Unit 1 : Introduction to BI

1. What is Decision Support system? (Appeared in May 2016)

➤ Little (1970) defines DSS as a "model-based set of procedures for processing data and judgments to assist a manager in his decision-making."

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

➤ A decision support system (DSS) is a computer program application that analyzes business data and presents it so that users can make business decisions more easily.

➤ Typical information that a decision support application might gather and present would be:

- Comparative sales figures between one week and the next

- Projected revenue figures based on new product sales assumptions

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

➤ **Types of DSS:**

1. Communication Driven DSS:

   Its purpose are to help conduct a meeting, or for users to collaborate. The most common technology used to deploy the DSS is a web or client server. Examples: chats and instant messaging software's, online collaboration and net-meeting systems.

2. Data Driven DSS:

   Examples: computer-based databases that have a query system to check (including the incorporation of data to add value to existing databases.

3. Document Driven DSS:

The purpose of such a DSS is to search web pages and find documents on a specific set of keywords or search terms. The usual technology used to set up such DSS are via the web or a client/server system.

4. Knowledge Driven DSS:

It is essentially used to provide management advice or to choose products/services.

It works exactly like Data mining. Tools used for building Knowledge-Driven DSS are sometimes called Intelligent Decision Support methods.

5. Model Driven DSS:

Model-driven DSS are complex systems that help analyse decisions or choose between different options. These are used by managers and staff members of a business, or people who interact with the organization, for a number of purposes depending on how the model is set up - scheduling, decision analyses etc.

Components of DSS:
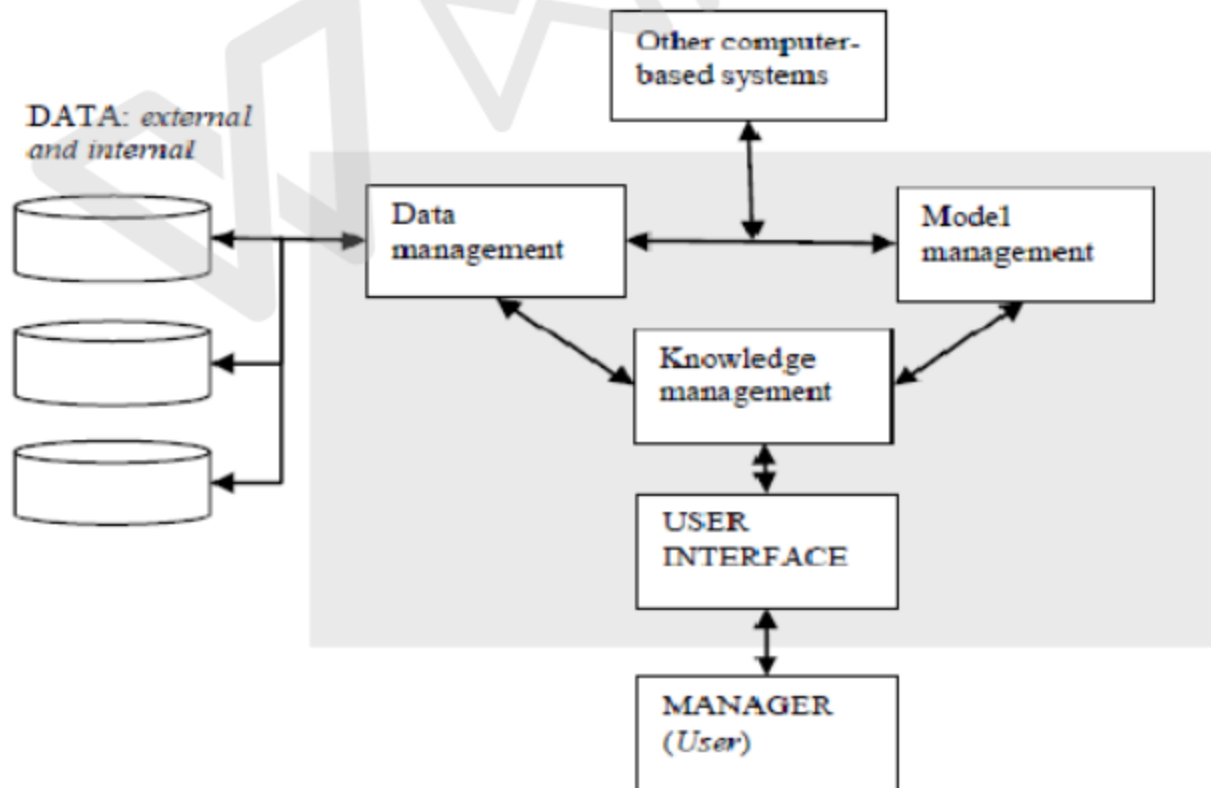
1. **Data Management Subsystem:**

The data management subsystem includes a database that extracts relevant data for the situation and is managed by software called the database management system (DBMS).

