole process is automated because every department can track the order progress in real-time and schedule their tasks accordingly.

In case there are multiple business units catering to a single order, a centralized order entry is created that can be tracked by all business units. It liberates employees from burden of excessive communication resulting in loss of time.

Furthermore, it prevents unwarranted confusion about the sales order. Besides your employees, the order progress can be tracked by customers and vendors. ERP is also enabled to prioritize orders in line with production assembly, delivery schedule and urgent orders.

b) Customer data processing

Customer specifications, needs and demands vary extensively. Customer variables may include address, terms and conditions specific to customer, pricing, credit limit etc.

However, ERP software is fully capable to deal with these disparities. Every detail is accurately processed during the sales order processing.

c) Data analytics

Order management system allows you to analyze and generate report to track efficiency of business in processing orders. It enables you to identify flaws across the organization that resulted in sales order delay.

Such issues may be related to manpower efficiency, product packaging, flawed assembly line, order backlogs, order returns etc. Hence, it enables you to suggest process improvements and remove glitches.

d) Manage your orders effectively with ERP

ERP system integrates your sales, finance, inventory and production department. It helps to maintain inventory levels, manage sales returns, keeps a track of payment and delivery status.

ERP - Sales and marketing

Any company would want to have a good and fighting sales and marketing force to compete in the market. A comprehensive sales and marketing ERP module will help a company stay competitive and streamline their sales and marketing activities.

A sales and marketing ERP software allows activities which begin from contacting customers which are referred to as pre sales activities to be recorded. It also allows tracking of each customer orders right from placing an order to dispatch of material for that particular order and customer.

Automating the sales force activities such as visits to customers, expenses, competitor assessment is possible with the ERP sales and marketing module.

Many a times payments have to be received from customers after dispatches are made. An ERP sales and marketing module allows executives to contact customers and follow-up each and every sales invoice and receive payments for such invoices.

Target setting for marketing personnel allows managements to monitor target achievement by individual marketing personnel. This feature in the ERP software enhances the working of the marketing department and ensures personnel are not working aimlessly.

A good sales and marketing module also has features to track lost orders and identify the reasons for loosing those orders. Business partners and franchises are a common phenomenon in today's world. Latest ERP software will associate marketing personnel to their business partners and franchises and allow them to track and monitor their performance.

ERP sales and marketing module will allow the preparation of reports to track sales trends over different periods, drill down for the consolidated data, allow for sales forecast and give a birds eye view of the sales and marketing activities of the company.

A good sales and marketing ERP module is an essential feature of an ERP software.

Sales and marketing with ERP

A number of factors may be used while utilizing ERP software for the purpose of sales and marketing. Companies use ERP or Enterprise Resource Planning in order to forecast and plan their future initiatives for how they want their company to grow. It allows them to find out what areas are needed for improvement, and ways to implement more growth in the future.

In sales and marketing with ERP, actual measured facts can be used to determine what areas are working for the company, and to plan those facts they have to their advantage. As a result of knowing these facts, sales and marketing with ERP can grow.

Integrating facilities management with sales and marketing with ERP will allow a company to understand what resources they already have and what they need currently. When a company discovers this through the use of sales and marketing with ERP, the numbers and charts displayed to them will allow for an up to date understanding of where the company growth and losses lie.

ERP is a very useful tool to have because without this information and software, there would be hours of research and this is quite costly for the company and the consumer. ERP eliminates this problem.

When sales are down, the company will know automatically and instantly. When sales are up, they also will know immediately and can use the information in front of them to continue to flourish, the key really is the focus on real-time.

Resources in a company, specifically in facilities management may not always be large and this again is another reason why ERP is so valuable. If one already knows the details of sales and marketing with ERP, it is much easier to make crucial financial decisions on supplies, contract work appointed, and general maintenance that may or may not be needed. In addition, ERP software is shown in real time, so the company can make day to day decisions on these needs.

