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Question1: List the advantages and limitations of data mining to support an Information system? Also, discuss the importance of business intelligence. Explain how “Big Data Technology” is affecting data mining.

Ans.

Data mining is an important part of knowledge discovery process that we can analyze an enormous set of data and get hidden and useful knowledge. Data mining is applied effectively not only in the business environment but also in other fields such as weather forecast, medicine, transportation, healthcare, insurance, government...etc. Data mining has a lot of advantages when using in a specific industry. Besides those advantages, data mining also has its own disadvantages e.g., privacy, security, and misuse of information. We will examine those advantages and disadvantages of data mining in different industries in a greater detail.

Advantages of Data Mining

Marketing / Retail

Data mining helps marketing companies build models based on historical data to predict who will respond to the new marketing campaigns such as direct mail, online marketing campaign...etc. Through the results, marketers will have an appropriate approach to selling profitable products to targeted customers.

Data mining brings a lot of benefits to retail companies in the same way as marketing. Through market basket analysis, a store can have an appropriate production arrangement in a way that customers can buy frequent buying products together with pleasant. In addition, it also helps the retail companies offer certain discounts for particular products that will attract more customers.

Finance / Banking

Data mining gives financial institutions information about loan information and credit reporting. By building a model from historical customer's data, the bank, and financial institution can determine good and bad loans. In addition, data mining helps banks detect fraudulent credit card transactions to protect credit card's owner.

Manufacturing

By applying data mining in operational engineering data, manufacturers can detect faulty equipment and determine optimal control parameters. For example, semiconductor manufacturers have a challenge that even the conditions of manufacturing environments at different wafer production plants are similar, the quality of wafer are a lot the same and some for unknown reasons even has defects. Data mining has been applying to determine the ranges of control parameters that lead to the production of the golden wafer. Then those optimal control parameters are used to manufacture wafers with desired quality.

Governments

Data mining helps government agency by digging and analyzing records of the financial transaction to build patterns that can detect money laundering or criminal activities.

Limitation of data mining

Privacy Issues

The concerns about the personal privacy have been increasing enormously recently especially when the internet is booming with social networks, e-commerce, forums, blogs.... Because of privacy issues, people are afraid of their personal information is collected and used in an unethical way that potentially causing them a lot of troubles. Businesses collect information about their customers in many ways for understanding their purchasing behaviors trends. However businesses don't last forever, some days they may be acquired by other or gone. At this time, the personal information they own probably is sold to other or leak.

Security issues

Security is a big issue. Businesses own information about their employees and customers including social security number, birthday, payroll and etc. However how properly this information is taken care is still in questions. There have been a lot of cases that hackers accessed and stole big data of customers from the big corporation such as Ford Motor Credit Company, Sony... with so much personal and financial information available, the credit card stolen and identity theft become a big problem.

Misuse of information/inaccurate information

Information is collected through data mining intended for the ethical purposes can be misused. This information may be exploited by unethical people or businesses to take benefits of vulnerable people or discriminate against a group of people.

In addition, data mining technique is not perfectly accurate. Therefore, if inaccurate information is used for decision-making, it will cause serious consequence.

Conclusion

Data mining brings a lot of benefits to businesses, society, governments as well as the individual. However, privacy, security, and misuse of information are the big problems if they are not addressed and resolved properly.

The term **Business Intelligence (BI)** refers to technologies, applications and practices for the collection, integration, analysis, and presentation of business information. The purpose of Business Intelligence is to support better business decision making. Essentially, Business Intelligence systems are data-driven Decision Support Systems (DSS). Business Intelligence is sometimes used interchangeably with briefing books, report and query tools and executive information systems.

Importance of Business Intelligence tools or software solutions

Business Intelligence systems provide historical, current, and predictive views of business operations, most often using data that has been gathered into a data warehouse or a data mart and occasionally working from operational data. Software elements support reporting, interactive "slice-and-dice" pivot-table analyses, visualization, and statistical data mining. Applications tackle sales, production, financial, and many other sources of business data for purposes that include business performance management. Information is often gathered about other companies in the same industry which is known as benchmarking.

Business Intelligence Trends

Currently organizations are starting to see that data and content should not be considered separate aspects of information management, but instead should be managed in an integrated enterprise approach. Enterprise information management brings Business Intelligence and Enterprise Content Management together. Currently organizations are moving towards Operational Business Intelligence which is currently under served and uncontested by vendors. Traditionally, Business Intelligence vendors are targeting only top the pyramid but now there is a paradigm shift moving toward taking Business Intelligence to the bottom of the pyramid with a focus of self-service business intelligence.

Self-Service Business Intelligence (SSBI)

Self-service business intelligence (SSBI) involves the business systems and data analytics that give business end-users access to an organization's information without direct IT involvement. Self-service Business intelligence gives end-users the ability to do more with their data without necessarily having technical skills. These solutions are usually created to be flexible and easy-to-use so that end-users can analyze data, make decisions, plan and forecast on their own. Companies such as PARIS Technologies have taken an approach to making Business Intelligence an easily integrated tool for other end-user tools such as Microsoft Excel, Access, Web browsers and other vendors

Big data and data mining are two different things. Both of them relate to the use of large data sets to handle the collection or reporting of data that serves businesses or other recipients. However, the two terms are used for two different elements of this kind of operation.

Big data is a term for a large data set. Big data sets are those that outgrow the simple kind of database and data handling architectures that were used in earlier times, when big data was more expensive and less feasible. For example, sets of data that are too large to be easily handled in a Microsoft Excel spreadsheet could be referred to as big data sets.

Data mining refers to the activity of going through big data sets to look for relevant or pertinent information. This type of activity is really a good example of the old axiom "looking for a needle in a haystack." The idea is that businesses collect massive sets of data that may be homogeneous or automatically collected. Decision-makers need access to smaller, more specific pieces of data from those

large sets. They use data mining to uncover the pieces of information that will inform leadership and help chart the course for a business.

Data mining can involve the use of different kinds of software packages such as analytics tools. It can be automated, or it can be largely labor-intensive, where individual workers send specific queries for information to an archive or database. Generally, data mining refers to operations that involve relatively sophisticated search operations that return targeted and specific results. For example, a data mining tool may look through dozens of years of accounting information to find a specific column of expenses or accounts receivable for a specific operating year.

In short, big data is the asset and data mining is the "handler" of that is used to provide beneficial results.

Question2: What are the different criteria which are used in “decision making”. Explain how quality of information improves the knowledge and decision making capability of the people

Ans.

We should always employ decision criteria in making any decision. Let's explore this by using an example of trying to decide which car to buy. What is important to us that will help us determine which car will best fit our situation? Is it style, comfort, noise, gas mileage, speed, manual/transmission, accessibility, price, payment terms available, reliability...?

You can think of this criteria as part of the user story around the decision being made. For example, this user story might apply to some: "I need the car to look cool so that I can impress women." One that is much more realistic for me would be "I need the car to be reliable so that I don't have to worry about breakdowns in traffic." The criteria are going to help you determine that a successful decision has been made. In this example, success would be that we purchased the right car for our situation.

The decision criteria in a business setting are those variables or characteristics that are important to the organization making the decision. They should help evaluate the alternatives from which you are choosing. I use the word "variables" because you can disregard any characteristics that are constant among the alternatives. For example, if all of the cars I am evaluating get the same gas mileage, then disregard that characteristic as it will not help you choose between the alternatives.