The data management subsystem can be interconnected with the corporate data warehouse, a repository for corporate relevant decision-making data. Usually the data are stored or accessed via a database Web server.

2. **Model Management Subsystem:**

This is a software package that includes financial, statistical, management science, or other quantitative models that provide the system's analytical capabilities and appropriate software management. Modeling languages for building custom models are also included. This software is often called a model base management system (MBMS). This component can be connected to corporate or external storage of models. Model solution methods and management systems are implemented in Web development systems (like Java) to run on application servers.

3. **User Interface Subsystem:**

The user communicates with and commands the DSS through this subsystem. The user is considered part of the system. Researchers assert that some of the unique contributions of DSS are derived from the intensive interaction between the computer and the decision-maker. The Web browser provides a familiar, consistent graphical user interface structure for most DSS.

4. **Knowledge based management subsystem:**

It provides intelligence to augment the decision-maker's own. It can be interconnected with the organization's knowledge repository (part of a knowledge management system), which is sometimes called the organizational knowledge base.

2. What is Data - Information - Knowledge - Decision making - Action cycle.

A. Data:

Data are any facts, numbers, or text that can be processed by a computer. Today, organizations are accumulating vast and growing amounts of data in different formats and different databases. This includes:

➢ operational or transactional data such as, sales, cost, inventory, payroll, and accounting

➢ non operational data, such as industry sales, forecast data, and macro economic data

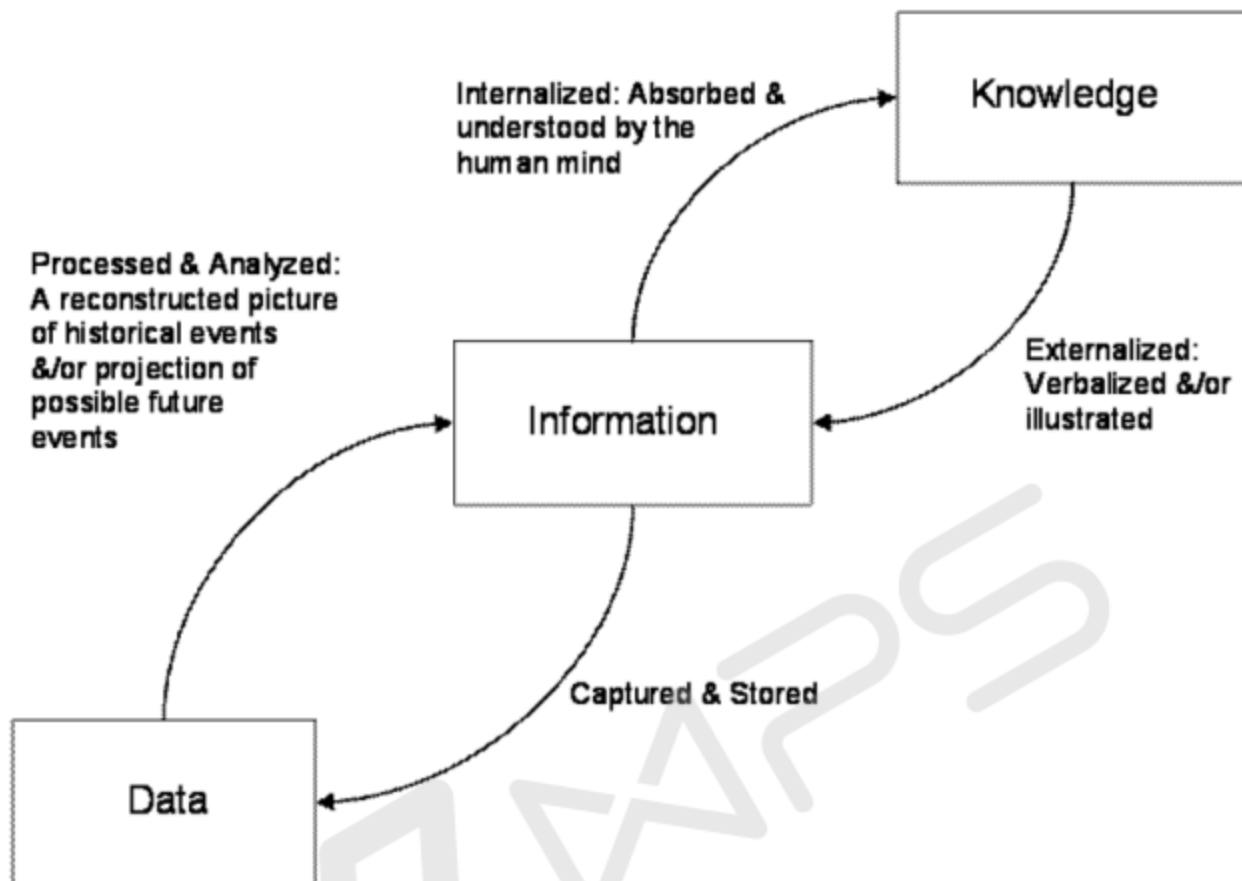➢ meta data - data about the data itself, such as logical database design or data dictionary definitions

