

What is BI?

UNIT - I

- Set of processes, architectures, Technologies → Convert raw data into meaningful info and make profitable business decisions.
- Fact based decision making using historical data
 - making decisions based on evidence and data.
- BI tools perform data analysis
 - provide detailed info about the business pbm. ←
 - create reports
dash boards
Maps,
graphs & charts.
- BI tools → Appln s/w
 - Gather & process large volume of data from Various sources
 - Journal, book, files, emails, images, videos.

Eg

Q2

- Restaurant owner wants to understand the preference of his customers.

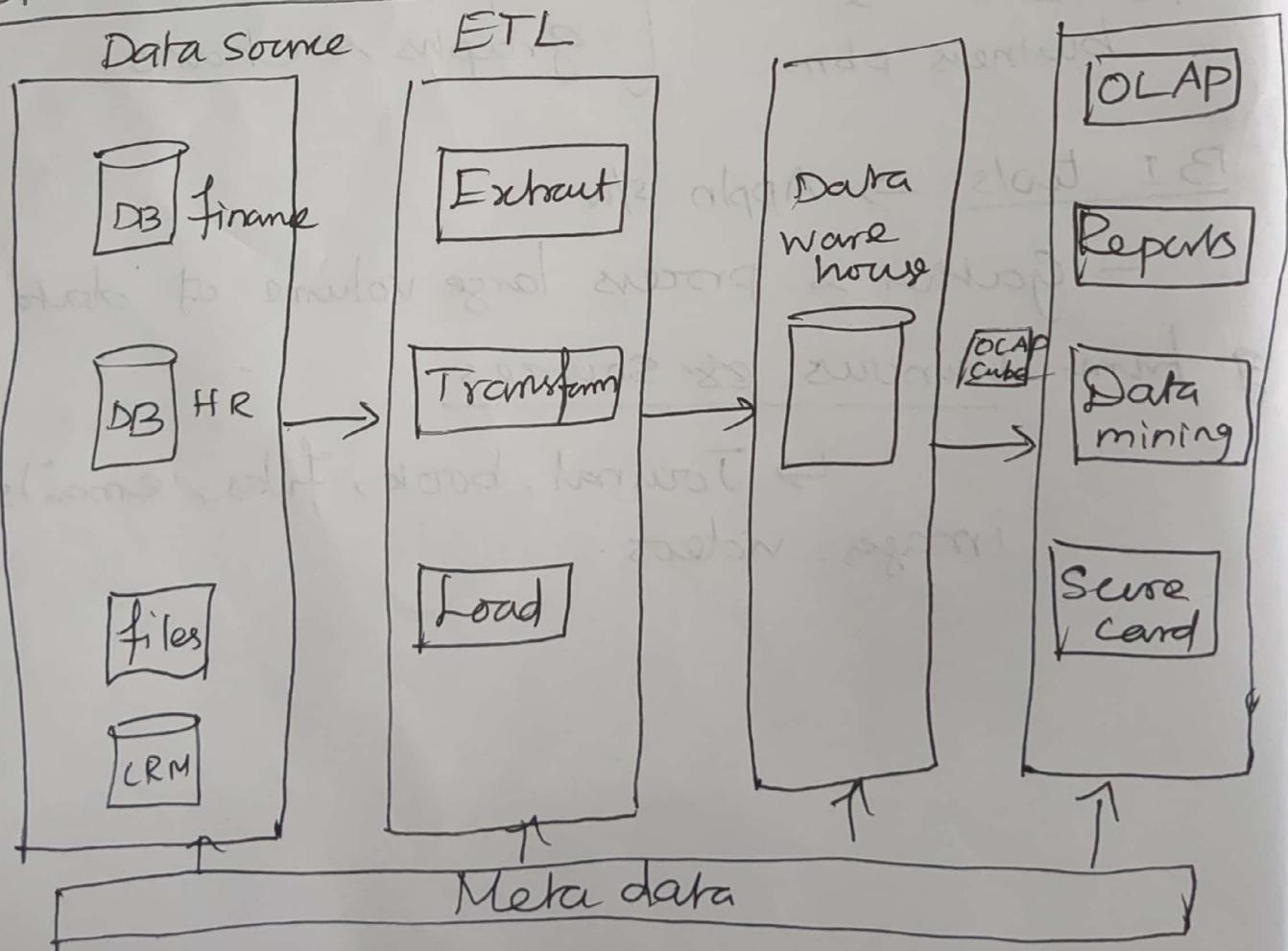
Cuisine they like / why they like that specific cuisine?

