

UNIT - 1

Business Intelligence and Business Decisions

- * **Business Intelligence:-** Business intelligence is a variety of software applications used to ^{for} analysis and organisation of raw data like sale revenue, product cost, income, wastage material and human resources etc.

Business Intelligence is a discipline made up of several related activities including data mining, online analytical processing, query and reporting.

Company use business intelligence to improve decision making, cut cost and identify new business opportunity.

BI technology provide current, historical and predictive views of internally structured data for product and department by establishing more effective decision making and strategy operational inside ~~organisat~~ through function like online, data mining, benchmarking and business performance management (BPM). These technology and function are often referred to an information management.

Business intelligence is used for multiple business purpose including -

Measurement of performance and progress towards business goals.

Quantitative analysis of business process modelling and statistical analysis.

Collect the internal and external business entities progress through EDI (Electronic Data Interchange) and data sharing.

4. Use the knowledge management system program to identify and create new opportunities for the business using learning management, training staff and regularly complains.

* DSS (Digital Support System) :- A decision support system is a computer based information system that support business and organisational decision making activities.

DSS serve the management, operation and planning level of an organisation (usually mid and higher level management) and help people make decisions about the problem that may be rapidly changing and not easily specified in advance.

For example - Unstructured and semi-structured problems.

DSS can be either fully computerised, human powered or a combination of both. DSS is used as a tool to support decision making process. DSS users see the drawbacks in business or product and provide facility of DSS tools for particular organisation.

- Characteristics of DSS -

- 1- DSS aimed to be well-structured under specified problem that upper level managers face them.
- 2- DSS attempt to combine the use of model or structure techniques with traditional data and retrieval function.
- 3- DSS specify focus on features which make them easy to use by non-computer user in an interactive mode.
- 4- DSS provide the facility to the upper-level of flexibility and adaptivity.

- Advantages of DSS - A Decision Support System or DSS is helpful for an organisation in various way. It improve the efficiency of the whole organisation. Following are five major points to understand it -

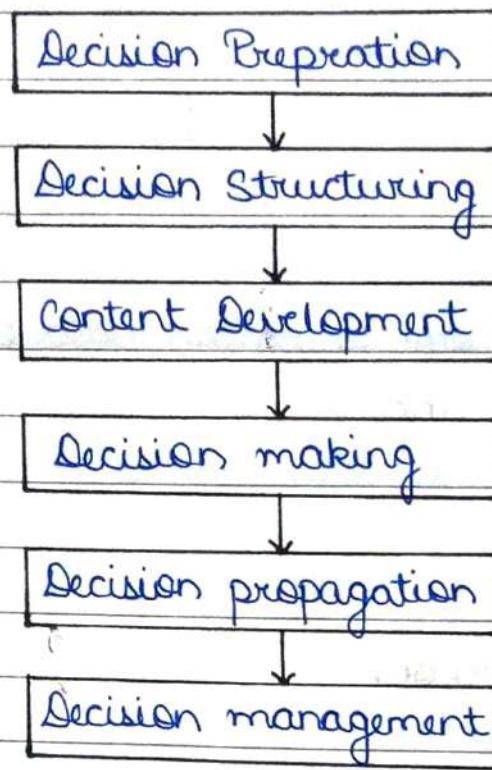
- 1- Improve personal efficiency
 - 2- Improving problem solving concept
 - 3- Facilitating communication
 - 4- Promoting learning and training techniques
 - 5- Increasing organisational control
- 1- Improves personal efficiency - One of the advantage of DSS is efficient decision making , resulting in better decisions. This is because use of DSS result in quick transfer of information, better data analyses , thus resulting in efficient decisions.
 - 2- Facilitating communication - Use of DSS in an organisation helps to improve interpersonal communication between same level of employees and between management and employees.
 - 3- Promoting learning and training techniques - The use of DSS in an organisation results in two type of learning. First managers themselves learn new concepts . Secondly , there is better factual understanding of business as well as the decision making environment.
 - 4- Increasing organisational control - Due to the use of DSS business transaction data is easily available for monitoring the performance of employees and querying . It thus leads to enhanced understanding of business operations for the management.

Types of DSS - There are five types of DSS -

- 1- Model driven DSS - It emphasizes access and manipulation of financial, optimization and simulation model. Model driven DSS use limited data and parameters which are provided by decision-makers.
- 2- Data driven DSS - Data driven DSS emphasizes access and manipulation of a time series of internal company data and sometimes external or real-time data. Simple file system accessed by query and retrieval tools provide the most elementary level of functionality on the basis of individual and particular data.
- 3- Communication driven DSS - It uses network and communication technologies to facilitate decision support collaboration.
- 4- Document driven DSS - It uses computer storage and processing technologies to provide document retrieval and analysis. Large document database may include scan documents, hypertext document, images, sound and videos.
- 5- Knowledge driven DSS - It suggest or recommends action to manage the expertise consist of knowledge about the particular domain, understanding of problems with that domain and skill for solving some of these problems.

For example - Expert System.

* Decision structure of DSS -



* Multi participants Decision Making (MDM) :-

Multiparticipant decision making can be define as a collection of entities of more than one individual participants in decision making process.

It also refer as a group which is independent of the characteristics of particular object, software or members.

