Retail Sales Performance Analysis

Overview

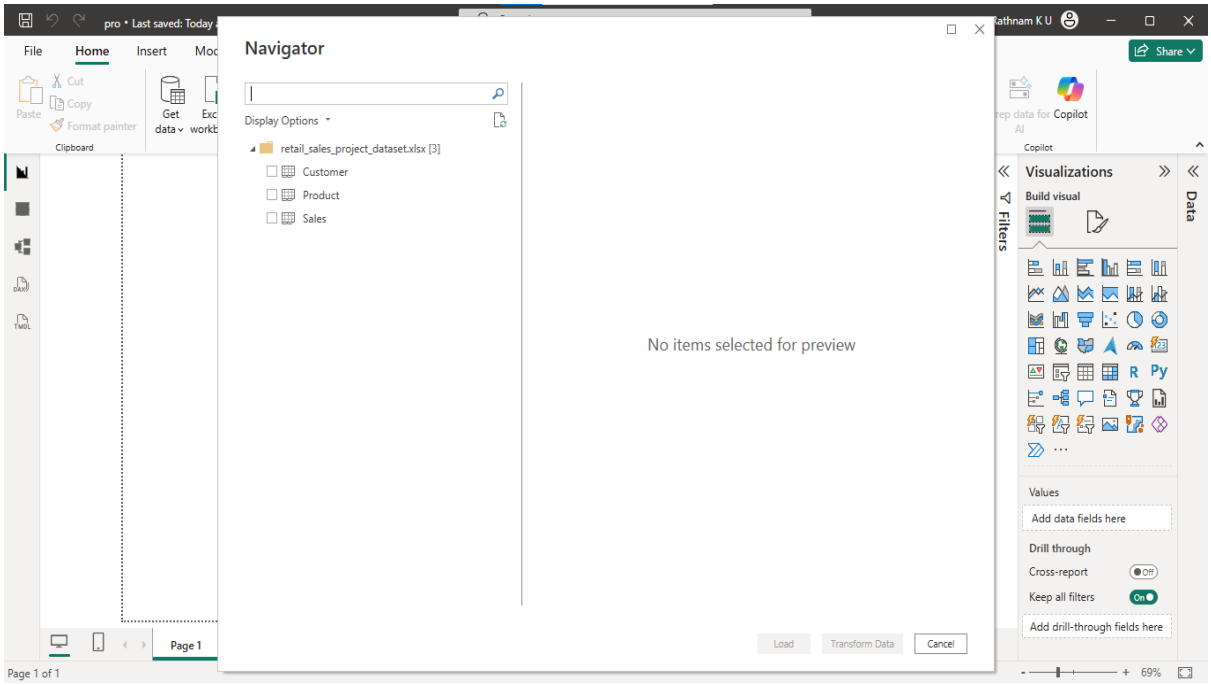
This Power BI dashboard provides a consolidated overview of retail sales performance across regions, product categories, and customer segments. It highlights key business metrics such as Total Sales, Total Profit, Profit Margin, and Number of Orders, enabling quick assessment of overall performance. The dashboard allows management to compare regional sales trends, identify high- and low-performing product categories, and observe monthly sales patterns through interactive visuals and filters. This overview supports data-driven decision-making for improving profitability, optimizing inventory, and planning targeted promotions.

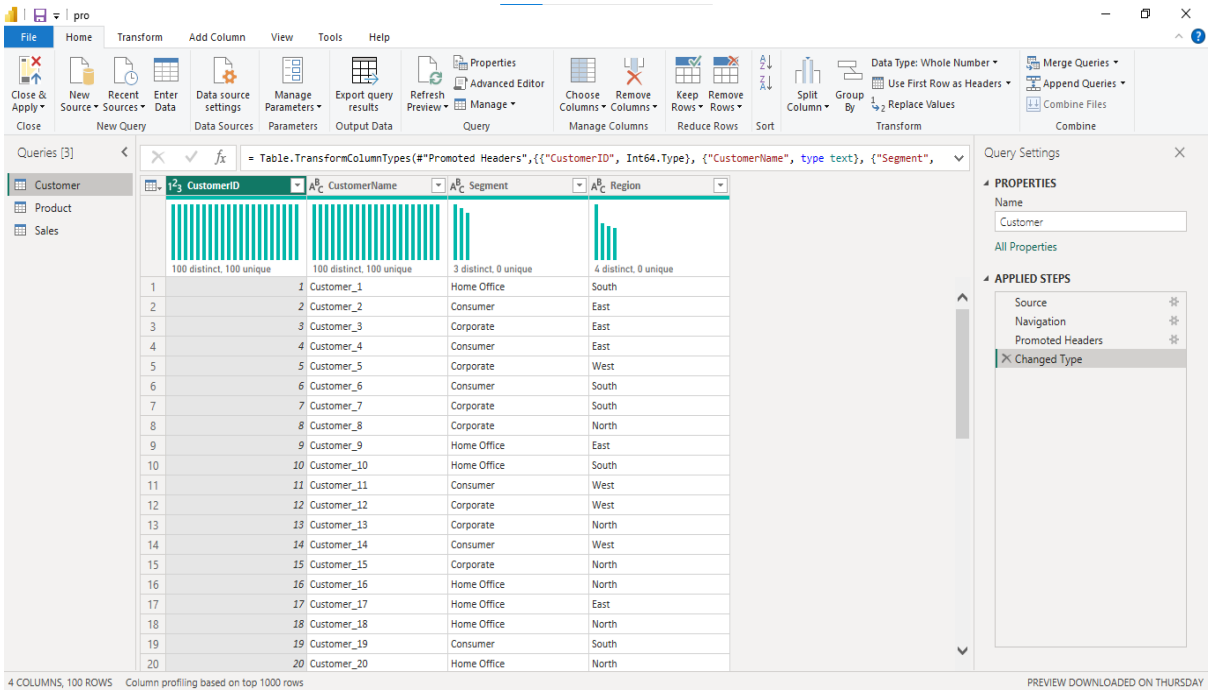
The step-by-step process involves loading the sales data into Power BI, cleaning and validating it using Power Query, and creating a star schema data model. DAX measures were then applied to calculate key metrics such as Total Sales, Total Profit, and Profit Margin. Finally, an interactive overview dashboard was designed to analyze regional and category-wise performance and support business decision-making.

Below is the step-by-step process,

STEP 1: Load Data into Power BI

The raw retail sales dataset was loaded into Power BI using the *Get Data* option. Customer, Product, and Sales tables were imported to support structured analysis and reporting.