- so, they conduct one survey using BI S/W.

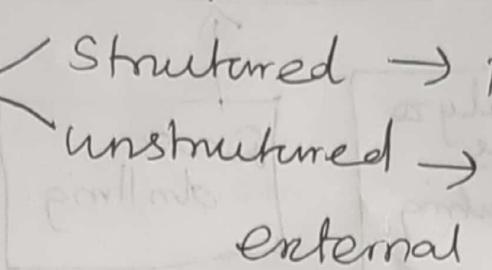
BI S/W → analyze customer mindset
 → what ordered most on the day.
 → which cuisine ordered freq.

→ Provides detailed report.

Architecture of BI



Data source

- Data stored in Various Sources like CRM, databases & files.
- data 
 Structured → from databases
 Unstructured → collect from external providers (email, video)

ETL

Extract → Data extracted from internal & external sources.

Transform → cleaning the data.

improving data quality.

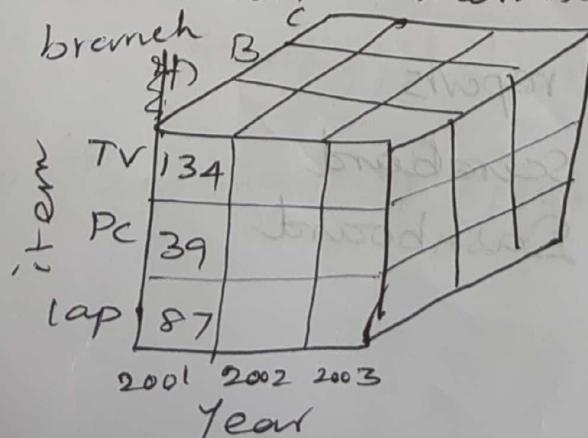
Load ^{Data} → Loaded into Datawarehouse -

Data warehouse

- DBMS , used to store large amt of data.
- support BI activities & analytics.