Functions of MDM -

- 1- Electronic brain-storming
- 2- Topic commentary
- 3- Issues analysis
- 4- Voting and preference indication
- 5- Policy formation
- 6- Stake-holder analysis
- 7- Idea of organisation
- 8- Evaluation of alternatives
- 9- Survey and feedback creation

- Classification of MDM - Basically there are two types of MDM -
 - By feature
 - By technology

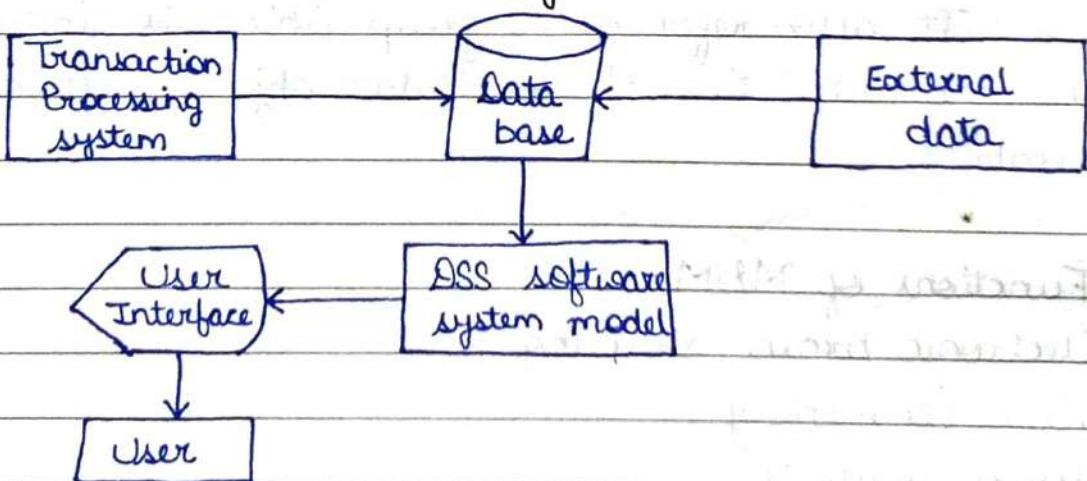
1- By feature -

- Level 1 : Reduce communication barriers
- Level 2 : Reduce uncertainty
- Level 3 : Regulate decision process

2- By Technology

- Electronic broad room -
- Tele conference room
- Group network
- Information centre
- Decision room

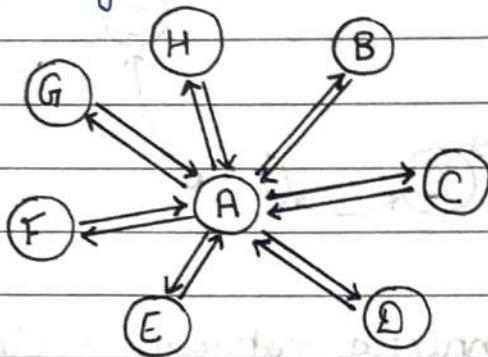
* DBMS Structure Processing -



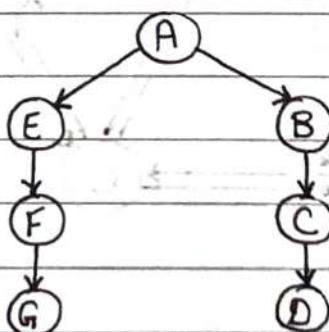
* Group communication network type -

1. The wheel network
2. The chain network
3. The circle network
4. The completely connected network

1. The wheel network — Here all subordinates receive commands from one superior. This is highly centralized type of communication network where each subordinate receives instructions from a single authority or superior 'A' and wants the immediate feedback. The senior communicates the information to employees while the employees do not communicate amongst themselves.



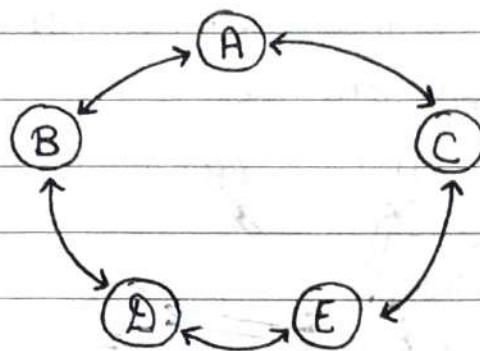
2. The chain network — This network of communication follows the organisational hierarchy and chain of command. All subordinates receive commands or instructions from their superior. B,C,D and E,F,G are the subordinates to A in the organisational hierarchy and receive commands from 'A'. A manager and employee communicate with each other through the vertical chain of authority, both upwards and downwards.



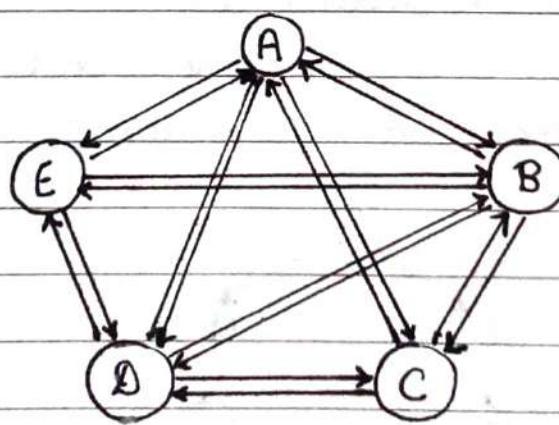
3. The circle network — The circle network is similar to a chain network except that information flows in a circular form rather than vertical form or direction. A can communicate simultaneously with two different persons, B and C.

but to communicate with D, he has to pass the information with through B or C, and E.

All five individuals cannot directly communicate with each other. In a circle network, the lowest level worker can communicate with the top manager.



4- The completely connected network - Under this communication network all members of the group communicate with each other and exchange information. This network is must for group communication or where teamwork is involved. This network channel of communication is open to all members of the group.