The decision criteria should be measurable and should be within scope of the problem you are trying to solve. On criteria that seem immeasurable, you should at least be able to compare one to another. For example, the typical software characteristic "user friendly" is not measurable as stated. You could either list out what makes the application user friendly for your organization or you can try out the applications and have a rankings for the alternatives on relative "user friendliness" between them.

These are some typical decision criteria:

Ease of implementation

Cost

Ease of modification/scalability/flexibility

Employee morale

Risk levels

Cost savings

Increase in sales or market share

Return on investment

Similarity to existing organization products

Increase in customer satisfaction

When in a group decision-making situation, it is often helpful to have the group brainstorm the decision criteria. This helps ensure buy in of the decision itself because the criteria is measurable and not just a

“well I feel like we should buy this product because I like it.” You might also weigh the criteria. For example, cost savings might have a higher weight than ease of use.

Following a structured decision making process will not only enable faster decision-making, it also improves the probability that you will get a consensus on the decision. Consensus is determined to exist when the entire group agrees to support the decision, even if they do not totally agree with it. When getting a group to make a decision, an open discussion with logical presentation of the decision criteria will drive the group toward consensus.

- Compare different types of decisions and describe the decision-making process.
 - Evaluate the role of information systems in helping people working individually and in groups make decisions more effectively.
 - Evaluate the business benefits of using intelligent techniques in decision making and knowledge management.
- Define and describe the types of systems used for enterprise-wide knowledge management and demonstrate how they provide value for businesses.
- Define and describe the major types of knowledge work systems and demonstrate how they provide value for firms.
- Problem: Cost pressures, complex supply chain.
- Solutions: Deploy modeling and optimization software to maximize return on investment and predict the most successful supply chain.
- Modeling software fueled with data from Oracle data warehouse improved efficiency and reduced costs.
- Demonstrates IT's role in restructuring a supply chain.
- Illustrates digital technology improving decision making through information systems.

Business Value of Improved Decision Making Business Value of Improved Decision Making

- Measuring the value of improved decision making
- Identifying key decisions that may benefit from new system investments that could improve decision making
- Decisions may be common, routine, and numerous
- Value of improving multitudes of small decisions that may not provide much value as single decisions

Quality of Decisions and Decision Making

- Accuracy
- Comprehensiveness
- Fairness
- Speed (efficiency)
- Coherence
- Due process

Question3: Elaborate the importance of security in Information System and explain the various measures against the threats to the system. Also, discuss the importance of information security policies and information security plan.

Ans.

Security of an Information System

Information system security refers to the way the system is defended against unauthorized access, use, disclosure, disruption, modification, perusal, inspection, recording or destruction.

There are two major aspects of information system security:

- Security of the information technology used - securing the system from malicious cyber-attacks that tend to break into the system and to access critical private information or gain control of the internal systems.
- Security of data - ensuring the integrity of data when critical issues, arise such as natural disasters, computer/server malfunction, physical theft etc. Generally an off-site backup of data is kept for such problems.

Guaranteeing effective information security has the following key aspects:

- Preventing the unauthorized individuals or systems from accessing the information.
- Maintaining and assuring the accuracy and consistency of data over its entire life-cycle.
- Ensuring that the computing systems, the security controls used to protect it and the communication channels used to access it, functioning correctly all the time, thus making information available in all situations.
- Ensuring that the data, transactions, communications or documents are genuine.
- Ensuring the integrity of a transaction by validating that both parties involved are genuine, by incorporating authentication features such as "digital signatures".
- Ensuring that once a transaction takes place, none of the parties can deny it, either having received a transaction, or having sent a transaction. This is called 'non-repudiation'.
- Safeguarding data and communications stored and shared in network systems.

Information Systems and Ethics

Information systems bring about immense social changes, threatening the existing distributions of power, money, rights, and obligations. It also raises new kinds of crimes, like cyber-crimes.

Following organizations promote ethical issues:

- The Association of Information Technology Professionals (AITP)
- The Association of Computing Machinery (ACM)
- The Institute of Electrical and Electronics Engineers (IEEE)
- Computer Professionals for Social Responsibility (CPSR)

The ACM Code of Ethics and Professional Conduct

- Strive to achieve the highest quality, effectiveness, and dignity in both the process and products of professional work.
- Acquire and maintain professional competence.
- Know and respect existing laws pertaining to professional work.
- Accept and provide appropriate professional review.
- Give comprehensive and thorough evaluations of computer systems and their impacts, including analysis and possible risks.
- Honor contracts, agreements, and assigned responsibilities.
- Improve public understanding of computing and its consequences.
- Access computing and communication resources only when authorized to do so.

The IEEE Code of Ethics and Professional Conduct

IEEE code of ethics demands that every professional vouch to commit themselves to the highest ethical and professional conduct and agree:

- To accept responsibility in making decisions consistent with the safety, health and welfare of the public, and to disclose promptly factors that might endanger the public or the environment;
- To avoid real or perceived conflicts of interest whenever possible, and to disclose them to affected parties when they do exist;
- To be honest and realistic in stating claims or estimates based on available data;
- To reject bribery in all its forms;
- To improve the understanding of technology, its appropriate application, and potential consequences;
- To maintain and improve our technical competence and to undertake technological tasks for others only if qualified by training or experience, or after full disclosure of pertinent limitations;
- To seek, accept, and offer honest criticism of technical work, to acknowledge and correct errors, and to credit properly the contributions of others;
- To treat fairly all persons regardless of such factors as race, religion, gender, disability, age, or national origin;
- To avoid injuring others, their property, reputation, or employment by false or malicious action;
- To assist colleagues and co-workers in their professional development and to support them in following this code of ethics.

security policies and information security

Policies and Procedures are two of the words that most employees dread to hear, especially when it comes to IT Security. Why does this phenomenon occur? Is it because people don't want to be told what to do? Is it because people feel as though they are being "micromanaged" when they have to abide by and comply with policies and procedures? The answer is that it is probably a little of both and for many other reasons that are unique to each specific company. The next obvious question is why do we need to have IT Security policies and procedures? Well, there are many reasons and here are the top 5 reasons, in no particular order:

- **They address threats** – Threats are everywhere, especially when it comes to IT Security and the explosion of Ransomware these days. The goal behind IT Security Policies and Procedures is to address those threats, implement strategies on how to mitigate those threats, and how to recover from threats that have exposed a portion of your organization
- **They engage employees** – I know that this might sound a little crazy but bear with me on this one. Think about a time when you worked for an organization that forced a bunch of policies and procedures down your throat. What were some of the thoughts that you had? Where did these come from? Who created them? Why are we doing this? These are all valid questions and ones that can be avoided when you engage employees in the process of developing and implementing IT Security policies and procedures. Of course there are going to be instances when organizations have to create and implement policies and procedures without engaging employees for obvious reasons. But think about the message that your organization is sending when they allow employees to participate in either the development or review of these policies and procedures.
- **Who does what, when, and why?** – IT Security policies and procedures provide a roadmap to employees of what to do and when to do it. Think about those annoying password management policies that every company has. You know the ones where you have to change your password every 47 minutes and can't use the last 56 passwords that you previously entered. If that policy and procedure didn't exist in organizations, how common would it be for people to use simple,

easy to guess passwords that ultimately open the organization to increased risk of data theft and/or data loss.

