

Mini Project

E-Commerce - Sales Data Analysis

By

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Project Overview

This project focuses on the comprehensive analysis of E-Commerce Sales Data using Microsoft Excel and Power BI. The objective is to transform, model, and visualize the data to derive actionable business insights, identify trends, and measure performance against sales targets.

Source Data Set

The project is based on three key datasets:

Source - [Sales Data Analysis Raw Data](#)

- List of Orders.csv – Contains order-level details
- Order Details.csv – Includes product and quantity information
- Sales Target.csv – Provides target data for sales performance

Tools & Technologies Used

- **Microsoft Excel** – for data preparation and preliminary analysis
- **Power BI** – for data transformation, modeling, and dashboard creation
- **DAX (Data Analysis Expressions)** – for calculated columns and performance measures

Phase 1 – Data Transformation & Data Modeling

In this phase, data was imported, cleaned, and structured within Power BI using Power Query Editor. The following transformations and modeling steps were performed:

1. Imported all three CSV files into Power BI.
2. Restricted the List of Orders table to the first 500 rows.
3. Changed data types appropriately (Order Date → Date, Amount/Target → Fixed Decimal Number).
4. Formatted Customer Names into Proper Case.
5. Merged City and State columns to create a new ‘Location’ column.
6. Added a custom ‘Profit Margin’ column ($\text{Profit} \div \text{Amount} \times 100$).
7. Added a conditional column ‘Profit Status’ (Profit, Loss, Break-Even).
8. Merged ‘List of Orders’ and ‘Order Details’ into ‘Orders Data’ table using Order ID.
9. Handled missing values and duplicates.
10. Grouped and aggregated metrics such as average profit by category and total target by month.
11. Established relationships:
 - List of Orders ↔ Order Details via Order ID
 - Order Details ↔ Sales Target via Category

1. Import Data:

Import & Transform the following Tables

"List of Orders.csv"

"Order Details.csv" and "Sales target.csv" into Power Query Editor are Done

2. Data Transformation:

1. Restrict the "List of Orders" table to only the first 500 rows.

The screenshot shows the Power Query Editor interface with the 'List of Orders' table selected. A 'Keep Range of Rows' dialog box is open, prompting the user to specify the range of rows to keep. The 'First row' field is set to 1, and the 'Number of rows' field is set to 500. The main preview area shows the first 500 rows of the 'List of Orders' table, which includes columns for Order ID, Order Date, CustomerName, State, and City. The 'Applied Steps' pane on the right lists the following steps: 1. Kept Range of Rows - 500 R., 2. Changed Type Order Date ..., 3. Capitalized Each Word Cust..., 4. Added Custom - Location - ..., 5. Removed Duplicates.

2. Ensure the "Order Date" column in the "List of Orders" table is set to data type 'Date'.

The screenshot shows the Power Query Editor interface with the 'List of Orders' table selected. A 'TransformColumnTypes' dialog box is open, showing the transformation rule: #1 kept Range of Rows - 500 Rows, {"Order ID", type text}, {"Order Date", type date}, {"CustomerName", type text}, {"State", type text}, {"City", type text}. The main preview area shows the transformed data, where the 'Order Date' column has been converted to a date type. The 'Applied Steps' pane on the right lists the following steps: 1. Kept Range of Rows - 500 R., 2. Changed Type Order Date ..., 3. Capitalized Each Word Cust..., 4. Added Custom - Location - ..., 5. Removed Duplicates. A note at the bottom of the screen says: "Merge the State and City columns to create a new column named Location in the format 'City, State'."

3.Change the data type of “Amount” and “Target” columns to ‘Fixed Decimal Number’

Order Details – Amount & Profit Column – Change Data Type – Fixed Decimal Number

The screenshot shows the Power BI Desktop interface with the 'Order Details' query selected in the Queries list. In the Query Editor, the 'Amount' and 'Profit' columns are highlighted, and their data type is being changed to 'Fixed decimal number'. The 'Applied Steps' pane on the right lists the step '3 Changed Type - Amount/P...', indicating the recent modification.

Sales Target – Target Amount Column – Data Type Changed to Fixed Decimal Number

The screenshot shows the Power BI Desktop interface with the 'Sales target' query selected in the Queries list. In the Query Editor, the 'Target' column is highlighted, and its data type is being changed to 'Fixed decimal number'. The 'Applied Steps' pane on the right lists the step '3 Changed Type - Target Dat...', indicating the recent modification.

4. Format the "Customer Name" column into proper case, ensuring consistent capitalization for each word.

capitalization for each word – Customer Name

The screenshot shows the Power BI Data Transformation & Data Modeling interface. A query named 'Table.TransformColumns (#2_Changed)' is selected. In the 'Applied Steps' pane, there is a step labeled '4 Capitalized Each Word Cust...'. The 'Customize' button for this step is highlighted, showing the formula: `=Text.Proper(type.Text)`. The 'Properties' pane shows the name 'List of Orders'.

Order ID	CustomerName	State	City
B-25601	01-04-2018 B	Ahmedabad	Gujarat
B-25602	01-04-2018 R	Pune	Punjab
B-25603	03-04-2018 IR	Bhopal	Madhya Pradesh
B-25604	03-04-2018 Divya	Kajurao	Jharkhand
B-25605	03-04-2018 Jyoti	West Bengal	Kolkata
B-25606	03-04-2018 Hemant	Mumbai	Maharashtra
B-25607	06-04-2018 Sonashu	Jammu and Kashmir	Kashmir
B-25608	08-04-2018 Anusha	Tamil Nadu	Chennai
B-25609	09-04-2018 Jitesh	Uttar Pradesh	Lucknow
B-25610	09-04-2018 Yogesh	Bihar	Patna
B-25611	11-04-2018 Anita	Kerala	Thiruvananthapuram
B-25612	12-04-2018 Shirish	Punjab	Chandigarh
B-25613	12-04-2018 Mulesh	Haryana	Chandigarh
B-25614	13-04-2018 Vandana	Himachal Pradesh	Simla
B-25615	15-04-2018 Sunita	Bihar	Gangtok
B-25616	15-04-2018 Kanak	Goa	Goa
B-25617	17-04-2018 Sagar	Nagaland	Kohima
B-25618	18-04-2018 Manju	Andhra Pradesh	Hyderabad
B-25619	18-04-2018 Ramesh	Gujarat	Ahmedabad
B-25620	20-04-2018 Senta	Maharashtra	Pune
B-25621	20-04-2018 Dinesh	Madhya Pradesh	Bhopal
B-25622	22-04-2018 Monisha	Rajasthan	Jaipur
B-25623	22-04-2018 Atharv	West Bengal	Kolkata
B-25624	22-04-2018 Vinit	Karnataka	Bangalore
B-25625	23-04-2018 Princy	Jammu and Kashmir	Kashmir
B-25626	23-04-2018 Bhushan	Maharashtra	Mumbai
B-25627	23-04-2018 Hilita	Madhya Pradesh	Indore
B-25628	24-04-2018 Pooja	Bihar	Patna
B-25629	24-04-2018 Hemant	Kerala	Thiruvananthapuram
B-25630	24-04-2018 Sahil	Punjab	Chandigarh

5. Merge the "State" and "City" columns to create a new column named "Location" in the format 'City, State'.

Location – Merge State & City Column

The screenshot shows the Power BI Data Transformation & Data Modeling interface. A query named 'Table.AddColumn (#4 Capitalized Each Word CustomerName, "Location", each [City]&[State])' is selected. In the 'Applied Steps' pane, there is a step labeled '5 Added Custom - Location ...'. The 'Properties' pane shows the name 'List of Orders'.