Components & Tools also

GDSS (Group Decision Support System) :- A GDSS, Group Decision Support System is an interactive computer based system facilitates a number of decision maker (working together in a group) finding solutions to problems.

They are designed in such a way that they take

input from multiple choices (user interacting simultaneously). The system to arrive at a decision as a group .

The tools and techniques ^{are} provided by group decision support system to improve the quality and effectiveness of the group meeting.

- Components of GDSS :- There are basically three components -

1. Hardware
2. Software
3. People

Groupware is a term.

* Groupware technologies :-

Groupware is a term that refers to technology designed to help people collaborate and includes a wide range of applications.

Groupware is a class of technologies (software and hardware) that helps groups of colleagues to communicate, collaborate and organize their activities via communication networks. " Technology that supports the intersection of electronic communication, information management and group processes is called groupware . "

The three categories of groupware are -

- Communication tools - Tools for sending messages and files, including email, web publishing, filesharing etc.
- Conferencing tools - Video / Audio conferencing, forums etc.
- Collaborative management tools - Tools for managing group activities, e.g. project management systems, workflow systems, information management system etc.

The best known groupware system is Lotus Notes. If designed and implemented properly, groupware systems are very useful in supporting knowledge management (km).

Characteristics :-

1. It permits people to communicate electronically, predominantly via electronic mail.
2. It facilitates the management of the information they use in common.
3. It has woven throughput, it will be used by a group to support collaboration.

Objectives :-

1. Document management
2. Business Intelligence
3. Electronic publishing
4. Group scheduling
5. Forum processing
6. Project - task management
7. Computer conferencing
8. Electronic newsletters

Technologies :-

Telephone

Fax

Teleconferencing, videoconferencing

Instant messaging

E-mail

Discussion forums

Internet telephone

UNIT - 2

Executive Information and Support Systems

* KMS (Knowledge Management System) :-

KMS work to create, organise and share important knowledge wherever and whenever it is needed.

For example - Many KMS rely on internet and intranet website, knowledge basis and discussion forums as key technology for gathering, storing business knowledge.

KMS deals with information (although knowledge management as a discipline for information) so it is a class of information which are utilized with other information sources.

KMS could be any of the following -

- 1- Document based, any technology that permit creation, management, sharing of formatted document via web, distributed system, lotus notes etc.
- 2- Based on AI technology which use a representation scheme to represent the problem domain.
- 3- Provide network map of the organisation showing the flow of communication between entities and individual.

* Business Expert System :-

A business expert system is a knowledge based information system, it uses its knowledge about a specific area to act as an expert system to user.

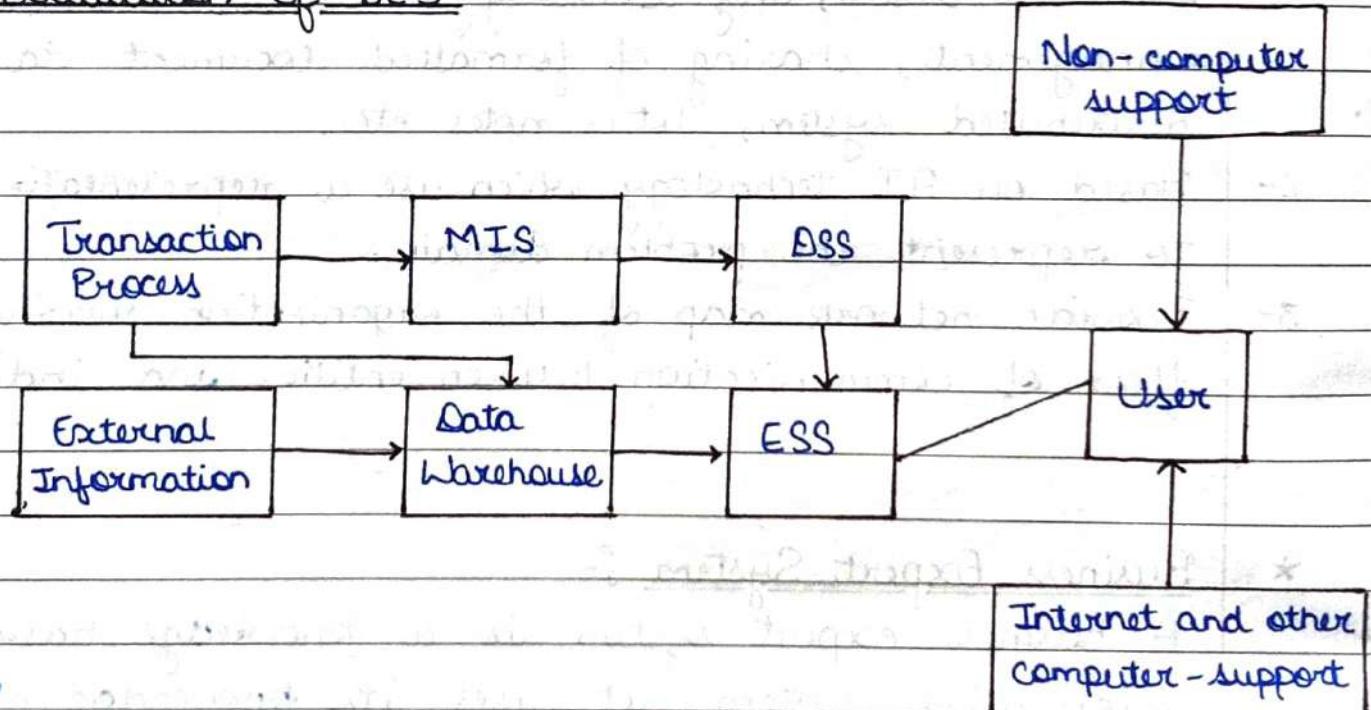
The component of business expert system are knowledge based and software modules that perform inter-connection on the knowledge and offer answer to user's question.

