

1.) What is Power BI?

Power BI is a Data Visualization and Business Intelligence tool that convert Data from Various Data Source in to interactive Dashboard and Analysis reports

Use :- Data Cleaning

- Data Modelling
- Data Preparations
- Data Visualization
- Data Analysis

What is Business Intelligence tools?

Business Intelligence tools are type of Applications Software that collect and process large amount of **Unstructured** Data from internal and external system including **Books, Images, Documents, Files, Email, Videos, Healthcare Records**, and other business source

Why Power BI?

First one is speed power bi have a great speed
user friendly
maximum features
interactive Dashboard
cost cheapest tools
Data Connectivity to 100 Data Source

2.) Components of Power BI

2. Components of Power BI

- Power BI Desktop: The main tool used to create reports and dashboards.
- Power BI Service (Web): Cloud-based platform to publish, share, and collaborate.
- Power BI Mobile App: To view dashboards on mobile devices.
- Power BI Gateway: Connects on-premises data with cloud services.
- Power BI Report Server: On-premise solution for hosting reports.

3.) Power BI Life Cycle

- 1.) Data Loading (Importing)
- 2.) Data Transformation (Data Cleaning)
- 3.) Data Modelling (Relationship)
- 4.) DAX Formula Apply (if need)
- 5.) Dashboard (Visualization)

Note –

Data Work in two ways inside the Power BI

➡ **Load Data (Importing)** - in Power BI (**Not Live Works**)

(Import Mode Query) or (M Query)

➡ **Source Data (Live Data)** - in Power BI (**Live Work**)

(Direct Query) or (Native Query) or (N Query) **If** Data inside any changes Dashboard
Automatically change

4.) Data Connectors –

Power BI - List of 70+ Data Connectors

◊ **Introduction to Data Connectors**

Power BI offers a wide variety of data connectors to import data from multiple sources. Connectors act as a bridge between your data source and Power BI.

Here is a detailed, colorful, and organized list of the major data connectors available in Power BI:

◊ **File-Based Connectors**

- Excel Workbook (.xlsx, .xls)
- Text/CSV File
- XML File
- JSON File
- PDF File
- SharePoint Folder
- Folder (Bulk File Import)
- Parquet File
- Delta Lake
- Dataflows

◊ **Database Connectors**

- SQL Server Database
- MySQL Database
- PostgreSQL Database
- Oracle Database
- IBM Db2 Database
- SAP HANA Database
- SAP Business Warehouse Application Server
- SAP Business Warehouse Message Server
- Amazon Redshift
- Snowflake
- Azure SQL Database
- Azure Synapse Analytics (SQL Data Warehouse)
- Azure Database for MySQL
- Azure Database for PostgreSQL

Transformation

Types of Transformations in Power Query

1. Column-Level Transformations

- Rename Columns – Change column headers.
- Remove Columns – Delete unwanted columns.
- Reorder Columns – Adjust column order.
- Split Column – Split by delimiter, number of characters, etc.
- Merge Columns – Combine multiple columns into one.
- Change Data Type – Text, Number, Date, etc.
- Replace Values – Replace specific text or numbers.

Right click on column ➔ and find all options OR double click on column

2. Row-Level Transformations

- Remove Rows – Top rows, bottom rows, duplicates, blank rows.
- Keep Rows – Top rows, range of rows, duplicates, etc.
- Filter Rows – Use conditions to filter out data.
- Group By – Aggregate rows (sum, average, count).
- Sort Rows – Ascending or descending order.

Go Home tab

3. Table-Level Transformations

- Transpose Table – Flip rows and columns.
- Unpivot Columns – Convert column headers into row values.
- Pivot Columns – Turn row values into column headers.
- Remove Errors – Delete error rows or cells.

Note -

Transpose – Vertical to Horizontal

Flip rows and column – Horizontal to Vertical

Go Transform tab

4. Add Column Transformations

- Custom Column – Use M language formulas to create new columns.
- Index Column – Add serial numbers.
- Conditional Column – Add a column based on if-else logic.
- Duplicate Column – Copy an existing column.

Note -

Custom Column – if we want to find new column (we can't find blank column) first we need to apply operator on two columns than I got a new column

[Go Add Column tab](#)

5. Text Transformations

- Trim / Clean – Remove extra spaces or non-printing characters.
- Uppercase / Lowercase / Capitalize – Modify text casing.
- Extract Text – From start, end, or a specific position.
- Replace Text – Change parts of text in a column.

[Go Add Column tab](#)

6. Number Transformations

- Standardize – Round, ceiling, floor, absolute, etc.
- Statistics – Minimum, maximum, average, count.
- Add/Subtract/Multiply/Divide – Perform math on columns.

[Go Add Column tab ➔ From Number](#)

7. Date & Time Transformations

- Date Only / Time Only / Year / Month / Day – Extract parts of date.
- Add/Subtract Days – Shift dates.
- Age Calculation – Calculate difference from today.
- Date Difference – Days between two dates.

[Go Add Column tab ➔ from Date & Time](#)

Note -

Add / Subtract Days – shift dates

Add – 15/07/2003 me 2 days add Karna Hai

- 1.) Open custom column
- 2.) =date.adddays([col1],[col2])

Age Calculation – Calculate different from today

1.) add column → format & Time → Date → Age

2.) go on Duration Box

8. Advanced Transformations

- Parameters – Create dynamic filters or control values.
- Merge Queries – Like SQL JOIN (inner, left, right, full).
- Append Queries – Combine data from multiple tables.
- Use First Row as Headers – Promote header rows.

[Go Home tab](#)

Delimiter

Delimiter is basically used for merge or split two words delimiter may be anything like ., , , _, -, = etc

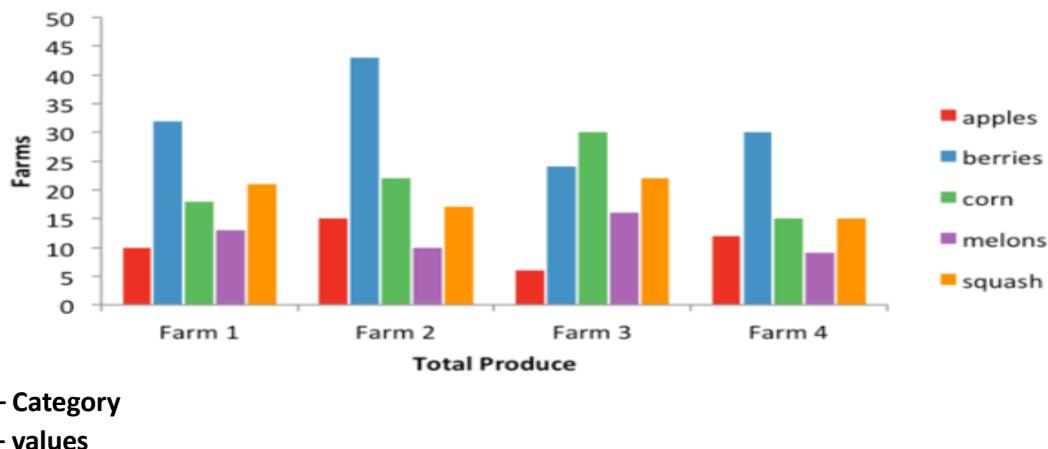
Visualisation Overview

Chart Name	Kya dikhata hai	Kab use karein	Kya data chahiye
Clustered Column Chart	Multiple categories ke data ko vertical bars ke form mein compare karta hai	Jab aapko alag-alag categories ka comparison dikhana ho	Category aur numerical values (e.g Sales)
Stacked Column Chart	Ek hi bar mein sub-categories ko stack karke dikhata hai	Jab total ke andar har part ka contribution dikhana ho	Category, Sub-category, Numeric
100% Stacked Column	Har column ko 100% ke base par stack karta hai	Jab proportion (percentage) dikhani ho	Category, Sub-category, Percentage values
Clustered Bar Chart	Column chart ka horizontal version	Jab categories long ho ya names bade ho	Category aur numerical val
Stacked Bar Chart	Bar chart jisme sub-categories stack hoti hain	Same as stacked column, par horizontally	Category, Sub-category, Numeric
100% Stacked Bar	Bar ko 100% base mein divide karta hai	Jab percentage compare karna ho	Category, Sub-category, Numeric
Line Chart	Time series data ke liye use hota hai	Jab trend dikhana ho across time	Date/Time, Numerical val
Area Chart	Line chart jaisa hi, bas area fill hota hai	Trend + volume emphasis dikhani ho	Date/Time, Numerical val
Pie Chart	Total ka part dikhata hai in circular format	Jab small number of categories ho	Category, Value