- **Who gets access to what** – Think about the days when you were back in college and you would go to a nightclub. Do you remember when you would venture towards the back of the nightclub and there was the VIP section with a very large, angry person guarding who got in and who didn't get in? Policies and procedures play the role of bouncer in a nightclub. They dictate who has access to what information, why, and reasons for accessing it. Without policies and procedures in place, everyone would be allowed into the VIP section and that wouldn't be good for business.
- **What's the penalty** – IT Security policies and procedures outline the consequences for failing to abide by the organizations rules when it comes to IT Security. We all have choices to make as to whether we are going to comply with the policy that has been outlined, that's just human nature. But, people like to know, and need to know, what the consequence is for failing to follow a policy. Policies and procedures provide what the expectation is, how to achieve that expectation, and what the consequence is for failure to adhere to that expectation. This eliminates any and all surprises as this will be clearly outlined, thus protecting the organization.

IT Security policies and procedures are necessary and often required for organizations to have in place to comply with various Federal, State, and Industry regulations (PCI Compliance, HIPAA Compliance, etc.) The development, implementation, and review of these policies and procedures can be another challenge completely, which is why we decided to write a brief eBook on some of the most important IT Security Policies for any organization to have in place.

Question4: Explain the significance of ERP in contemporary business environment? Explain, how an ERP is different from conventional packages? Also, describe the components of an ERP system.

Ans.

Enterprise Resource Planning (ERP) is the latest high end software solution, Information Technology has lent to the world of business application. An ERP software solution seeks to streamline and integrate operations, processes and information flows in an enterprise, to synergize the resources of an organization namely men, material, money and machine. In other words, ERP systems integrate all data and processes of an organization into a unified system. A typical ERP will use multiple components of computer software and hardware to achieve the integration. A key ingredient of most ERP systems is the use of a unified database to store data for the various system modules.

Most organizations across the world have realized that in a rapidly changing business environment, it is impossible to create and maintain a custom designed software package which will cater to all their requirements and also be up-to-date. Realizing these requirements of organizations, companies have designed and developed ERP software, which offer an integrated software solution to all the functional processes in an organization.

Although, in the initial stage ERP originated in the manufacturing environment, now ERP software solutions typically cover all basic business process/functions of any organization, regardless of the organization's business or charter. A typical ERP module include: Manufacturing, Supply Chain, Financials, Customer Relationship Management (CRM), Human Resources, Warehouse Management and Decision Support System. These solutions are often incorrectly quoted as back office solutions indicating that customers and the general public are not directly involved. This is contrasted with front office systems like Customer Relationship Management (CRM) systems that directly deal with customers, or ebusiness systems such as eCommerce, eGovernment, eTelecom, and eFinance, or Supplier Relationship Management (SRM) systems. In reality, ERP modules are cross-functional and enterprise wide software solutions. All functional departments that are involved in operations or production can be integrated in

one system using it. In addition to manufacturing, warehousing, logistics, and Information Technology, it also includes; accounting, human resources, marketing, and strategic management.

There are many different flavors of ERP that serve businesses' varying procedure types. An ERP solution has numerous benefits depending on the type of business that it serves; these are business solutions and industry solutions. The industry solutions are designed for people who are working in specific industries, like finance, communications, education, healthcare to name a few.

Importance of ERP software for businesses:

ERP softwares business solutions are designed for companies that work in a wide variety of areas. IT combines a large number of different elements into a single unit. Three of the most important ERP tools available today are manufacturing, human resources, and finance.

The finance tools allow companies to successfully maintain their financial information like that of the assets, accounts, budgets and cash. ERP can also assist a company in managing internal as well as external factors affecting it. A company that uses ERP financial products can save a great deal of money over the long term, the reason being, the productivity of the organization will be improved. Enterprise Resource Planning is instrumental in getting rid of time consuming activities as paper management. A company is able to study their processes, earnings, and performance by merging their operational information with their financial information. Once this information is connected together, a company can become more competitive and productive. Synergy is an important part of ERP solutions. The concept of combining multiple processes into a single whole will allow the company to become successful in the long term.

In addition to finance and business processes, it is also important to look at materials maintenance. Enterprise Resource Planning will allow a company to successfully automate the process of buying materials and maintaining them. There are modules that track the supplies that are purchased and can also make calculations about how these materials should be distributed. It also becomes possible for a company to predict the demand of the market based on history, economic statistics, and data from their employees. They can even decide when a product should be produced, and they can do this based on the raw material that is available.

Conventional Application Package and ERP differ in a number of ways. An ERP (which stands for Enterprise Resource Planning) program allows a business owner or manager to focus upon, make attainable, and achieve business objectives. An ERP system is used throughout the entire company to ensure that resources and information are equally distributed throughout the company in order to allow each member of the company to achieve the goals they have been set. Although ERP programs were constructed for use in the largest companies, today they are used in companies and businesses of all sizes. ERP programs allow users to monitor and complete a number of broad ranging tasks. On the other hand, a conventional application package is used in order to allow the users within the company to complete a single task, or multiple tasks which are somehow related to one another, therefore a conventional application package appears to be less versatile and flexible than an ERP program to fulfill the needs of a company and those within it.

In response to the second part of your question, to ensure the success of the implementation of an ERP program, most companies who offer ERP software also offer a lot of support, in the form of consultation and customization. This means that you will be able to consult with the provider of your ERP program in order to get their advice about implementing your ERP software, and they will usually help you in many stages of the implementation. This also means that, to an extent, your ERP software may be customized

in order to suit the needs of its users and your company as a whole. The process of customizing your new ERP software may also be referred to as configuration.

components of an ERP system.

1. Human Resources

Managing your employees should always be priority number one. Without them, you don't have a company. Your HR ERP component should be able to handle the full spectrum of employee management and take care of processes like onboarding, off boarding, benefits administration and timekeeping.

The biggest feature you need from an HR component is payroll software. Manually submitting payroll and issuing direct deposits is incredibly time-consuming and isn't very cost-effective either. Instead, an HR component automates payments, including tax and benefits deductions. With an integrated timekeeping feature, payments to your hourly workers can also be automated, so you don't need to manually input their timesheets.

2. Customer Relationship Management

Managing your customers and leads needs to be your second highest priority. Without them, your business can't survive, let alone grow. A customer relationship management (CRM) ERP component allows you to keep track of all of your customer and lead data within your ERP solution. The insights you can gain from a CRM help optimize your marketing and sales efforts.

One of the main uses of a CRM is tracking your customers' buying habits. With this data available, you're able to see which products you may want to upsell and the best times to do it. In addition, you can use a CRM to track conversation history with leads. This way you know which sales personnel has talked to a customer, when they talked and what they talked about. Using this information, you can reduce redundancy in the sales process, minimize customer irritation and ensure a successful sale.

3. Business Intelligence

Business intelligence (BI) has quickly become a standard in ERP systems and it's easy to see why. The BI component of your ERP software collects and analyzes data, providing you with actionable insights related to your business processes. And as businesses start to lean more heavily on decisions backed by data, BI becomes indispensable. The best BI ERP components deliver those insights in reports. A good reporting feature is very important in BI and enables you to make sense of the data analyzed. Some reports come in the form of numbers and tables. However, many prefer visual reports because they allow you to spot trends at a glance. Whichever you decide is best for your company, make sure that it's available in your ERP's reporting capabilities.

4. Supply Chain Management

Creating an effective supply chain is never easy, especially when you don't have the best tools to oversee your operation. Ensuring that your ERP has a Supply Chain Management (SCM) component is crucial to staying competitive in this arena. Your SCM should optimize both manufacturing and distribution processes and create an overall more efficient supply chain. This starts by collecting real-time data.