Expert system provide answer to questions in very specific problem area by making human like inference about knowledge contain in a specialised knowledge based.

- Business Expert System Structure — The knowledge base of the business expert system contain facts about specific area. There are many ways that knowledge are represent in business expert system.

1. Case - Base Knowledge BES
2. Frame - Base Knowledge BES
3. Object - Base Knowledge BES
4. Rule - Base Knowledge BES
5. Software Resources

- Evaluation of BES —



- Objective of BES — Following are the various objectives of a business expert system—
1. The role of computer in information system.

- 2- Define the characteristics and elements of information system.
- 3- What are the various type of information system and model.
- 4- Measuring the different type of specialized information system.

* Artificial Intelligence in Business Expert System :-

Simulate human intelligence such as the ability to learn and reason is called artificial intelligence. There are various commercial application of AI are given -

1. Expert system
- 1- Expert System - Computerised advisory program that imitate the reasoning process of expert in solving difficult problem.
- 2- Neural Network - It attempt to emulate the way behalf the working of human brain.
- 3- Fuzzy logic - A mathematical method for handling imprecise or subjective information.
- 4- Genetic algorithm - An AI system that mimics the evolutionary survival of the fittest process to generate increasingly better solution to a problem.
Example : Shopping bot.
- 5- Intelligent Agent - Special purpose knowledge based information system that generate for specific task on behalf of user request.

6- Virtual Reality - A computer based simulated environment that can be able to create simulation of the real world or an imaginary world.

- Examples of AI :-

Games, robotics, natural language, common sense reasoning, perception etc.

- ★ Data Warehousing :-

Dimensional modelling of data is called data warehousing. These procedure are useful for producing first cut design. Most of these modification have to do further simplifying the model and dealing with non-hierarchical data.

- Model tuning in data warehouse -

It is the process to generate relationship with database in data warehouse. These are the major factors for create tuning -

1. Combining tables with the help of foreign key.
2. Produce pre-aggregate stars using one to many relationship.
3. Combining dimension.
4. Handling sub-types relationship.