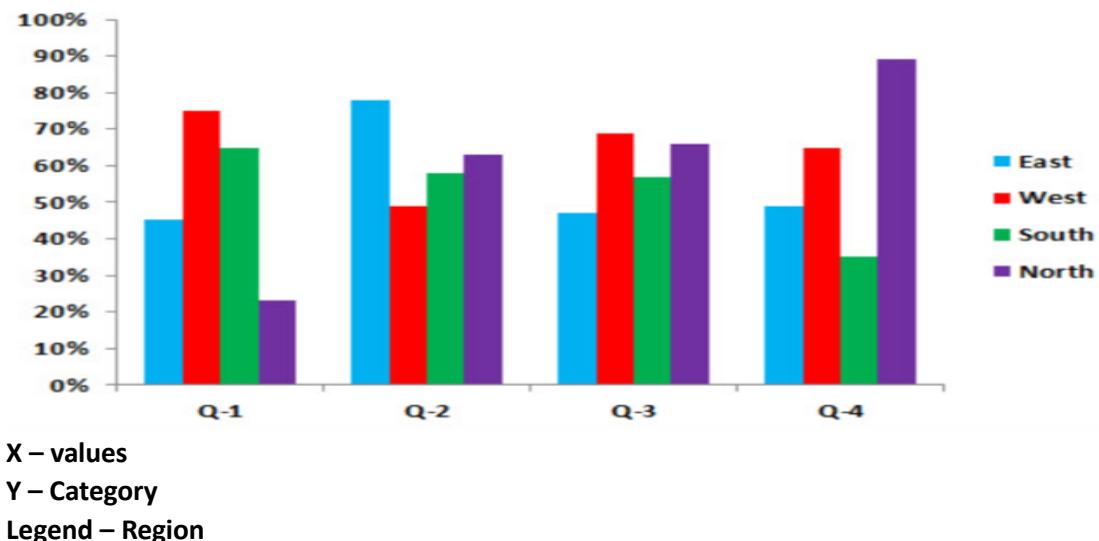
Not - If we want to change inside the chart go Visual

