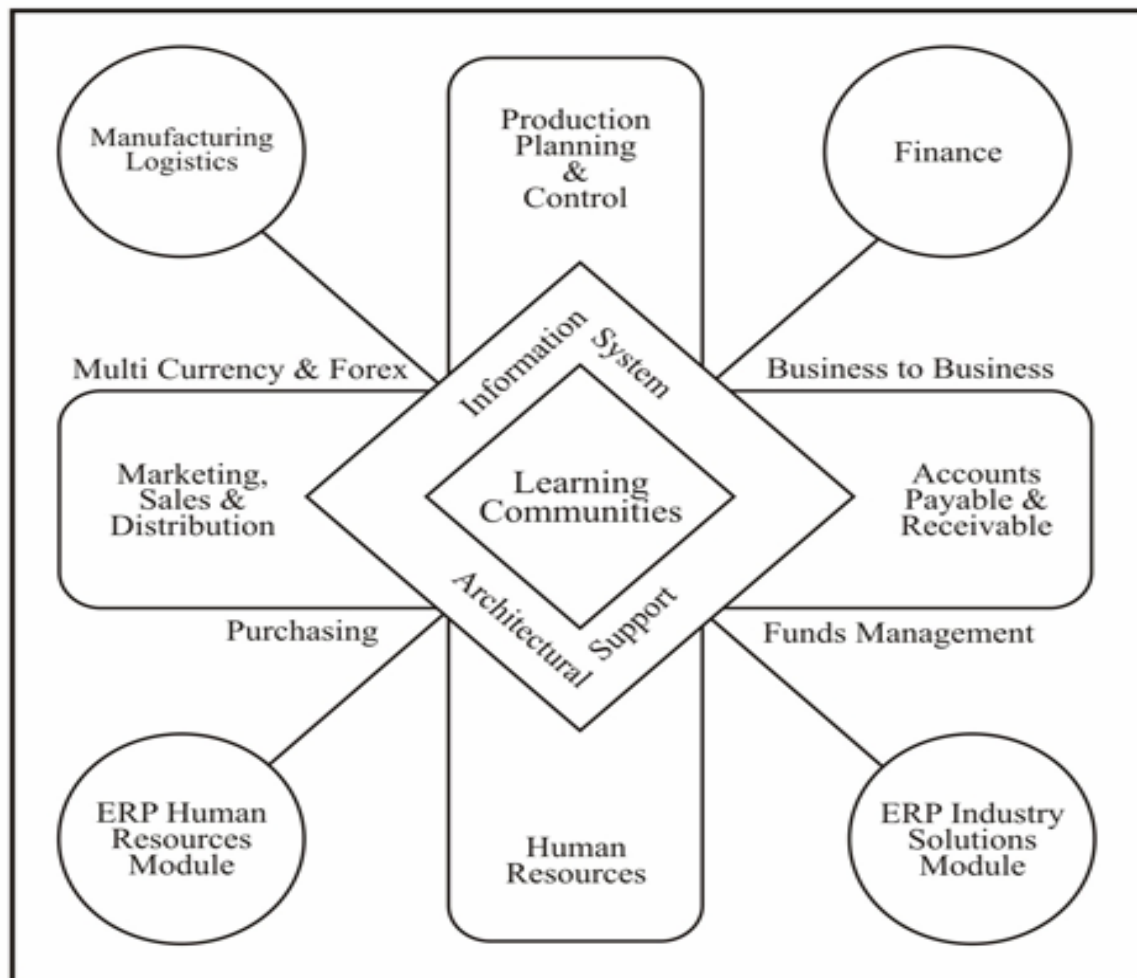


Q.1 what are the different components of an ERP? Outline the main stages in the development of an ERP system?

Ans.: All application modules share data through the ERP database, which contains the data for all modules. This is a new implementation of the old key database concept of entering data one time and then using it in all other processing. The world's finest easy-to-use ERP solution is fully web-enabled, seamlessly integrated and can be implemented in weeks. And it can computerize your complete operations globally. ERP can furnish assistance in accomplishing unimaginable efficiency of operations, significant cost savings, and maximize profits. ERP is packed with powerful features, tremendously easy to implement and use, comprehensive in its scope, modular and flexible, fully customizable, totally secure, and incredibly robust. It is the way companies will manage their businesses tomorrow. With ERP, you can assimilate transactions of any pulse of the entire organization, all the time. This drives costs number of your company's branches into one system. ERP can be completely webenabled and from any type of software on any platform, you can deal with your entire business by exception. ERP modules are a most excellent way to integrate all the departments. It is like a four-wheeler which can not shift single steps without its underneath, for ERP the underneath are its modules which sometimes also known as components. These modules enables all the employees of an enterprise to operate like CEO, giving them the tools, information, and insights they necessitate detecting problems earlier and taking action faster. To facilitate the easy handling of the system the ERP has been divided into the following core subsystems as shown in *Figure*.