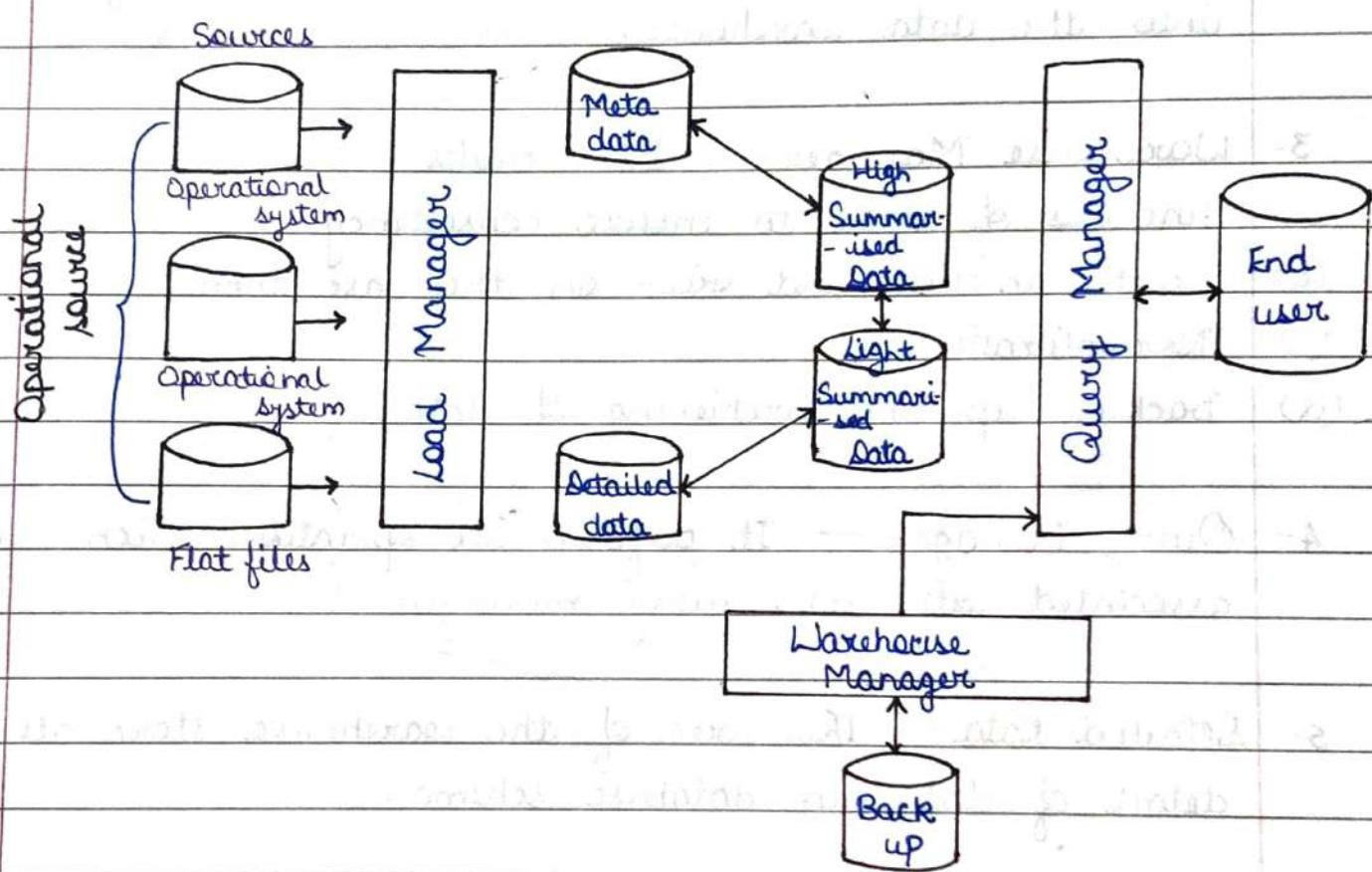
- Benefits of data warehouse -

1. Multiple iteration
2. Shorter implementation
3. Easy validation of each phase
4. Provide extensible, scalable architectures.
5. Allow easy construction for integrated data mart environments

Phases of Data Warehouse - There are six phases-

1. Strategy
2. Definition
3. Analysis
4. Design
5. Build
6. Production

Data Warehousing Architecture :-



1- Operational Source - The source of data for data warehousing is supplied from

- (a) The data from the main frame system in the traditional network and hierarchical format.
- (b) Data can also come from the relational RDBMS like Oracle, Informix.
- (c) In addition these internal data, operational data also

Flat files - It is a system of files in which transactional data is stored, and every file in the system must have a different name.

include external data from databases which are associated with supplier and customer.

An operational system is a method used in data warehousing to refer to a system that is used to process the day-to-day transactions of an organisation.

2- Load Manager — The load manager perform all the operations associated with extraction and loading data into the data warehouse.

3- Warehouse Manager — It includes -

- (a) Analysis of data to ensure consistency.
- (b) Create in click and view on the base table.
- (c) Normalization.
- (d) Backing up and archiving of data.

4- Query Manager — It perform all operation which are associated with user query management.

5 Detailed Data — This area of the warehouse store all detail of data in database schema.

6- Lightly and highly summarized data — The area of the data warehouse store all the predefined lightly and highly summarized (aggregated) data generated by warehouse manager. The goals of summarized information are to speed up query performance.

7- Archive and Backup data — This area of warehouse store detail and summarized data for purpose of archiving and backup.

Meta data summarizes necessary information about data, which can make finding and work with particular instances of data more accessible.

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- 8- Meta data - It is used to map data sources to common view of info within the warehouse. A set of data that defines and give information about other data.
- 9- End user access tool - The principle purpose of data warehousing is to provide information to the business manager for strategic decision making. Some examples of end user access tool -
- Report and query tools
 - Application development tools
 - Executive system tools
 - Online analytical tools
 - Data mining tools

- * Component or tools or Extract Transformation Tool (ETT) -
1. Extract
 2. Transform
 3. Cleaning
 4. Loading

UNIT - 3

Multidimensional Analysis

* Multidimensional analysis :-

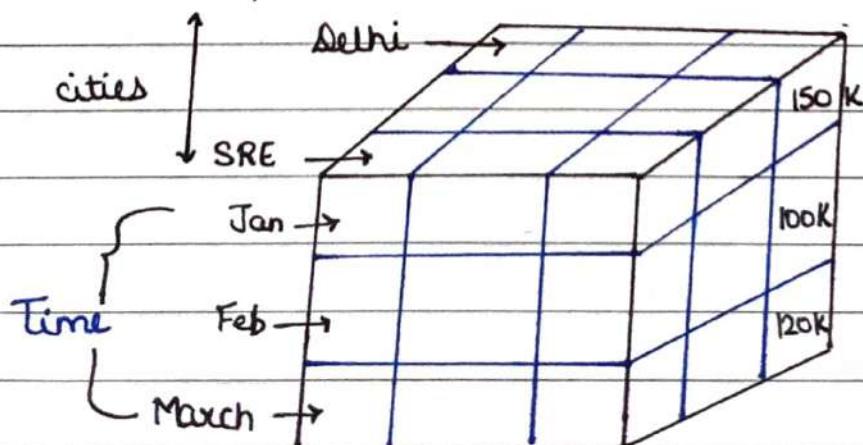
In many application, data contain structured information that is multidimensional and multi-level in nature such as- e-commerce, tele communication, retail, stock, scientific data etc.

In last decade, we have been facing research afford on data warehousing to get better view of multidimensional data. This strategy of searching pattern in multidimension database is called data cubing.

The basic of multidimensional analysis is effective and efficient competition of aggregating function

* Multidimensional data cubing :-

A multidimensional data cubing contain information for analytical purpose. It is a data structure that allows fast analysis of data according to multidimensional that define a problem. In cubing every phase hold uniquely identity and each identity are linked together in business problem.



* Visualisation in multidimensional analysis :-

Visualisation is an area related to data mining. It is used to visualise knowledge and data. It can be used on its own (usually for description and summary task).

It can be used in combination with other data mining techniques. Visualisation can be done by following techniques -

- 1- Visualisation for decision trees
- 2- Cluster visualisation
- 3- Visualisation of association rules
- 4- Sub-group visualisation

* Knowledge Discovery :-

It is define as the process of identifying valid, valuable, potentially and ultimately understandable model/pattern in data.

Data mining is a key step in knowledge discovery process, performed by using data mining technique for extracting model or pattern from the data.