General planning can also be made for a company using sales and marketing with ERP. Facilities management resources can be mapped out for a month, year, anything the client would require in order to benefit the company sufficiently. In combination with planning and ERP use, there is a great deal of potential for the company, the client, and the topics at hand in which they chose to improve.

Using such techniques, in combination with the use of ERP will result in success for the client and company. Sales and marketing with ERP the areas of improvement will be clearly shown. It will be up to date information which will improve the companies daily tasks. Planning for the future can be initiated and most certainly will create success for the client.

By using the facts that ERP provides, a proper decision can be made about how the sales can be improved and also the materials needed to make that improvement. Without ERP software, all of these forecasts would have to be done manually, costing time, money and energy. Its clear that in the end ERP software is definitely beneficial to the client, company and its affiliates.

Customer Relationship Management-ERP Systems:
Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) are similar in many ways, as they are both used to increase the overall profitability of a business. These systems overlap in some areas, and can be completely integrated in others.

Both as a unique category, CRM normally consist of sales force automation, marketing automation and customer support. As part of ERP, CRM is one of the five ERP pillars, with the other four pillars being financial accounting, distribution or supply chain management, manufacturing and human resources/payroll.

ERP is heavy duty software that touches every aspect of operations. You can purchase a single suite or build your own out of different modules from a variety of vendors. ERP Software commonly features:

- ✓ **Accounting:** manage financial transactions and payroll
- ✓ **Business Intelligence:** analyze and report data to help companies make evidence-based decisions
- ✓ **CRM:** more on this below
- ✓ **Human Resources:** manage personnel, benefits administration, employee evaluations, and learning management
- ✓ **Inventory:** provides up-to-date information on product supply
- ✓ **Manufacturing:** at the core of ERP
- ✓ **Supply Chain:** tracks goods as they move from manufacturing to distribution

CRM is used by sales, marketing and business development departments to manage interactions throughout the customer life cycle. CRM Software typically includes:

- ✓ **Marketing Integration:** lead management, email marketing, and campaign management
- ✓ **Sales Force Automation:** contact management, pipeline analysis, sales forecasting, and more
- ✓ **Customer Service & Support:** ticketing, knowledge management systems, self-service, and live chat
- ✓ **Field Service Management:** scheduling, dispatching, invoicing, and more
- ✓ **Call Centre Automation:** call routing, monitoring, CTI, and IVR
- ✓ **Help Desk Automation:** ticketing, IT asset management, self-service and more
- ✓ **Channel Management:** contact and lead management, partner relationship management, and market development funds management

Most ERPs will feature some elements of a CRM. If you're not sure what you need, meet with team leads and stakeholders. If you get the overall impression that folks are happy with the solutions in place for HR and accounting, but could use help with sales and marketing processes, it may be time to look into a new CRM system. Conversely, if you get a sense of widespread dissatisfaction with the processes in place, a new ERP may be in order. If you find that ERP offering is lacking more in-depth customer relationship applications, rest assured–most modern systems are designed to integrate with third-party CRMs.

CRM helps the business data to provide services for what the customer wants. The benefits of CRM is having all your business data stored in a particular section. The CRM software can also naturally deliver e-mails to separate customers as label by the sales person. CRM is generally used to maintain a business customer relationship.

The Benefits of using CRM are :