“Source: Adopted from Joseph. G. & Goorge. A 2002” Figure 5: The ERP Learning Community Framework

a) **Finance:** ERP takes care of complete financial accounting of the enterprise over the web. It maintains all the books and records that are essential for proper bookkeeping and accounting. All transactions affect and update the entire system, and the entire reporting is on the fly, for the most accurate information at all times. ERP helps you to manage all kinds of taxes, bank reconciliation and everything else that is required for efficient and complete financial accounting. Thus, financials provide real-time visibility into financial results, minute-by-minute control over expenditure, and guidance for better decisions,

b) **Human Resources:** Handling Software for personnel-related tasks for corporate managers and individual employees of the organisation. Examples: human resources administration, automatic personnel management processes including recruitment, business travel, and vacation allotments, payroll handles accounting and preparation of cheque related to employee salaries, wages, and bonuses. Thus, human resources offers comprehensive HR solutions, from recruitment to compensation to work-force development

c) **Manufacturing and Logistics:** A group of applications for planning production, taking orders, and delivering products to the customer. Examples: production planning performs capacity planning and creates a daily production schedule for a company's manufacturing plants. Materials management controls purchasing of raw materials needed to build products.

d) **Purchasing:** Empower the Purchase function just like sales, indents, and orders. ERP covers all aspects of production, including issues quality control, material receipts, purchase invoices and production receipts, multiple bills of material. Thus, purchasing saves the time by simplifying and improving vendor evaluation, performance tracking and quality examination.

e) **Production, Planning and Control:** ERP enables you to plan for material requirements based on a production planning process. The system reports inventory requirements based on work orders initiated, stocks committed and existing stocks. Thus, PPC provides all possible reports and analysis, which facilitates in managing and keep good control of inventory.

f) **Multi currency and Forex:** ERP supports accounting for multi-currency operations, with exchange rate tables, transactions in any currency, accounting and reporting in all currencies, and accounting for forex gains and losses.

g) **Business 2 Business (B2B):** ERP is a virtual portal that can be accessed by customers, distributors, suppliers, and auditors. Anyone with a computer and a modem, and the necessary access permissions, they can place orders and monitor deliveries, and view account statements. To improve your service efficiency you can allow your business associates to manage their own interaction with your enterprise. All reporting can be individual, grouped, or instantly consolidated across the enterprise.

h) **Funds Management:** ERP enables you to manage funds efficiently. For each wing maintains your complete customer database and does kind of transaction type you may specify its effect on funds flow.

i) **Marketing, Sales and Distribution:** Helps to optimize all the everyday jobs and activities carried out in sales, delivery and billing. Key elements are: presales support, inquiry processing, quotation processing, sales order processing, delivery processing, and billing and sales information system. This module also includes a

Point-of-Sale, which comes under retailing, can optimize the sales figures and also facilitate in having more delighted customers. Billing system with barcode label provides better reading, printing, quick billing and collections.

DISTINCTIVE WAYS OF IMPLEMENTING AN ERP

A properly implemented ERP system can convey good results & dramatically enhance the aptitude to diminish costs, run leaner, and endow with good customer service. These are distinctive ways of implementing an ERP and following are the implementation approaches:

- **Phased implementation approach:** This implementation approach is also known as Modular Implementation. The system of modular implementation goes after one ERP module at a time. This limits the capacity of implementation usually to one functional department. This approach suits enterprises that do not share many widespread processes across departments or business units. Independent modules of ERP systems are installed in every unit, while integration of ERP modules is taken place at the afterward stage of the project. This has been the most usually used methodology of ERP implementation. Each business unit may have their own 'instances' of ERP and databases. Modular implementation trims down the risk of installation, customisation and operation of ERP systems by reducing the scope of the implementation. The successful implementation of one module can promote the overall success of ERP projects.
- **Big-Bang implementation approach:** This requires simultaneous implementation of numerous modules of an ERP packages. Enterprises outline a grand plan for their ERP implementation. The installation of ERP systems of all modules happens transversely the entire enterprises at once. The big bang approach has the prospective to condense the integration cost if it's executed methodically and cautiously. This method dominated early ERP implementations; it partially contributed to the higher rate of breakdown in ERP implementation. Today, not many companies dare to endeavor it anymore. The hypothesis of this implementation method is treating ERP implementation as the implementation of a big information system, which typically follows SDLC (Systems Development Life Cycle). But ERP is much more than a conventional information system because the implementation of ERP continuously calls for the realignment of business processes. Many parties concerned in ERP software systems are not IT professionals. ERP more than automates existing business processes and alter the business processes.
- **Process-Oriented Implementation:** This method of implementation focus on the support of one or a few critical business processes, which involves a few business units. The initial customization of the ERP system is limited to functionality closely related to the intended business processes. The processoriented implementation may eventually grow into a full-blown ERP system. This approach is utilized by many small to mid-sized companies whose business processes are not too complex.
- **Vanilla implementation approach:** In another implementation approach that focuses on minimal customisation of the ERP packages.

Q.2. What is the role of OLAP in decision-making? What does the term drill mean down in an executive information system?

Ans.: Decision-making is the cognitive process of selecting a course of action from among multiple alternatives. Every decision-making process produces a final choice. It can be an action or an opinion. It begins when we need to do something but we do not know what. Therefore decision-making is a reasoning process, which can be rational or irrational, and can be based on explicit assumptions or tacit assumptions. Common examples include shopping, deciding what to eat, and deciding whom or what to vote for in an election or

referendum. Decision-making is said to be a psychological construct. This means that although we can never “see” a decision, we can infer from observable behavior that a decision has been made. Therefore, we conclude that a psychological event that we call “decision making” has occurred. It is a construction that imputes commitment to action. That is, based on observable actions, we assume that people have made a commitment to effect the action.

Online Analytical Processing (OLAP): OLAP tools are mainly used by analysts. They apply relatively simple techniques such as deduction, induction, and pattern recognition to data in order to derive new information and insights.

Standard reports are designed and built centrally and then published for general use. There are three types of standard reports:

- **Static reports or canned reports:** Fixed-format reports that can be generated on demand.
- **Parameterized reports:** Fixed layout reports that allow users to specify which data are to be included, such as date ranges and geographic regions.
- **Interactive reports:** These reports give users the flexibility to manipulate the structure, layout and content of a generic report via buttons, drop-down menus and other interactive devices.