Real-time data allows you to find and fix issues as they happen, rather than waiting a day or more after the fact. It also makes predictive analytics possible to help with demand planning. Real-time data can help you create an accurate and up-to-the-minute production plan so that you meet demand, but don't exceed it.

5. Inventory Management System

An inventory management component is one of the most collaborative ERP components. Inventory management works in tandem with the SCM component but also dips its toes in other processes, such as sales and warehousing. The main purposes of these components are to manage order fulfillment and the stocking functions in a warehouse.

The best inventory management components come with tracking features that all but eliminate manual inventory control. These features include multi-level serial number tracking, revision level tracking and multiple units of measure per product ID or SKU.

6. Financial Management

Last but not least, we come to the financial management component. Since every business process involves the flow of money, whether it's paying your employees or paying to ship goods, this component works with all of the other parts of your ERP system.

A financial management system stores and analyzes all of your financial data. This includes accounts payable, accounts receivable, costs and budgets. Analysis of your data can reveal trends in your spending, helping you better understand how your profit is calculated and where to reduce costs. You can also receive financial forecasts with data analysis, allowing you to increase profit in the future.

Question5: Explain how system analysis approach is different in new system requirement compared to the existing system. What problems does the system analyst face in ascertaining the information requirement at the various levels of Management?

Ans.

System is defined as a set of elements arranged in an orderly manner to accomplish an objective. System is not a randomly arranged set. It is arranged with some logic governed by rules, regulations, principles and policies. Such an arrangement is also influenced by the objective the system desires to achieve. Systems are created to solve problems. One can think of the systems approach as an organized way of dealing with a problem. In this dynamic world, the subject system analysis and design (SAD) mainly deals with the software development activities.

For example, if a computer system is designed to perform commercial data processing, then the elements will be data entry devices, a CPU, a disk, a memory, application programs and a printer. If a computer is designed to achieve the objective of design, engineering and drawing processing, then the elements will be the graphic processor, and the languages suitable for engineering and design applications, and plotters for drawing the output.

However, a clear statement of objectives brings a precision and an order into the selection of elements and their arrangements in the system. Any disorder would create a disturbance in the system, affecting the accomplishment of the objectives.

If a system in any field is analyzed. It will be observed that it has three basic parts, which are organized in an orderly manner. These three parts can be represented in a model as shown:-



A system may have single input and multiple outputs or may have several inputs and outputs. All the systems operate in an environment. The environment may influence the system in its design and performance. When a system is designed to achieve certain objectives, it automatically sets the boundaries for itself. The understanding of boundaries of the system is essential to bring clarity in explaining the system components and their arrangements.

A collection of component that work together to realize some objectives forms a system. In a system the different components are connected with each other and they are interdependent. For example, human body represents a complete natural system. We are also bound by many national systems such as political system, economic system, educational system and so forth. The objective of the system demands that some output is produced as a result of processing the suitable inputs. A well designed system also includes an additional element referred to as 'control' that provides a feedback to achieve desired objectives of the system.

The system can be classified in different categories based on the predictability of its output and the degree of information exchange with the environment. A system is called deterministic when the inputs, the process and outputs are known with certainty. In a deterministic system, when the output can only be predicted in probabilistic terms. The accounting system is a probabilistic one. A deterministic system operates in a predictable manner while a probabilistic system behavior is not predictable.

If a system is functioning is separated from the environment, then the system does not have any exchange with the environment nor is it influenced by the environmental changes then it is called an open system. All kinds of accounting systems, for example, cash, stocks, attendance of employees, are closed systems. Most of the systems based on rules and principles are closed systems.

The systems which are required to respond to changes in the environment such as marketing, communication and forecasting are open systems. All open systems must have a self-organizing ability and a sensitivity to absorb and adjust to the business organization systems of manufacturing are closed systems.

The information system is a combination of a person (the user of information), the hardware –software system is a closed deterministic system but in combination with the user it is an open and a probabilistic system.

Generally, the deterministic systems are closed, and the probabilistic systems are open. The deterministic and the closed systems are easy to computerize as they are based on facts and their behavior can be predicted with certainty. A fixed deposit accounting system, an invoicing system, and share accounting systems are examples of closed and deterministic system.

The probabilistic system and the open systems are complex in every aspect. Hence, they call for considerable amount of checks and controls so that the system behavior on the performance can be controlled. All such systems must ideally have self organizing corrective system to keep the system going its desired path.

For example, the pricing systems are probabilistic and open. They are to be so designed that the changes in the taxes and duties, the purchase price and the supply positions are taken care of, in the sales price computation. Since the pricing system operates under the influence of the environment, it has to be designed with flexible computing routines to determine the price. The building of self-organizing processing routines to respond to the environmental influences is a complex task both in terms of design and operations of the system.

System analysis

System analysis may be understood as a process of collecting and interpreting facts, identifying problems and using the information to recommend improvements in the system. In other words system analysis means identification, understanding and examine the system for achieving predetermined goals/objectives of the system. System analysis is carried out with the following two objectives:-

1. To know how a system currently operates and
2. To identify the users requirements in the proposed system

Basically, system analysis is a detailed study of all important business aspects under consideration and the existing system, and thus, the study becomes a basis for the proposed system (may be a modified or an altogether new system). System analysis is regarded as a logical process. The emphasis in this phase is an investigation to know how the system is currently operating and to determine what must be done to solve the problem.

The system analysis phase is very important in the total development efforts of a system. The user may be aware of the problem but may not know how to solve it. During system analysis, the developer (system designer) works with the user to develop a logical model of the system. A system analyst, because of his technical background, may move too quickly to program design to make the system prematurely physical, which is not desirable and may affect the ultimate success of the system. In order to avoid this, the system analyst must involve the user at this stage to get complex information about the system. This can be achieved if a logical model of the system is developed on the basis of detailed

study. Such a study (analysis) should be done by using various modern tools and techniques, such as data flow diagrams, data dictionary, and rough description of the relevant algorithm the final requirement of proposed information system.

System analysis is a process of collecting factual data, understanding the process involved, identifying problems and recommending feasible suggestion for improving the system functioning. This involves studying the business processes, gathering operational data, understand the information flow, finding out bottlenecks and evolving solutions for overcoming the weakness of the system so as to achieve the organizational goals. System analysis also includes subdividing of complex process involving the entire system, identification of data store and manual process.

The major objectives of system analysis are to find answers for each business process: what is being done how is it being done, who is doing it, when is he doing it, why is it being done and how can it be improved? It is more of a thinking process and involves the creative skills of the system analyst. It attempts to give birth to a new efficient system that satisfies the current needs of the user and has scope for future growth within the organizational constraints. The result of this process is a logical system design. System analysis is an interactive process that continues until a preferred and acceptable solution emerges.

SYSTEM DESIGN

Based on the user requirements and the detailed analysis of the existing system, the new system must be designed. This is the phase of system designing. It is the most crucial phase in the development of a system. The logical system design arrived at as a result of system analysis is converted into physical system design. Normally, the design proceeds in two stages:

PRELIMINARY OR GENERAL DESIGN

In the preliminary or general design, the features of the new system are specified. The costs of implementing these features and the benefits to be derived are estimated. If the project is still considered to be feasible (possible), we move to the detailed design stage.

STRUCTURED OR DETAILED DESIGN

In the detailed design stage, computer oriented work begins in earnest. At this stage the design of the system becomes more structured. Structure design is a blue print of a computer system solution to a given problem having the same components and inter-relationships among the same components as the original problem. Input, output, databases, forms, codifications schemes and processing specifications are drawn up in detail. In the design stage, the programming language and the hardware and software platform in which the new system will run are also decide.