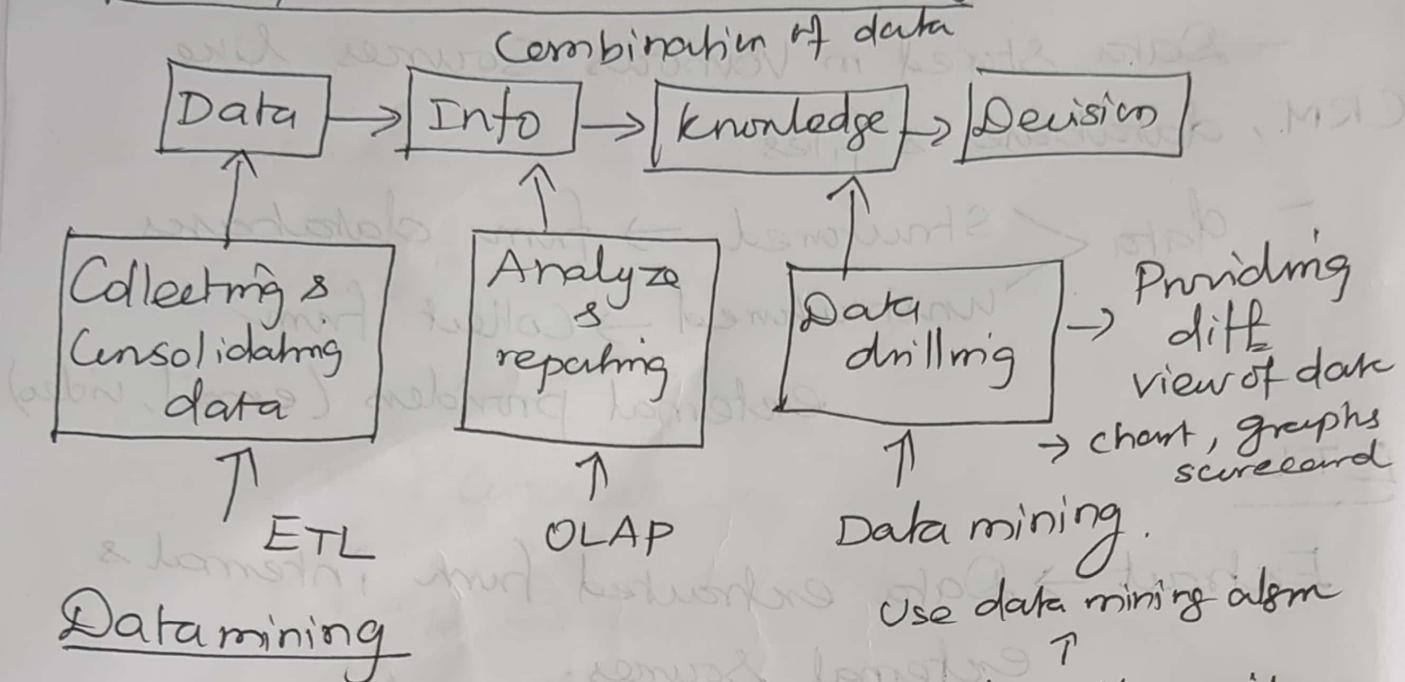
OLAP Cube

- online Analytical processing
- enable multi dimensional analysis of data.



- We can retrieve data fast.

Role of BI in decision making



Datamining

↳ Identify hidden info and collect it

From Data warehouse, Databases & other sources.

Steps of BI System

Step 1: Collect data from multiple sources. (ETL used)

Step 2: Data transformed in Data warehouse.

Step 3: Data stored in the format of multi dimensional cube.