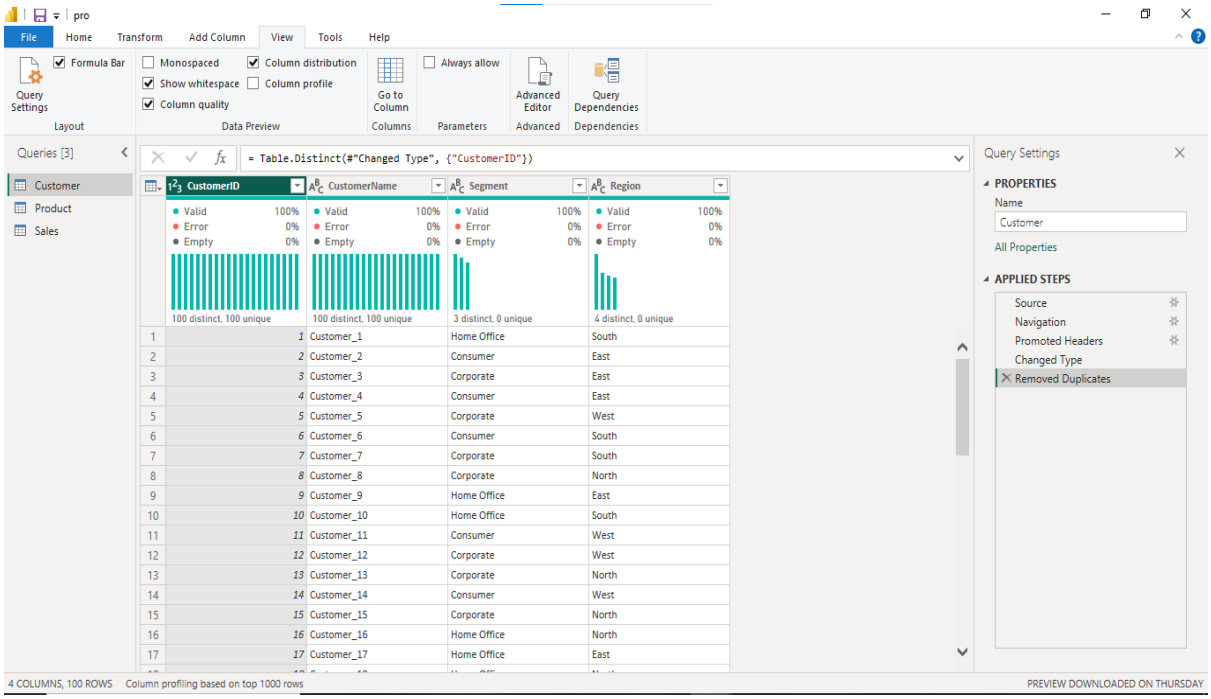




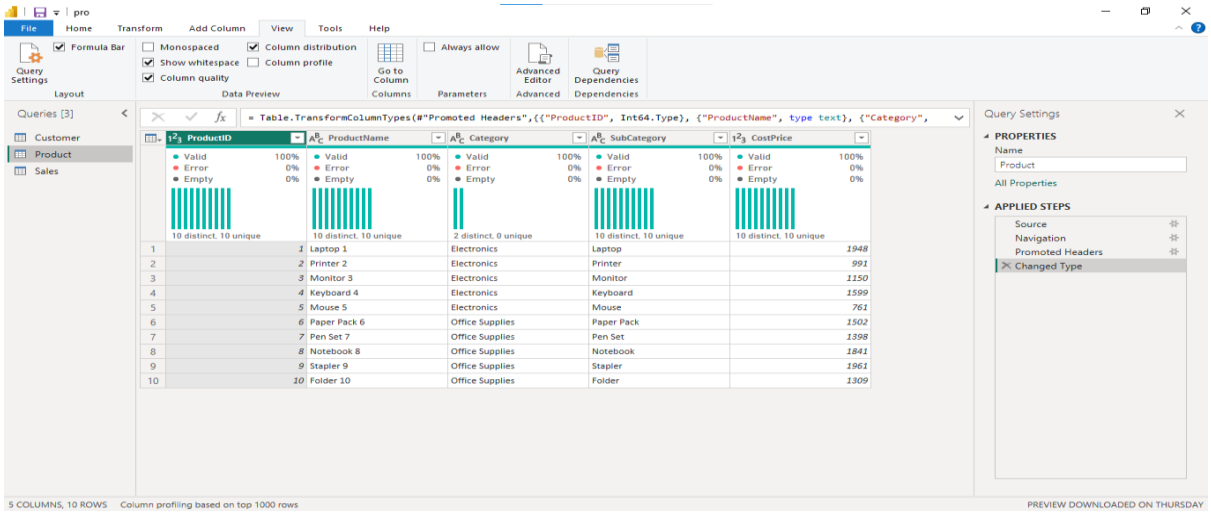
STEP 2: Data Cleaning (Power Query)

Data cleaning was performed using Power Query. The dataset was checked for missing values in critical columns such as Sales, Profit, Quantity, and Order Date. Records with missing or invalid values were handled appropriately to ensure data consistency. Duplicate records were identified using Order ID and Product ID combinations and were removed. Date formats and category names were standardized to improve data quality.

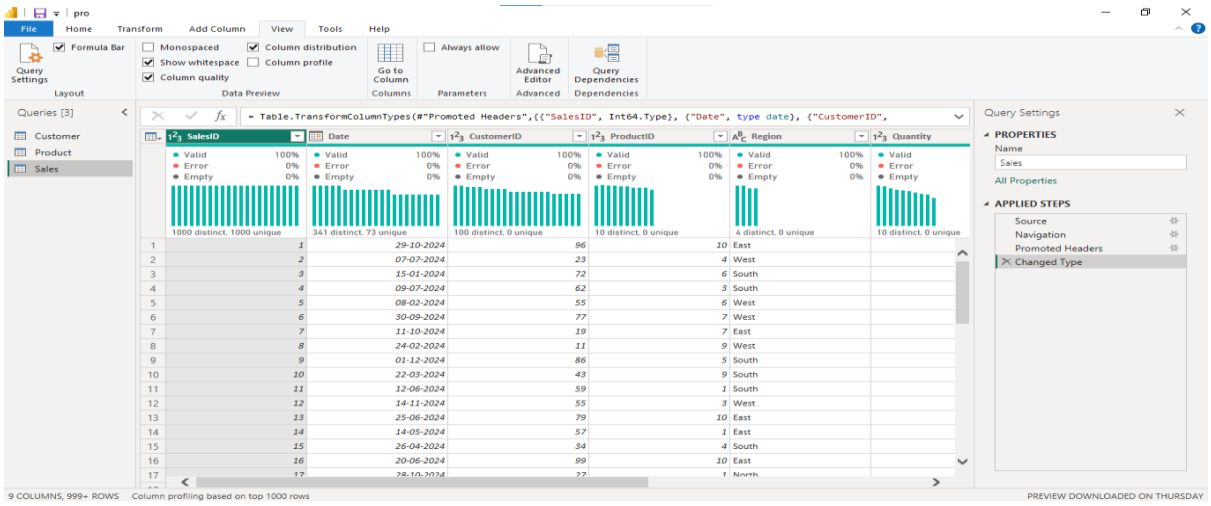
Customer:



Product:



Sales



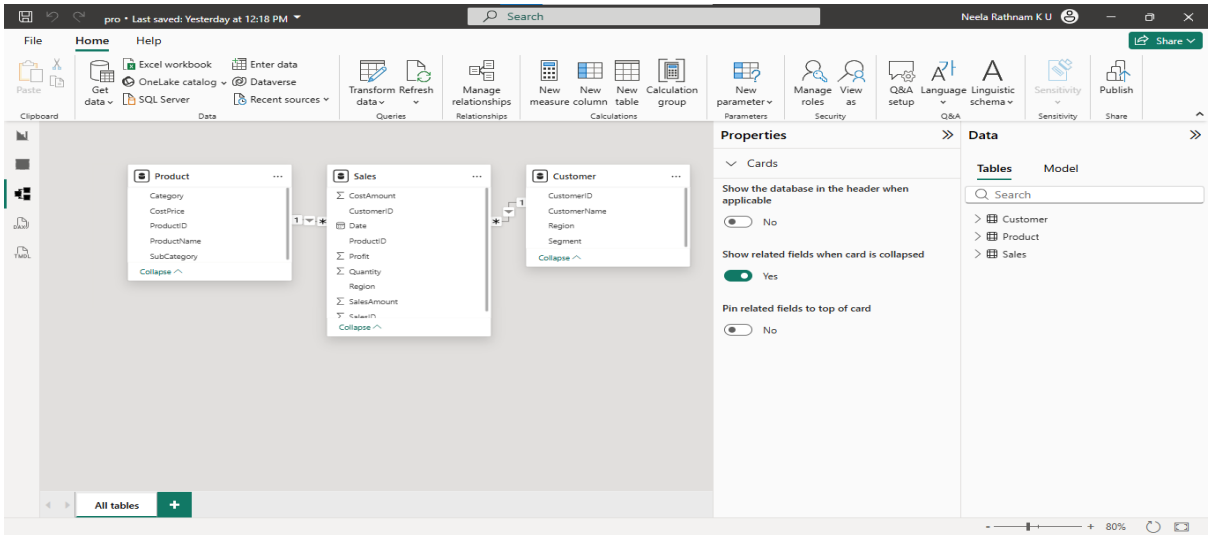
Missing values in Sales & Profit were checked and handled. Duplicate orders were removed to ensure data accuracy.

STEP 3: Create Data Model (Relationships)

Sales[CustomerID] → Customer[CustomerID]

Sales[ProductID] → Product[ProductID]

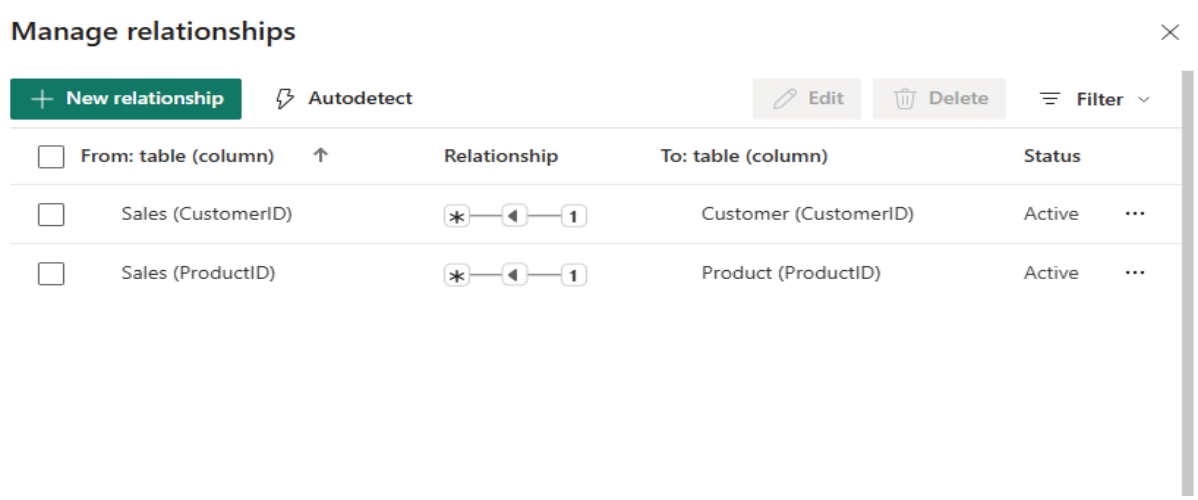
A star schema data model was created to enable efficient analysis. The Sales table was used as the fact table and connected to Customer and Product dimension tables through appropriate relationships. This model reduces data redundancy, improves query performance, and allows easy slicing of data by region, category, and segment.