B. Information:

The patterns, associations, or relationships among all this data can provide information. For example, analysis of retail point of sale transaction data can yield information on which products are selling and when.
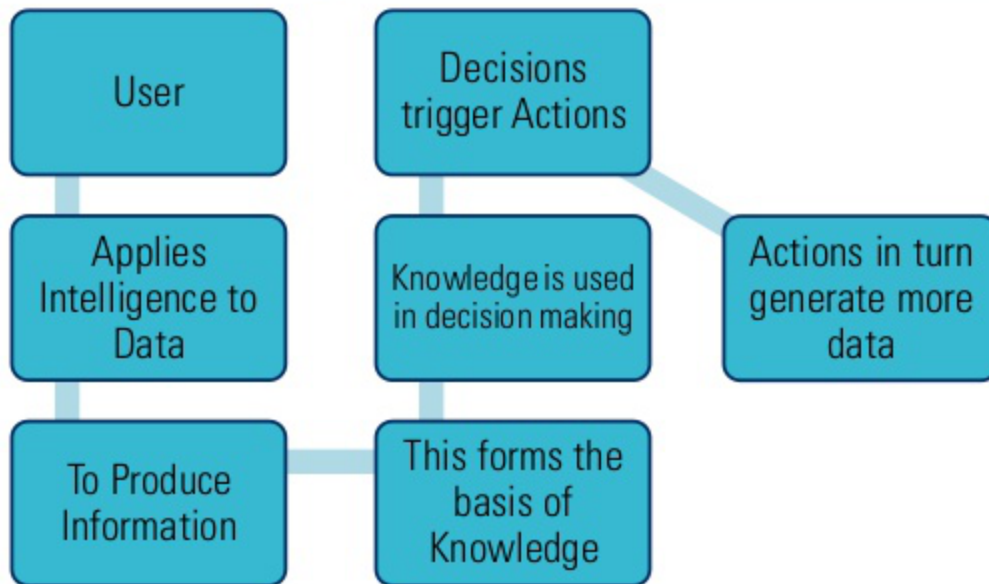
C. Knowledge:

Information can be converted into knowledge about historical patterns and future trends. For example, summary information on retail supermarket sales can be analyzed in light of promotional efforts to provide knowledge of consumer buying behavior. Thus, a manufacturer or retailer could determine which items are most susceptible to promotional efforts.