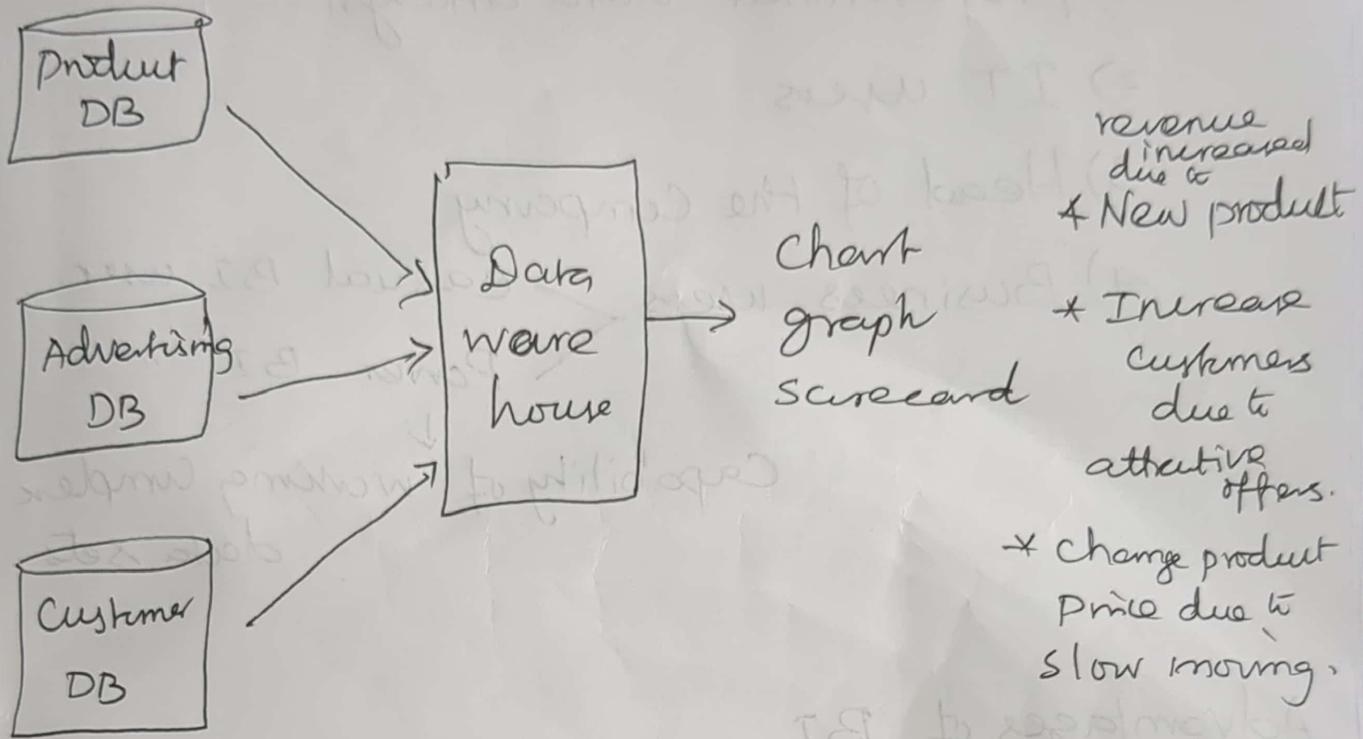
Step 4: Provide reports

Scoreboard

Dashboard

Examples of BI

Ex 1



Ex: 2 Restaurant

Ex: 3 Bank

- Bank gives BI to branch managers.
- BI helps to branch managers.

(1) To determine who are the most profitable customers.

(2) Generate various reports monthly, daily, weekly.

(3) Techniques of offering Loan

4 types of BI users

- 1) Professional data analyst.
- 2) IT users.
- 3) Head of the Company.
- 4) Business users

casual BI user.
Power BI

↓
capability of working complex
data sets

Advantages of BI

① Boost productivity

- with a single click, business users can create reports.
- It saves lot of time & resources.

② To improve visibility

- BI can identify which area need more attention.

③ Fix accountability

Fix ownership & other progresses

④ Bird's eye view

- owner should monitor & understand roles of everyone.
- BI did this.

⑤ Streamlines business processes

- deals all Complexity associated with business.
- solve

⑥ Easy analytics

- Even non technical users can easily adopt BI.

BI System disadvantages

① Cost (BI tools)

- costly for small & medium scale businesses.

② Complexity

- It can be so complex.

③ Limited use

- BI system not affordable for small & medium size companies yet.

④ Time consuming Impln

- BI implementation takes almost one and a half year to complete the implementation processes.

Trends in BI

2

- AI & ML (Here we use BI concepts because of its complex tasks.)

- Collaborative BI

BI software combined with social media and other technologies to enhance the performance.

- Embedded BI

- Integration of BI software or features with another business application for enhancing.

- Cloud Analytics

- BI applications used in cloud computing.

Cloud computing

Benefits of BI

- faster
- More accurate → decisions.
- More efficient decision making process.
- Provides best customer relationship mgmt.
- Improve profit
- Identify new business challenges.
- Identify every hidden cost.

Methodologies of BI

Step 1 : Data Collection

1) Surveys → web / online survey.

↳ widely used method

reliable

economical

ease of use

cost-efficiency.

2) In-person surveys

- face to face interview

- Most effective method of collecting accurate info.

- We can observe

body language

- behavior

- tone of speech
- mannerism

- Costly method compared to other methods

③ Mail survey

- Gather info from larger set of audience
- It reaches every corner of the world

But,

- It takes more time
- expensive
- error-prone
- low response rate

e.g. plastic bag survey.

④ Telephone survey

- Little costlier than online survey
- Drawback
 - Availability of respondent

⑤ Questionnaires

- Make set of questions as Exit interview questions
- send to respondents
- After some time, get results from respondents

⑥ Polls

3

- Consists of only one question.
- Response rate: extremely high.
- Very easy to answer.
- Takes less time.

e.g. election polls.

⑦ Forms

- used to collect specific info from respondents in each field.
 - age, income, gender.
- e.g. - To create a bank account.

Step 2

Data analysis

- Did by BI tool.

- Some types of DA

⑧ Conjoint analysis

- Survey based market research
- e.g. plan to buy a house.

⑨ Maxdiff analysis

- based on respondent's preference
- e.g. Introduce new smart phone

③ Trend analysis

- Predict the current trend and based on that making analysis.
eg: dresses, bike.

④ Text analysis

- analyzing text written by big customers.
eg: comments.

Step-3

Reporting & Presentation

- report - detailed account of specific topic.
- Presentation - Highlights the key points.
- Organizations used to conduct meeting periodically and analyze the customer needs.

Importance of BI in organization

BI evaluate

- customer opinions
- Market & customer behavior

* Gather actionable insights

- BI transfers the raw data into useful info. so, we can get detailed info about particular topic.

* In-depth understanding of the organization

- Impossible to understand ~~the whole~~ all the components of organization.
- But BI did easily.