Order ID	CustomerName	Location
B-25601	01-04-2018 B	Gujarat, Gujarat
B-25602	01-04-2018 R	Punjab, Punjab
B-25603	03-04-2018 IR	Bhopal, Madhya Pradesh
B-25604	03-04-2018 Divya	Kajurao, Jharkhand
B-25605	03-04-2018 Jyoti	West Bengal, Kolkata
B-25606	03-04-2018 Hemant	Mumbai, Maharashtra
B-25607	06-04-2018 Sonashu	Jammu and Kashmir, Kashmir
B-25608	08-04-2018 Anusha	Tamil Nadu, Chennai
B-25609	09-04-2018 Jitesh	Uttar Pradesh, Lucknow
B-25610	09-04-2018 Yogesh	Bihar, Patna
B-25611	11-04-2018 Anita	Thiruvananthapuram, Kerala
B-25612	12-04-2018 Shirish	Punjab, Chandigarh
B-25613	12-04-2018 Mulesh	Haryana, Chandigarh
B-25614	13-04-2018 Vandana	Himachal Pradesh, Simla
B-25615	15-04-2018 Sunita	Bihar, Gangtok
B-25616	15-04-2018 Kanak	Goa, Goa
B-25617	17-04-2018 Sagar	Nagaland, Kohima
B-25618	18-04-2018 Manju	Andhra Pradesh, Hyderabad
B-25619	18-04-2018 Ramesh	Gujarat, Ahmedabad
B-25620	20-04-2018 Sarita	Maharashtra, Pune
B-25621	20-04-2018 Dinesh	Bihar, Patna
B-25622	22-04-2018 Monisha	Karnataka, Bangalore
B-25623	22-04-2018 Amey	West Bengal, Kolkata
B-25624	22-04-2018 Vini	Karnataka, Bangalore
B-25625	23-04-2018 Princy	Jammu and Kashmir, Kashmir
B-25626	23-04-2018 Bhushan	Mumbai, Maharashtra
B-25627	23-04-2018 Hilita	Andhra Pradesh, Hyderabad
B-25628	24-04-2018 Pooja	Patna, Bihar
B-25629	24-04-2018 Hemant	Thiruvananthapuram, Kerala
B-25630	24-04-2018 Sahil	Chandigarh, Punjab

6.Create a new custom column named "Profit Margin" as the percentage of "Profit" divided by "Amount".

Profit Margin Column

The screenshot shows the Power BI Data Transformation & Data Modeling interface. In the 'Applied Steps' pane, step 6 is highlighted: '6 Added Custom - Profit Margin'. The formula used is `=Table.TransformColumnTypes(#"6 Added Custom - Profit Margin", {"[Profit Margin]": Percentage, Type})`.

Order ID	Amount	Profit	Quantity	Category	Sub-Category	Profit Margin
B-25001	1,275.00	-1,148.00	7	Furniture	Bookcases	-86.04%
2	66.00	-12.00	5	Clothing	Saree	-18.18%
3	8.00	-2.00	3	Clothing	Hankiechief	-25.00%
4	80.00	-56.00	4	Electronics	Electronic Games	-70.00%
5	168.00	-111.00	2	Electronics	Phones	-66.07%
6	424.00	-272.00	5	Electronics	Phones	-64.15%
7	2,617.00	1,151.00	4	Electronics	Phones	43.98%
8	561.00	212.00	3	Clothing	Saree	37.79%
9	119.00	-5.00	2	Clothing	Saree	-4.20%
10	1,355.00	-90.00	5	Clothing	Trousers	-4.43%
11	24.00	-30.00	2	Furniture	Chairs	-125.00%
12	125.00	-166.00	3	Clothing	Saree	-86.01%
13	180.00	5.00	3	Clothing	Trousers	2.78%
14	116.00	16.00	4	Clothing	Saree	13.79%
15	205.00	36.00	6	Clothing	Saree	33.64%
16	250.00	1.00	2	Clothing	Hankiechief	8.33%
17	38.00	18.00	2	Clothing	Kurti	47.37%
18	25.00	3.00	2	Clothing	T-shirt	26.15%
19	137.00	5.00	9	Clothing	Saree	3.73%
20	250.00	75.00	7	Clothing	Saree	0.00%
21	87.00	4.00	2	Clothing	Shirt	4.60%
22	50.00	15.00	4	Clothing	Leggings	30.00%
23	1,364.00	-1,864.00	5	Furniture	Tables	-136.66%
24	476.00	0.00	3	Furniture	Chairs	0.00%
25	257.00	23.00	5	Clothing	Hankiechief	8.95%
26	856.00	385.00	6	Electronics	Printers	44.98%
27	485.00	29.00	4	Electronics	Electronic Games	5.98%
28	250.00	28.00	4	Clothing	Saree	-20.00%
29	2,076.00	-58.00	4	Electronics	Printers	-3.33%
30	1,076.00	-54.00	4	Clothing	Saree	-5.04%

7.Add a new conditional column named "Profit Status" based on the values in the "Profit" column. The conditions are as follows: if the profit is less than 0, the label should be "Loss"; if the profit equals 0, the label should be "Break-Even"; and if the profit is greater than 0, the label should be "Profit".

Profit Status Column

The screenshot shows the Power BI Data Transformation & Data Modeling interface. In the 'Applied Steps' pane, step 7 is highlighted: '7 Added Conditional Column - Profit Status'. The formula used is `=Table.AddColumn(#"6 Added Custom - Profit Margin", "Profit Status", each if [Profit] < 0 then "Loss" else if [Profit] = 0 then "Break-Even" else "Profit")`.