Relationship between Data, Information and Knowledge:

Internalized: Absorbed & understood by the human mind

Knowledge

Processed & Analyzed: A reconstructed picture of historical events &/or projection of possible future events

Information

Externalized: Verbalized &/or illustrated
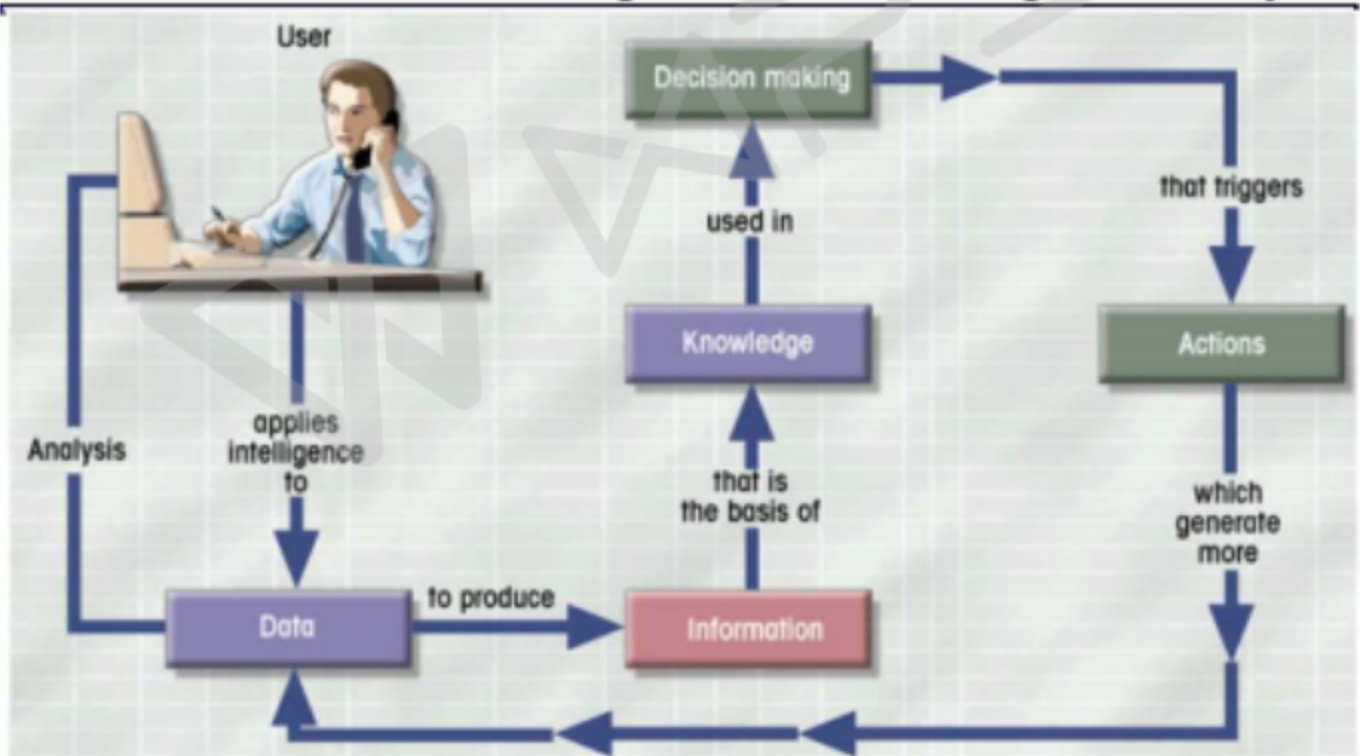
Captured & Stored

Data

(Explain the diagram in your words, briefly in 4-5 lines)

Decision Action Cycle

Data-Information-Knowledge-Desision Making - Action cycle

Technology is needed *"... to push information closer to the point of service to enhance decision-making, and to make the data actionable"* – SAS vision of their customers' needs

3. What is Business Intelligence. State importance and need.

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.

Business intelligence (BI) is a collection of technical and process innovations across the data warehousing and business intelligence space. Proactive BI focuses on decision-making acceleration by leveraging existing BI infrastructure to identify, calculate, and distribute up-tothe-moment, mission-critical information. Through the application of these techniques and technologies, the reach and value of data warehouse and BI systems can be increased by one or more orders of magnitude. Business success today requires intelligent data use.

Importance:

A. Gain Insights into Consumer Behaviour:

One of the main advantages of investing in BI and skilled personnel is the fact that it will boost your ability to analyze the current consumer buying trends. Once you understand what your consumers are buying, you can use this information to develop products that match the current consumption trends and consequently improve your profitability.