Ad-hoc reports: generated by users as a “one-off” exercise. The only limitations are the capabilities of the reporting tool and the available data.

Advanced Analytics: Advanced statistical and analytical processing such as correlations, regressions, sensitivity analysis and hypothesis testing.

Empowers everyone: Provide each person with relevant, complete information tailored to their role.

• **Drive more effective actions:** Guide users toward more intelligent actions and customer interactions.

• **Do it in real time:** Use real-time intelligence to drive better business outcomes and operational results every second of every day.

OLAP is an acronym for *On Line Analytical Processing*. It is an approach to quickly provide the answer to analytical queries that are multi-dimensional in nature. It is part of the broader category business intelligence, which also includes ETL (Extract, Transform, Load), relational reporting and data mining. The typical applications of OLAP are in business reporting for sales, marketing, management reporting, business performance management (BPM), budgeting and forecasting, financial reporting and similar areas. The term OLAP was created as a slight modification of the traditional

database term OLTP (On Line Transaction Processing). Databases configured for OLAP employ a multidimensional data model, allowing for complex analytical and ad-hoc queries with a rapid execution time. Nigel Pendse has suggested that an alternative and perhaps more descriptive term to describe the concept of OLAP is Fast Analysis of Shared Multidimensional Information (FASMI).

They borrow aspects of navigational databases and hierarchical databases that are speedier than their relational kin.

Executive Information Systems (EIS): Executive dashboards with drilldown analysis capabilities that support decision-making at an executive level.

Executive information systems (EIS) represent an evolutionary advancement in information systems for decision support. Previous generations of information systems either were unconcerned with executive support or required the executive’s staff to play an intermediary role between the executive and the data. What distinguishes an EIS from its predecessors is that *the end user is the executive* - it is a decision support system for the executive.

For the purposes of this paper, a formal definition of an executive information system is as follows: *an interactive computer-based system that allows executive officers to access data and information to identify problems, explore solutions, and guide the strategic planning process*. The purpose of an executive information system is to deliver data to the desktop of the executive officers and transform it into information that conveys useful knowledge to the executive. This information is used to investigate solutions for pressing managerial problems and make planning decisions for the institution.

In information technology, to move from summary information to detailed data by focusing in on something. To drill down through a series of folders, for example, on a desktop means to go through the hierarchy of folders to find a specific file or to click through drop-down menus in a GUI. To drill down through a database is to access information by starting with a general category and moving through the hierarchy of field to file to record.

Q.3. Explain the advantages of outsourcing computer facilities. Also, explain its major drawbacks. In Indian context ?

Ans.: Outsourcing refers to hiring an outside, independent firm to perform a business function that internal employees might otherwise perform. Many organizations outsource jobs to specialized service companies, which frequently operate abroad. The outsourcing trend stands to continue; the latest wave of outsourcing impacts the information technology field. IT outsourcing includes data center operations, desktop and help desk support, software development, e-commerce outsourcing, software applications services, network operations and disaster recovery.

Advantages of Outsourcing IT

Outsourcing allows management to defer the details to a specialized company. Removing the details, permits management to focus on the larger issues within the organization. Typically, the specialized company that handles the outsourced IT work boasts technological capabilities superior to the organization. Organizations view outsourcing as a cost-effective means to expand into other countries and new markets.

Cost Savings

There can be significant cost savings when a business function is outsourced. Employee compensation costs, office space expenses and other costs associated with providing a work space or manufacturing setup are eliminated and free up resources for other purposes.

Focus On Core Business

Outsourcing allows organization to focus on their expertise and core business. When organizations go outside their expertise, they get into business functions and processes that they may not be as knowledgeable about and could potentially take away from their main focus. An example of this is when a grocery store decides to add a florist to their operation. If too much focus is put on that part of the business they lose focus of the core business which is grocery.

Improved Quality

Improved quality can be achieved by using vendors with more expertise and more specialized processes. An example of this would be contracting out a cleaning service. An outside service would have the resources for hiring, proper training and facility inspections that may not be available if the function were kept in-house.

Customer Satisfaction

The advantage of having a vendor contract is they are bound to certain levels of service and quality. An example of this is if your IT function is outsourced and the technician calls in sick, it is the vendor's responsibility to find someone to replace them and meet your support needs.

Operational Efficiency

Outsourcing gives an organization exposure to vendor specialized systems. Specialization provides more efficiency that allows for a quicker turnaround time and higher levels of quality.

Disadvantages of outsourcing

- One of the biggest disadvantages of outsourcing is the risk of losing sensitive data and the loss of confidentiality. It is important, therefore, to have checks in place to avoid data loss.
- Losing management control of business functions mean that you may no longer be able to control operations and deliverables of activities that you outsource.
- Problems with quality can arise if the outsourcing provider doesn't have proper processes and/ or is inexperienced in working in an outsourcing relationship.
- Since the outsourcing provider may work with other customers, they might not give 100% time and attention to a single company. This may result in delays and inaccuracies in the work output.
- Hidden costs and legal problems may arise if the outsourcing terms and conditions are not clearly defined.
- If important functions are being outsourced, an organization is mightily dependent on the outsourcing provider. Risks such as bankruptcy and financial loss cannot be controlled.
- Not understanding the culture of the outsourcing provider and the location where you outsource to may lead to poor communication and lower productivity.