The system design involves:-

- I. Defining precisely the required system output
- II. Determining the data requirement for producing the output
- III. Determining the medium and format of files and databases
- IV. Devising processing methods and use of software to produce output
- V. Determine the methods of data capture data input
- VI. Designing input forms
- VII. Designing codification schemes
- VIII. Detailed manual procedures
- IX. Documenting the design

SYSTEM ANALYSIS AND DESIGN

SAD, as performed by the system analysts, seeks to understand what human need to analyze data input or data flow systematically, process information in the context of a particular business. Furthermore, system analysis and design is used to analyze, design and implements in the support of users and the functioning of business that can be accomplished through the use of computerized information system.

Installing a system without proper planning leads to great user dissatisfaction and frequently causes the system to fall into disuse. System analysis and design lends structure to the analysis and design of information systems, a costly endeavor that might otherwise have been done in a haphazard way. It can be thought of as a series of processes systematically undertaken to improve a business through the use of computerized information system. SAD involves working with current and eventual users of information system to support them in working with technologies in an organizational setting.

THE NEED FOR SYSTEM ANALYSIS

When you are asked to computerized a system, it is necessary to analyze the system from different angles. The analysis of the system is the basic necessity for an efficient system design. The need for analysis stems from the following point of view:-

System objective: it is necessary to define the system objectives. Many a times, it is observed that the systems are historically in operation and have lost their main purpose of achievement of the objectives. The users of the system and the personnel involved are not in a position to define the objectives. Since you are going to develop a computer based system, it is necessary to redefine or reset the objectives as a reference point in context of current business requirement.

System boundaries: it is necessary to establish the system boundaries which would define the scope and the coverage of the system. This helps to short out and understand the functional boundaries in the

system, and the people involved in the system. It also helps to identify the inputs and the outputs of the various subsystems, covering the entire system.

System importance: it is necessary to understand the importance of the system in the organization. This would help the designer to decide the design feature of the system. It would be possible then to position the system in relation to the other systems for deciding the design, strategy and development.

Nature of the system: the analysis of the system will help the system designer to conclude whether the system is closed type or an open, and a deterministic or a probabilistic. Such an understanding of the system is necessary prior to design the process to ensure the necessary design architecture.

Role of the system as an interface: the system, many a times, acts as an interface to the other systems. It is necessary to understand the existing role of the system, as an interface, to safeguard the interests of the other systems. Any modification or changes made should not affect the functioning or the objectives of the other system.

Participation of the user: the strategic purpose of the analysis of the people to a new development. System analysis process provides a sense of participation to the people. This helps in breaking the resistance to the new development and it also then ensures the commitment to the new development and it also then ensures the commitment to the new system.

Understanding of resource needs: the analysis of the system helps in defining the resource requirement in terms of hardware and software. Hence, if any additional resources are required, this would mean an investment from the point of view of return on such investment. If the return on such investment from the point of view of return on such an investment. If the return on the investment is not attractive, the management may drop the project.

Assessment of feasibility (practicability): the analysis of the system helps to establish the feasibility from different angles. The system should satisfy the technical economic and operational feasibility. Many a time, the systems are feasible from the technical and economic point of view, but they may be infeasible from the operational point of view. The assessment of feasibility will have the investment and the system designer's time. It would also save the embracement to the system designer as he is viewed as the key figure in such project.

MIS AND SYSTEM ANALYSIS

System analysis plays central role in the development of the MIS. Since the MIS is a corporation of the various systems, a systematic approach in its development helps in achieving the objective of the MIS. Each system within the MIS plays a role which contributes to the accomplishment of the MIS objective.

The tools of the system analysis and the method of development enforce a discipline on the designer to follow the steps strictly as stipulated. The possibility of a mistake or an inadvertence is almost ruled out. The system analysis with its structural analysis and design approach ensures an appropriate coverage of the subsystems. The data entities and attributes are considered completely keeping in view the needs of the systems in question and their interface with other systems.

The systems analysis begins with the output design which itself ensures that the information needs are considered and displayed in the appropriate report or screen format; the subsequent design steps are taken to fulfill these needs.

The MIS may call for an open system design. In such a case while making the systems analysis and design, the aspect of open system design is considered and necessary modification are introduced in the designed the information system.

The user's application in the system development ensures the attention to the smaller details in the design. The users actively come out with their requirements automatically ensuring that the users are met more precisely.

The systems analysis and designs, as a tool of the MIS development, helps in streamlining the procedures of the company to the current needs of the business and information objectives. New transactions, new documents, new procedures are brought in to make the system more efficient before it is designed.

The SAD exercise considers testing the feasibility of the system as an important step. This step, many a times, saves the implementation of inefficient systems. Sometimes it forces the management and analysts to look into the requirement and its genuineness. The MIS development process largely relies on the systems analysis and design as a source of the scientific development of the MIS.

The development of the MIS in today advance information technology and internet, web environment is a challenge. The nature of the system analysis has undergone a change, while the core process of the analysis and development has remained the same.

The system analysis is not restricted to the data-process-output. It also covers the technologies which enables the process feasible. The subject now covers the analysis of interfacing and supports the technologies and it's fitting into a chosen hardware-software platforms for a core system development. The MIS largely depends on how these technologies are blended with the main system. The system architecture of the MIS is now different due to the high tech involvement of the data capture, communication, and processing technologies. The trend is towards more swift data capture and making it available in the fastest possible time leaving its usage to the user.

The development methodology may be the predictable design of data, databases and file approach or object oriented analysis and design approach. The MIS design is same, the difference is in the development cycle time, quality of information efficiency of design and the ease of maintenance of the system.

REQUIREMENT DETERMINATION

It is also termed as a part of software requirement specification (SRS); it is the starting point of the system development activity. This activity is considered as the most difficult and also the most error prone activity because of the communication gap between the user and the developer. This may be because the user usually does not understand the users problem and application area. The requirement

determination is a means of translating the ideas given by the user, into a formal document, and thus to bridge the communication gap. A good SRS provides the following benefits:-

- It bridges the communication gap between the user and the developer by acting as a basis of agreement between the two parties.
- It reduces the development cost by overcoming errors and misunderstandings early in the development.
- It becomes a basis of reference for validation of the final product and thus acts as a benchmark.

Requirement determination consists of three activities namely requirement anticipation, requirement investigation and requirement specification. A requirement anticipation activity includes the past experience of the analysis, when influence the study. They may force the likelihood of certain problems or features and requirements for a new system. Thus, the background of the analysts to know what to ask or which aspects to investigate can be useful in at the system investigation. Requirement investigation is at the centre of system analysis. In this, the existing system is studied and documented for further analysis. Various methods like fact-finding techniques are used for the investigation are analyzed to determine requirement specification, which is the description of the features for a proposed system.

Requirement determination, in fact, is to learn and collect the information about:-

- ü The basic process
- ü The data which is used or produced during the process
- ü The various constraints in terms of time and volume of work and
- ü The performance controls used in the system.

UNDERSTAND THE PROCESS

Process understanding can be acquired, if the information is collected regarding:-

- The purpose of the business activity
- The steps which and where they are performed
- The persons performing them, and
- The frequency, time and user of the resulting information

Identify data used and information generated

Next to process understanding, an information analyst should find out what data is used to perform each activity.

Determine frequency, timing and volume.