(Knowledge Discovery in Database (KDD)) -

- Process of Knowledge Discovery — There are five steps in knowledge discovery process -

1. Selection
2. Pre-processing
3. Transformation
4. Data mining
5. Interpretation evaluation

* Knowledge discovery and detection :-

In this sub-section deals with discovering the knowledge that the process apply over the organisation. Once knowledge is created it can ^{be} reuse or shared. it must be properly recognised and categorised.

Knowledge discovery and detection following with sub-section -

1- Explicit knowledge — This is largely process of sorting data through documents and other reports which apply many patterns like intelligence gathering, data mining, text mining etc.

2- Tacit knowledge — The role of this method to management of data understanding of what their company's expert actually knows. It is a process of observation and awareness any organisation terms and condition.

3- Embedded knowledge — This kind of knowledge trapped inside organisational routine, process, product etc.

• Knowledge discovery sub-process :-

There are two sub-process used in knowledge-

1. Combination — It enabling the discovery of new explicit knowledge.

2. Socialisation — It enabling the discovery of new Tacit knowledge.

- Technologies used in Knowledge discovery :-

 1. Database
 2. World Wide Web
 3. Sorting
 4. Adding
 5. Combining

* Data mining :-

It is a process of discovering knowledge, meaningful new correlation, pattern and trends. In data, By shifting through large amount of data using pattern recognition as well as statistical and mathematical techniques is called data mining.

Data mining provides tools and techniques for producing useful knowledge from information.

• Data mining applications -

- 1- In business for increasing marketing sale.
- 2- Fraud reduction
- 3- To improve product and process
- 4- For text mining
- 5- For finding new best solution for difficult problem.

* Data Sources :-

- 1- Relational database
- 2- Data warehouse
- 3- WWW
- 4- Audio
- 5- Printed material

- Data mining tasks :-

1. Predictive - It perform on current data.
2. Descriptive - It characterised general properties of data.
3. Pattern - It identify interactive method.

- Issues of data mining -

1. Data mining methodology
2. User interaction
3. Performance (accuracy / robustness)
4. Interestingness
5. Heterogeneous database.

* Clustering for database in data mining :-

This concept is define as

Set of data points , each having a set of attributes and similarity measure among them.

- (a) Data points in one cluster are more similar to another cluster.
- (b) Data points in separate cluster are less similar to one another.

★ Predictive data mining -

- 1- Often referred to as regression.
- 2- Data are object characterized with attributes.
- 3- Given object described with attribute numeric value.

• Predictive data mining techniques -

1- Bayesian Methods

(a) Simple Bayesian methods

(b) Main Bayesian methods

(b.a) Native Bayesian classifier

(b.b) Semi Naïve - Bayesian classifier

(b.c) Gaussian - Bayesian classifier

2- Decision tree framing

(a) Create nodes

(b) Selecting labels and classes of each nodes

3- Classification of rule learning

(a) Unordered set of rules

(b) Ordered set of rules

4- Classifier evaluation

(a) Accuracy and error

(b) N-fold cross validation

• Genetic algorithm in data mining :-

Genetic algorithm is a search heuristic that mimics the process of natural evolution. This is routinely used to generate useful solution for optimization and search problem which generate solution techniques inspired by natural evolution, inheritance, mutation, selection and cross over etc.

* Link analysis :-

Link analysis focus on analysis of relationship among nodes through visualisation methods (network chart, association matrix). There are three purpose of link analysis -

1. Find match in data for known pattern of interact.
2. Find anomalies where known patterns are violated.
3. Discover new pattern of interaction like social media analysis.

* Decision-tree :-

Decision tree is one of the most used techniques in data mining because its model is easy to understand for users. In decision tree, the root of decision tree is the simple question or condition that have multiple answer. Each answer is lead with set of questions or condition that help us determine the data to find best answer or solution.

* Neural Network :-

These network are an approach to computing that involve developing mathematical structure with ability to learn. Neural network have broad applicability to real world business problem and have been already successfully applied in many industry areas.

Neural networks are the best at identifying patterns or trends in data. They are well-suited for prediction or future forecasting. Need including -

1. Sale forecasting
2. Industrial process control
3. Customer research
4. Data validation
5. Risk management
6. Target marketing

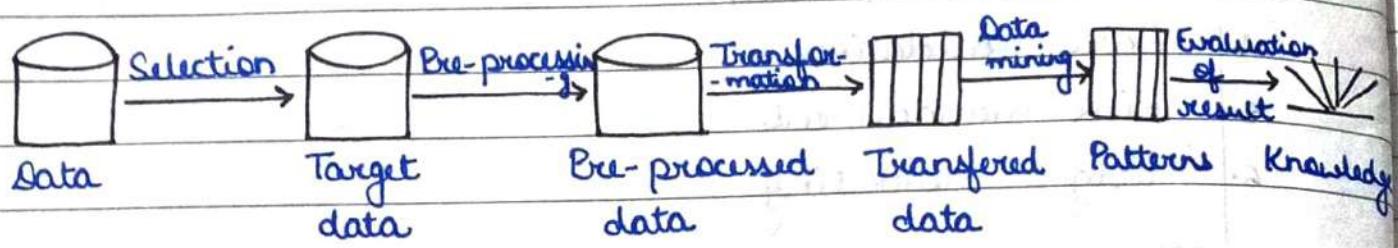
* Memory Based Reasoning (MBR) :-

MBR is identifying similar like experience. It is applying the information from these cases to the problem to hand. MBR finds neighbours similar to new record and use neighbours for classification and prediction.