and if you want to change the background of the chart go general

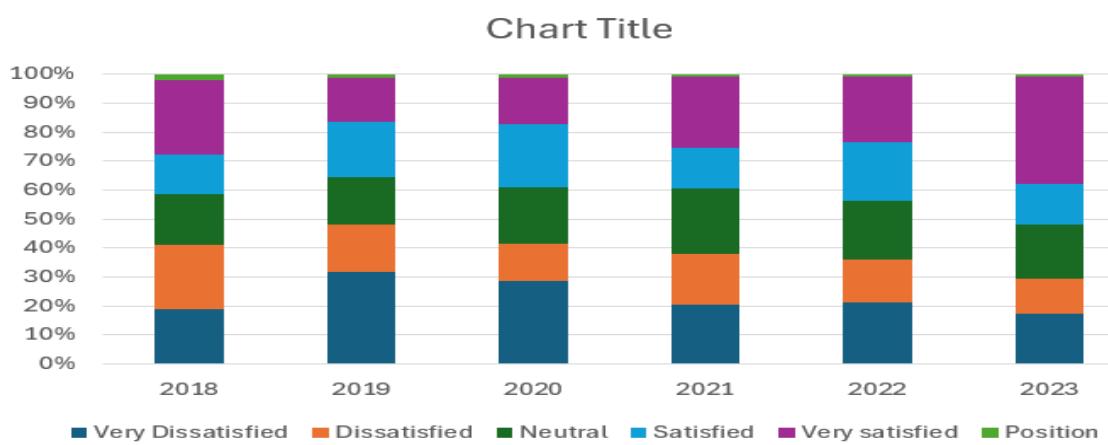
1.) Stacked Column Chart



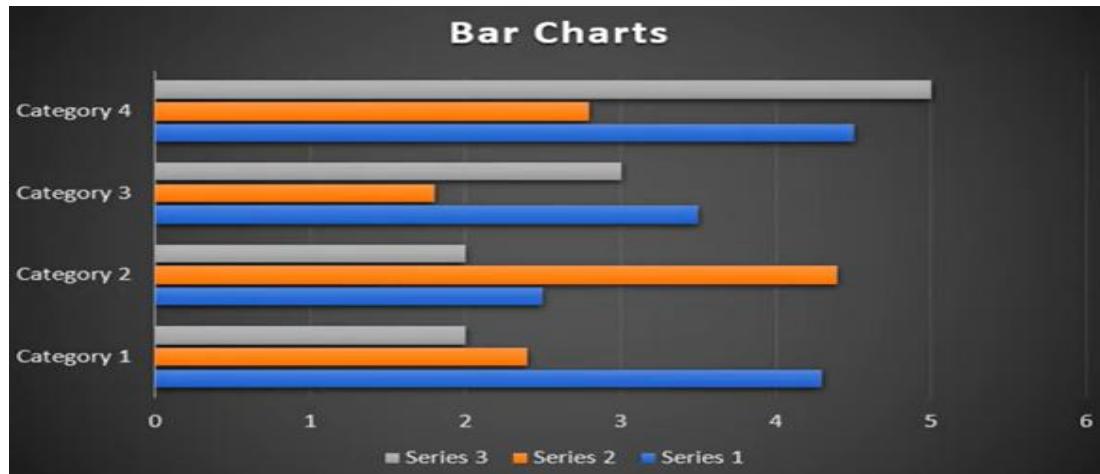
2.) Cluster Column Chart



3.) 100% Stacked Column Chart



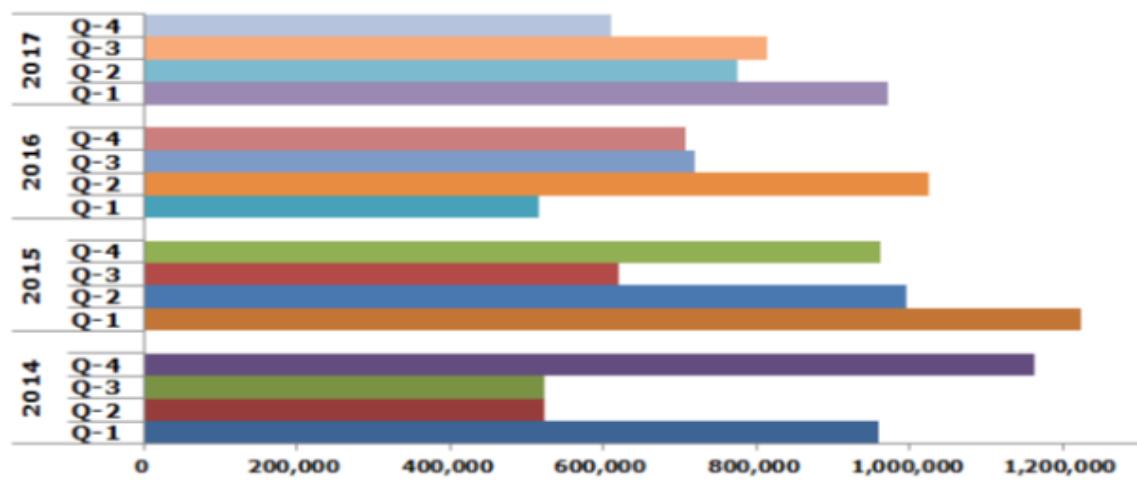
4.) Stacked Bar Chart



X – values

Y – Category

5.) Cluster Bar Chart

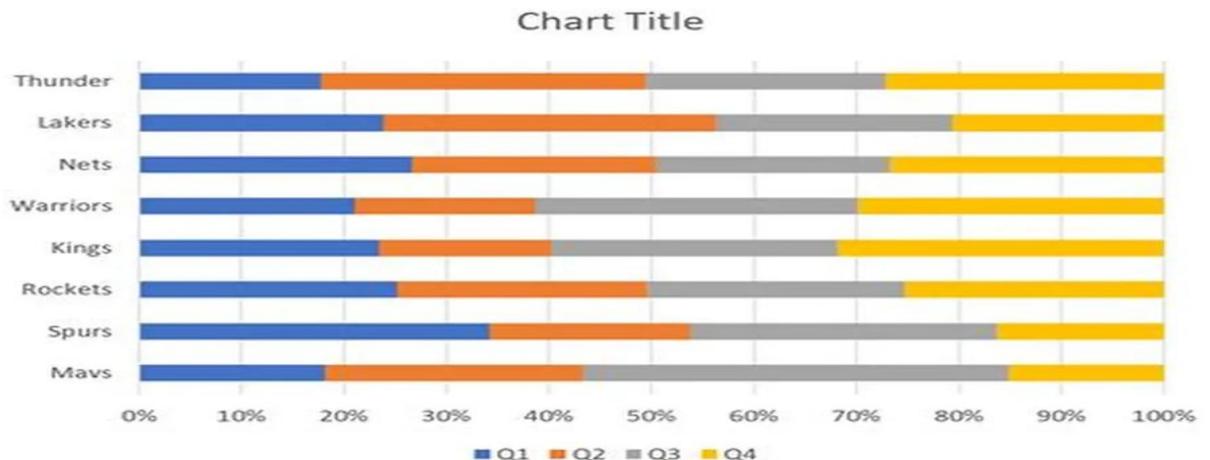


X – values

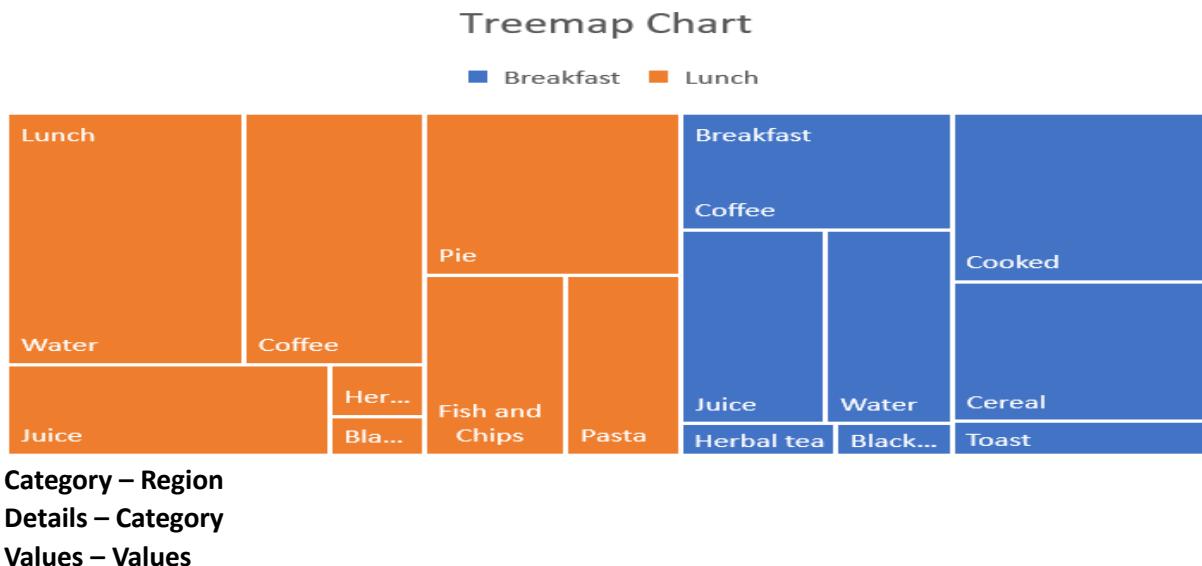
Y – Category

Legend – Region

6.) 100% Stacked Bar Chart

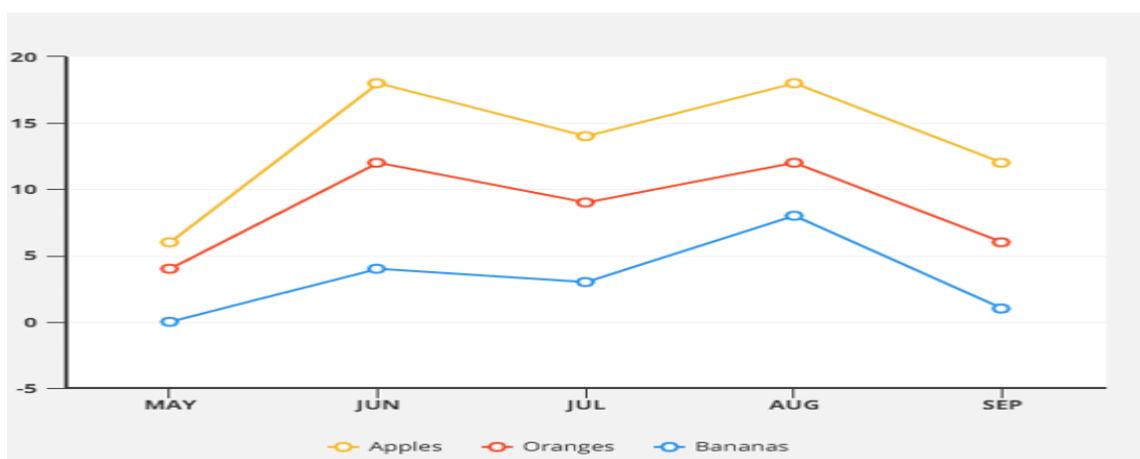


7.) Tree Map Chart

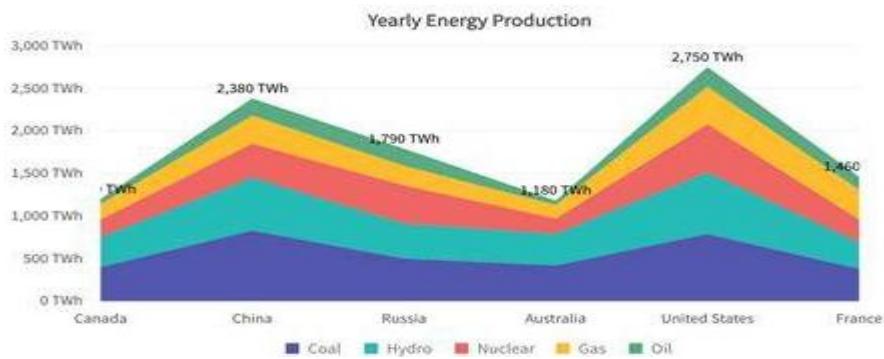


8.) Line Chart

LINE CHART TEMPLATE



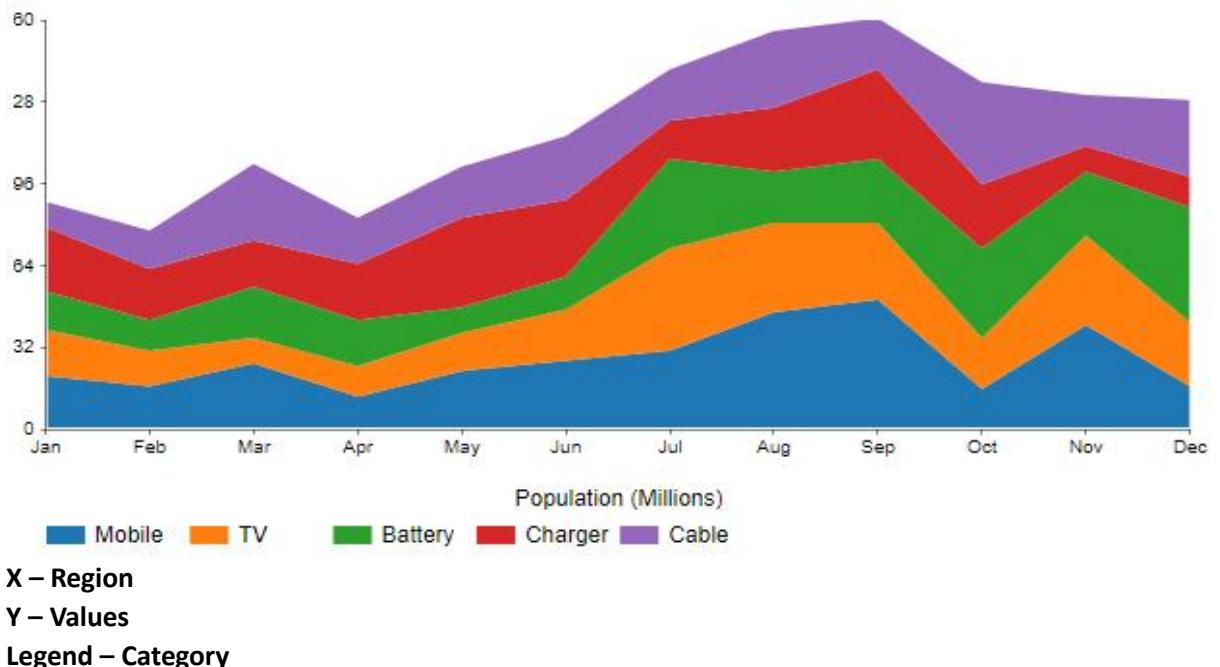
9.) Area Chart



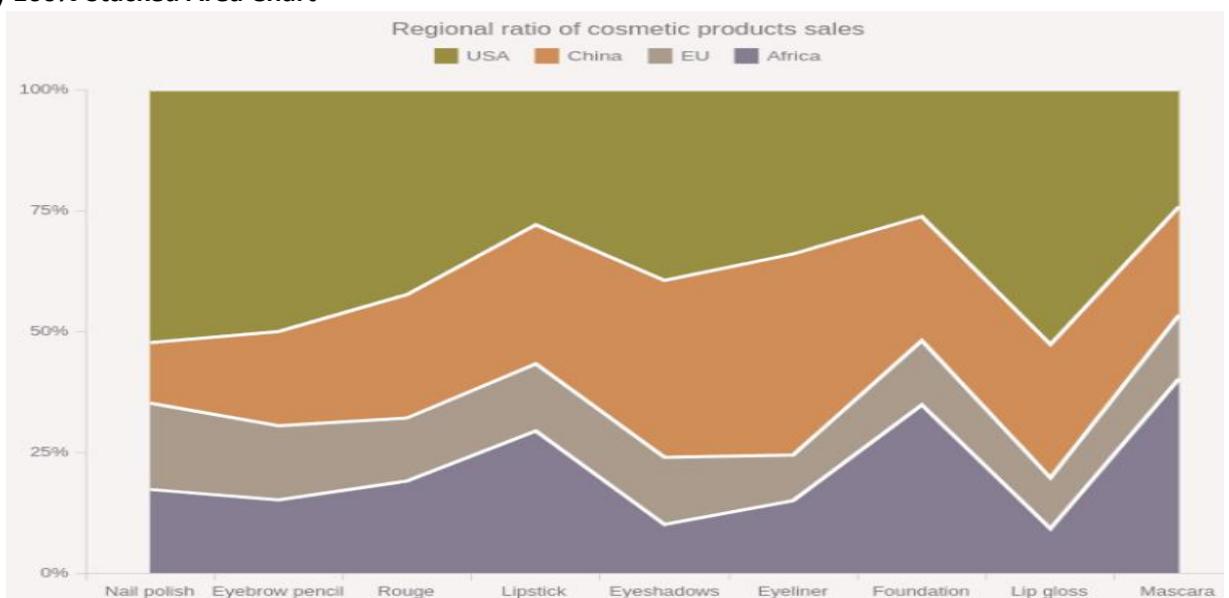
X – Category

Y – Values

10.) Stacked Area Chart



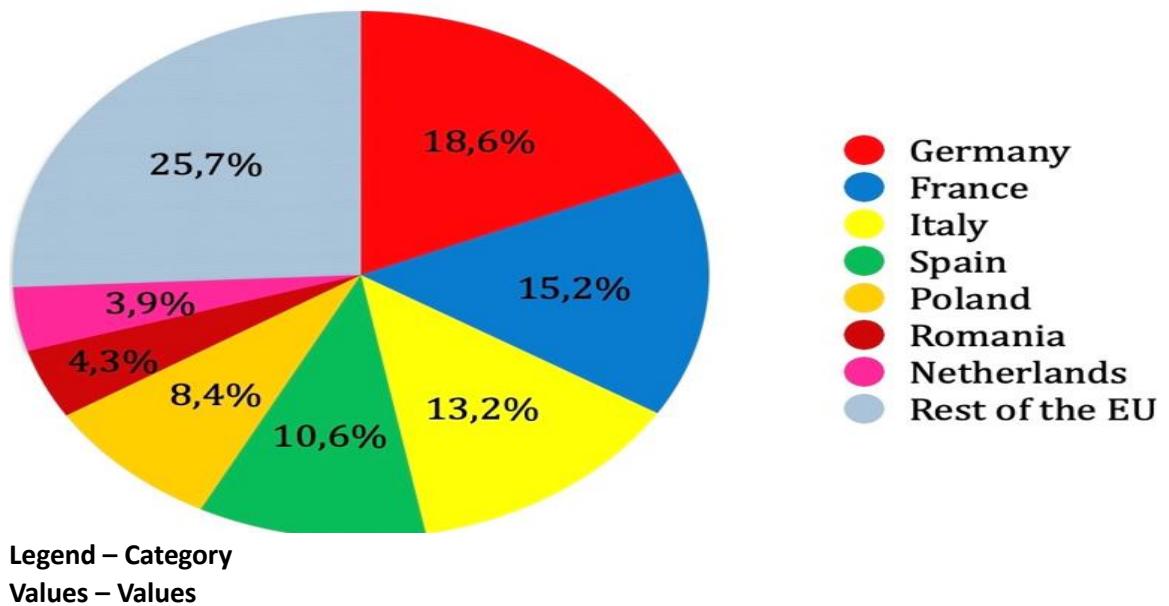
11.) 100% Stacked Area Chart



12.) Pie Chart