B. To Improve Visibility:

If you want to improve your control over various important processes in your organization, you should consider investing in a good BI system. This will improve the visibility of these processes and make it possible to identify any areas that need improvement. Moreover, if you currently have to skim through hundreds of pages in your detailed periodic reports to assess the performance of your organisation's processes, you can save time and improve productivity by having skilled intelligence analysts using relevant BI software. Good BI should be at the heart of every organization as it can provide increased control. Visibility is essential.

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C. To Turn Data into Actionable Information:

A BI system is an analytical tool that can give you the insight you need to make successful strategic plans for your organization. This is because such a system would be able to identify key trends and patterns in your organisation's data and consequently make it easier for you to make important connections between different areas of your business that may otherwise seem unrelated. As such, a BI system can help you understand the implications of various organizational processes better and enhance your ability to identify suitable opportunities for your organization, thus enabling you to plan for a successful future.

D. To Improve Efficiency:

One of the most important reasons why you need to invest in an effective BI system is because such a system can improve efficiency within your organization and, as a result, increase productivity. You can use business intelligence to share information across different departments in your organization. This will enable you to save time on reporting processes and analytics. This ease in information sharing is likely to reduce duplication of roles/duties within the organization and improve the accuracy and usefulness of the data generated by different departments. Furthermore, information sharing also saves time and improves productivity.

E. To Gain Sales & Market Intelligence:

Whether you are a sales person or a marketer, you probably like to keep track of your customers — probably using a CRM to help you. CRM stands for Customer Relationship Management. It refers to software that handles all aspects of an organization's interactions with its customers. In other words, it collects the data about your customer and tries to make sense of it, presents it to you in various tables and charts. That may include the entire sales cycle, from winning new customers, to servicing and tracking existing customers, to providing post-sales services. CRM systems are now more involved in decision-support processes than ever before. In our next articles, we will look at how BI can help increase

your sales efficiently and gain a further insight into your current market as well as market entry support.

F. To Gain Competitive Intelligence:

BI can also be used to gain an insight into what your competitors are doing. This strengthens your company's ability to make decisions and plan for the future.

4. Data Warehousing definition and characteristics:

A data warehouse (DW) is a collection of corporate information and data derived from operational systems and external data sources. A data warehouse is designed to support business decisions by allowing data consolidation, analysis and reporting at different aggregate levels. Data is populated into the DW through the processes of extraction, transformation and loading.

A data warehouse is constructed by integrating data from multiple heterogeneous sources that support analytical reporting, structured and/or adhoc queries, and decision making. Data warehousing involves data cleaning, data integration, and data consolidations.

Characteristics:

A. Subject-oriented.

Data are organized by detailed subject (e.g., by customer, policy type, and claim in an insurance company), containing only information relevant for decision support. Subject orientation enables users to determine not only how their business is performing, but why. A data warehouse differs from an operational database in that most operational databases have a product orientation and are tuned to handle transactions that update the database; subject orientation provides a more comprehensive view of the organization.

B. Integrated.

Data at different source locations may be encoded differently. For example, gender data may be encoded as 0 and 1 in one place and "m" and "f" in another. In the warehouse they are scrubbed (cleaned) into one format so that they are standardized and consistent. Many organizations use the same terms for data of different kinds. For example, "net sales" may mean net of commission to the marketing department but gross sales returns to the accounting department. Integrated data resolve inconsistent meanings and provide

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uniform terminology throughout the organization. Also, data and time formats vary around the world.

C. Time-variant (time series).

The data do not provide the current status. They -are-kept for five or ten years or more and are used for trends, forecasting, and comparisons. There is a temporal quality to a data warehouse. Time is the one important dimension that all data warehouses must support. Data for analysis from multiple sources contain multiple time points (e.g., daily, weekly, monthly views).

D. Nonvolatile.

Once entered into the warehouse, data are read-only, they cannot be changed or updated. Obsolete data are discarded, and changes are recorded as new data. This enables the data warehouse to be tuned almost exclusively for data access. For example, large amounts of free space (for data growth) typically are not needed, and database reorganizations can be scheduled in conjunction with the load operations of a data warehouse.

E. Summarized

Operational data are aggregated, when needed, into summaries.

F. Not normalized

Data in a data warehouse are generally not normalized and highly redundant.

G. Sources.

All data are present; both internal and external.

H. Metadata.

Metadata (defined as data about data) are included.