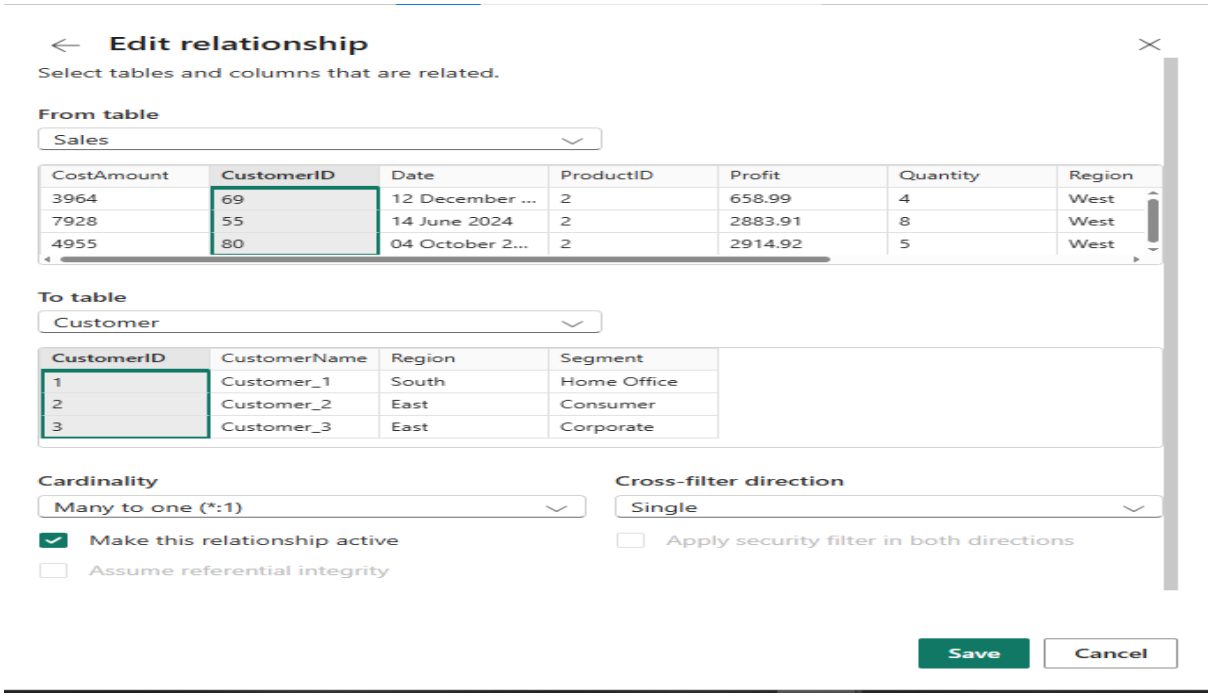


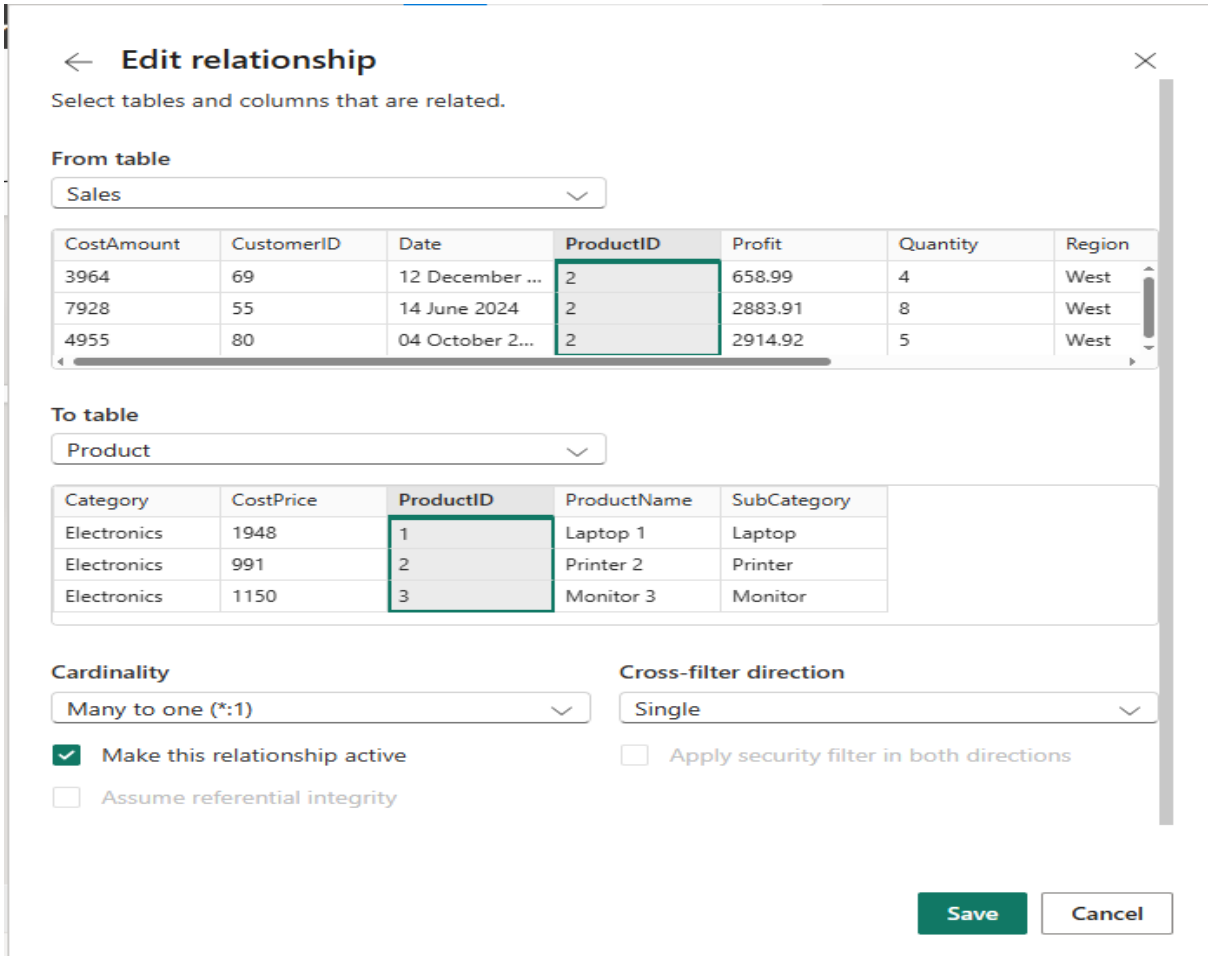
Model structure

- ⭐ Sales center
- ⭐ Customer + Product sides

(Star Schema)




Edit relationship
Select tables and columns that are related.
From table
Sales
CostAmount | CustomerID | Date | ProductID | Profit | Quantity | Region
3964 | 69 | 12 December ... | 2 | 658.99 | 4 | West
7928 | 55 | 14 June 2024 | 2 | 2883.91 | 8 | West
4955 | 80 | 04 October 2... | 2 | 2914.92 | 5 | West
To table
Customer
CustomerID | CustomerName | Region | Segment
1 | Customer_1 | South | Home Office
2 | Customer_2 | East | Consumer
3 | Customer_3 | East | Corporate
Cardinality
Many to one (*:1)
Cross-filter direction
Single
Make this relationship active
Apply security filter in both directions
Assume referential integrity
Save
Cancel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Sales
CostAmount | CustomerID | Date | ProductID | Profit | Quantity | Region
3964 | 69 | 12 December ... | 2 | 658.99 | 4 | West
7928 | 55 | 14 June 2024 | 2 | 2883.91 | 8 | West
4955 | 80 | 04 October 2... | 2 | 2914.92 | 5 | West
To table
Product
Category | CostPrice | ProductID | ProductName | SubCategory
Electronics | 1948 | 1 | Laptop 1 | Laptop
Electronics | 991 | 2 | Printer 2 | Printer
Electronics | 1150 | 3 | Monitor 3 | Monitor
Cardinality
Many to one (*:1)
Cross-filter direction
Single
Make this relationship active
Apply security filter in both directions
Assume referential integrity
Save
Cancel

STEP 4: Create DAX Measures

Total Sales = SUM(Sales[SalesAmount])

Total Profit = SUM(Sales[Profit])

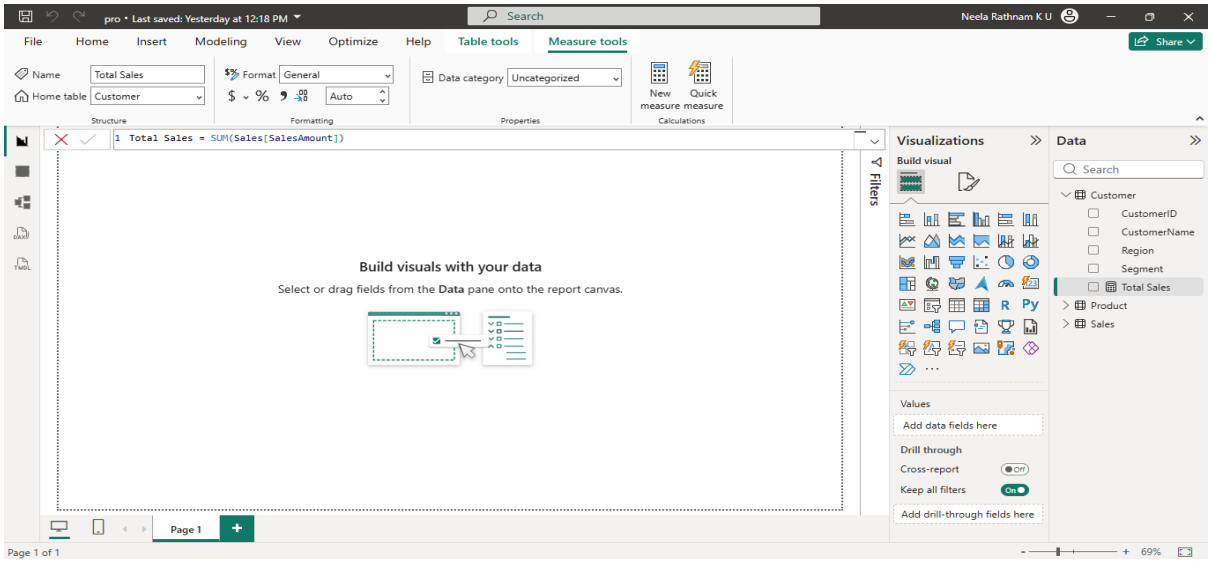
Profit Margin % =DIVIDE([Total Profit], [Total Sales], 0) * 100