Pie chart use when we have small number of categories

Population of Countries of the European Union in 2021 by percentage

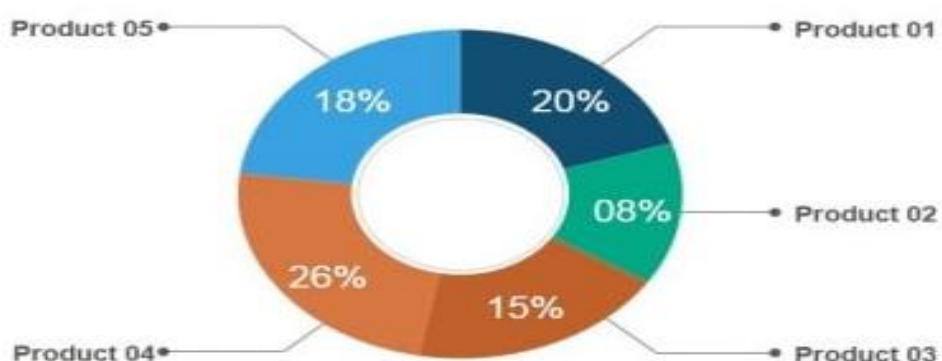


13.) Donut Chart

Same to Pie Chart only Morden look and hole in center



Donut Pie Chart



Legend – Category

Values – Values

14.) Table Chart

Table chart shows row data in to tabular formats

Title	Year	Month	ProductQuantity	ProductSales
AC	2019	August	20	40000
Calculator	2019	August	12	4000
Desktop	2019	August	5	30000
Generator	2019	August	30	45000
Ipod	2019	August	7	2000
Laptop	2019	August	20	50000
Light	2019	August	10	1500
Mobile	2019	August	15	20000
Radio	2019	August	3	3000
Refrigerator	2019	August	40	40000
Tablet	2019	August	30	15000
TV	2019	August	10	100000
Gyser	2019	September	80	12000
LCD TV	2019	September	15	35000
Radio	2019	September	20	1000
Washing Machine	2019	October	10	27000
Total			327	425500