Major drawbacks. In Indian context in Outsourcing of Computer facilities:

The copying of software programs, although nominally protected by copyright laws, is certainly widespread. While some may acknowledge that such copying is tantamount to theft, the activity persists if only because it is so easy, the chance of getting caught is considered negligible, and the software developers are perceived as being rich enough already. Such copying is not restricted to personal users – businesses are involved as well, though often inadvertently. It is not uncommon to notice that employees contribute significantly to the presence of illegal software in the workplace, posing serious financial and legal consequences for their employers. Among those [companies] surveyed, software decision-makers indicate that colleagues bringing software from home (40%), downloading unauthorized copies from the Internet (24%), and sharing programs with other employees (24%) are three of the most common forms of violation occurring in their companies.

In such contexts, much of the argument about INTELLECTUAL PROPERTY AND RIGHTS (IPR) lies in the principles between rights and duties. Software producers claim that they have the right to protect the fruit of their endeavors in the software programs. The notion of ownership of something, whether it has a physical form or not, does still make sense as intellectual property. There are a number of laws and agreements throughout the world to protect intellectual property rights.

Copyrights: The right to copy or duplicate materials can be granted only by the owners of the information. This is called the copyright.

Challenge by Electronic Information Systems : The fluidity of information on the networks has caused some confusion about how copyrights and intellectual property rights apply to electronic files. In the relatively small

world of the original network users, an emphasis on free exchange of information and a common understanding of intellectual property allayed most potential conflicts over use of information. Now, as the networks grow larger and attract a broader range of people, some clarification of how electronic files may be used is becoming necessary. The basic existing copyright principles should keep most network users on ethical grounds.

- Copyrights protect original works of authorship, including literary, musical, dramatic, graphic, audiovisual, and architectural works, and sound recordings.
- The law forbids unauthorised reproduction, distribution, performance, or display of works with copyrights. The general intent of the law is to protect the commercial value of a work.
- Having a copy of a work with a copyright does not mean that the holder also has the right to distribute, reproduce, perform, or display it.
- Copyrights apply to both published and unpublished work. Under the international Berne Convention on copyrights, which the U.S. signed in 1989, a copyright comes into effect from the moment a work is created and is fixed in some form of tangible expression.
- A copyright notice is not required for copyright protection. The only way a copyright can be invalidated is by explicit announcement by the author that copyright protections are waived. Copyrights do not apply to titles, short phrases, names, slogans, mere listing of ingredients, or works consisting entirely of unoriginal information (such as standard calendars).
- Copyrights do not extend to ideas, procedures, methods, systems, concepts, principles, discoveries, or devices; these must be patented for protection.
- Remember, Complete international copyright protection does not exist. Works are subject to the laws of individual nations, although most nations have signed international agreements on copyrights.

Law for Work Created on a Network: The principles of copyright laws apply easily to work not created in an electronic file. But what about original work that is created within a network? The law applies in sometimes surprising ways, and users should think about copyrights before distributing or reproducing work created by another person. For instance: E-mail.

Computer programs, which might appear to be ideas, procedures, systems, or devices, may be registered as literary works under the law, and therefore, receive copyright protection.

Q.4. How does e-business fit into different locations within the production chain? Discuss?

Ans.: eBusiness: Laudon and Traver have defined e- Business as “the digital enablement of transactions and processes within a firm, involving information systems under the control of the firm, which doesn’t include the company’s revenue” (2001, p.7). For example, a company’s inventory management system and warehousing do not affect its revenue directly, such as its sales strategies and models. It comes under the domain of e-Business. However e-commerce does affect revenue.

The transformation of an organization’s processes to deliver additional customer value through the application of technologies, philosophies and computing paradigm of the new economy.

Three primary processes are enhanced in e-business:

1. **Production processes,** which include procurement, ordering and replenishment of stocks; processing of payments; electronic links with suppliers; and production control processes, among others;

2. **Customer-focused processes**, which include promotional and marketing efforts, selling over the Internet, processing of customers' purchase orders and payments, and customer support, among others; and

3. **Internal management processes**, which include employee services, training, internal information-sharing, video-conferencing, and recruiting. Electronic applications enhance information flow between production and sales forces to improve sales force productivity. Workgroup communications and electronic publishing of internal business information are likewise made more efficient

Basically a **production chain** is the steps that need to be taken in order to transform raw materials into goods which can then be used by consumers such as you and me. For instance, a primary product might be an apple and some wheat, and the chain of production will turn this into an apple pie for you to enjoy.

At each step in the production chain, value is added to the product so it can be sold for a greater amount when it becomes the final product. This value is added through the addition of labour, buildings, raw materials and/or manufacturing and processing.

A typical production chain would look something like this:

1. Primary producers are always the first stage in any chain, and the part they play is to produce the raw materials from which the final product will then be created.
2. The secondary stage of production is when the product itself takes shape in the hands of manufacturing companies. These companies bring together products and other raw materials to create the final product.
3. The last and final stage in each production chain is the actual selling of the product to the consumer. A retailer such as a supermarket will buy a large amount of the final product from the supplier, to then sell on to you, the consumer.

The chain of production

Primary stage	Secondary stage	Tertiary stage
Farmers, fishers, miners, foresters etc. growing, producing, harvesting, extracting.	Transport of raw materials. Manufacturers processing, making and constructing goods.	Transport of product, storage and other intermediary services. Distributors, retailers, e.g. shops, cafés, selling goods.

After all these production chain steps, the product then enters the **distribution chain/ Supply Chain**. This involves adding value to the products by transporting them to wherever the consumer requires them to be. For instance, even after the wood has been turned into a piece of furniture, it is still of little use to your family until it has been brought close enough to your home for you to see it and purchase it. So one of the last stages in the distribution chain is actually getting the furniture to a store near the end consumer.