- ✓ Improved Customer Experience
- ✓ Focused Marketing Efforts

- ✓ Increased Customer revenues
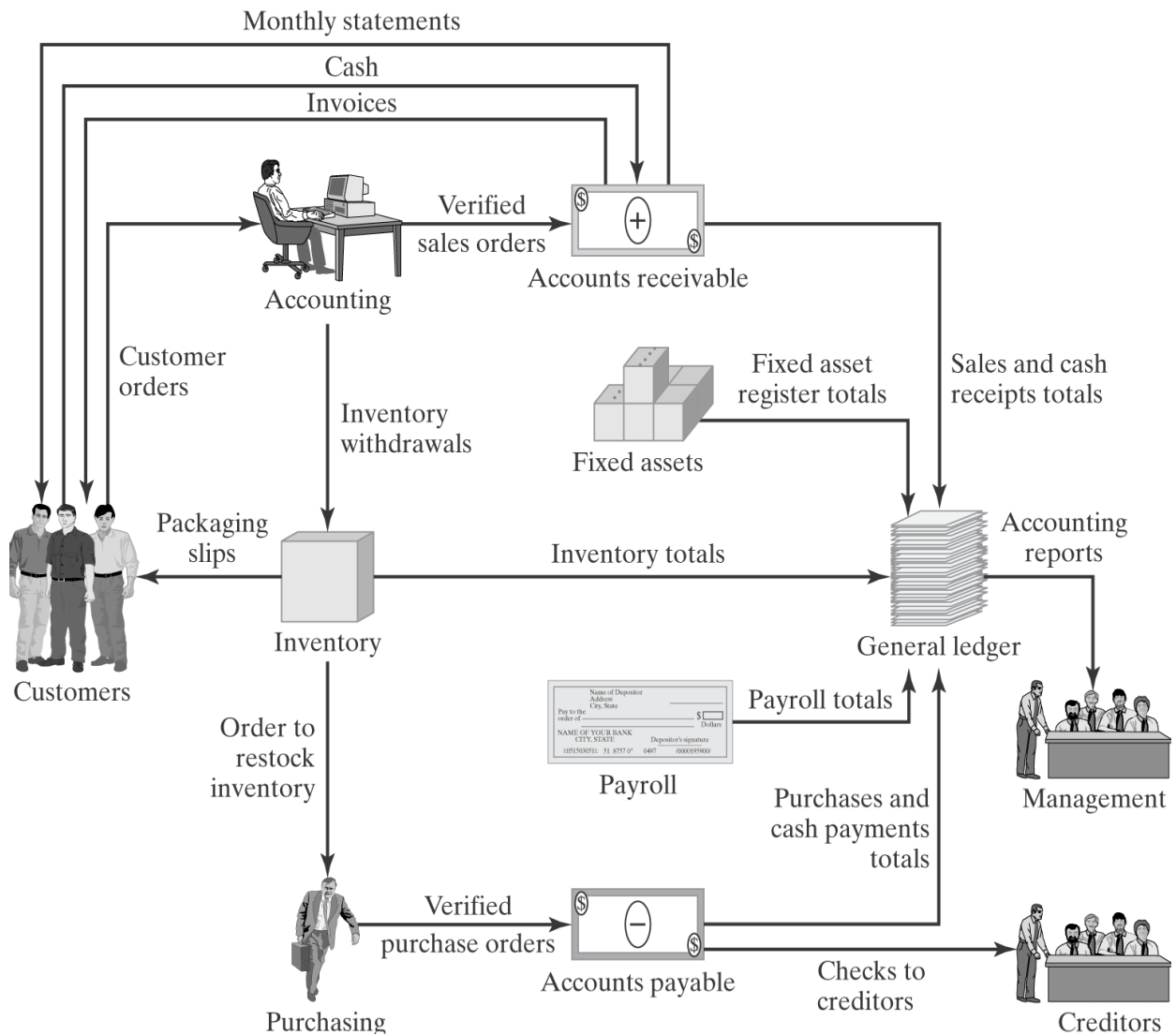- ✓ Focused Marketing Efforts

Accounting & Finance Control Processes:

Objectives:

- Examine accounting systems within ERP
- Understand ERP financial systems
- Review the interrelationships among business processes supporting finance and accounting

Accounting Processes:

FIGURE 5-1   Conceptual Model of an Accounting System

Accounting Management Control Process:

Budgeting
- Analysis of allocations, expenditures, revenues

Cash management
- Cash flow analysis
- What-if analysis

Capital budgeting
- Evaluation tools: NPV, IRR, pay-back period
- Investment management

Accounting Systems

Traditional
- Provide operational-level software
- Produce invoices, checks, statements