Information should also be collected to know how often the activity is repeated and volume of items to be handled. Similarly, timing does affect the way analysts evaluate certain steps in carrying out an activity, in other words, timing, frequency and volume of activities are important facts to collect.

Know the performance controls

System controls enable analysts to understand how business functions can be maintained in an acceptable manner.

In order to understand the business operations of the organizations and thus to know the existing system and information requirement for the new system and information analyst collects the information and then makes an analysis of the collected information by using certain analysis tools.

Sunil Poonia

Strategies for requirement determination

In order to collect information so as to study the existing system and to determine information requirement, there are different strategies, which could be used for the purpose. These strategies are discussed below:-

Interview: the interview is a face-to-face method used for collecting the required data. In this method, a person (the interviewer) asks question from the other person being interviewed. The interview may be formal or informal and the question asked may be structured or unstructured. The interview is the oldest and the most often used device for gathering information about an existing system.

Because of time required for interviewing and the inability of the users to explain the system in detail, other methods are also used to gather information. Interviewing is regarded as an art and it is important that analysts must be trained in the art of successful interviewing. This is also important because of the fact that the success of an interviewer and on his or her preparation for interview.

Questionnaire: a questionnaire is a term used for almost any tool that has questions to which individual respond. The use of questionnaires allows analysts to collect information about various aspects of a system from a large number of persons. The questionnaire may give more reliable data than other fact-finding techniques. Also the wide distribution ensures greater uncertainty for responses. The questionnaire survey also helps in saving time as compared to interviews. The analysts should know the advantages and disadvantages of structured as well as unstructured questionnaires must be tested and modified as per the background and experience of the respondents.

Record review: record review is also known as review of documentation. Its main purpose is to establish quantitative information regarding volumes, frequencies, trends, ratios, etc. in record review; analysts examine information that has been recorded about the system and its users. Records/documents may

include written policy manuals, regulations and standard operating procedures used by the organization as a guide for managers and other employees. Procedures, manuals and forms are useful sources for the analysts to study the existing system.

Observation: another information gathering tool used in system studies is observation. It is the process of recognizing and noticing people, objects and occurrences to obtain information. Observation allows analysis to get information. This is difficult to obtain by any other fact finding method. This approach is most useful when analysts need to actually observe the way documents are handled, Processes are carried out and weather specific steps are actually followed. As an observer, the analyst follows a set of rules. While making observations, he/she is more likely to listen than talk.

The analysis usually use a combination of all these approached to study an existing system as any one approach may not be sufficient for electing information requirement of the system.

Question6: Discuss the significance and requirements of EIS (Executive information system) and ESS (executive support system). Also, explain the differences between MIS and EIS.

Ans.

An **executive information system (EIS)**, also known as an **executive support system (ESS)**, is a type of management support system that facilitates and supports senior executive information and decision-making needs. It provides easy access to internal and external information relevant to organizational goals. It is commonly considered a specialized form of decision support system (DSS) EIS emphasizes graphical displays and easy-to-use user interfaces. They offer strong reporting and drill-down capabilities. In general, EIS are enterprise-wide DSS that help top-level executives analyze, compare, and highlight trends in important variables so that they can monitor performance and identify opportunities and problems. EIS and data warehousing technologies are converging in the marketplace.

Components

EIS components can typically be classified as:

Hardware

Software

User interface

Telecommunications

Hardware

When talking about computer hardware for an EIS environment, we should focus on the hardware that meets the executive's needs. The executive must be put first and the executive's needs must be defined before the hardware can be selected. The basic hardware needed for a typical EIS includes four components:

Input data-entry devices. These devices allow the executive to enter, verify, and update data immediately

The central processing unit (CPU), which is the most important because it controls the other computer system components

Data storage files. The executive can use this part to save useful business information, and this part also helps the executive to search historical business information easily

Output devices, which provide a visual or permanent record for the executive to save or read. This device refers to the visual output device such as monitor or printer

In addition, with the advent of local area networks (LAN), several EIS products for networked workstations became available. These systems require less support and less expensive computer hardware. They also increase EIS information access to more company users.

Software

Choosing the appropriate software is vital to an effective EIS. Therefore, the software components and how they integrate the data into one system are important. A typical EIS includes four software components:

Text-handling software—documents are typically text-based

Database—heterogeneous databases on a range of vendor-specific and open computer platforms help executives access both internal and external data

Graphic base—graphics can turn volumes of text and statistics into visual information for executives.

Typical graphic types are: time series charts, scatter diagrams, maps, motion graphics, sequence charts, and comparison-oriented graphs (i.e., bar charts)

Model base—EIS models contain routine and special statistical, financial, and other quantitative analysis

User interface

An EIS must be efficient to retrieve relevant data for decision makers, so the user interface is very important. Several types of interfaces can be available to the EIS structure, such as scheduled reports, questions/answers, menu driven, command language, natural language, and input/output.

Telecommunication

As decentralizing is becoming the current trend in companies, telecommunications will play a pivotal role in networked information systems. Transmitting data from one place to another has become crucial for establishing a reliable network. In addition, telecommunications within an EIS can accelerate the need for access to distributed data.

Applications

EIS helps executives find data according to user-defined criteria and promote information-based insight and understanding. Unlike a traditional management information system presentation, EIS can distinguish between vital and seldom-used data, and track different key critical activities for executives, both which are helpful in evaluating if the company is meeting its corporate objectives. After realizing its advantages, people have applied EIS in many areas, especially, in manufacturing, marketing, and finance areas.

Manufacturing

Manufacturing is the transformation of raw materials into finished goods for sale, or intermediate processes involving the production or finishing of semi-manufactures. It is a large branch of industry and of secondary production. Manufacturing operational control focuses on day-to-day operations, and the central idea of this process is effectiveness.

Marketing

In an organization, marketing executives' duty is managing available marketing resources to create a more effective future. For this, they need make judgments about risk and uncertainty of a project and its impact on the company in short term and long term. To assist marketing executives in making effective marketing decisions, an EIS can be applied. EIS provides sales forecasting, which can allow the market executive to compare sales forecast with past sales. EIS also offers an approach to product price, which is found in venture analysis. The market executive can evaluate pricing as related to competition along with the relationship of product quality with price charged. In summary, EIS software package enables marketing executives to manipulate the data by looking for trends, performing audits of the sales data, and calculating totals, averages, changes, variances, or ratios.

Financial

Financial analysis is one of the most important steps to companies today. Executives need to use financial ratios and cash flow analysis to estimate the trends and make capital investment decisions. An EIS integrates planning or budgeting with control of performance reporting, and it can be extremely helpful to finance executives. EIS focuses on financial performance accountability, and recognizes the importance of cost standards and flexible budgeting in developing the quality of information provided for all executive levels.

differences between MIS and EIS

MIS (MANAGEMENT INFORMATION SYSTEMS) :

- MIS is generally more sophisticated reporting systems built on existing transaction processing systems
- Often used to support structured decision making (decisions that can be described in detail before the decision is made)
- Typically will also support tactical level management, but sometimes are used at other levels
- Examples of structured decisions supported by MIS might include deciding on stock levels or the pricing of products.