Supply Chain Management: Supply Chain management is the process of managing the movement of goods from suppliers to buyers.

Supply Chain Management (SCM), also known as supply chain integration or supply chain optimization, is the process of optimizing a company's internal practices in interacting with suppliers and customers in order to

bring products to market more efficiently. SCM functions encompass demand forecasting, sourcing and procurement, inventory and warehouse management, distribution logistics, and other disciplines. The SCM procedure repeatedly succeeds where Enterprise Resource Planning (ERP) fails. In order to correctly forecast inventory levels, the supply chain management system needs ERP's database cooperation (Laudon & Laudon, 2002). A powerful SCM includes the systematization and optimization of operational and strategic information and methods within and between enterprises. SCM is connected with optimizing business processes and business value in every nook of the outspread enterprise, from the supplier's supplier to the customer's customer. SCM can utilize e-business concepts and Web technologies to bring the organization upstream and downstream. It is the strategic approach that combines all steps in the business cycle, from the beginning of the product design and the acquisition of raw materials for production to shipping, distribution, and warehousing, until a finished product is sold to the customer (Laudon & Laudon, 2002).

Features of Supply Chain Management

- * Customer focus
- * Retaining existing customers
- * Streamlining of operations
- * Minimum Fixed Cost
- * Elimination of paper work
- * Just in time
- * Transparency at all levels
- * Developing multiple supply sources for a multiple components
- * Customer value enhancement and cost reduction

Effects of eBusiness on the Supply Chain Management

In the 1970s, finding a manufacturer, or starting a new company, in another country is not easy, especially when facing cultural differences and legal issues. Also, bringing the products across the Pacific Ocean back to the United States can be very difficult because more third parties are involved in the supply chain. Information from Asia is not easy to find and much of the secondary information could be deemed useless or incorrect. These difficulties had brought some new jobs into the business (supply chain environment), such as brokers and agencies. In the first stage of business globalization, during 1970 to 1980, brokers and agencies had done a good job with helping companies on both sides of the Pacific Ocean. They provided the manufacture's information to American companies and brought American business to Asian manufactories.

1. Location

Of the twelve categories, decisions in this area have perhaps the longest time horizon. Decisions at this level set the physical structure of the supply chain and thus create constraints for more tactical decisions such as transportation, logistics and inventory planning. Engineering tools such, as mathematical models of facility location and geographic information systems are very useful in sorting the location choices¹.

2. Transportation and logistics

It includes all issues related to the physical flow of goods through the supply chain, including transportation, warehousing and material handling. This category addresses many of important choices related to transportation

management including vehicle routing, dynamic fleet management with global positioning systems and merge-in-transit².

3. Outsourcing and logistics alliances

It examines the supply chain impact of outsourcing logistics services. With the rapid growth in third party logistics providers, there is a large and expanding group of technologies and services to be examined. These include fascinating initiatives such as supplier hubs managed by third parties³.

4. Sourcing and Supplier management

This category addresses the issue of outsourcing components and the management of the suppliers who provide them. Make/buy decisions fall into this category⁴. These decisions should involve top managers and strategic thinkers because they can literally define the future of the firm. For example, IBM to outsource its PC operating software to Microsoft and its central processing unit to Intel.

5. Marketing and Channel restructuring

It includes critical decisions related to getting the products from a firm's factories all the way into the customer's hands. As with facility location, these decisions impact the supply chain structure as well as define an interface with marketing⁵.

6. Inventory and forecasting

It includes techniques for ongoing inventory management and demand forecasting. Industrial engineers and operation managers have employed statistical models for forecasting and inventory planning⁶. Stochastic inventory models can identify the potential cost savings from sharing information with supply chain partners, but more complex models are required to coordinate multiple locations.

7. Service and after sales support

This category covers the important issue of providing service and service parts. Some leading firms, such as Saturn and Caterpillar, build their reputations in this area, and this area and this capability generates significant sales⁷.

8. Reverse logistics and green issues

This area examines both reverse logistics issues of product returns and environmental impact issues⁸. Growing regulatory pressures in many countries are forcing managers to consider the most efficient and environment friendly way to deal with product recovery. Product recovery includes the handling of all used and discarded products, components and materials.

9. Product design and new product introduction

It deals with design issues for mass customisation, delayed differentiation, modularity and other issues for new product introduction⁹. Traditionally, products destined for world markets would be customized at the factory to suit local market tastes. The customized product is desirable and managing worldwide. Thus if the French version selling well, but the German version is not, German products can be quickly shipped to France and customized for the French market.

10. Information and electronic mediated environments

This category addresses the impact of information technology to reduce inventory and the rapidly expanding area of electronic commerce¹⁰. It focuses attention on integrative ERP software such as SAP and Oracle as well as supply chain offerings such as Manugistics, i2's Rhythm and Peoplesoft's Red pepper.

11. Metrics and Incentives

It refers to the measurement of both engineering and organisational processes and the related economic motivations. Several recent articles concentrate on the link between performance management and supply chain management ¹¹.

12. Global issues

It considers the issues beyond local country specific operating environments to encompass issues related to cross-border distribution and sourcing ¹². For example, currency exchange rates, duties and taxes, freight forwarding, customs issues, government regulation and country comparisons are all included.

Q.5. What is the purpose of Decision Support Systems in MIS? List the characteristics of Decision Support Systems.