Orders = COUNT(Sales[SalesID])

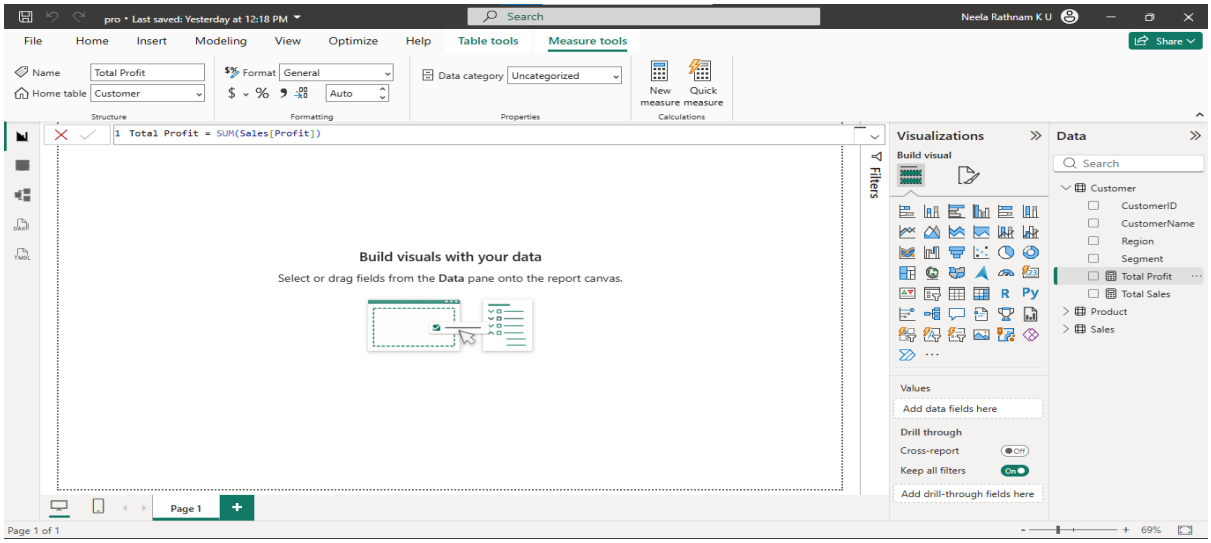
Low Margin =IF([Profit Margin %] < 10, "Low", "Good")

Key performance metrics were calculated using DAX measures. Measures such as Total Sales, Total Profit, Profit Margin (%), and Number of Orders were created to support analysis and dashboard visuals. These measures ensure consistent calculations across all reports.

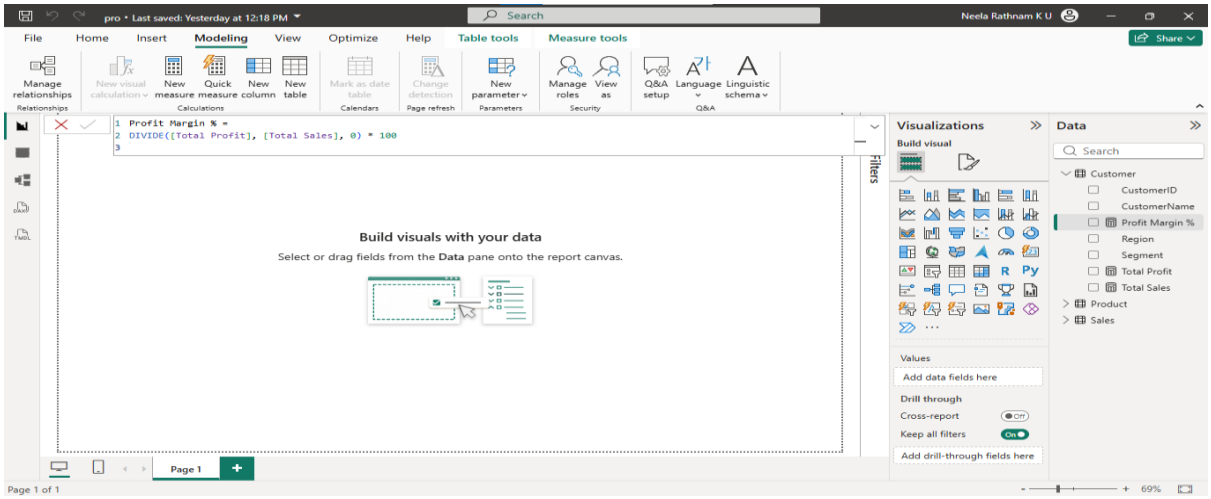
Total Sales



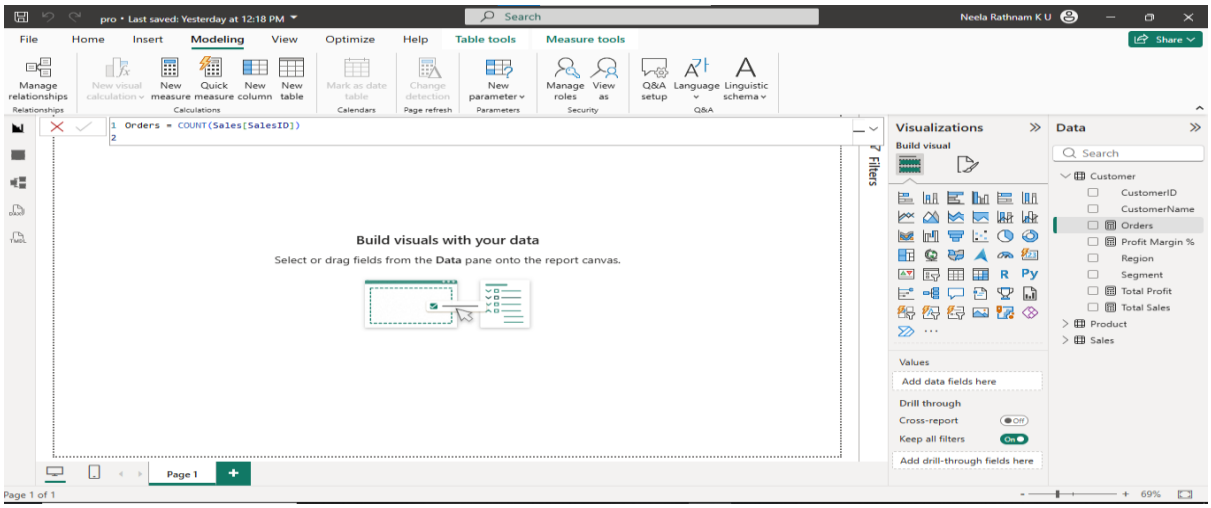
Total Profit



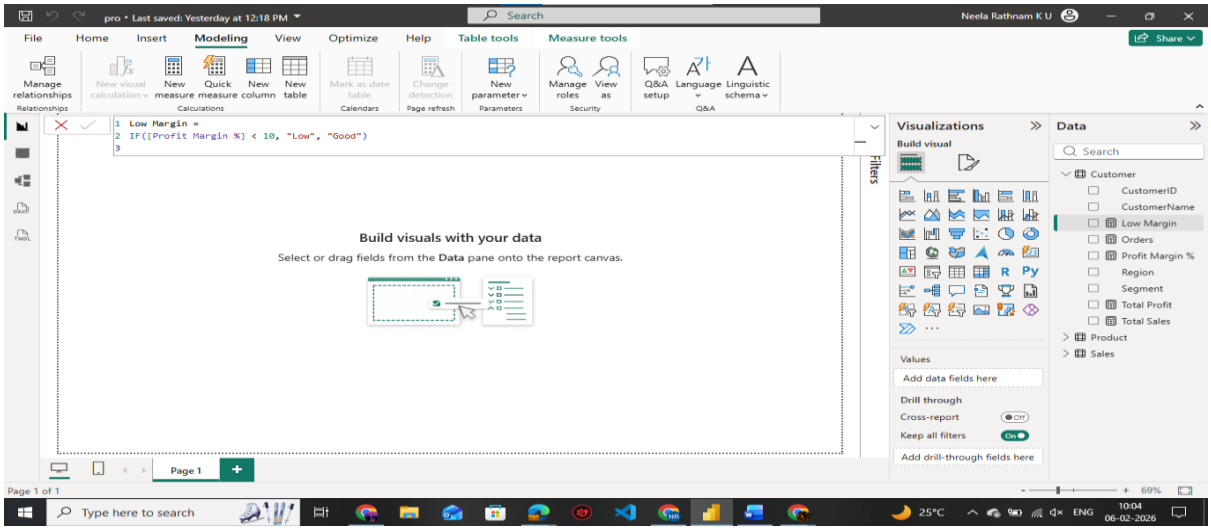
Profit Margin



Orders



Low Margin



STEP 5 : Create Visuals (Dashboard)