Column – Values,Category,Region etc we can put

15.) Matrix Chart

It is showing the data row and column like Pivot – table

Sales Stage	Region	Central		
		Opportunity Size	Opportunity Count	Revenue
Lead	Small		26	\$22,907,676
	Medium		25	\$96,249,147
	Large		40	\$321,876,492
	Total		91	\$441,033,315
Qualify	Small		10	\$11,550,016
	Medium		12	\$48,820,525
	Large		7	\$51,344,920
	Total		29	\$111,715,461
Solution	Small		13	\$13,771,741
	Medium		9	\$38,048,946
	Large		7	\$48,923,102
	Total		29	\$100,743,789

Rows - Region

Column - Category

Values – Values

16.) Card

They are Showing the Single Values in a Card



Fields - Values

17.) Multi - Row Cards

Multiple single values Showing

1.09.316.11	36,105.51	Technology
Sum of Sales	Sum of Profit	Category
New York City		
City		
75,691.05	5,306.69	Furniture
Sum of Sales	Sum of Profit	Category
New York City		
City		
73,029.79	13,908.54	Technology
Sum of Sales	Sum of Profit	Category

Fields – Values, Category, Regions etc we can put

18.) KPT Chart

Target vs Actual with trend line



OR



Values – Values

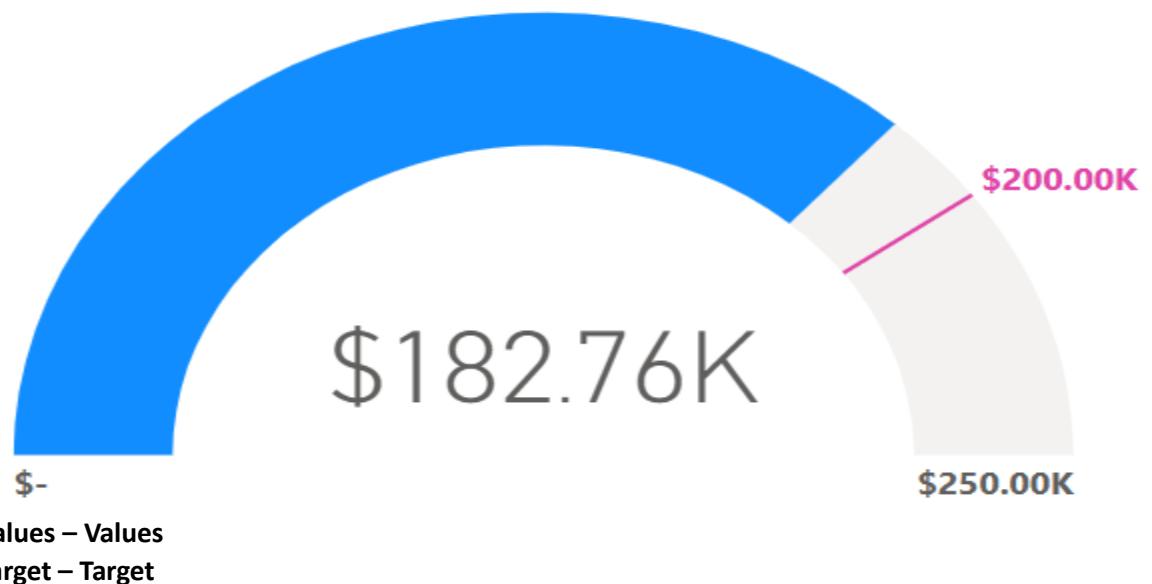
Trend axis – Month

Target – Target

19.) Gauge Chart

Values are showing dial formats

Average of Gross Sales



20.) Line and Stacked Column Chart

Line and Stacked Column Chart

Mean Rainfall by Max and Min Temperature by Month

● Mean Maximum Temperature ● Mean Minimum Temperature ● Mean Rainfall (mm)