Ans.: Decision support systems are a class of computerized information systems or knowledge based systems that support decision-making activities. The concept of a *decision support system* (DSS) is extremely broad. A DSS can take many different forms and the term can be used in many different ways.

On the one hand, a DSS is broadly defined as “a computer-based system that aids the process of decision making.” In a more precise way, it has been defined as “an interactive, flexible, and adaptable computer-based information system, especially developed for supporting the solution of a non-structured management problem for improved decision making. It utilises data, provides an easy-to-use interface, and allows for the decision maker’s own insights.”

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

Other definitions, which fill the gap between these two extremes, are:

- DSS couple the intellectual resources of individuals with the capabilities of the computer to improve the quality of decisions (“DSS are computer-based support for management decision makers who are dealing with semi-structured problems”).
- DSS are “interactive computer-based systems that help decision makers utilize data and models to solve unstructured problems.”
- The term *decision support system* remains a useful and inclusive term for many types of information systems that support decision making.

As of now, there is no universally accepted definition of DSS.

Additionally, the specifics of it are what make it less generalised and more detailed. In addition, a DSS also is a specific Software application that helps to analyse data contained within a customer database. This approach to customers is used when deciding on target markets as well as customer habits. This may be noticed this specific example, that DSS can be used for more than just organisation.

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

Applications

As mentioned above, there are theoretical possibilities of building such systems in any knowledge domain.

One of the examples is clinical decision support system for medical diagnosis. Other examples include a bank loan officer verifying the credit of a loan applicant or an engineering firm that has bids on several projects and wants to know if they can be competitive with their costs.

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

DSS has many applications that have already been spoken about. However, it can be used in any field where organisation is necessary. Additionally, a DSS can be designed to help make decisions on the stock market, or deciding which area or segment to market a product toward. DSS has endless possibilities that can be used anywhere and anytime, for its decision making needs.

Characteristics of DSS:

- ☐ DSS assists managers in their decision making specifically in semi-structured and unstructured fields.
- ☐ DSS supports and enhances, rather than replaces, managerial decisions.
- ☐ DSS improves the effectiveness of the decision rather than its efficiency.
- ☐ DSS combines the use of models and analytical techniques with conventional data access and retrieval functions.
- ☐ DSS has features (including interactive features) which make its use by non-computer people easier.
- ☐ DSS has enough flexibility to accommodate changes in the environment, the approach and the needs of the users.
- ☐ DSS supports managers at all levels that take decisions.
- ☐ DSS is user initiated and user controlled.
- ☐ DSS supports the personal decision making styles of individual managers.
- ☐ Facilitation helps ensure the system provides the correct data and information for upcoming decisions.
- ☐ Interaction also represents important characteristics of decision support systems. Many of these systems in current businesses make extensive use of technology, primarily personal computers and decision-making software.
- ☐ Task-oriented activities are also common elements of decision support systems. This element means that the support system can handle more than one activity at a time, which is essential.
- ☐ Companies can define their own characteristics of decision support systems.

Q.6. Discuss the security threats to information systems? How does encryption ensure data security?

Ans.: Information Systems Security is the protection of the information systems against unauthorized access to or modification of information whether in storage, processing or transit, and against the denial of service to authorized users, including those measures necessary to detect, document, and counter such threats.

Threats to Security

Threats to computers and information systems are quite real. In previous newsletters, we've

discussed hacking risks to your information systems, but this is just a small element of the big picture of threats and vulnerabilities to information security. Identifying threats are only part of the picture; once threats are identified, it is up to you to find the vulnerabilities in your information system and find ways to keep these threats from occurring.

Although threats to information systems are evolving and abundant, they can all be broken down into three categories:

Natural Threats: These can best be thought of as threats caused by Mother Nature—floods, quakes, tornadoes, temperature extremes, hurricanes, and storms are all examples.

Intentional Threats: Computer crimes are the best examples of intentional threats, or when someone purposely damages property or information. Computer crimes include espionage, identity theft, child pornography, and credit card crime.

Unintentional Threats: These threats basically include the unauthorized or accidental modification of software. Have you ever accidentally deleted an important file, or tripped over a power cord?

Finding the Vulnerable Spots

Now we need to be able to determine how your information system is vulnerable to the above threats. The two main vulnerabilities to home users are to your operating system (OS) and to your Internet connection.

An OS is the program that essentially “runs” your computer. Although Microsoft Windows and Apple Mac OS are the most well known operating systems, others that you may have heard of include Linux and UNIX. If someone knows what OS you’re running on your computer, the more likely he’ll be able to access your system and exploit weaknesses within it. Making sure that you frequently check for security patches and updates will help keep your system more secure.

Internet connections are also susceptible to threats. Broadband connections are more susceptible than dialups because these services are always connected to the Internet, making it easier for people to find you and take your information or send you a virus. Purchasing a firewall and an anti-virus program will help keep your information safe from attack when connected to the Internet for long periods of time.

Being aware of threats and vulnerabilities is the first step in making your information system more safe and secure. Although no system is truly safe from all threats, knowing ahead of time just what could compromise your information and becoming educated in ways of preventing these threats will make you more prepared for any attack and give you the chance to protect yourself from it.

Encryption is a technique that uses math to transform information in a way that makes it unreadable to anyone except those with special knowledge, usually referred to as a “key.” There are many applications of encryption, but some of the most important uses help protect the security and privacy of files on your computer, information passing over the Internet, or left sitting in a file on someone else’s computer. If encryption is used properly, the information should only be readable by you and people that receive the key from you. Encryption provides a very strong technical protection against many kinds of threats — and this protection is often easy to obtain

How Does Encryption Work?