Financial accounting
- Financial statements for external reporting purposes

Management accounting
- Information on profitability

Accounting Systems v. ERP Modules

ERP
- ✓ Information shares integrated database
- ✓ Provides up-to-date information
- ✓ Seamless
- ✓ Creates document flow of transactions

Accounting systems
- ✓ Manual or separate transfer of information
- ✓ Multiple platforms

TABLE 5-3   How ERP Supports Accounting and Finance

Subsystem	*What It Does*
Credit management	Accounts receivable balances are automatically updated, so sales has up-to-date information on customer credit limits
Product profitability	Data is entered and stored in an integrated database, leading to uniform results
Finished goods inventory	ERP automatically updates the increase in the monetary value of finished goods when finished goods are transferred to the warehouse; financial statements are updated
Inaccurate inventory costing	Provides up-to-date information on cost variances, which enables the company to establish prices that will enable it to sell products profitably
Consolidating information from subsidiaries	Provides an integrated database with the capability of converting multiple currencies
Management reporting	ERP database is integrated, so all information is consistent, complete, and accurate; a data warehouse provides a comprehensive database for management reporting
Creating an audit trail	ERP provides interconnected document flow, which establishes an audit trail and makes it possible to research and link source documents

Financial Modules in ERP Systems:

An ERP (enterprise resource planning) finance module is a software program that gathers financial data and generates reports such as ledgers, trail balance data, overall balance sheets and quarterly financial statements.

Basic Modules of ERP System:

For any business large or small what matters at the end of the day is the bottom line. Financial indicators make up this bottom line. If your business does not have an effective method for recording and analysis of financial data, chances are your numbers might get affected.

An ERP (Enterprise Resource Planning) finance module is a software program that gathers financial data and generates reports such as ledgers, trail balance data, overall balance sheets and quarterly financial statements.

All kind of organizations small scale, large scale organizations benefit from the implementation of ERP finance module. The financial module is the core of many ERP software systems. It can gather financial data from various functional departments, and generates valuable financial reports such general ledger, trail balance, as balance sheet and quarterly financial statements.

This module of the ERP software will take care of all accounts related entries and their impact on the whole system. How the finance comes and how it is been utilised. Total flow of money

(Cash/Bank) and total expenditures will be reflected here. As an after effect of this, the management will be able to take their important financial decision, Budgeting etc. They can come to know about companyï¿½s financial position at any point of time. All sorts of important financial reports i.e. Trial Balance, Trading A/c, Profit & Loss A/c, Balance Sheet, Debtors Balance, Creditors Balance, Cash/Bank Fund position and many more are covered in this module.

General Ledger

The General Ledger module is the foundation of your accounting system, with flexibility that meets the current and future financial management requirements of organizations of all types and sizes. It provides a robust feature set designed to handle your most demanding budgeting and processing needs. General Ledger fully integrates with all modules and is the key to maximizing the efficiency and accuracy of your financial data.

G/L Security

The G/L Security module enables organizations to control which users can view or use certain general ledger accounts based on segment validation in G/L Security settings.

G/L Consolidations

G/L Consolidations lets you transfer and merge General Ledger account and transaction information between separate company and branch office locations. It is also designed to enable subsidiaries and holding companies to run without being on the same network or accounting database. G/L Consolidations provides a feature set that allows your company to define the level of detail to consolidate and provides a comprehensive audit trail.

Intercompany Transactions

The Intercompany Transactions module lets you enter General Ledger and Accounts Payable transactions that affect more than one company by automatically distributing transactions across two or more companies. In addition, its built-in flexibility automatically generates intercompany loan account entries according to user-defined relationship tables called routes. Intercompany Transactions simplifies and significantly reduces the amount of work required for intercompany accounting.

The Accounting Module is completely Transaction based unlike journal based. This implies most of the accounting functions are handled through relevant transactions in other Modules thereby saving lot of time. The Module contains complete functionality required for any Accounting Department right from vouchers to the Balance Sheet and Profit and Loss Account.