Order ID	Amount	Profit	Quantity	Category	Sub-Category	Profit Margin	Profit Status
B-25001	1,275.00	-1,148.00	7	Furniture	Bookcases	-86.04%	Loss
2	66.00	-12.00	5	Clothing	Saree	-18.18%	Loss
3	8.00	-2.00	3	Clothing	Hankiechief	-25.00%	Loss
4	80.00	-56.00	4	Electronics	Electronic Games	-70.00%	Loss
5	168.00	-111.00	2	Electronics	Phones	-66.07%	Loss
6	424.00	-272.00	5	Electronics	Phones	-64.15%	Loss
7	2,617.00	1,151.00	4	Electronics	Phones	43.98%	Profit
8	561.00	212.00	3	Clothing	Saree	37.79%	Profit
9	119.00	-5.00	2	Clothing	Saree	-4.20%	Loss
10	1,355.00	-60.00	5	Clothing	Trousers	-4.43%	Loss
11	24.00	-10.00	1	Furniture	Chairs	-125.00%	Loss
12	193.00	-166.00	3	Clothing	Saree	-86.01%	Loss
13	180.00	5.00	3	Clothing	Trousers	2.78%	Profit
14	116.00	16.00	4	Clothing	Saree	13.79%	Profit
15	207.00	36.00	6	Clothing	Saree	33.64%	Profit
16	12.00	1.00	2	Clothing	Hankiechief	8.33%	Profit
17	38.00	18.00	2	Clothing	Kurti	47.37%	Profit
18	65.00	17.00	2	Clothing	T-shirt	26.15%	Profit
19	257.00	5.00	9	Clothing	Saree	3.73%	Profit
20	75.00	0.00	4	Clothing	Saree	0.00%	Break-Even
21	87.00	4.00	2	Clothing	Shirt	4.60%	Profit
22	50.00	15.00	4	Clothing	Leggings	30.00%	Profit
23	1,364.00	-1,864.00	5	Furniture	Tables	-136.66%	Loss
24	476.00	0.00	3	Furniture	Chairs	0.00%	Break-Even
25	257.00	23.00	5	Clothing	Hankiechief	8.95%	Profit
26	856.00	385.00	6	Electronics	Printers	44.98%	Profit
27	485.00	29.00	4	Electronics	Electronic Games	5.98%	Profit
28	25.00	-5.00	4	Clothing	Saree	-20.00%	Loss
29	1,076.00	-38.00	4	Electronics	Printers	-3.33%	Loss
30	*** ***	*** ***	1	***	***	***	***

Merging Data (Joins):

- Merge the "List of Orders" and "Order Details" tables into a new single table named "Orders Data" based on the "Order ID" relationship.

Orders Data Table

The screenshot shows the Power BI Data Transformation & Modeling interface. The main area displays a table titled 'Orders Data' with columns: Order ID, Order Date, Customer Name, State, City, and Location. The table contains 30 rows of data. The 'APPLIED STEPS' pane on the right shows the query: 'Table.NestedJoin#"List of Orders", {"Order ID"}, "Order Details", {"Order ID"}, "Order Details", JoinKind.Inner'. The 'PROPERTIES' pane shows the table name is 'Order Data'. The bottom status bar indicates '7 COLUMNS, 500 ROWS - Column profiling based on top 1000 rows'.

Order ID	Order Date	Customer Name	State	City	Location
1 B-25601	03-04-2018	Bharat	Gujarat	Ahmedabad	Ahmedabad,Gujarat
2 B-25602	03-04-2018	Pearl	Maharashtra	Pune	Pune,Maharashtra
3 B-25603	03-04-2018	Jain	Madhya Pradesh	Shibpur	Bhopal,Madhya Pradesh
4 B-25604	03-04-2018	Karan	Rajasthan	Jaipur	Jaipur,Rajasthan
5 B-25605	03-04-2018	Karthik	West Bengal	Kolkata	Kolkata,West Bengal
6 B-25606	03-04-2018	Hazel	Karnataka	Bangalore	Bangalore,Karnataka
7 B-25607	03-04-2018	Sonakshi	Jammu and Kashmir	Kashmir	Kashmir,Jammu and Kashmir
8 B-25608	03-04-2018	Anuphi	Tamil Nadu	Chennai	Chennai,Tamil Nadu
9 B-25609	03-04-2018	Jitesh	Uttar Pradesh	Lucknow	Lucknow,Uttar Pradesh
10 B-25610	03-04-2018	Yogesh	Punjab	Panja	Panja,Punjab
11 B-25611	13-04-2018	Kaka	Kerala	Thiruvananthapuram	Thiruvananthapuram,Kerala
12 B-25612	13-04-2018	Shivchand	Punjab	Chandigarh	Chandigarh,Punjab
13 B-25613	13-04-2018	Mukesh	Haryana	Chandigarh	Chandigarh,Haryana
14 B-25614	13-04-2018	Vandana	Himachal Pradesh	Sirma	Sirma,Himachal Pradesh
15 B-25615	13-04-2018	Bhavana	Sikkim	Gangtok	Gangtok,Sikkim
16 B-25616	13-04-2018	Uma	Uttarakhand	Dehradoon	Dehradoon,Uttarakhand
17 B-25617	13-04-2018	Segar	Nagaland	Kohima	Kohima,Nagaland
18 B-25618	13-04-2018	Manju	Andhra Pradesh	Hyderabad	Hyderabad,Andhra Pradesh
19 B-25619	13-04-2018	Ramesh	Gujarat	Ahmedabad	Ahmedabad,Gujarat
20 B-25620	20-04-2018	Sarita	Maharashtra	Pune	Pune,Maharashtra
21 B-25621	20-04-2018	Deepak	Madhya Pradesh	Shibpur	Bhopal,Madhya Pradesh
22 B-25622	20-04-2018	Monisha	Karnataka	Hubli	Hubli,Karnataka
23 B-25623	23-04-2018	Ankush	West Bengal	Kolkata	Kolkata,West Bengal
24 B-25624	23-04-2018	Vini	Karnataka	Bangalore	Bangalore,Karnataka
25 B-25625	23-04-2018	Pinky	Jammu and Kashmir	Kashmir	Kashmir,Jammu and Kashmir
26 B-25626	23-04-2018	Bhishm	Maharashtra	Mumbai	Mumbai,Maharashtra
27 B-25627	23-04-2018	Hitsa	Madhya Pradesh	Indore	Indore,Madhya Pradesh
28 B-25628	23-04-2018	Pooja	Punjab	Panja,Bill	Panja,Bill
29 B-25629	24-04-2018	Hemant	Kerala	Thiruvananthapuram	Thiruvananthapuram,Kerala
30 B-25630	24-04-2018	Sahil	Punjab	Chandigarh	Chandigarh,Punjab

Handling Missing Data & Duplicate Data:

- Identify missing values in the data and determine a strategy to address them.
- Check for duplicate rows and define a strategy to handle duplicates.

Sorting and Filtering Data:

- In the 'Orders Data' table, utilize sorting and filtering techniques on columns like Order Date, State or Category to analyze data based on specific criteria:

◆ Sort the orders by Order Date in descending order to analyze recent trends.

The screenshot shows the Power BI desktop interface with the 'Orders Data' query selected in the Queries list. The query is defined as: `= Table.Sort(#"Removed Duplicates",{{"Order Date", Order.Descending}})`. The data table contains columns: Order ID, Order Date, CustomerName, State, City, Location, and Amount. The 'Applied Steps' pane on the right shows the step: 'Sorted Rows Descending'.