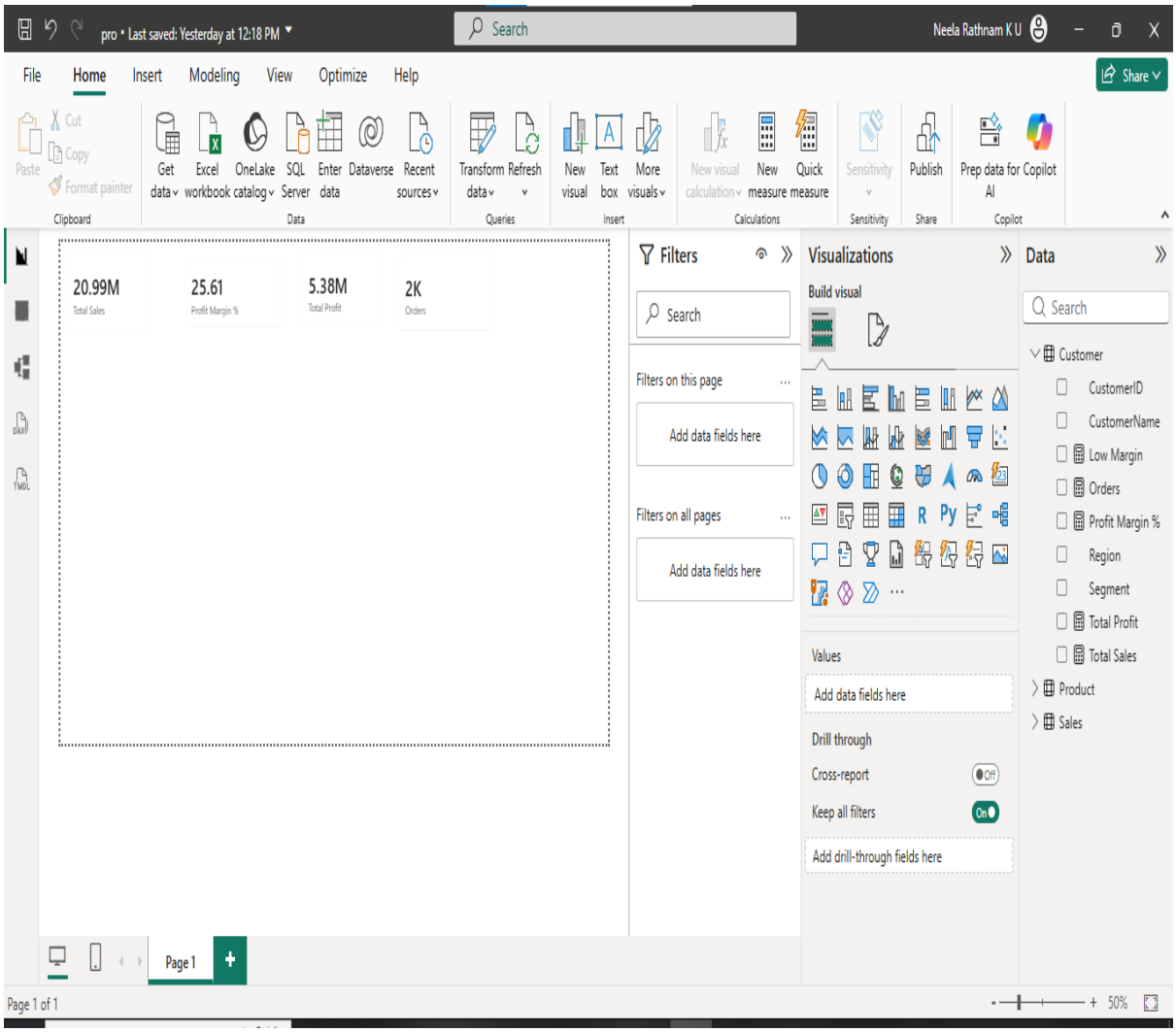
Overview Dashboard

Add:

KPI Cards

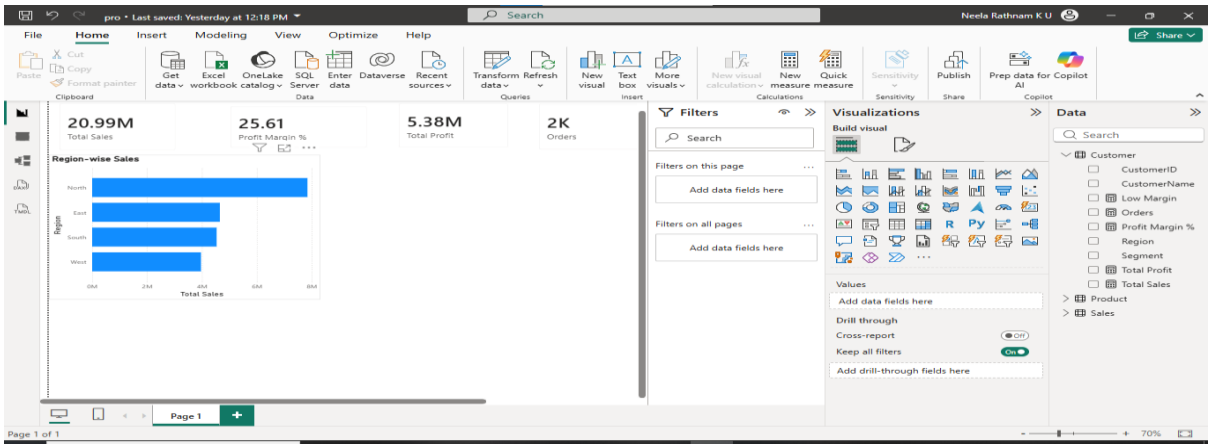
- Total Sales
- Total Profit
- Profit Margin %
- Orders

An overview dashboard was designed using KPI cards, bar charts, column charts, and line charts. KPI cards display Total Sales, Total Profit, Profit Margin, and Orders. Charts were used to visualize region-wise sales performance, category-wise profit contribution, and monthly sales trends.