MIS	EIS
Information processing	Status Access
Middle, lower levels, sometime senior executives	Senior Executives Expediency
Efficiency	
Production control, sales forecasts, financial analysis, human resource management	Environmental scanning, performance evaluation, identifying problems and opportunities
Corporate	Special
Direct or indirect support, mainly structured routine problems, using standard operations, research and other models	Indirect support, mainly high level and unstructured decisions and policies
Scheduled and demand reports; structured flow, exception reporting mainly internal operations	News items, external information on customers, competitors and the environment
Control	Tracking and control
Usually none, standardized	Tailored to the decision making style of each individual executive, offers several options of outputs
Desirable	A must
Desirable	A must
Information is provided to a diversified group of users who then manipulate it or summarize it as needed	Filters and compresses the information, tracks critical data and information
Inflexibility of reports, cannot get the supporting details quickly	Instant access to the supporting details of any summary
Standard Models are available but are not managed	Can be added, usually not included or limited in nature
By vendors or IS specialists	By Vendors or IS Specialists
Mainframes, Micros or distributed	Distributed system
Application oriented, performance reports, strong reporting capabilities, standard statistical, financial, accounting and management science models	Interactive, easy to access multiple databases, on-line access, sophisticated DBMS capabilities and complex linkages

EIS (EXECUTIVE INFORMATION SYSTEM) :

- EIS support a range of decision making, but more often than not, this tends to be unstructured
- EIS support the executive level of management, often used to formulate high level strategic decisions impacting on the direction of the organization
- These systems will usually have the ability to extract summary data from internal systems, along with external data that provides intelligence on the environment of the organization
- Generally these systems work by providing a user friendly interface into other systems, both internal and external to the organization

Question7:

(a) What is "Copyright" protection? Explain its relevance in computer applications.

Ans.

Until 1989, a published work had to contain a valid copyright notice to receive protection under the copyright laws. But this requirement is no longer in force — works first published after March 1, 1989 need not include a copyright notice to gain protection under the law.

But even though a copyright notice is not required, it's still important to include one. When a work contains a valid notice, an infringer cannot claim in court that he or she didn't know it was copyrighted. This makes it much easier to win a copyright infringement case and perhaps collect enough damages to make the cost of the case worthwhile. And the very existence of a notice might discourage infringement.

Finally, including a copyright notice may make it easier for a potential infringer to track down a copyright owner and legitimately obtain permission to use the work.

What is a valid copyright notice?

A copyright notice should contain:

- the word "copyright"
- a "c" in a circle (©)
- the date of publication, and
- the name of either the author or the owner of all the copyright rights in the published work.

For example, the correct copyright for the ninth edition of *The Copyright Handbook*, by Stephen Fishman (Nolo) is *Copyright © 2006 by Stephen Fishman*.

In the United States, a copyright owner can significantly enhance the protection afforded by a basic copyright. This is done by registering the copyright with the U.S. Copyright office. See **Copyright Registration and Enforcement**.

When can I use a work without the author's permission?

When a work becomes available for use without permission from a copyright owner, it is said to be "in the public domain." Most works enter the public domain because their copyrights have expired.

To determine whether a work is in the public domain and available for use without the author's permission, you first have to find out when it was published. Then apply the following rules to see if the copyright has expired:

- All works published in the United States before 1923 are in the public domain.
- Works published after 1922, but before 1978 are protected for 95 years from the date of publication. If the work was created, but not published, before 1978, the copyright lasts for the life of the author plus 70 years. However, even if the author died over 70 years ago, the copyright in an unpublished work lasts until December 31, 2002.
- For works published after 1977, the copyright lasts for the life of the author plus 70 years. However, if the work is a work for hire (that is, the work is done in the course of employment or has been specifically commissioned) or is published anonymously or under a pseudonym, the copyright lasts between 95 and 120 years, depending on the date the work is published.
- Lastly, if the work was published between 1923 and 1963, you must check with the U.S. Copyright Office to see whether the copyright was properly renewed. If the author failed to renew the copyright, the work has fallen into the public domain and you may use it.

The Copyright Office will check renewal information for you, at a charge of \$150 per hour. (Call the Reference & Bibliography Section at 202-707-6850.) You can also hire a private copyright search firm to see if a renewal was filed. Finally, you may be able to conduct a renewal search yourself. The renewal records for works published from 1950 to the present are available online at www.copyright.gov. Renewal searches for earlier works can be conducted at the Copyright Office in Washington D.C. or by visiting one of the many government depository libraries throughout the country. Call the Copyright Office for more information.

With one important exception, you should assume that every work is protected by copyright unless you can establish that it is not. As mentioned above, you can't rely on the presence or absence of a copyright notice (©) to make this determination, because a notice is not required for works published after March 1, 1989. And even for works published before 1989, the absence of a copyright notice may not affect the validity of the copyright — for example, if the author made diligent attempts to correct the situation.

The exception is for materials put to work under the "fair use rule." This rule recognizes that society can often benefit from the unauthorized use of copyrighted materials when the purpose of the use serves the ends of scholarship, education or an informed public. For example, scholars must be free to quote from their research resources in order to comment on the material. To strike a balance between the needs of a public to be well-informed and the rights of copyright owners to profit from their creativity, Congress passed a law authorizing the use of copyrighted materials in certain circumstances deemed to be "fair" — even if the copyright owner doesn't give permission.

Often, it's difficult to know whether a court will consider a proposed use to be fair. The fair use statute requires the courts to consider the following questions in deciding this issue:

- Is it a competitive use? (In other words, if the use potentially affects the sales of the copied material, it's usually not fair.)
- How much material was taken compared to the entire work of which the material was a part? (The more someone takes, the less likely it is that the use is fair.)
- How was the material used? Is it a transformative use? (If the material was used to help create something new it is more likely to be considered a fair use than if it is merely copied verbatim into another work. Criticism, comment, news reporting, research, scholarship and non-profit educational uses are most likely to be judged fair uses. Uses motivated primarily by a desire for a commercial gain are less likely to be fair use).

As a general rule, if you are using a small portion of somebody else's work in a non-competitive way and the purpose for your use is to benefit the public, you're on pretty safe ground. On the other hand, if you

take large portions of someone else's expression for your own purely commercial reasons, the rule usually won't apply.

(b) Explain the concept of data warehousing. Also, discuss its need in modern business.

Ans.

Data warehousing is the process of constructing and using a data warehouse. A data warehouse is constructed by integrating data from multiple heterogeneous sources that support analytical reporting, structured and/or ad hoc queries, and decision making. Data warehousing involves data cleaning, data integration, and data consolidations.

Using Data Warehouse Information

There are decision support technologies that help utilize the data available in a data warehouse. These technologies help executives to use the warehouse quickly and effectively. They can gather data, analyze it, and take decisions based on the information present in the warehouse. The information gathered in a warehouse can be used in any of the following domains –

- **Tuning Production Strategies** – The product strategies can be well tuned by repositioning the products and managing the product portfolios by comparing the sales quarterly or yearly.
- **Customer Analysis** – Customer analysis is done by analyzing the customer's buying preferences, buying time, budget cycles, etc.
- **Operations Analysis** – Data warehousing also helps in customer relationship management, and making environmental corrections. The information also allows us to analyze business operations.

Integrating Heterogeneous Databases

To integrate heterogeneous databases, we have two approaches –

- Query-driven Approach
- Update-driven Approach

Query-Driven Approach

This is the traditional approach to integrate heterogeneous databases. This approach was used to build wrappers and integrators on top of multiple heterogeneous databases. These integrators are also known as mediators.

Process of Query-Driven Approach

- When a query is issued to a client side, a metadata dictionary translates the query into an appropriate form for individual heterogeneous sites involved.
- Now these queries are mapped and sent to the local query processor.
- The results from heterogeneous sites are integrated into a global answer set.