Order ID	Order Date	CustomerName	State	City	Location	Amount
B-26100	31-05-2019	Hitka	Madhya Pradesh	Indore	Indore, Madhya Pradesh	72.00
B-26100	31-05-2019	Hitka	Madhya Pradesh	Indore	Indore, Madhya Pradesh	828.00
B-26100	31-05-2019	Hitka	Madhya Pradesh	Indore	Indore, Madhya Pradesh	34.00
B-26099	30-05-2019	Bishim	Maharashtra	Mumbai	Mumbai, Maharashtra	207.00
B-26099	30-05-2019	Bishim	Maharashtra	Mumbai	Mumbai, Maharashtra	2,366.00
B-26099	30-05-2019	Bishim	Maharashtra	Mumbai	Mumbai, Maharashtra	9.00
B-26099	30-05-2019	Bishim	Maharashtra	Mumbai	Mumbai, Maharashtra	835.00
B-26098	29-05-2019	Pinky	Jammu and Kashmir	Kashmir	Kashmir, Jammu and Kashmir	46.00
B-26098	29-05-2019	Pinky	Jammu and Kashmir	Kashmir	Kashmir, Jammu and Kashmir	497.00
B-26098	29-05-2019	Pinky	Jammu and Kashmir	Kashmir	Kashmir, Jammu and Kashmir	409.00
B-26098	29-05-2019	Pinky	Jammu and Kashmir	Kashmir	Kashmir, Jammu and Kashmir	59.00
B-26098	29-05-2019	Pinky	Jammu and Kashmir	Kashmir	Kashmir, Jammu and Kashmir	96.00
B-26098	29-05-2019	Pinky	Jammu and Kashmir	Kashmir	Kashmir, Jammu and Kashmir	82.00
B-26096	28-05-2019	Atharv	West Bengal	Kolkata	Kolkata, West Bengal	103.00
B-26097	28-05-2019	Vini	Karnataka	Bangalore	Bangalore, Karnataka	97.00
B-26097	28-05-2019	Vini	Karnataka	Bangalore	Bangalore, Karnataka	19.00
B-26096	28-05-2019	Atharv	West Bengal	Kolkata	Kolkata, West Bengal	88.00
B-26097	28-05-2019	Vini	Karnataka	Bangalore	Bangalore, Karnataka	39.00
B-26096	28-05-2019	Atharv	West Bengal	Kolkata	Kolkata, West Bengal	264.00
B-26096	28-05-2019	Atharv	West Bengal	Kolkata	Kolkata, West Bengal	451.00
B-26097	28-05-2019	Vini	Karnataka	Bangalore	Bangalore, Karnataka	185.00
B-26097	28-05-2019	Vini	Karnataka	Bangalore	Bangalore, Karnataka	14.00
B-26097	28-05-2019	Vini	Karnataka	Bangalore	Bangalore, Karnataka	671.00
B-26095	28-05-2019	Monisha	Rajasthan	Jaipur	Jaipur, Rajasthan	6.00
B-26096	28-05-2019	Atharv	West Bengal	Kolkata	Kolkata, West Bengal	45.00
B-26096	28-05-2019	Atharv	West Bengal	Kolkata	Kolkata, West Bengal	140.00
B-26097	28-05-2019	Vini	Karnataka	Bangalore	Bangalore, Karnataka	663.00
B-26090	27-05-2019	Sagar	Nagaland	Kohima	Kohima, Nagaland	80.00
B-26093	27-05-2019	Sarita	Maharashtra	Pune	Pune, Maharashtra	148.00

◆ Filter the orders to focus only on a specific state (e.g., Tamil Nadu) for regional analysis.

The screenshot shows the Power BI desktop interface with the 'Orders Data' query selected in the Queries list. The query is defined as: `= Table.SelectRows(#"Sorted Rows Descending", each ([State] = "Tamil Nadu"))`. The data table contains columns: Order ID, Order Date, CustomerName, State, City, Location, and Amount. The 'Applied Steps' pane on the right shows the step: 'Filtered Rows - Tamil Nadu'.

Order ID	Order Date	CustomerName	State	City	Location	Amount
B-26081	22-05-2019	Aarushi	Tamil Nadu	Chennai	Chennai, Tamil Nadu	79.00
B-26081	22-05-2019	Aarushi	Tamil Nadu	Chennai	Chennai, Tamil Nadu	169.00
B-26081	22-05-2019	Aarushi	Tamil Nadu	Chennai	Chennai, Tamil Nadu	859.00
B-26081	22-05-2019	Aarushi	Tamil Nadu	Chennai	Chennai, Tamil Nadu	99.00
B-26081	22-05-2019	Aarushi	Tamil Nadu	Chennai	Chennai, Tamil Nadu	24.00
B-26018	14-02-2019	Aarushi	Tamil Nadu	Chennai	Chennai, Tamil Nadu	637.00
B-26018	14-02-2019	Aarushi	Tamil Nadu	Chennai	Chennai, Tamil Nadu	61.00
B-26008	09-02-2019	Kalyani	Tamil Nadu	Chennai	Chennai, Tamil Nadu	326.00
B-26008	09-02-2019	Kalyani	Tamil Nadu	Chennai	Chennai, Tamil Nadu	22.00
B-26008	09-02-2019	Kalyani	Tamil Nadu	Chennai	Chennai, Tamil Nadu	206.00
B-25608	09-02-2019	Kalyani	Tamil Nadu	Chennai	Chennai, Tamil Nadu	10.00
B-26008	09-02-2019	Kalyani	Tamil Nadu	Chennai	Chennai, Tamil Nadu	57.00
B-25860	15-11-2018	Akshay	Tamil Nadu	Chennai	Chennai, Tamil Nadu	212.00
B-25788	21-09-2018	Dinesh	Tamil Nadu	Chennai	Chennai, Tamil Nadu	32.00
B-25716	11-07-2018	Surabhi	Tamil Nadu	Chennai	Chennai, Tamil Nadu	58.00
B-25698	23-06-2018	Amisha	Tamil Nadu	Chennai	Chennai, Tamil Nadu	207.00
B-25698	23-06-2018	Amisha	Tamil Nadu	Chennai	Chennai, Tamil Nadu	27.00
B-25698	23-06-2018	Amisha	Tamil Nadu	Chennai	Chennai, Tamil Nadu	65.00
B-25698	23-06-2018	Amisha	Tamil Nadu	Chennai	Chennai, Tamil Nadu	87.00
B-25698	23-06-2018	Amisha	Tamil Nadu	Chennai	Chennai, Tamil Nadu	7.00
B-25698	23-06-2018	Amisha	Tamil Nadu	Chennai	Chennai, Tamil Nadu	516.00
B-25608	08-04-2018	Aarushi	Tamil Nadu	Chennai	Chennai, Tamil Nadu	257.00
B-25608	08-04-2018	Aarushi	Tamil Nadu	Chennai	Chennai, Tamil Nadu	856.00
B-25608	08-04-2018	Aarushi	Tamil Nadu	Chennai	Chennai, Tamil Nadu	476.00
B-25608	08-04-2018	Aarushi	Tamil Nadu	Chennai	Chennai, Tamil Nadu	1,364.00

Grouping and Aggregating Data:

- Duplicate the “Order Details” table and calculate the count of each Order ID, average profit by Category or total amount by Sub-Category.