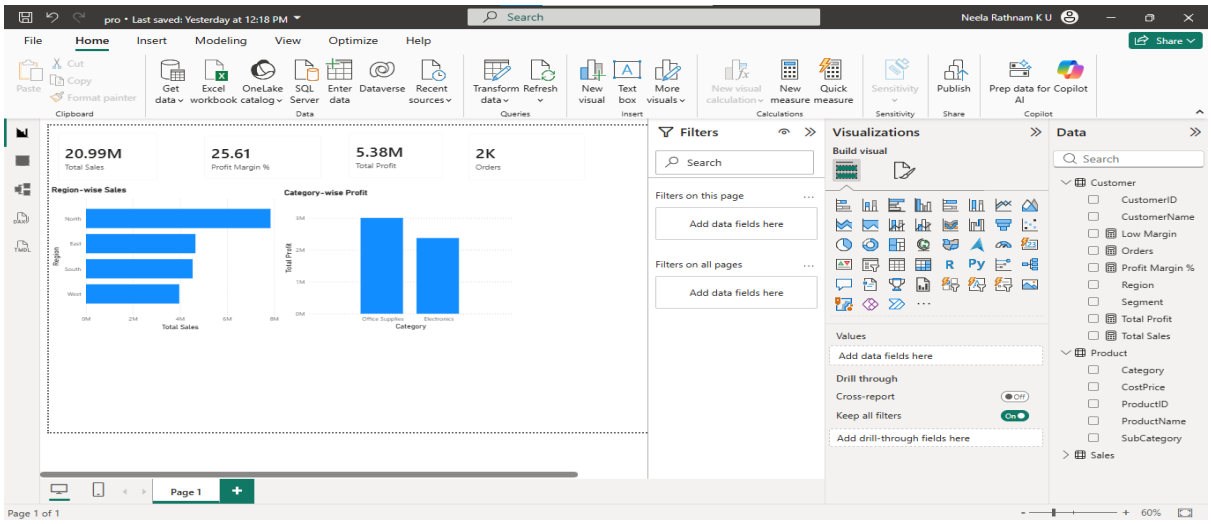


Charts

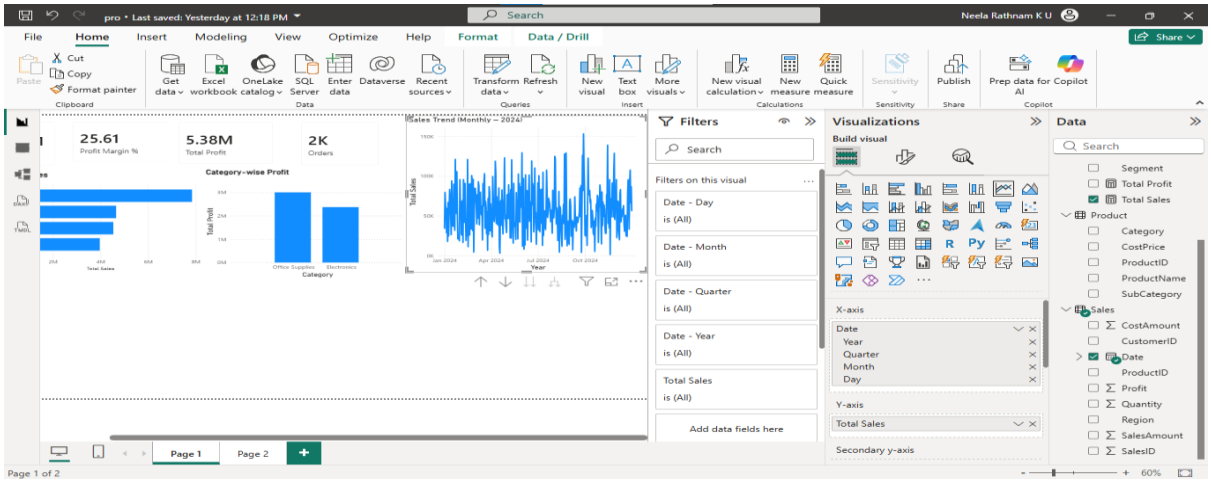
Bar → Region vs Sales



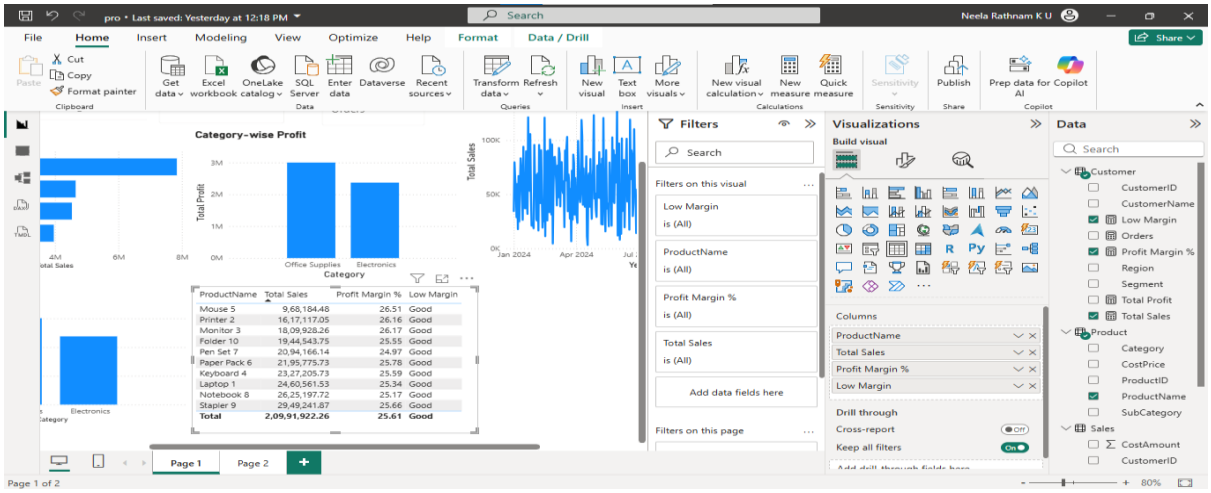
Column → Category vs Profit



Line → Date vs Sales (trend)



Product Analysis

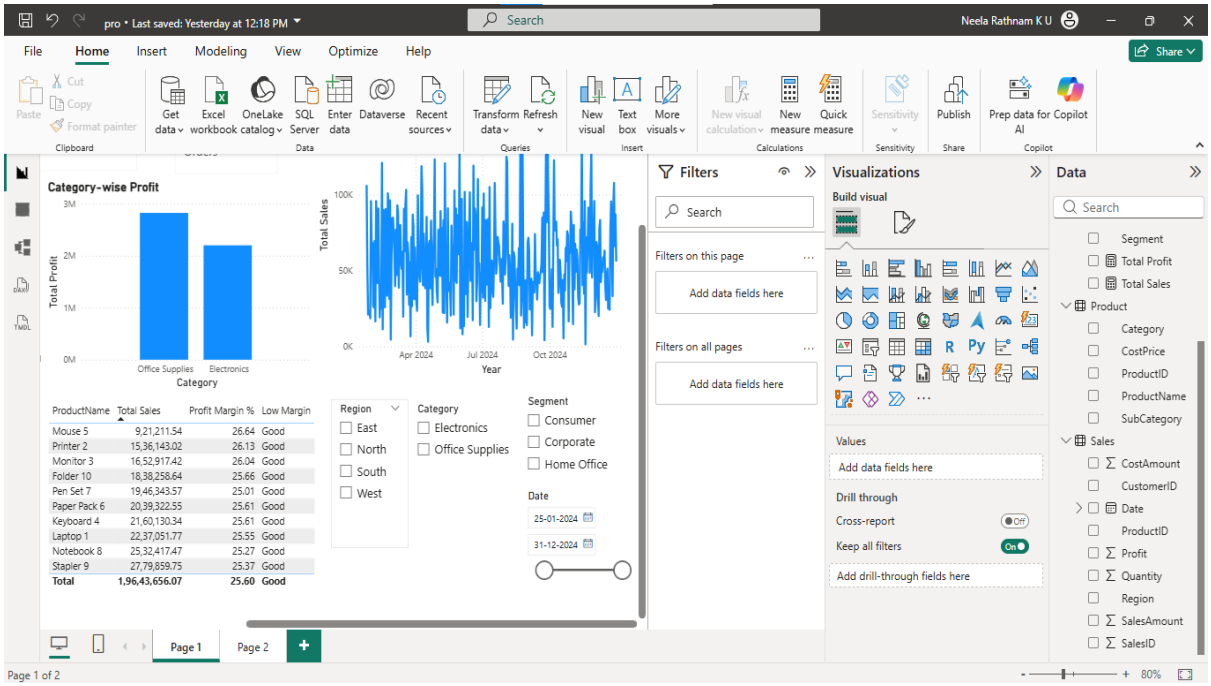


STEP 6: Slicers (Filters)

Add slicers:

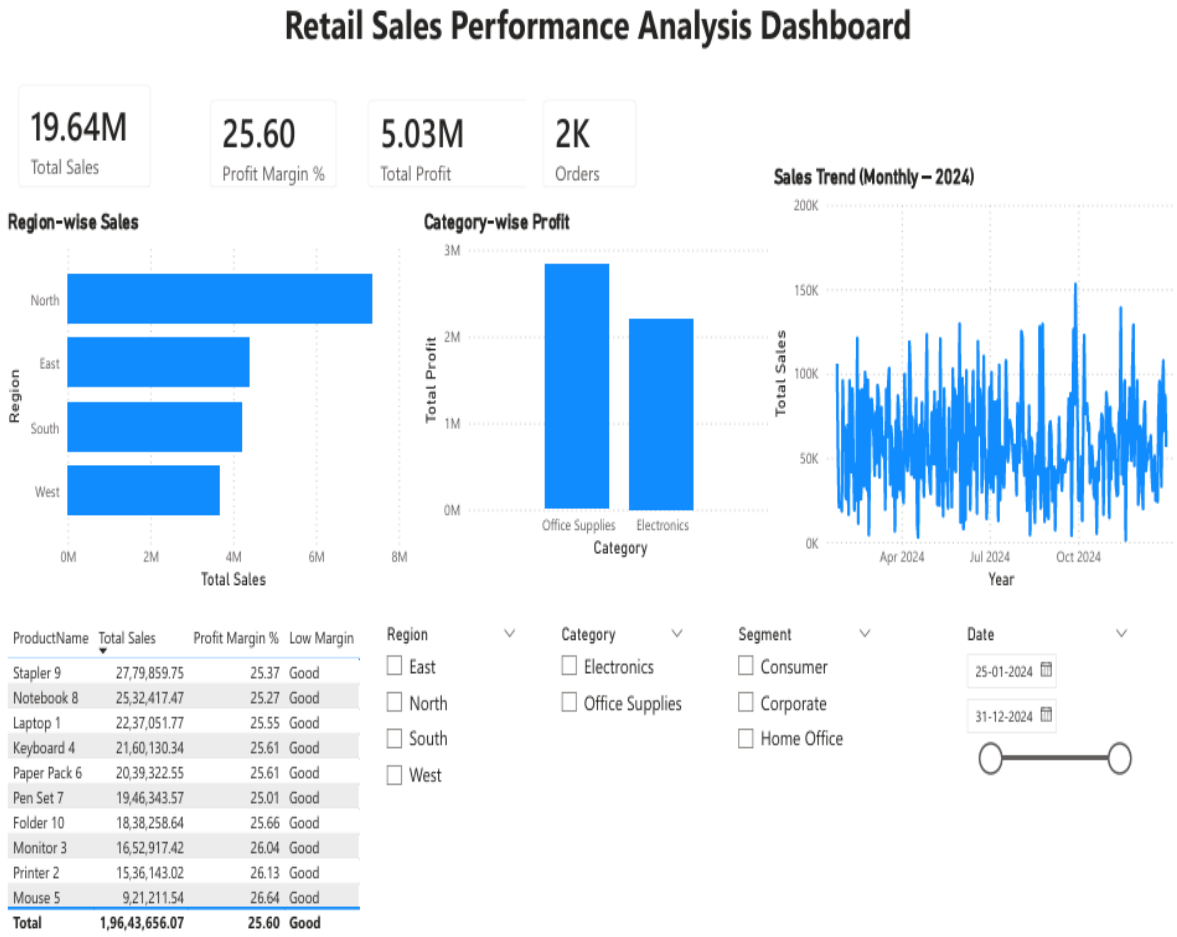
- Region
- Category
- Date
- Segment

Interactive slicers were added for Region, Category, Segment, and Date. These filters allow users to dynamically explore data and analyze performance across different dimensions.



STEP 7 : Insights and Bussiness Recommendation

Based on the analysis, high-performing and low-performing products and regions were identified. Office Supplies emerged as the most profitable category, while certain Electronics products showed low profit margins despite high sales. These insights support decisions related to promotions, pricing strategies, and inventory planning.