What do you need to know about how encryption works? Surprisingly little. Encryption is conceptually similar to the “secret codes” that children learn about and use to communicate. If you’ve ever spoken in pig Latin or used a decoder ring, you’ve used very simple encryption techniques on a message. Again, the idea is to take a

normal human-readable message (often called the plaintext message) and transform it into an incomprehensible format that can only become comprehensible again to someone with secret knowledge:

Plaintext message + Encryption algorithm + Key = Scrambled message

Decryption algorithm + Key + Scrambled message = Plaintext Message

Your Little Brother's Cryptography. A simple encryption system would be to change each letter in your message to a set number of letters later in the alphabet. The specific number of spaces you move down the alphabet for each letter is the secret key. If the key is two, A becomes C, B becomes D, C becomes E, etc. Using that encryption system, the plaintext message "INSECURE" would become "KPUGEWGTG."

How is Encryption Applied?

Although the mechanics of encryption can be explained by the "decoder ring" analogy, the modern practice of using encryption has been accurately described as using a very resilient envelope for your messages. Most unencrypted data transmitted online is accessible to the servers passing off the information. Conversely, using encryption puts your online communications in a "steel envelope" — they can't be read in the course of delivering the message to the recipient and are extremely resistant to tampering.

Modern encryption is very difficult to break, using very complex mathematics to scramble information and ensure that only people possessing the right key can unscramble it. In many cases you can get major security benefits from encryption without a detailed understanding of how it works. Some software implements very convenient, fully automated encryption features which may simply require that you turn them on.

For instance, when a website is configured properly, web browsers can use SSL encryption to protect the privacy of information you send to or receive from a web server. This is most often used to protect log-in passwords and financial data. Using a browser's SSL encryption can be as simple as accessing a site with the https scheme instead of the http scheme (for instance, <https://www.eff.org/> instead of <http://www.eff.org/>); the browser typically takes care of all the details behind the scenes.

Q.7. What is total cost of ownership (TCO)? What are the different cost factors for computation of the TCO of any system? Explain

Ans.: The *total cost of ownership* (TCO) of an information system is defined as the total cost of acquiring, implementing, and *keeping* that system running. It's an accounting methodology that today is proving to be crucial in making sound IT decisions.

Many IT professionals conveniently factor in only the costs of purchasing hardware and software when doing TCO analysis. This isn't surprising; when pressed for time, they only take into account what's easy to find out. In the relatively easy-to-manage world of mainframes and big centralized information systems, hardware and software accounted for much of the cost factors. In the current era of e-business, client /server, and peer-to-peer systems, however, the costs of *managing and maintaining* information systems is often much higher and cannot be ignored.

Cost factors, which should go into the computation of the TCO of any system, can be grouped into **direct** and **indirect** costs.

Direct costs pertain to the acquisition expenses or the cost of buying the system, and cover all of the following activities:

- **Researching** possible products to buy, which is essentially a labour cost but may also include materials cost, such as purchase of third-party research reports or consultant fees.
- **Designing** the system and all the necessary components to ensure that they work well together. Naturally, this cost component will be higher if a move to a totally different system platform is being considered.
- **Sourcing** the products, this means getting the best possible deal from all possible vendors through solicited bids or market research. It's often sufficient to get a quotation from three vendors (with the cheapest one not necessarily being the best choice). With the Internet, it's easy to get price quotations even from sources outside the country, to get a good spectrum of pricing options.
- **Purchasing** the product(s), which includes the selling price of the hardware, software, and other materials as negotiated with the chosen suppliers. Include all applicable taxes that might be incurred. Don't forget to consider the costs of the systems at the end-user side; some system choices might entail a change or upgrade at that end.
- **Delivering** the system, which includes any shipping or transportation charges that might be incurred to get the product into its final installation location.
- **Installing** the system. Bear in mind that installation also incurs costs in utilities and other environmental — not just labour costs. If the installation of the system will result in downtime for an existing system, relevant outage costs must be included. Any lost end-user productivity hours during this activity should also be factored in.
- **Developing or customizing** the application(s) to be used.
- **Training** users on the new system.
- **Deploying** the system, including transitioning existing business processes and complete integration with other existing computing resources and applications. Include here the costs to promote the use of the new system among end users.

Indirect costs address the issues of maintaining availability of the system to end users and keeping the system running, which includes the following:

- **Operations management**, including every aspect of maintaining normal operations, such as activation and shutdown, job control, output management, and backup and recovery.
- **Systems management**, such as problem management, change management, performance management, and other areas.
- **Maintenance of hardware and software components**, including preventive maintenance, corrective maintenance, and general housekeeping.
- **Ongoing license fees**, especially for software and applications.
- **Upgrade costs** over time that may be required.
- **User support**, including ongoing training, help desk facilities, and problem resolution costs. Remember to include any costs to get assistance from third parties, such as maintenance agreements and other service subscriptions.
- **Environmental factors** affecting the system's external requirements for proper operation, such as air conditioning, power supply, housing, and floor space.

- **Other factors** that don't fall into any of the above categories, depending on the type of system deployed and the prevailing circumstances.

All these cost factors seem fairly obvious, but quantifying each cost is difficult or impractical in today's world, because few organisations have an accounting practice that's mature enough to identify and break down all these types of expenses in sufficient detail.

Although all analyst's TCO estimates vary considerably, they all point to the fact that –

- TCO results will be very different for every organisation, given their varied computing environment, user experience level and IT expertise.
- PC systems have much higher indirect costs than direct costs.
- TCO analysis is never going to be an exact science, due to the many assumptions and unknowns that have to be taken into account.
- As you provide more functionality and capability to end users, TCO rises. As you install more software or provide more complex hardware at the hands of end users, you pay increasingly more for support and maintenance.