“Order Details” table and calculate the count of each Order ID - Order Details Aggregated

The screenshot shows the Power BI Data Transformation & Data Modeling interface. A query named "Order Details Aggregated" is selected. The query formula is: `= Table.Group(#"Added Custom", {"Order ID"}, {"Count", each Table.RowCount(_), Int64.Type})`. The resulting table has two columns: "Order ID" and "Count". The "Count" column contains values such as 4, 5, 8, 2, 1, etc. The "APPLIED STEPS" pane on the right lists steps like "Promoted Headers", "Changed Type - Amount Profit", "Added Custom - Profit Margin", etc.

Order ID	Count
B-25601	4
B-25602	5
B-25603	8
B-25604	2
B-25605	1
B-25606	1
B-25607	1
B-25608	4
B-25609	2
B-25610	6
B-25611	1
B-25612	1
B-25613	1
B-25614	2
B-25615	1
B-25616	4
B-25617	1
B-25618	2
B-25619	1
B-25620	1
B-25621	3
B-25622	1
B-25623	4
B-25624	1
B-25625	3
B-25626	2
B-25627	1
B-25628	3
B-25629	1
B-25630	6

Average Profit by Category

The screenshot shows the Power BI Data Transformation & Data Modeling interface. A query named "Order Details Average Profit" is selected. The query formula is: `= Table.Group(#"Changed Type - Profit Status", {"Category"}, {"Average of Profit", each List.Average([Profit]), type nullable number})`. The resulting table has two columns: "Category" and "Average of Profit". The "Average of Profit" column contains values such as 9.456790123, 11.76299832, and 34.07142857. The "APPLIED STEPS" pane on the right lists steps like "Promoted Headers", "Changed Type - Amount Profit", "Added Custom - Profit Margin", etc.

Category	Average of Profit
Furniture	9.456790123
Clothing	11.76299832
Electronics	34.07142857

- Duplicate the “Sales Target” table and aggregate the total target amount by Month of Order Date.

Total Target amount by “Month” of Order Date

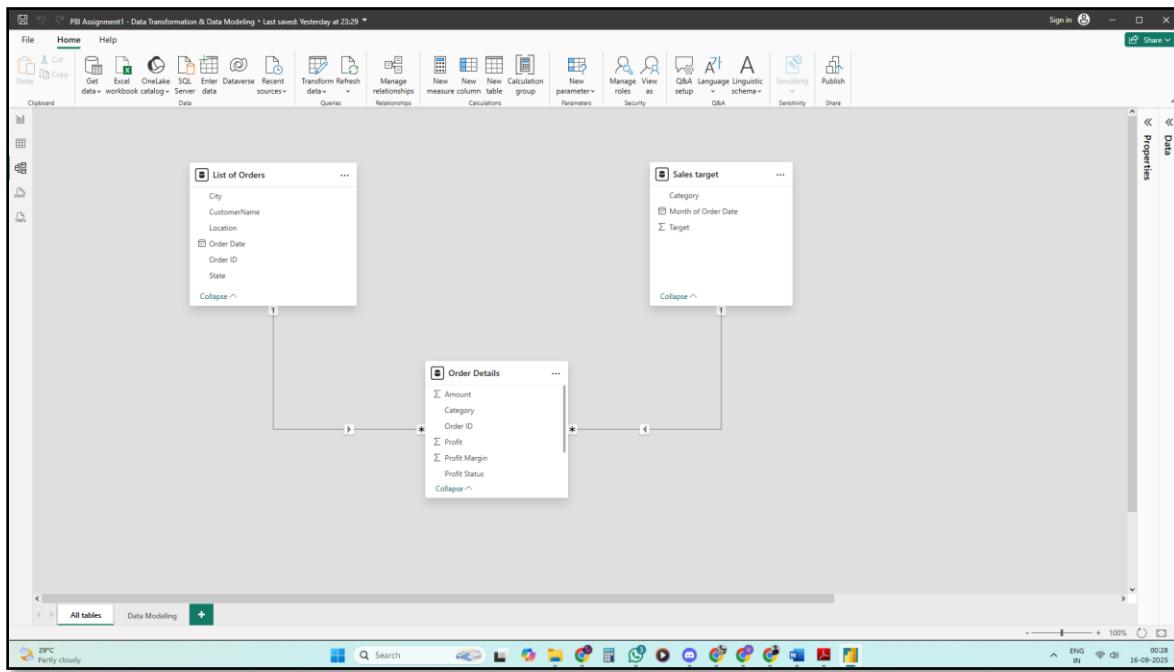
The screenshot shows the Power BI Data Transformation & Data Modeling interface. A query named "Target Amount by Month" is displayed in the editor. The table contains 12 rows of data:

Month Name	Target Amount
January	32400
February	33800
March	34800
April	34400
May	35800
June	32600
July	33800
August	35900
September	34000
October	36300
November	36300
December	36400

The properties pane indicates the name is "Sales target - Total amount by Month" and the applied step is "Grouped Rows".

3. Data Modeling:

- Establish a relationship between the “List of Orders” and “Order Details” tables using the ‘Order ID’ column.
- Build a relationship between the “Order Details” and “Sales Target” tables based on the ‘Category’ column. Click "Manage relationships" and ensure this relationship is active.



Phase 2 – DAX & Data Visualization

This phase involved the creation of calculated columns, DAX measures, and interactive Power BI dashboards to visualize key business metrics and trends.

Calculated Columns

- Category Type = Category & “-” & Sub-Category
- Revenue per Order = Amount × Quantity
- Sales Category = IF(Amount > AVERAGE(Amount), 'Above Average', 'Below Average')

Calculated Measure

- Order Count = DISTINCTCOUNT (Order ID)
- Average Profit in Delhi = CALCULATE(AVERAGE(Profit), City = 'Delhi')
- Year-to-Date (YTD) Sales = TOTALYTD(SUM(Amount), Order Date)

Data Visualizations

Multiple interactive visuals were created to analyze performance and uncover trends:

1. Clustered Column Chart – Sales Target Achievement by Category
2. Donut Chart – Max Profit Margin by Sub-Category
3. Line Chart – Monthly Sales Trend
4. Scatter Chart – Profit vs Quantity by Sub-Category
5. Cards – Total Sales vs Sales Target
6. Multi-Row Card – Minimum Target per Segment
7. Matrix Table – Sales vs Target by Category and Month
8. Map Visual – Geographic Sales Analysis by City
9. Treemap – Sales Distribution by Sub-Category
10. Funnel Chart – Order Count Analysis by State

Calculated Columns:

- **Create a Calculated Column for 'Category Type':** Add a calculated column in the Order Details table that combines the 'Category' and 'Sub-Category' columns into a single 'Category Type' column.