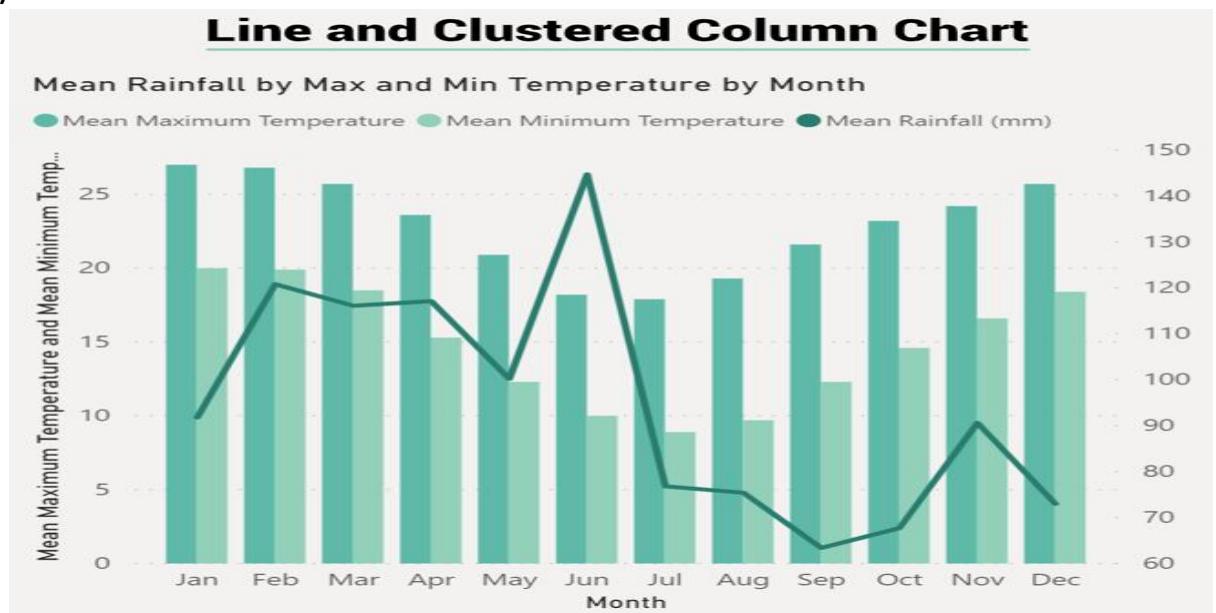


X – Region

Y – Total sell

Line Y -axis – Values

21.) Line and Clustered Column Chart

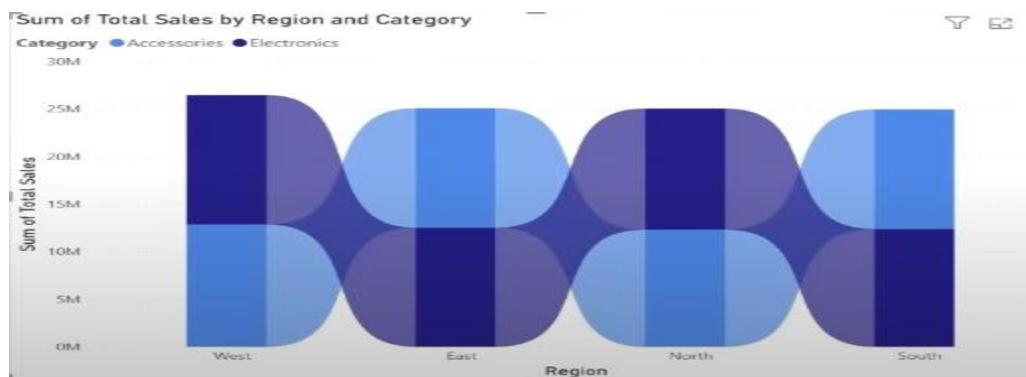


X – Region

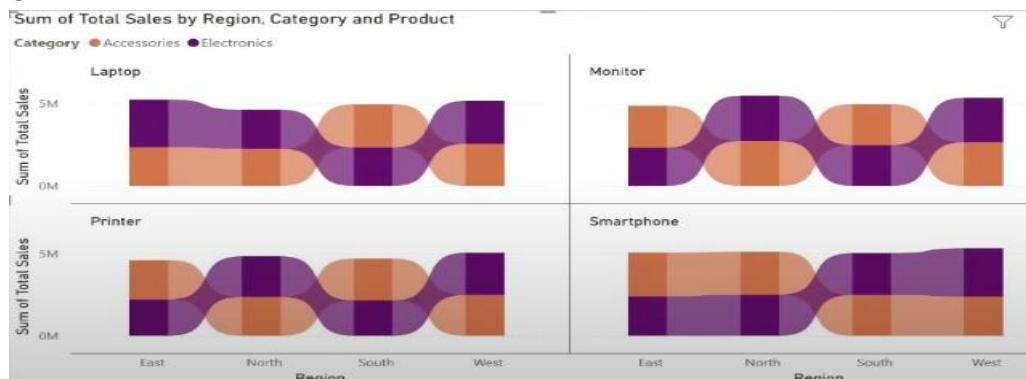
Y – Total sell

Line Y -axis – Values

22.) Ribbon Chart



OR

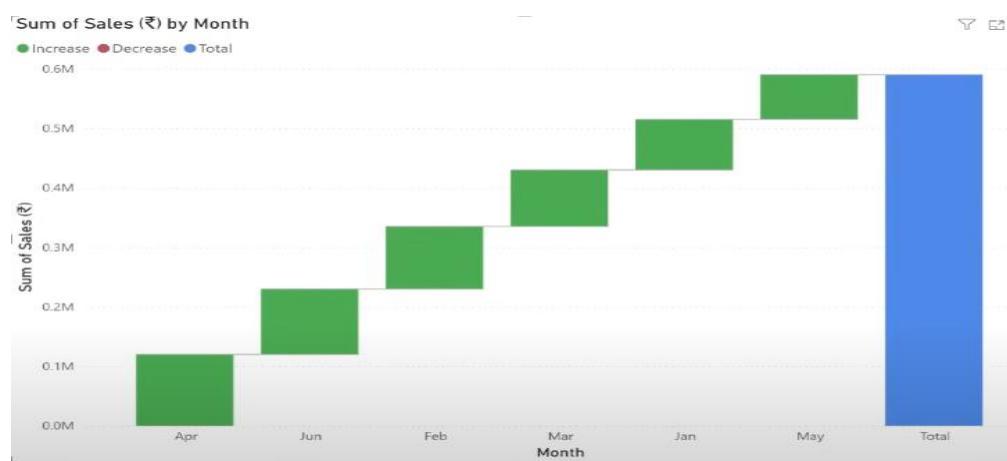


X – Region

Y – Total sell

Legend – Category

23.) Waterfall Chart

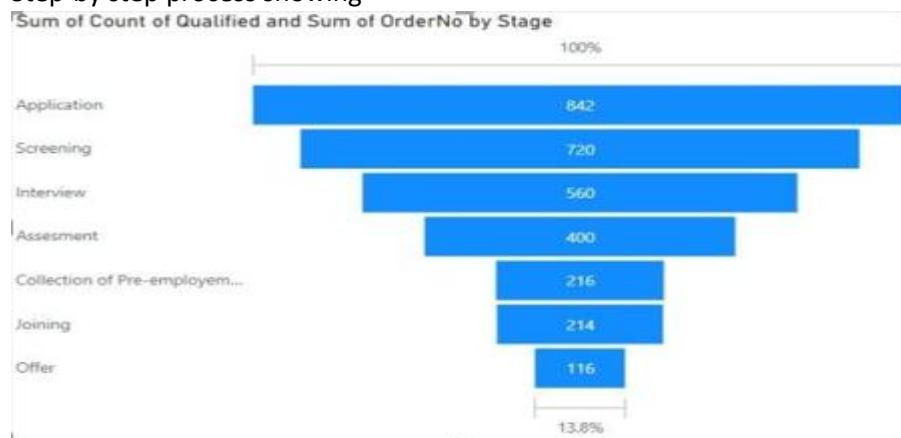


Category – Region

Y – Values

24.) Funnel Cards

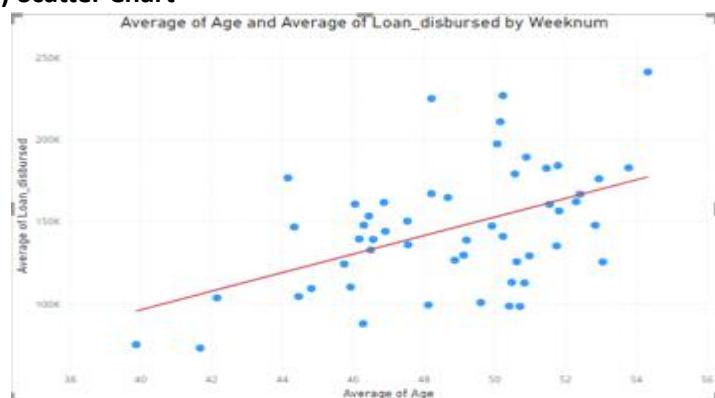
Step-by step process showing



Category – Category

Values – Values

25.) Scatter Chart



Values - Region

X – Values

Y – Values

Legend - Months

26.) Slicer



Field – Put any column name

27.) Button Slicer



Field – Put any column name

28.) QNA



414.00

Sum of Discount

Give Prompt and ask anything

Visualization

Canvas Settings and Canvas Background

Go format Page -> Canvas Setting

Dashboard Creation

- **Slicers Use**
 - Date (Time Period)
 - Region/State/City
 - Department
 - Category
 - Payment Mode
- **Card Visual Use**
 - Total Sales → $\text{SUM}(\text{Sales Amount})$
 - Total Quantity → $\text{SUM}(\text{Quantity})$
 - Total Orders → $\text{COUNT}(\text{Order ID})$
 - Total Profit → $\text{SUM}(\text{Profit})$
- **Charts (Middle section – Visual Analysis)**
 - Sales Trend (Line Chart) → Time ke saath Sales ka movement.
 - Sales by Region (Map / Bar Chart) → Region wise comparison.
 - Sales by Category (Column Chart / Pie Chart) → Product wise sales.
 - Sales by Payment Mode (Donut Chart) → Online vs Offline share.

 Tip:

- Line chart → Trend ke liye
- Column/Bar chart → Comparison ke liye
- Pie/Donut chart → % Share ke liye

Data Modelling

Power BI Table Types –

1. Fact Table

- ◆ Ye table hoti hai jisme saare transactions ya measurable data hota hai.
- ◆ Isme usually numbers hote hain jinko tum visuals mein use karte ho – jaise Sales, Quantity, Amount.
- ◆ Har row ek event ya transaction ko represent karti hai.
- ◆ Ye table Dimension tables se link hoti hai unke foreign keys ke zariye.