MBR mainly perform two operations -

1. Distance function (assign the distance between any two words).
 2. Combination function (combine the result from the neighbour to arrive at an answer).
- Application areas of MBR -
 - 1. Fraud detection
 - 2. Customer Response Prediction
 - 3. Classifying Response
 - 4. Appropriate set of historical record
 - 5. Help in medical treatment

Ques - How you relate data mining techniques to knowledge discovery?



Ques - Difference between data mining and data warehouse.

- 1- Collecting - data collection, date extraction through tools
- 2- Organising - The collected data need to be organised.
- 3- Summarizing - The lengthy info is presented in tabular or graphical format.
- 4- Analyzing - The info is analyzed in order to find the relationships, redundancies and patterns.
- 5- Synthesizing - At this point, information becomes knowledge.
- 6- Decision making - The knowledge is used for decision making.

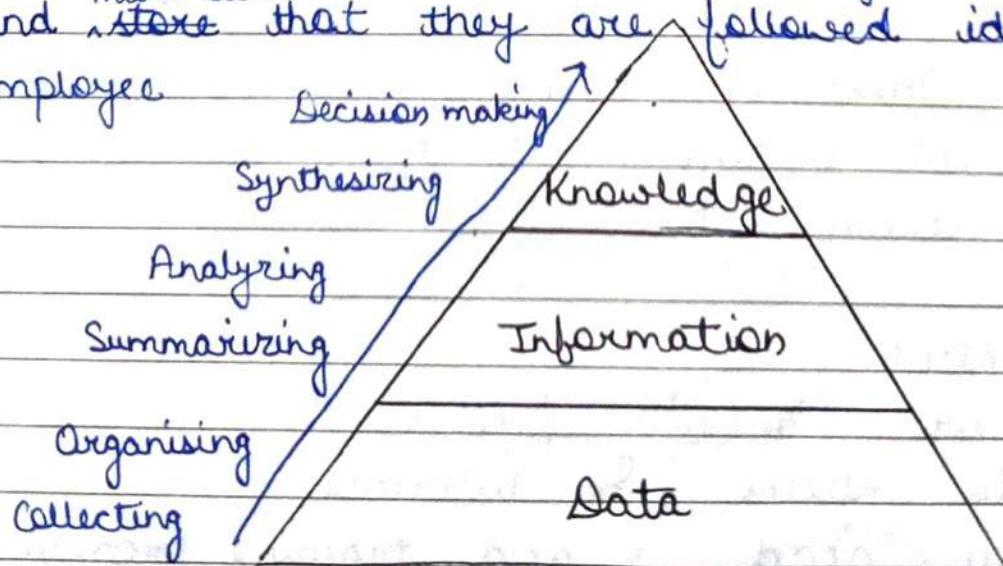
UNIT - 4

Knowledge Management Systems

* Knowledge Management Processes :- To ensure the knowledge in your company is properly created, stored and used, it is paramount to implement the internal processes the right way. Company policy and procedures govern the way employees interact with each other and the organisation itself, here are some things you should know -

1 General Company policy towards knowledge management - Communicate the importance of knowledge management and knowledge sharing to your employees. For example - giving employees some time off work every week so that they may think of what they had learned recently.

2 Knowledge creation guidelines - Make sure that any material that enters your knowledge base does so in an organised fashion. Create guidelines for knowledge creation, communicate them to your employees create and ^{make sure} store that they are followed ideally, every employee



Assignment

ques 1- Define the system of Knowledge Management.

Ans- System of KM :-

Knowledge management systems refer to any kind of IT system that stores and retrieves knowledge, improves collaboration, locates knowledge sources, mines repositories for hidden knowledge, captures and uses knowledge, or in some other way enhances the KM processes.

The meaning of knowledge management system, while broad in use, can be narrowed to the following purpose: to help people utilize knowledge to better achieve tasks. When you look at it like this, you can reframe it as a more proactive form of customer success. You can answer customers' questions in real time as they're struggling with their challenges, instead of constantly answering the same questions in your support ticketing system.

There are many types of knowledge management systems, but they all share some common characteristics. These include -

- FAQ content
- Forum or community feature
- How-to articles and tutorials
- Education, academies and training programs