Formula: Category Type = 'Order Details'[Category]&"-">&'Order Details'[Sub-Category]

Power BI Assignment 2 - DAX Data Visualization • Last saved: Today at 00:29

The screenshot shows the Power BI Data View window. The left pane displays the 'Order Details' table with columns: Order ID, Amount, Quantity, Category, Sub-Category, Profit Margin, Profit Status, and Category Type. A new column 'Revenue' has been added, calculated as 'Amount * Quantity'. The right pane shows the data context pane with various filters and measures applied.

Table: Order Details (1,500 rows) Column: Revenue (17 distinct values)

- Calculate Revenue per Order in Order Details Table:** Create a calculated column in the Order Details table to compute the revenue (Amount * Quantity) per order.

Formula: Revenue = 'Order Details'[Amount]*'Order Details'[Quantity]

Power BI Assignment 2 - DAX Data Visualization • Last saved: Today at 00:42

The screenshot shows the Power BI Data View window. The left pane displays the 'Order Details' table with columns: Order ID, Amount, Quantity, Category, Sub-Category, Profit Margin, Profit Status, and Category Type. A new column 'Revenue' has been added, calculated as 'Amount * Quantity'. The right pane shows the data context pane with various filters and measures applied.

Table: Order Details (1,500 rows) Column: Revenue (845 distinct values)

- **Create a Calculated Column to Categorize Sales:** Add a calculated column named 'Sales Category' in the Order Details table that categorizes each order as 'Above Average' or 'Below Average' based on the Amount value.

Formula: Sales Category = IF ('Order Details'[Amount]>AVERAGE ('Order Details'[Amount]),"Above Average", "Below Average")

The screenshot shows a Power BI Data Visualization window. On the left, there is a table with columns: Order ID, Amount, Profit, Quantity, Category, Sub-Category, Profit Margin, Profit Status, Category Type, Revenue, and Sales Category. The Sales Category column contains values like 'Above Average' and 'Below Average'. On the right, the DAX formula editor is open, showing the formula: `=IF('Order Details'[Amount]>AVERAGE('Order Details'[Amount]),"Above Average","Below Average")`. The formula bar above the editor also has the same formula. The ribbon at the top includes Home, Help, Table tools, and Column tools.

Calculated Measures:

- **Calculate Order Count:** Define a measure to count the total number of orders in the Order Details table.

Formula: Order Count = DISTINCTCOUNT ('Order Details'[Order ID])

The screenshot shows the Power BI Desktop interface. In the top ribbon, 'Measure tools' is selected. A measure named 'YTD Sales' is defined with the formula `= TOTALYTD(SUM('Orders Data'[Amount]), 'Orders Data'[Order Date])`. The main area displays a card visual titled 'Total Orders' with the value '1500'. The data pane on the right lists fields from the 'Orders Data' table, including Amount, Category, Order ID, Profit, Profit Margin, Profit Status, Quantity, Revenue, Sales Category, Sub-Category, Order Date, City, CustomerName, State, and Sub-Category.

- **Calculate Average Profit in Delhi:** Create a measure to calculate the average profit for orders placed in Delhi.

Formula: Average Profit in Delhi = CALCULATE(AVERAGE('Orders Data'[Profit]), 'Orders Data'[City] = "Delhi")

The screenshot shows the Power BI Desktop interface. In the top ribbon, 'Measure tools' is selected. A measure named 'Average Profit in Delhi' is defined with the formula `= CALCULATE(AVERAGE('Orders Data'[Profit]), 'Orders Data'[City] = "Delhi")`. The main area displays a card visual with the value '₹ 43.31'. The data pane on the right lists fields from the 'Orders Data' table, including Amount, Category, Order ID, Profit, Profit Margin, Profit Status, Quantity, Revenue, Sales Category, Sub-Category, Order Date, City, CustomerName, State, and Sub-Category.

- **Calculate Year-to-Date (YTD) Sales:** Define a measure to calculate the total sales amount accumulated from the earliest order date up to each order date.

Formula: YTD Sales = TOTALYTD (SUM ('Orders Data'[Amount]),'Orders Data'[Order Date])

Order Date	Sum of Amount	YTD Sales
01 April 2018	₹ 5,318	₹ 5,318
02 April 2018	₹ 2,247	₹ 7,565
03 April 2018	₹ 75	₹ 7,540
04 April 2018	₹ 137	₹ 7,777
05 April 2018	₹ 2,953	₹ 10,730
06 April 2018	₹ 2,615	₹ 13,345
07 April 2018	₹ 160	₹ 13,505
08 April 2018	₹ 1,862	₹ 15,367
09 April 2018	₹ 592	₹ 15,959
10 April 2018	₹ 262	₹ 16,221
11 April 2018	₹ 305	₹ 16,526
12 April 2018	₹ 77	₹ 16,553
13 April 2018	₹ 987	₹ 18,340
14 April 2018	₹ 1,025	₹ 19,365
15 April 2018	₹ 1,995	₹ 21,260
16 April 2018	₹ 2,259	₹ 23,519
17 April 2018	₹ 19	₹ 23,538
18 April 2018	₹ 5,076	₹ 28,614
19 April 2018	₹ 2,155	₹ 30,769
20 April 2018	₹ 434	₹ 31,203
21 April 2018	₹ 1,447	₹ 32,650
22 April 2018	₹ 76	₹ 32,726
23 April 2018	₹ 695	₹ 33,421
24 April 2018	₹ 42	₹ 33,463
25 April 2018	₹ 315	₹ 33,778
26 April 2018	₹ 27	₹ 33,805
27 April 2018	₹ 2,810	₹ 36,615
28 April 2018	₹ 1,802	₹ 38,417
Total	₹ 43,1502	₹ 1,58,800