Q.8. Explain the different advantages of Knowledge Management in Organisations. Also, explain different the role of business intelligence tools in different management levels?

Ans: Knowledge management (KM) is the management of knowledge within organisations. A widely accepted 'working definition' of knowledge management applied in worldwide organisations is "Knowledge Management caters to the critical issues of organisational adaptation, survival, and competence in the face of increasingly discontinuous environmental change.... Essentially, it embodies organisational processes that seek synergistic combination of data and information processing capacity of information technologies, and the creative and innovative capacity of human beings."

Advantages of Knowledge Management in Organisations:-

- Knowledge management plays a vital role in the up bring of an organization. Knowledge management in an organization is the capture of knowledge in a systematic way and using it for the progress.
- Knowledge allows an organization to recognize, create and distribute knowledge. When each employee of an organization contributes his part of knowledge in the knowledge pool, there forms a big one that helps the organization in realizing the right path towards success.
- Knowledge can provide many competitive advantages to both the employee and the organization. Application of correct knowledge at the right situation helps an organization to make prime decisions.
- Knowledge management is a difficult task and the process of knowledge management can be divided into many categories. They are creating a favourable environment, capturing right knowledge, refining the collected knowledge, storing it in an effective way, tagging it and circulating it.
- Knowledge is not measurable. Even a small piece of knowledge will be helpful if it is used in the right way. In organizations a favourable environment should be made to capture knowledge in an effective way. After capturing the knowledge, it should be refined and stored for future purpose. The refined information can be circulated within the organization to educate employees and authorities.
- Knowledge Management is a system that creates techniques and strategies to organize, create, enable, and represent a company.

Role of business intelligence tools in different management levels:

The information economy puts a premium on high quality actionable information —exactly what *Business Intelligence (BI)* tools like data warehousing, data mining, and OLAP can provide to the business. Through a host of analyses and reports, BI can also improve internal organisational support functions like finance and human resource management of any business.

Marketing: Smart Businesses in their efforts to meet the competition have reoriented their *business around the customer* by improving *Customer Relationship Management*. In the mad rush to acquire new customers, they have realized it is equally important to retain the existing ones. Increased interaction and sophisticated analysis techniques have given businesses unprecedented access to the mind of the customer; and they are using this to develop one-to-one relation with the customer, design marketing and promotion campaigns, optimize sale front layout, and manage e-commerce operations.

For improving Customer Relationship Management (CRM), the CRM strategy needs to include:

- *Operational CRM:* Automating interaction with the customers and sales force.
- *Analytical CRM:* Sophisticated analysis of the customer data generated by operational CRM and other sources like Sales Orders transactions, web site transactions, and third-party data providers.

- *Customer Classification:* Customer classification is a vital ingredient in a business organisation's marketing strategy. It can offer insights into how different segments respond to shifts in demographics, fashions and trends.
- *Campaign / Marketing Promotion Effectiveness Analysis:* Once a campaign is launched, its effectiveness can be studied across different media and in terms of costs and benefits; this greatly helps in understanding what goes into a successful marketing campaign.
- *Customer Lifetime Value:* Not all customers are equally profitable. At the same time customers who are not very profitable today may have the potential of being profitable in future.

Sales and Orders: The success of a business in the future would depend on how effectively it manages multiple delivery channels like the Internet, interactive TV, catalogs, etc.

- *E-Business Analysis:* The Internet has emerged as a powerful alternative channel for established sales methods. Increasing competition from businesses operating purely over the Internet has forced the businesses who had not adopted this route to quickly adopt this channel.

1) *Web Log Analysis:* This involves analyzing the basic traffic information over the e-commerce web site. This analysis is primarily required to optimize the operations over the Internet. It typically includes following analyses:

- Site Navigation
- Referrer Analysis
- Error Analysis
- Keyword Analysis

2) *Web Housing:* This involves integration of web log data with data from other sources like the purchase order transactions, third party data vendors etc. customer centric data warehouse, often referred to as

Web house, all the applications already described under CRM can be implemented. Often a business wants to design specific campaigns for users who purchase from the e-commerce web site. In this case, segmentation and profiling can be done specifically for the .ecustomers to understand their needs and browsing behaviour. It can also be used to personalize the content of the e-commerce web site for these users.

- 3) **Channel Profitability:** Data warehousing can help analyse channel profitability, and whether it makes sense for the business to continue building up expertise in the channel. The decision of continuing with a channel would also include a number of subjective factors like outlook of key enabling technologies for that channel.
- 4) **Product Channel Affinity:** Some product categories sell particularly well on certain channels. Data warehousing can help identify hidden product channel affinities and help the business design better promotion and marketing campaigns.

Human Resource: Data warehousing can significantly help in aligning the HR strategy to the overall business strategy. It can present an integrated view of the workforce and help in designing retention schemes, improve productivity, and curtail costs. Some BI applications in HR are:

- Human Resource Reports/ Analytics
- Manpower Allocation
- HR Portal
- Training and Succession Planning

Finance and Accounts: The role of financial reporting has undergone a paradigm shift during the last decade. Many companies, across industries, have integrated financial data in their enterprise wide data warehouse or established separate Financial Data Warehouse (FDW). Following are some of the uses of BI in finance:

- Budgetary Analysis
- Fixed Asset Return Analysis
- Financial Ratio Analysis
- Profitability Analysis