- Certificates
- Case studies
- Webinars

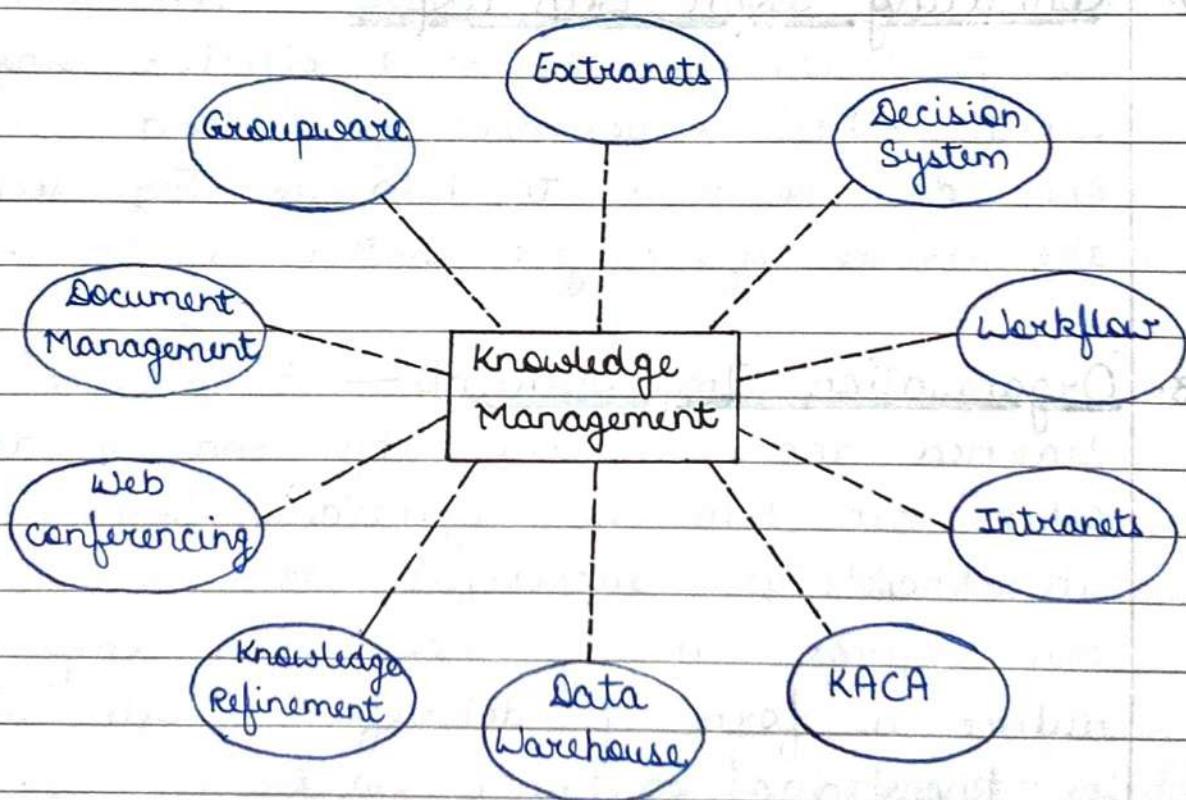
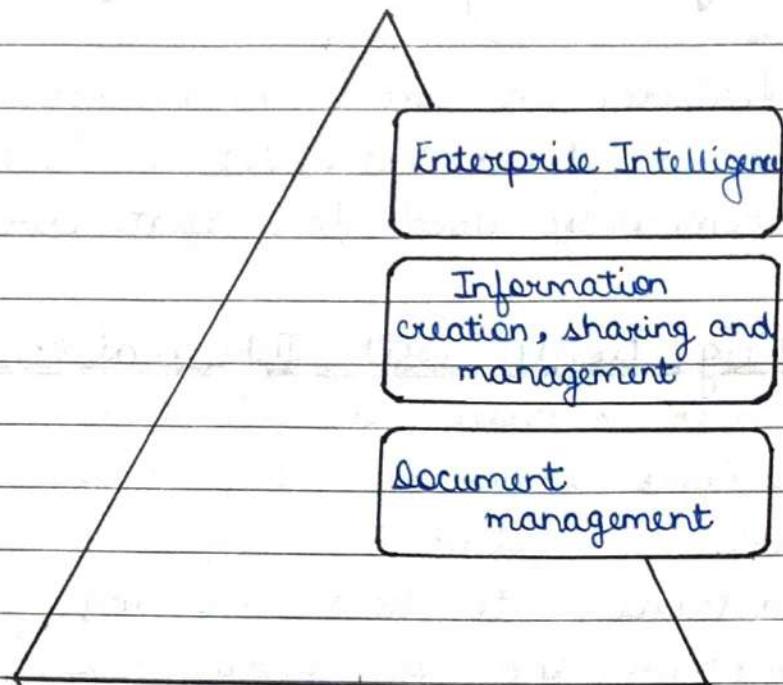


fig :- System of KM

Ques 2 - Explain the techniques of Knowledge Management.
(Need of KM)

Ans - Knowledge Management Techniques:

To understand what features an ideal knowledge management platform must possess, let us take a look at the tools commonly used for that purpose -

1. Connecting People with Information and Knowledge — New work should always build on the foundation of previous knowledge. Try seeking knowledge from previous case studies, rapid evidence review, and web databases to help connecting people to the information and knowledge you desire.

2. Connecting People with People — Communicating with our peers can be the most effective way to learn about other's experiences first-hand, and get the knowledge we need to help us. Try seeking out the advice of subject matter experts in your field.

3. Organisation Improvement — Summarize lessons learned and experiences by sharing them with others can help the organisation build and retain its knowledge. Successful ways the organisation can improve is by encouraging employees to utilize a form of debriefing, after actions reviews, or knowledge exchange platforms.

4. Learn Before, During and After — This means that when you start a new piece of work, you should

check if anyone has done something similar before and there is anything you can learn from them. Then while you are working on that work, there should be a stage where you reflect on what you have done so far to help you decide how to continue forward. This brings you to the final stage of learning, when you have completed the piece of work.

5- Become a Knowledge Owners — Knowledge owners are individuals who have the role of managing company knowledge in one specific area. They are typically experts in their subjects, within the functional department. Strive to become a SME (subject matter expert) in your topic, maybe try to become a knowledge owner in multiple disciplines.

Q3- What are limitations of knowledge system ?

- Some of the common limitations are-

1. The problem begins with language — The problems of knowledge management begin with the issue of language.
2. Creating and delivering new forms of knowledge : the knowledge opportunity .
3. Understanding the ecology and interactions of the innovating stereotypes.

4. Finding ways to efficiently capture and record business knowledge.
5. Making information and resources easier to find.
6. Motivating people to share, reuse and apply knowledge consistently.
7. Aligning knowledge management with the overall goals and business strategy.
8. Choosing and implementing knowledge management technology.
9. Integrating knowledge management into existing processes and information systems.