💡 Example:

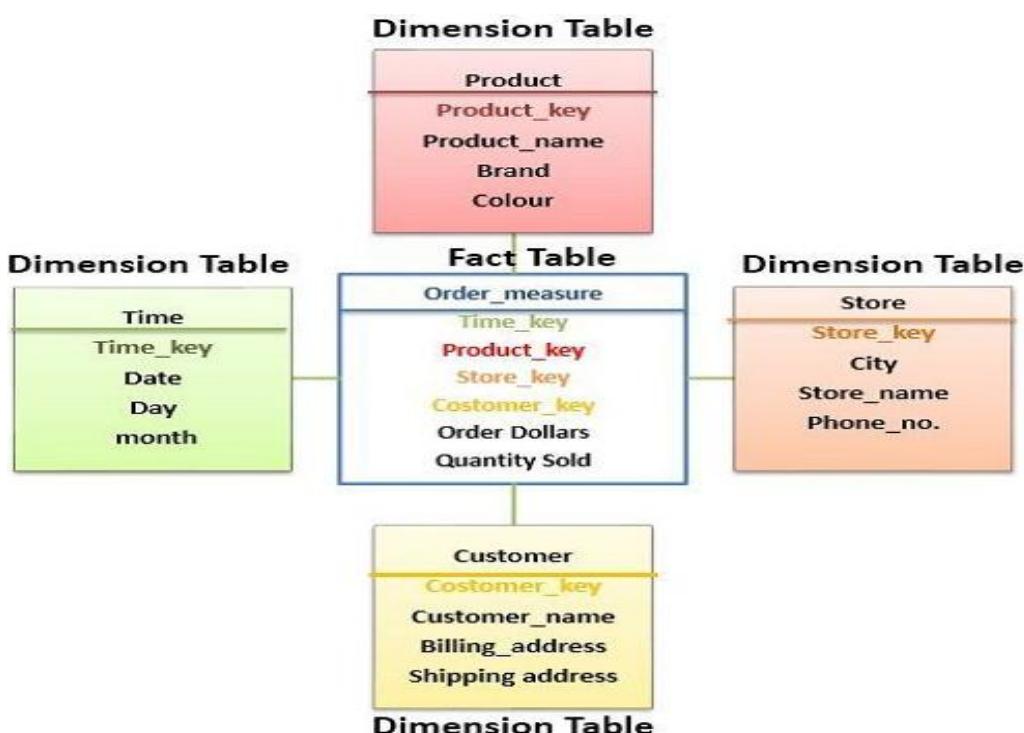
- Sales Table: SalesID, CustomerID, ProductID, Quantity, SalesAmount, DateID
- Har row ek sale ko represent karti hai.

2. Dimension Table

- ◆ Ye descriptive ya lookup table hoti hai jo Fact table ke rows ko explain karti hai.
- ◆ Inme usually text-based information hoti hai.
- ◆ Ye filter context banati hai Power BI visuals ke liye.

💡 Example:

- Customer Table: CustomerID, CustomerName, City, State
- Product Table: ProductID, ProductName, Category, Brand
- Date Table: Date_ID, Year, Quarter, Month, Day

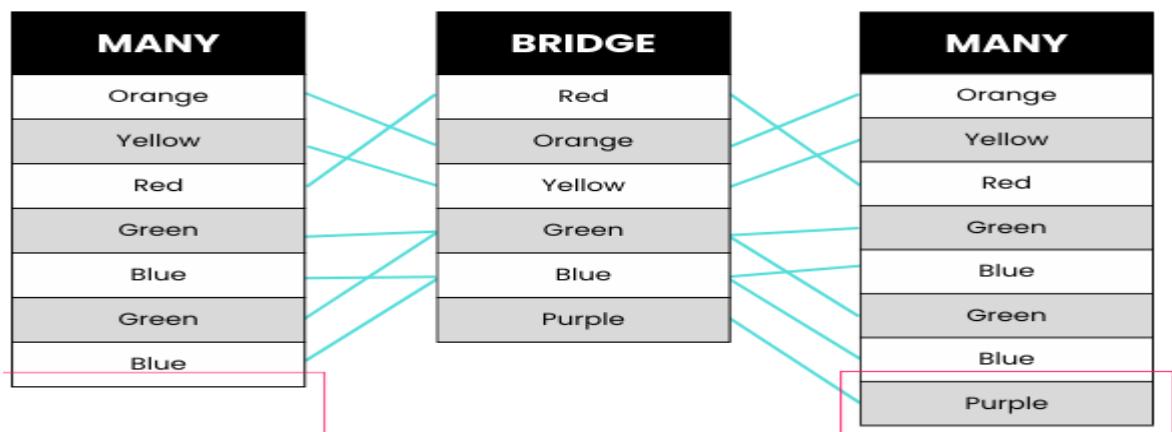


3. Bridge Table

- ◆ Jab do dimension tables ke beech Many-to-Many relationship hoti hai tab Bridge Table banayi jaati hai.
- ◆ Isme dono dimension tables ke keys hoti hain taaki indirect relationship ban sake.
- ◆ Ye Fact jaisa kaam karti hai but sirf linking ke liye.

💡 Example:

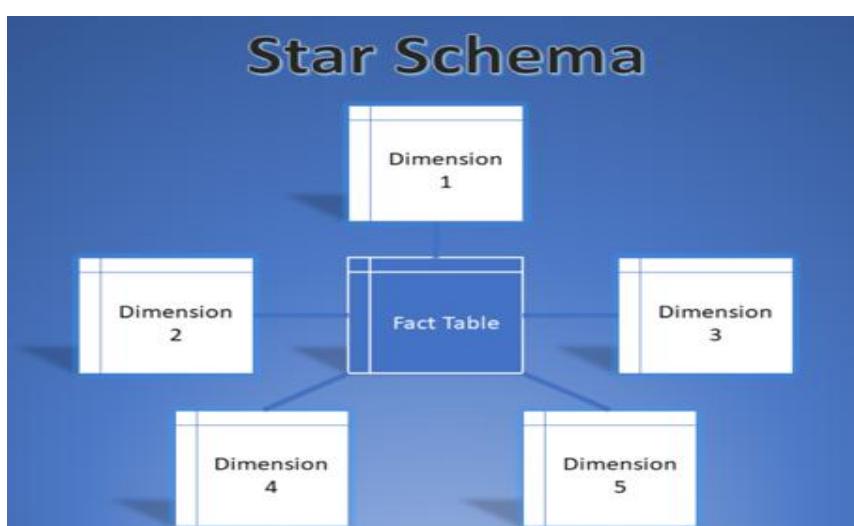
- StudentCourseBridge: StudentID, CourseID
- CustomerProductBridge: CustomerID, ProductID



Power BI Positioning & it's types

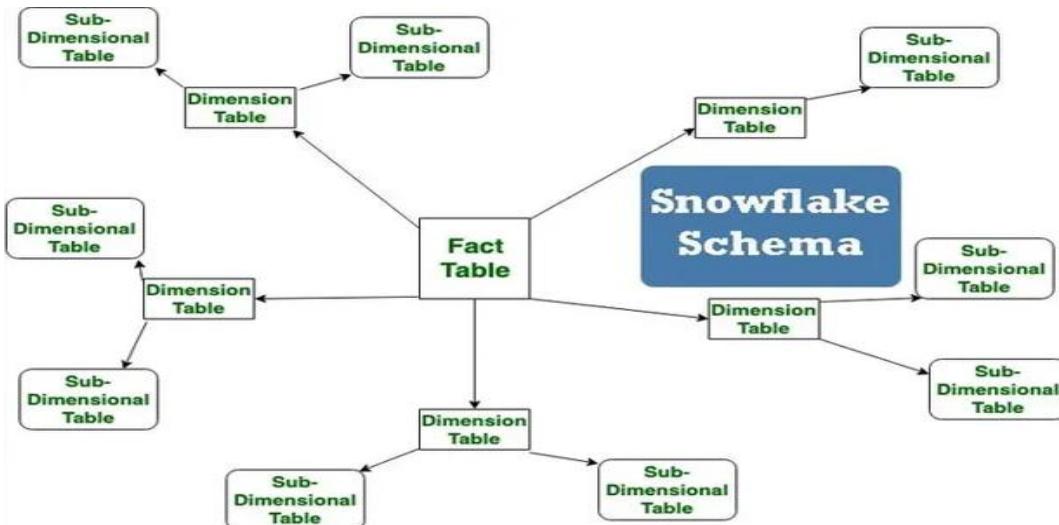
1. Star Schema Positioning.