* Achieve Sales & marketing targets

- BI used to understand the target market & current trends.
- Boost the performance of marketing

* Boost overall productivity

- Many organizations have inefficient processes & manual routine tasks.

- BI release these routines and bringing new level of organization.

* Anticipate buyer behavior & trends

- Provides detailed insights on buyer behavior.

* ROI

Improve ROI.

Components of BI

① OLAP

- Online Analytical processing.

* - used to sort & select aggregate of data

②

- It enables user to easily and selectively extract data from DW.

- Coined by E. F. Codd

- First product of OLAP →

'Express'

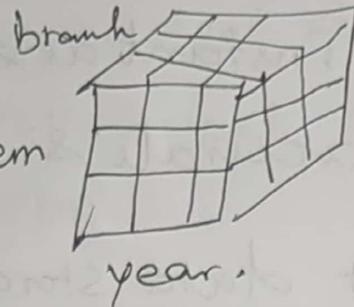
↳ Released in 1970

by oracle.

- Analyze data from multiple databases at one time.

↳ website, applications.

- OLAP stores data in multidimensional way.



- Some Popular OLAP s/w

- Oracle express Server.
- Hyperion soln Essbase.

- Main use → fast analysis of data.

② Corporate Performance management (CPM)

- Coined by gartner
in 2001.

- Subset of BI

- Monitoring & Managing an organization's performance.

ROI, operational cost, overhead cost
insurance ↓

Maintains day-to-day - operations.

e.g. Salary of the employee.

- CPM used in following areas.

* Budgeting.

* Financial planning.

* Forecasting.

- Also known as business performance mgmt, Enterprise performance mgmt, financial Perf mgmt.

③ Real-time BI

- Analyze data instantaneously.
- Provide highly accurate & up-to-date data
- It uses smart data storage soln

Redshift data warehouse.

- Used by

- * CRM

- * Inventory managers.

- * Manufacturers.

- * Risk analysts.

④ Data mart

- data storage system.

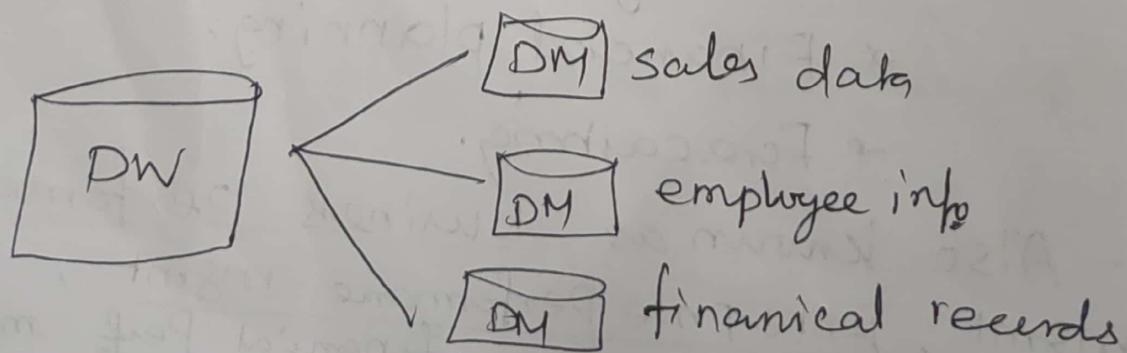
- Contains specific info of an organization

Sales data,

Sensor data

Employee info

Financial records.



Types

- ① Dependent data mart
 - ② Independent data mart
 - ③ Hybrid
- " → Combine ↑.

Dependent

- also known as top-down approach.
- Data warehouse creates the data mart.

Independent

- Data marts are designed independently.
- Then create DW.
- Integrate both DW & DM.
- bottom-up approach.

Benefits

- ① Creates specific into
- ② Ease of creation.
- ③ Easy access.
- ④ Lower cost.
- ⑤ Contains only essential data.

- ⑤ Data Sources² into form
- BI extract multiple sources.
 - email msg.
 - images
 - sounds
 - formatted tables.
 - web pages.
 - Databases.
 - videos.

Other Sources

1) Enterprise Resource planning (ERP)

- Stores large amt of transaction data

2) CRM

- Store & analyze customer behavior

3) E-commerce Apps

- Real time sales activity.