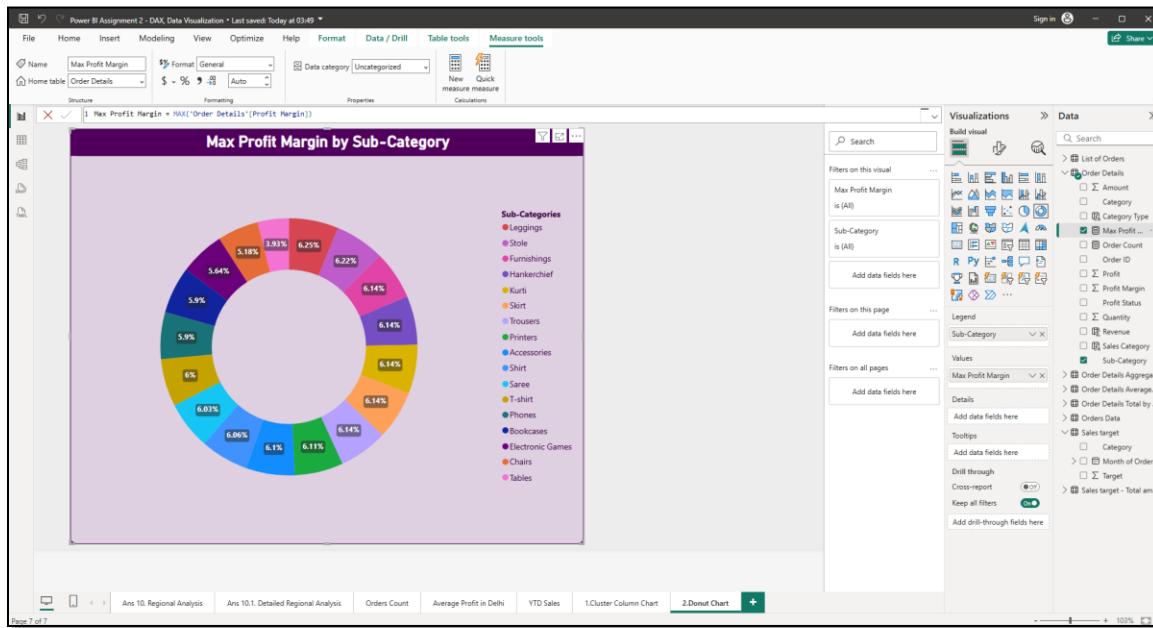
Data Visualization:

1. **Sales Target Achievement by Category:** Compare actual sales with sales targets by category using a clustered column chart.

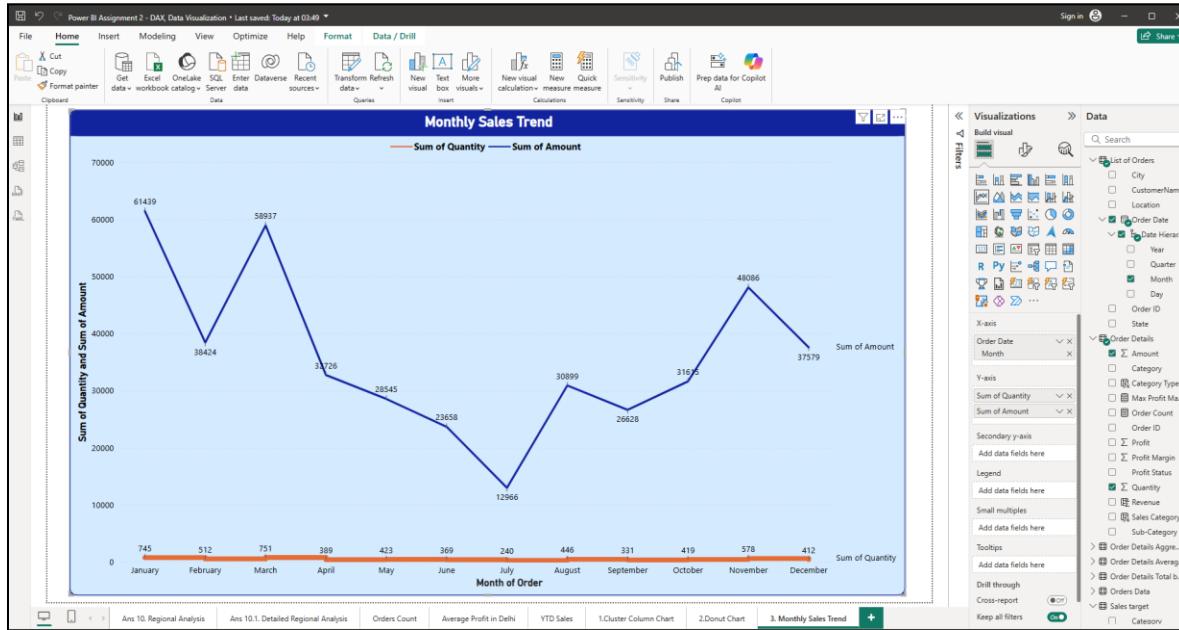
Category	Sum of Amount	Sum of Target
Electronics	165K	129K
Clothing	139K	174K
Furniture	127K	133K

2. Max Profit Margin by Sub-Category: Analyze the maximum profit margin for each sub-category of products using a donut chart.

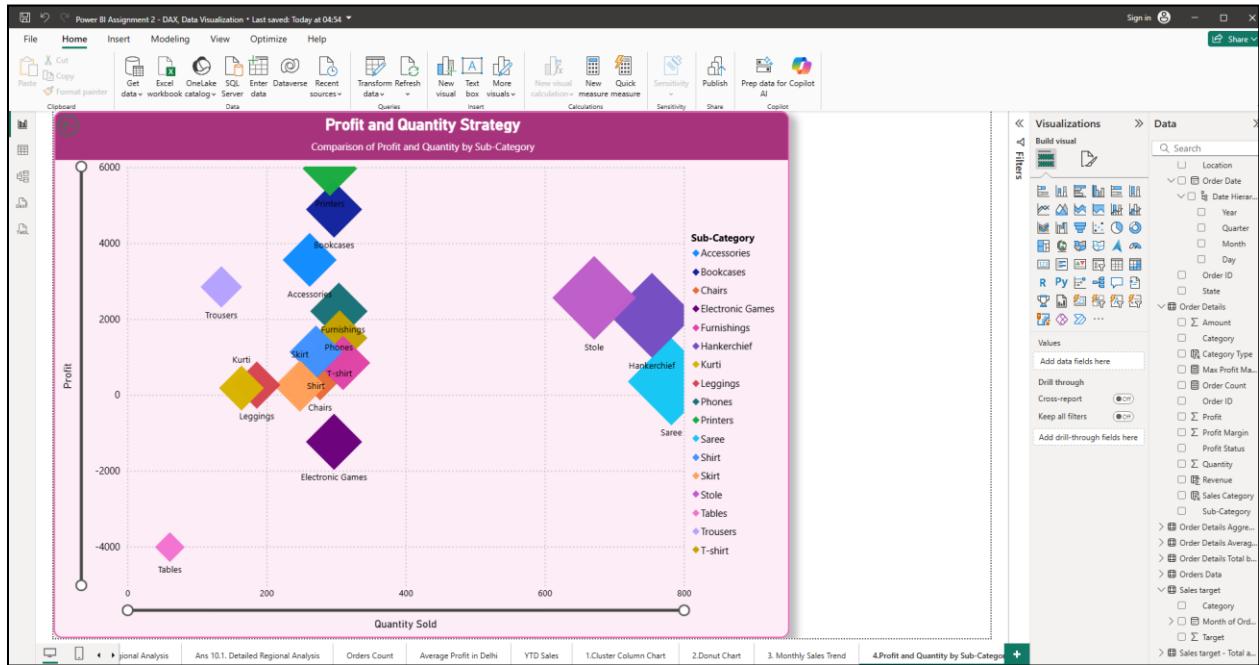
Formula: Max Profit Margin = MAX ('Order Details'[Profit Margin])