- ◆ Star Schema is a types of Data Modelling technique used in data warehousing to represent the data in a structured way.
- ◆ Only one Fact table
- ◆ Multiple Dimension table connect to fact table



2. Snowflake Schema Positioning.

- ◆ Only one Fact table
- ◆ Two or more Dimension table connect to each other



⌚ Best Practices for Table Positioning:

- Fact Table should be at the center in your model view.
- Dimension Tables should be placed on the top and sides.
- Avoid creating circular relationships – always keep one-directional flow.
- Maintain a clean layout – similar tables ek side mein rakho (e.g., all Time tables ek taraf).
- Keep Bridge Tables between two related tables (usually at the center line).

📊 Visual Hierarchy Suggestion:

Top Level: Dimension Tables (Product, Customer, Date, Region)

Middle Level: Bridge Tables (if any)

Bottom Level: Fact Tables (Sales, Transactions)

Side/Helper: Utility Tables (for filters, sorting, etc.)

Keys & It's types

Key basically used for create relationship between tables

1. Primary Key

- ◆ Only one Fact table

2. Foreign Key

- ◆ Only one Fact table

3. Keys ka use Relationship banate waqt

Power BI mein jab hum do tables ke beech relationship banate hain, tab keys kaafi important role play karti hain:

- Ek table mein Primary Key honi chahiye (unique values).
- Doosri table mein Foreign Key honi chahiye (repeated values bhi ho sakti hain).
- Power BI automatically ya manually one-to-many ya many-to-one relationship create karta hai based on these keys.

4. Kaise pehchaane kaunsi key hai?

- Jis column mein unique values ho, wo mostly Primary Key hota hai.
- Jis column mein repeat hone wale values ho aur wo kisi dusri table se match kare, wo Foreign Key hota hai.
- Power BI mein 'Manage Relationships' option use karke aap match dekh sakte ho.

5. Flow of Relationship Creation in Power BI

- Step 1: Tables ko load karo (Excel, SQL, etc. se).
- Step 2: Tables ka structure samjho (columns aur unki values dekho).
- Step 3: Identify karo Primary aur Foreign Keys.
- Step 4: Go to 'Model' view in Power BI.
- Step 5: Drag aur drop karke keys ko connect karo.
- Step 6: Relationship ka direction aur cardinality check karo (One-to-Many etc.).
- Step 7: Data analysis aur visuals create karo confidently.

1. Types of Relationships in Power BI

Power BI mein mainly 3 types ke relationships hote hain:

- ◆ One-to-Many (1:*):

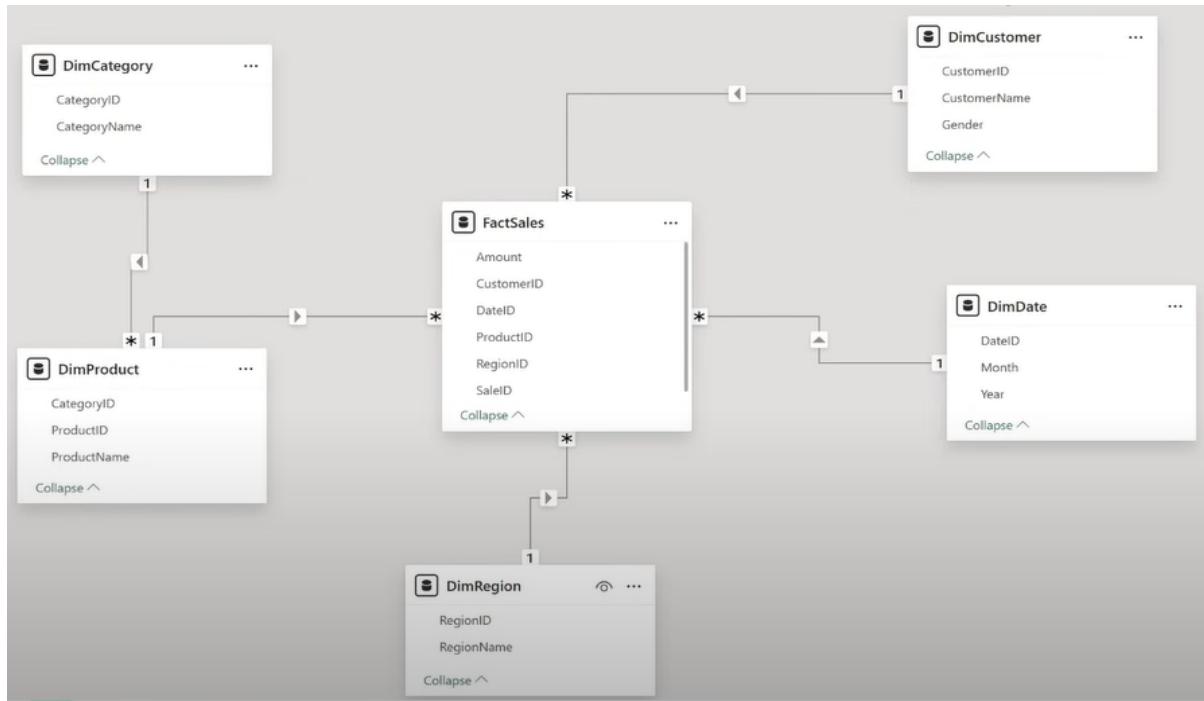
- Most common type hai.
- Ek table mein unique values (Primary Key), dusri mein repeat values (Foreign Key).
- Example: Customer Table (CustomerID) -> Orders Table (CustomerID)

- ◆ Many-to-One (*:1):

- Ulta flow One-to-Many ka.
- Visualization ya filter direction ke liye use hota hai.
- Example: Orders Table (CustomerID) -> Customer Table (CustomerID)

- ◆ One-to-One (1:1):
 - Dono tables mein column unique hota hai.
 - Example: Employee Table -> EmployeeDetails Table
 - ◆ Many-to-Many (*:*):
- Jab dono tables mein duplicate values ho aur direct match na ho.
- Use carefully karna padta hai.
- Example: Product Sales Table -> Product Discount Table (same ProductID multiple times)

Example –



1.) What is DAX in Power BI?

DAX(Data Analysis Expression) is a Formula and function language.
which can be used in Power BI and Visualizations
with the help of DAX formulas we can create a new information's from Data already in your models
with the help of DAX formulas we can do Calculations, Data Modelling, and relationship between two tables

Types of DAX

2. Calculated Columns
3. Measures
4. Time Intelligence
5. Text function
6. Information function
7. Filter functions

2.) Different between Measures vs Calculated Columns

● Measures:

- Generic Function
- Does not take space in dataset
- Faster Analysis Capability
- Do not Create a relationship b/w two tables
- Aggregation ke liye use hote hain

 **Example:** Total Profit = SUM([profit]) # Use – Filter
Sum
Count, Total etc

● Calculated Columns:

- Not a Generic Function
- Take up space in dataset and consume more memory **because** generate new column
- Slow Analysis Capability
- Calculated column can Create a relationship b/w two tables
- Data load time par calculate hote hain

 **Example:**

New Col = [Col_1] – [Col_2] # Use conditional Statements

DAX Functions in Power BI

There are 250 function available in power bi

- Left – Find the string from the left side
- Right - Find the string from the right side
- Len – Return string length
- Lower / Upper – Convert all string Upper / Lower case
- Replace – Replace Part of a string with a different text string
- Trim – Remove all space from string

 **Example:**

LEN –

New Col_Nam = LEN(tab_nam[col_nam])

LEFT –

New Col_Nam = LEFT(tab_nam[col_nam],3)

LOWER –

New Col_Nam = LOWER(tab_nam[col_nam])

CONCAT –

New Col_Nam = CONCAT(tab_nam[First_col]& " "&tab_nam[Sec_col])

3.) What is Bookmark?

Whenever we designed / edit any reports with the help of bookmark we can

Captured and Store the all-Activities Step by Steps

Whatever we use like - Filter, Slicer, Dropdown etc

Go view tab -> show panes -> Bookmark

4.) Different between Filter and Slicer?

Filter

- Advance options
- Not User Friendly
- Operate in the background of reports

Slicer

- Limited Options
- User friendly
- Operate on - Canvas

5.) Delimiter

Delimiter is basically use for merge or split two words delimiter may be anything like . , , _ , = etc