⑥ Data Warehouse

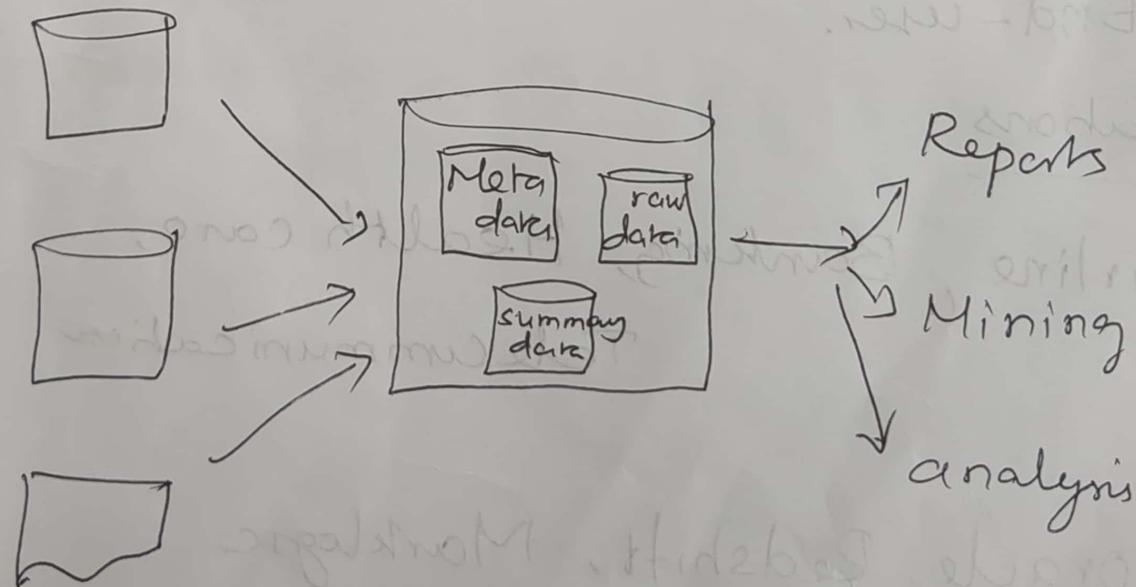
- stores large amt of historical data.
- used to analyze data from various sources.
- core of BI.

History

- * - started in 1960.
 - develop dimensions & facts.
- 1970 → Introduce dimensional data mart.
- 1980 → Support decision systems.

Architecture

Data Sources



Types

① Enterprise Data warehouse

- Collection of databases

Contains business info.

② Operational DW

- holds real time data.

③ Data mart

Components of DW

- ① Load manager
- ② Warehouse manager
- ③ Query manager
- ④ End-user.

Applications

Airline, Banking, Health care,
Telecommunication

Tools

oracle, Redshift, Marklogic

Business Analytics

Data Warehouses are

- * 1) subject oriented
 - Analyze data abt particular subject.
- 2) Integrated
 - Accept diff data types.
- 3) Non volatile
 - Once data is in DW, it is stable and doesn't change.
- 4) Time - Variant
 - change over time.

Business analytics

↓
Set of disciplines } → solve business problems
technologies } ↓ using
data analysis
statistical methods

How business analytics works?

(1) Determine the business goal

(2) Select analysis methodology.