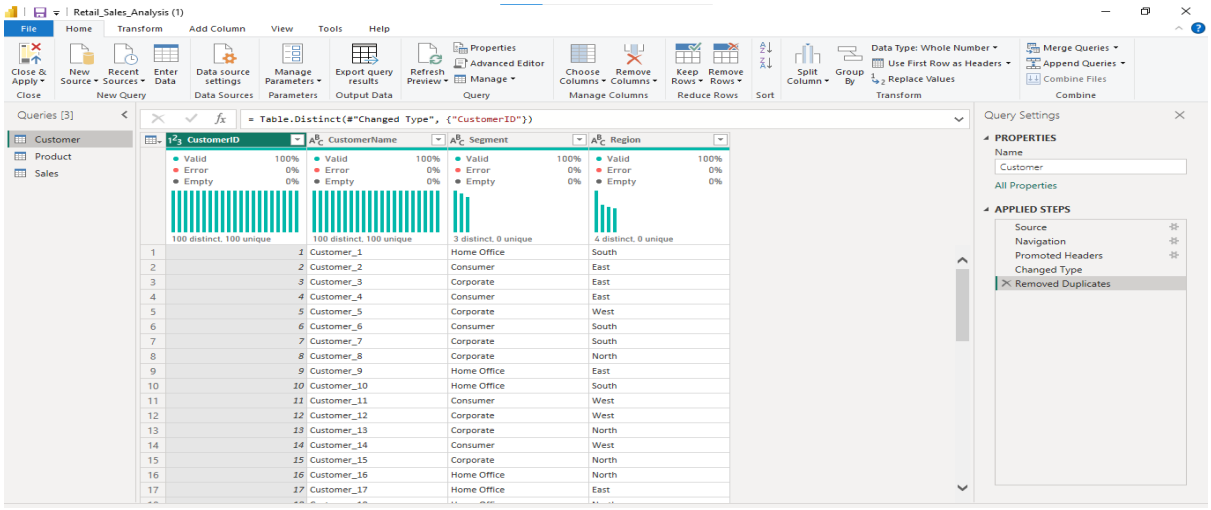


Retail Sales Performance Analysis

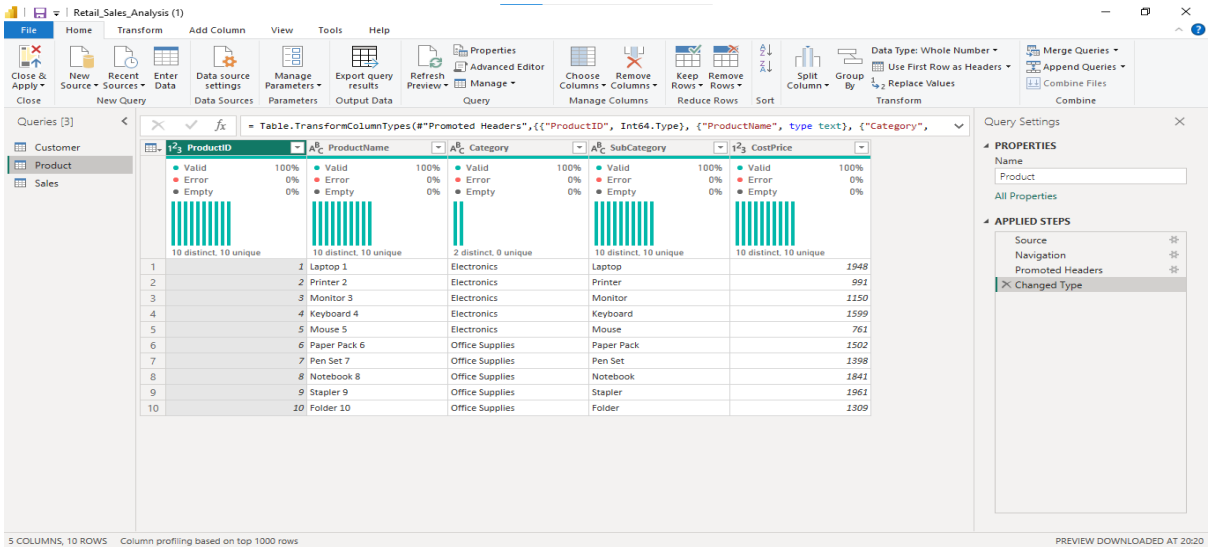
Power BI Dashboard Report

1. Identify missing values and duplicates in the Sales dataset. What cleaning steps are required?

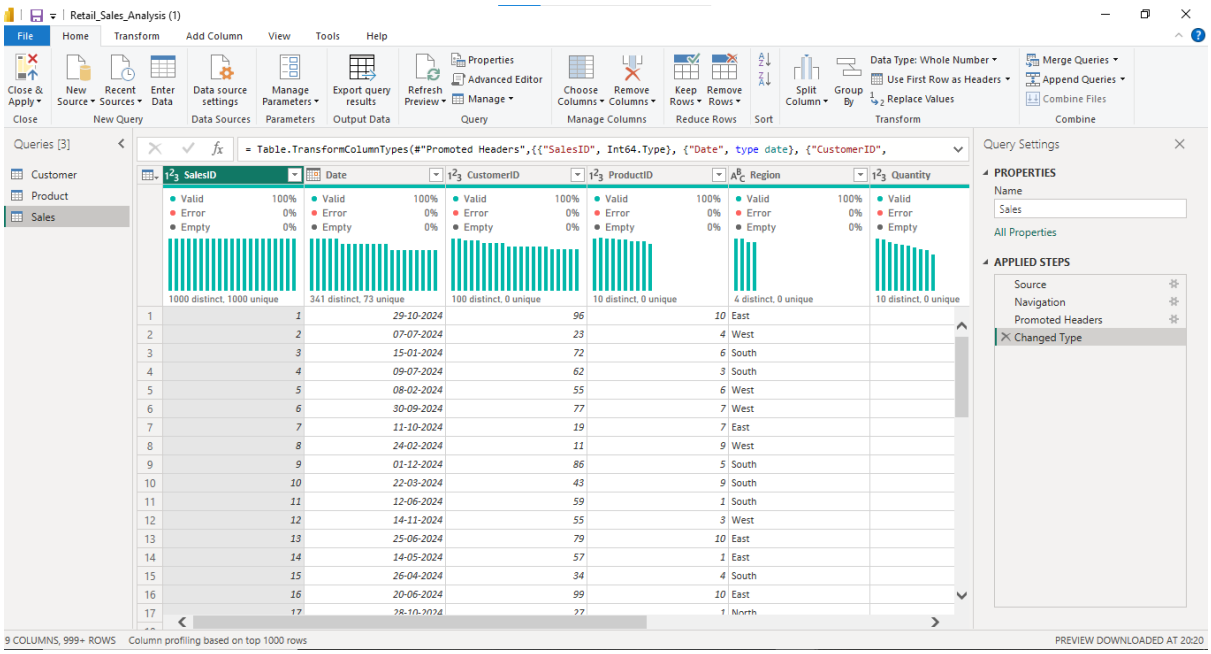
Data Cleaning and Validation



	CustomerID	CustomerName	Segment	Region
1	1	Customer_1	Home Office	South
2	2	Customer_2	Consumer	East
3	3	Customer_3	Corporate	East
4	4	Customer_4	Consumer	East
5	5	Customer_5	Corporate	West
6	6	Customer_6	Consumer	South
7	7	Customer_7	Corporate	South
8	8	Customer_8	Corporate	North
9	9	Customer_9	Home Office	East
10	10	Customer_10	Home Office	South
11	11	Customer_11	Consumer	West
12	12	Customer_12	Corporate	West
13	13	Customer_13	Corporate	North
14	14	Customer_14	Consumer	West
15	15	Customer_15	Corporate	North
16	16	Customer_16	Home Office	North
17	17	Customer_17	Home Office	East



	ProductID	ProductName	Category	SubCategory	CostPrice
1	1	Laptop 1	Electronics	Laptop	1948
2	2	Printer 2	Electronics	Printer	991
3	3	Monitor 3	Electronics	Monitor	1150
4	4	Keyboard 4	Electronics	Keyboard	1599
5	5	Mouse 5	Electronics	Mouse	761
6	6	Paper Pack 6	Office Supplies	Paper Pack	1502
7	7	Pen Set 7	Office Supplies	Pen Set	1398
8	8	Notebook 8	Office Supplies	Notebook	1841
9	9	Stapler 9	Office Supplies	Stapler	1961
10	10	Folder 10	Office Supplies	Folder	1309



	SalesID	Date	CustomerID	ProductID	Region	Quantity
1	1	29-10-2024	96	10	East	
2	2	07-07-2024	23	4	West	
3	3	15-01-2024	72	6	South	
4	4	09-07-2024	62	3	South	
5	5	08-02-2024	55	6	West	
6	6	30-09-2024	77	7	West	
7	7	11-10-2024	19	7	East	
8	8	24-02-2024	11	9	West	
9	9	01-12-2024	86	5	South	
10	10	22-03-2024	43	9	South	
11	11	12-06-2024	59	1	South	
12	12	14-11-2024	55	3	West	
13	13	25-06-2024	79	10	East	
14	14	14-05-2024	57	1	East	
15	15	26-04-2024	34	4	South	
16	16	20-06-2024	99	10	East	
17	17	28-10-2024	27	1	North	

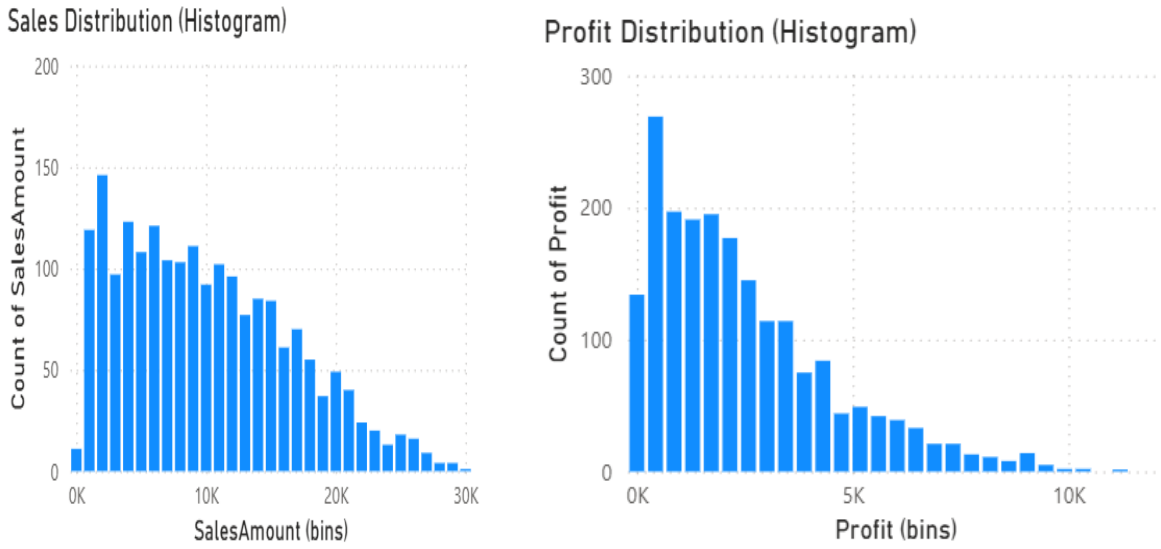
Before analysis, the raw sales data was cleaned and validated using Power Query in Power BI.