Functions of Data Warehouse Tools and Utilities

The following are the functions of data warehouse tools and utilities –

- **Data Extraction** – Involves gathering data from multiple heterogeneous sources.
- **Data Cleaning** – Involves finding and correcting the errors in data.
- **Data Transformation** – Involves converting the data from legacy format to warehouse format.

- **Data Loading** – Involves sorting, summarizing, consolidating, checking integrity, and building indices and partitions.
- **Refreshing** – Involves updating from data sources to warehouse.

Question8: Explain the significance of Knowledge Management. Discuss the issues to be considered for successful implementation of knowledge management.

Ans.

Before we start to explore and understand the details of what knowledge management is, and how to implement knowledge management projects and initiatives, we need to first ask ourselves why we want to consider knowledge management in the first place?

What are the real benefits that can be gained from effective knowledge management for the individual, the team, the entire organization, the community, the nation, or even the entire planet Earth?

Knowledge management is far reaching. Maybe you are considering developing your own personal knowledge management competencies, to become a more effective player in the global knowledge economy, or becoming a more competitive knowledge leader and knowledge driven organization.

Maybe you wish to develop and apply knowledge management strategies to government, military operations, global poverty eradication, international disaster management and even, now, knowledge management for global climate change.

The list is endless. Knowledge management is applied today across the world, in all industry sectors, public and private organizations and humanitarian institutions and international charities.

Most importantly, effective knowledge management is now recognised to be 'the key driver of new knowledge and new ideas' to the innovation process, to new innovative products, services and solutions.

Once we can understand the value and benefits to be gained, we will then become far more motivated to look further at the implementation of knowledge management. Doing 'knowledge management' for knowledge management's sake is likely to produce a failure, or mediocre results at very best.

Knowledge management, as a discipline, must result in better achieving, or even exceeding, your objectives. The purpose of knowledge management must not be to just become more knowledgeable, but to be able to create, transfer and apply knowledge with the purpose of better achieving objectives.

How can we better achieve objectives with effective knowledge management?

Well, for a start, effective knowledge management should dramatically reduce costs. Most individuals, teams and organizations are today continually 'reinventing the wheel'. This is often because they simply do not know that what they are trying to do has already been done by elsewhere. They do not know what is already known, or they do not know where to access the knowledge. Continually reinventing the wheel is such a costly and inefficient activity, whereas a more systematic reuse of knowledge will show substantial cost benefits immediately.

But as well as reducing costs, effective knowledge management should also dramatically increase our speed of response as a direct result of better knowledge access and application.

Effective knowledge management, using more collective and systematic processes, will also reduce our tendency to 'repeat the same mistakes'. This is, again, extremely costly and inefficient. Effective knowledge management, therefore, can dramatically improve quality of products and/or services.

Better knowing our stakeholder needs, customer needs, employee needs, industry needs, for example, has an obvious immediate effect on our relationship management.

So it is very easy to see how effective knowledge management will greatly contribute to improved excellence, which is to:

- a) dramatically reduce costs
- b) provide potential to expand and grow
- c) increase our value and/or profitability
- d) improve our products and services
- e) respond faster

Knowledge simply underpins everything we do.

But the benefits of knowledge management for improved excellence, is simply 'one side of the coin'. There is more.

Effective knowledge management, especially accelerated knowledge creation, is the driver for innovation. Increasingly, products and services are becoming 'smarter' and more knowledge based.

Our ability to better collaborate in physical and virtual teams, as knowledge workers, is driving the process of new knowledge creation. Ideas can now be turned into innovative products and services much faster.

As organizations, we are learning faster, and that means that individuals are learning faster. People are developing their competencies and confidence faster in organizations that practice effective knowledge management.

In summary, we simply cannot afford not to mainstream, to embed and embody knowledge management principles, strategies, policies, processes, methods, tools and technologies into our daily personal, team and organizational lives.

The Knowledge Economy is the next booming economy in a world of recession

In a world that is facing economic recession many are starting to ask 'What is going to be the next booming economy, what are its characteristics and, how will it help us to grow out of recession?'



At knowledge-management-online.com we strongly suggest that the next booming economy is already here! It's the rapidly growing global knowledge economy!

More individuals, teams, organizations and inter-organizational networks will be restructuring and renewing themselves with the primary purpose of profitably trading their knowledge to add even higher value, predominantly on the World Wide Web.

Already we see more enlightened organizations developing and applying the knowledge they have about their industry, customers, partners and stakeholders, as their prime strategic asset, and at the highest point in the value chain. And many are becoming less involved, and more open to profitably outsourcing the other business operations.

Around the world we hear automobile companies talking far more about their critical and key knowledge areas of design, knowledge of manufacturing, knowledge of distribution, knowledge of service and support etc as their 'crown jewels' or 'master recipe'.

Based on applying this key knowledge they then outsource the other business components. We hear the same from the aerospace industry, the oil and gas industry, the information technology industry, the food and agricultural industry, the healthcare industry, in fact most, if not all, industries.

Our knowledge mantra is 'know and apply what you know the best, and link to the best of the rest'

Knowledge has become the key strategic asset for the 21st Century and for every organization that values knowledge it must invest in developing the best strategy for identifying, developing and applying the knowledge assets it needs to succeed.

Every organization needs to invest in creating and implementing the best knowledge networks, processes, methods, tools and technologies. This will enable them to learn, create new knowledge, and apply the best knowledge much faster.

Every individual who wishes to successfully participate in the rapidly growing global knowledge economy must now consider the development of their personal knowledge management competencies as an 'essential life skill' for the 21st Century.

It has been said many times, 'knowledge will radically and fundamentally transform economies'.

One thing is absolutely certain in this rapidly changing world.

The best knowledge will always be in demand.

In, say, fifty years time you can be certain of one thing. Leaders of economies, industries and organizations will always be very interested in finding new and better ways to create and apply knowledge.

Effective Knowledge Management is a timeless and changeless principle.

The strategies, methods and tools of knowledge management will undoubtedly change, but the timeless principles will, of course, remain unchanged.



And to survive and succeed in the new global knowledge economy, we must become far more effective and more productive. We must always strive for the best relations and highest quality.

To do that, the successful organizations and individuals will not allow themselves to keep 're-inventing the wheel' or 'repeating the same mistakes. This is so costly and, we suggest that good leaders will simply not tolerate, nor be able to afford, such cost inefficiencies caused by knowledge gaps and bad knowledge flows.

Would the global financial crisis have been prevented or minimized with far more effective global knowledge management?

Finally, those individuals and organizations that can best sense, become quickly alerted to, find, organize, and apply knowledge, with a much faster response time, will simply leave the competition far behind.

All of this can only be achieved through good knowledge leadership that understands the unchanging timeless principles for knowledge, that transforms individuals and organisations to become far more responsive and effective players in a growing knowledge economy.

Knowledge Management is for everyone.

Global and/or Planetary Knowledge Management is becoming a reality today.

It is our belief that the knowledge economy is rapidly becoming the largest and most successful and sustainable economy in the world.

Why chose knowledge management?

Today, some see knowledge management as a choice. Today, those that work with knowledge very well are considered extraordinary.

Those that fail to understand knowledge management will consider it as 'extra effort' to our main work, or consider it a passing fad. They will risk 'throwing the baby out with the bathwater'.

We predict that effective and extraordinary knowledge management, at all levels, for the individual, team, organization and global community will naturally become mainstream and ordinary, as the only way to successfully develop and grow for the future