→ Excel, python, R, hooker

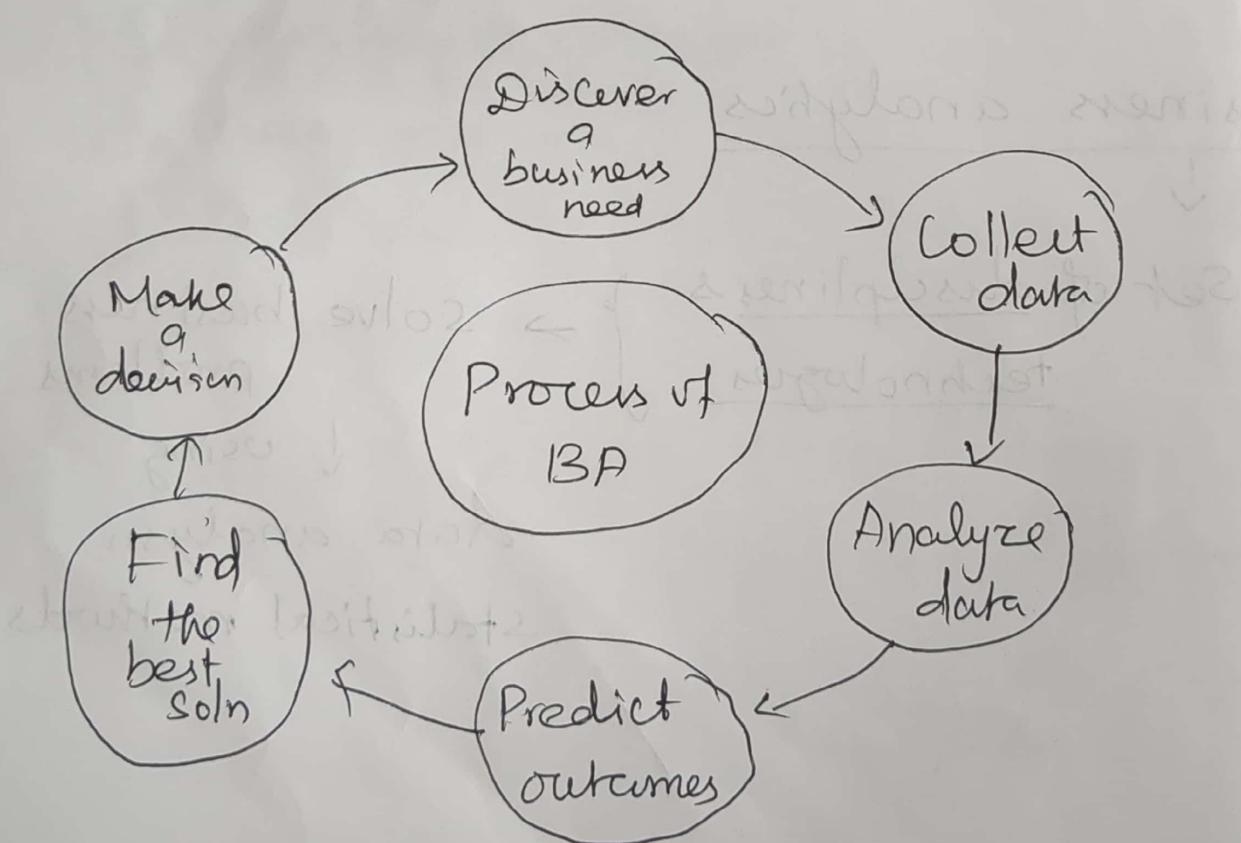
(3) Get business data from various sources.

(4) Clean the data.

(5) Integrate data.

(6) Store in DW.

Process of BA



Types

(1) Descriptive analytics.

(2) Predictive "

(3) Prescriptive "

(4) Diagnostic "

Descriptive analysis

- Analyzes historical data.
- reveal what has happened ?
- * Decide which business metrics useful?
- Identify req data.
- Collect & prepare data

↓ duplicate data

- Presenting data ^{cleaning.} in chunks & graphs.

social media.

Predictive analytics

- It uses data mining, modelling and ML algs to predict future events

Prescriptive analytics

- It enables

* optimization

* simulation

* decision modeling.

Diagnostic analytics

- Identify cause of issues & p bms.
- Used to identify areas of improvement

Benefits of BA

① Data driven decisions

- Hard decisions became smarter.
- HR budgets, Manufacturing, sales.

② Easy visualization

BA takes wide amt of data → turn it into visualized o/p.

③ What-if-scenario

→ how a given situation might be handled?

- Use ML algms & AI algms.

④ No augmented

- learn, adopt & process bulk quantities of data.
- automate processes without human bias.

Components of BA

① Data aggregation

- Obtain data
- sort "
- filter "

② Data mining

- Identify hidden info.

③ Association & Sequence Identification

- Identify the activities & place them in a sequential order.

④ Text mining

- organise big & unstructured db.

⑤ Forecasting

- Analyze historical data.

⑥ Optimization²

- use simulation tools for discover patterns.

⑦ Data visualization

visual repr. of data. graph / chart / ..

BI vs BA

Parameters	BI	BA
Def	deals Company's Past & present	Predicting the future outcome of the company
Focus	BI tools focus data management	focus data analysis
Operation	Current business operations	Future business operations
Appln	all large - scale Companies	large - scale Companies
Tools	TIBCO, PowerBI, SAP Business Objects	Word processing, MS - tools google docs