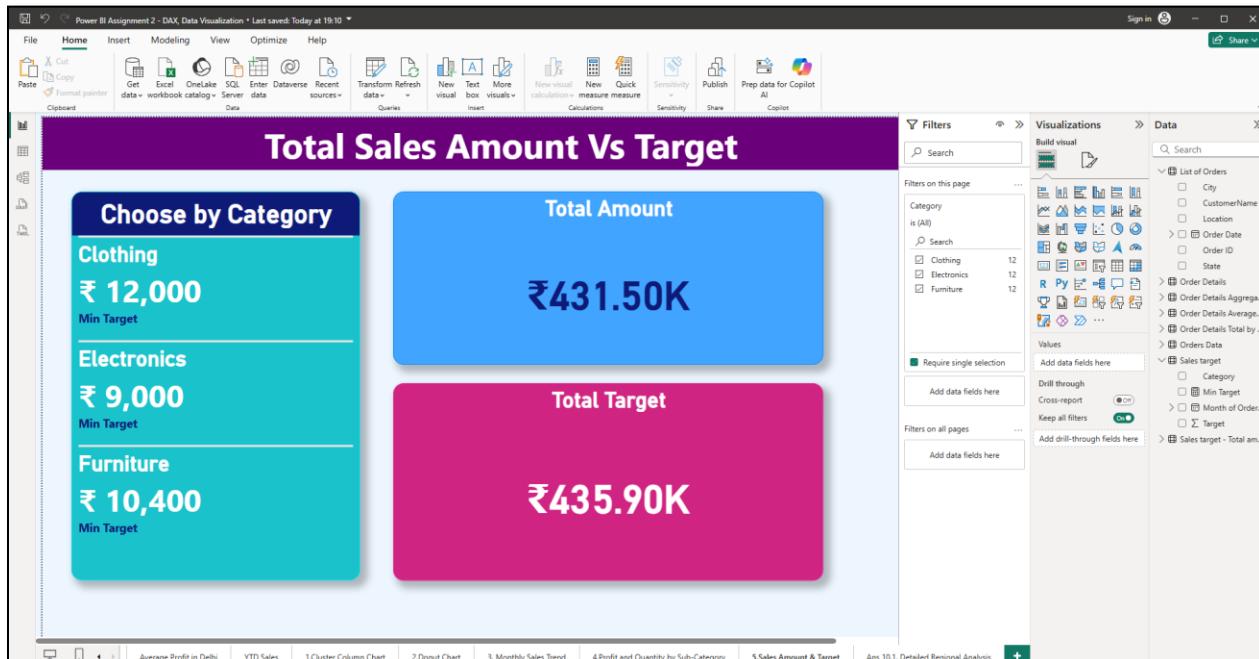
3. Monthly Sales Trend: Show the trend of monthly sales over time using a line chart.



4.Comparison of Profit and Quantity by Sub-Category: Compare the relationship between profit and quantity sold for different sub-categories using a scatter chart.



5.Comparison of Total Sales Amount and Target: Create cards to succinctly display the total sales amount alongside the sales target for quick comparison and analysis. Also, create a multi-row card to display the minimum target for each segment.



6.Sales Performance Matrix: Build a matrix view to analyze how actual sales compare to sales targets across different categories and months.

The screenshot shows a Power BI Analysis Studio interface. The main area displays a "Sales Performance Matrix" table with data for various months across Clothing, Electronics, and Furniture categories. The table includes columns for Category, Month, Sum of Amount, and Sum of Target. The Power BI Data Model pane on the right side shows the underlying data model with tables like "List of Orders" and "Order Details".

Category	Clothing		Electronics		Furniture		Total	
	Month	Sum of Amount	Sum of Target	Sum of Amount	Sum of Target	Sum of Amount	Sum of Target	Sum of Amount
January	₹13,466.00	₹1,74,000.00	₹26,716.00	₹1,29,000.00	₹21,257.00	₹1,32,900.00	₹61,439.00	₹4,35,900.00
March	₹21,418.00	₹1,74,000.00	₹20,860.00	₹1,29,000.00	₹16,659.00	₹1,32,900.00	₹58,937.00	₹4,35,900.00
November	₹16,270.00	₹1,74,000.00	₹16,651.00	₹1,29,000.00	₹15,165.00	₹1,32,900.00	₹48,086.00	₹4,35,900.00
February	₹9,569.00	₹1,74,000.00	₹12,593.00	₹1,29,000.00	₹16,262.00	₹1,32,900.00	₹38,424.00	₹4,35,900.00
December	₹9,545.00	₹1,74,000.00	₹18,560.00	₹1,29,000.00	₹9,474.00	₹1,32,900.00	₹37,579.00	₹4,35,900.00
April	₹13,478.00	₹1,74,000.00	₹11,127.00	₹1,29,000.00	₹8,121.00	₹1,32,900.00	₹32,726.00	₹4,35,900.00
October	₹11,488.00	₹1,74,000.00	₹13,361.00	₹1,29,000.00	₹6,766.00	₹1,32,900.00	₹31,615.00	₹4,35,900.00
August	₹11,822.00	₹1,74,000.00	₹9,539.00	₹1,29,000.00	₹9,538.00	₹1,32,900.00	₹30,899.00	₹4,35,900.00
May	₹9,518.00	₹1,74,000.00	₹12,807.00	₹1,29,000.00	₹6,220.00	₹1,32,900.00	₹28,545.00	₹4,35,900.00
September	₹10,717.00	₹1,74,000.00	₹7,207.00	₹1,29,000.00	₹8,704.00	₹1,32,900.00	₹26,628.00	₹4,35,900.00
June	₹8,782.00	₹1,74,000.00	₹9,344.00	₹1,29,000.00	₹5,532.00	₹1,32,900.00	₹23,658.00	₹4,35,900.00
July	₹2,981.00	₹1,74,000.00	₹6,502.00	₹1,29,000.00	₹3,483.00	₹1,32,900.00	₹12,966.00	₹4,35,900.00
Total	₹1,39,054.00	₹1,74,000.00	₹1,65,267.00	₹1,29,000.00	₹1,27,181.00	₹1,32,900.00	₹4,31,502.00	₹4,35,900.00

Summary

This project successfully demonstrates an end-to-end data analytics workflow covering data transformation, modeling, and visualization. Through the use of Power BI, the analysis delivers clear insights into sales performance, profitability, and regional trends. Key takeaways include improved visibility into sales targets, identification of high-performing categories, and enhanced decision-making through data-driven visual dashboards.

Conclusion

The Sales Data Analysis Project provides a practical demonstration of how Power BI and Excel can be used together for efficient business analytics. By integrating clean data models, calculated measures, and insightful visuals, the project enables businesses to monitor key metrics, evaluate performance, and support strategic planning.

- Thank You -