- The dataset was checked for **missing values** in key columns such as Sales, Profit, Quantity, and Order Date.
- Records with missing critical values were either removed or corrected to ensure accuracy.
- **Duplicate records** were identified using Order ID and Product ID combinations and were removed.
- Data formats such as date fields and category names were standardized.

These steps ensured the dataset was accurate, consistent, and reliable for further analysis.

2. Perform univariate analysis on Sales and Profit. What distribution patterns do you observe?

Univariate Analysis on Sales and Profit



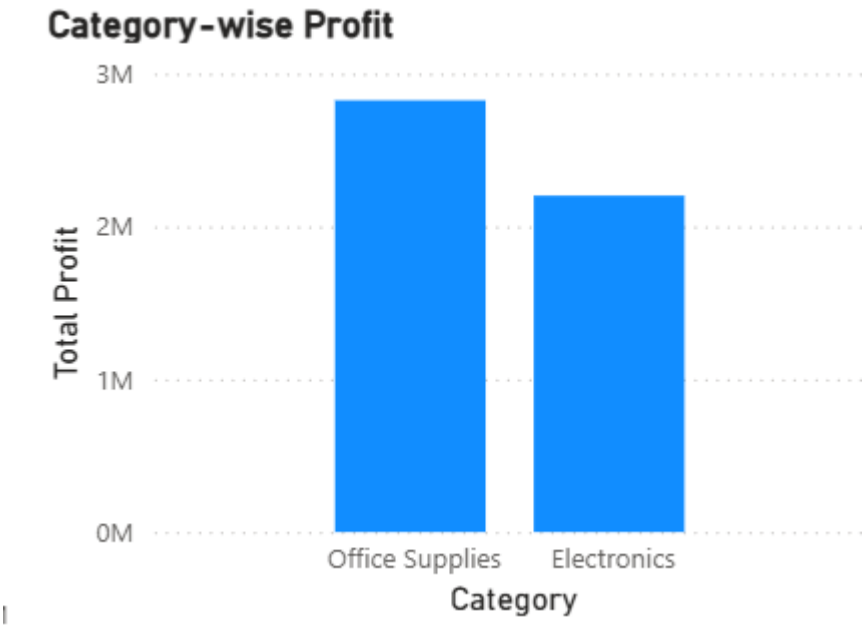
Univariate analysis was performed to understand the distribution of Sales and Profit.

- **Sales Distribution:**
  Sales values are right-skewed, indicating that a small number of high-value transactions contribute significantly to total revenue.
- **Profit Distribution:**
  Profit values vary widely across products. Some products generate high sales but comparatively low profit, indicating margin issues.

This analysis shows that revenue growth does not always translate into consistent profitability.

3. Which product categories contribute the highest revenue and profit?

Product Category Contribution



The business primarily sells products under two categories:

- Electronics
- Office Supplies

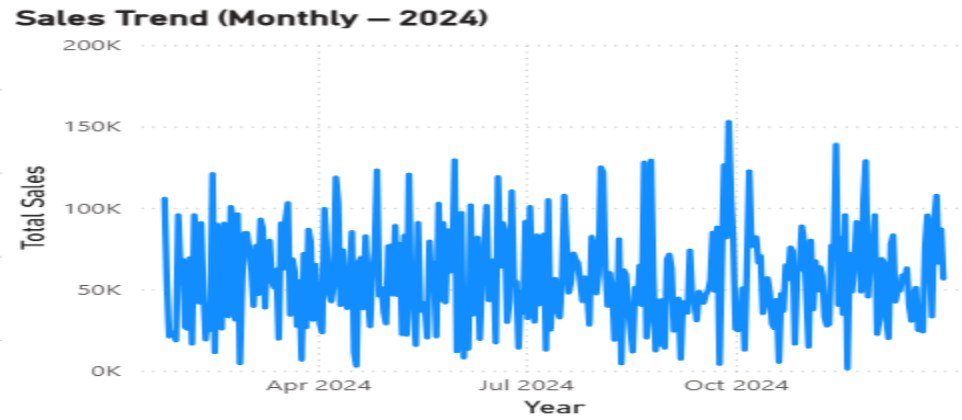
Key Observations:

- **Office Supplies** contribute the highest profit overall.
- **Electronics** generate high sales but show relatively lower profit margins.

This indicates that Office Supplies are more consistently profitable compared to Electronics.

4. How does sales performance vary across regions?

Regional Sales Performance



Sales performance was analyzed across four regions: North, South, East, and West.

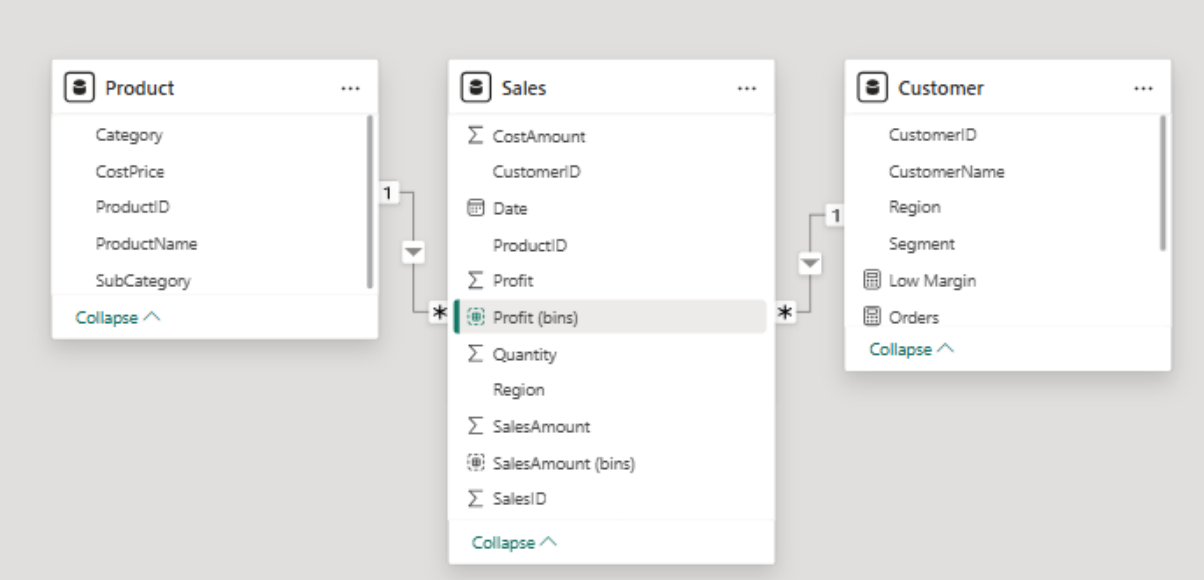
Findings:

- The **North region** records the highest sales.
- **East and South regions** show steady and moderate performance.
- The **West region** has the lowest sales contribution.

Some regions demonstrate high sales volume but lower profit margins, highlighting regional performance gaps.

5. Create a star schema using Sales, Customer, and Product tables. Why is this model effective?

Star Schema Data Model



A star schema data model was designed to support efficient analysis.

Fact Table:

- FactSales (Sales, Profit, Quantity, Order Date, Product ID, Customer ID)

Dimension Tables:

- DimProduct (Product Name, Category, Sub-category)
- DimCustomer (Region, Segment)

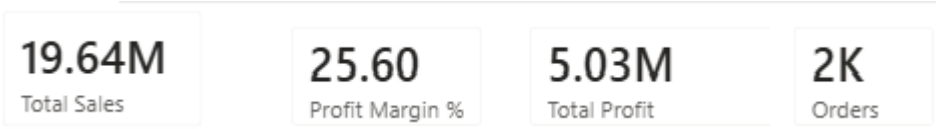
Why this model is effective:

- Reduces data redundancy
- Improves query performance
- Enables easy filtering and slicing across dimensions

- Follows Power BI best practices for analytical reporting

6. Write a DAX measure to calculate Total Sales and Total Profit.

DAX Measures for Sales and Profit



The following DAX measures were created:

Total Sales = SUM(Sales[Sales])

Total Profit = SUM(Sales[Profit])

Profit Margin % =DIVIDE([Total Profit], [Total Sales], 0) * 100

Orders = COUNT(Sales[SalesID])

Low Margin =IF([Profit Margin %] < 10, "Low", "Good")

These measures are used across all visuals and KPI cards in the dashboard.

7. Calculate Profit Margin (%) using DAX and identify low-margin products.

Profit Margin (%) and Low-Margin Products

ProductName	Total Sales	Profit Margin %	Low Margin
Stapler 9	27,79,859.75	25.37	Good
Notebook 8	25,32,417.47	25.27	Good
Laptop 1	22,37,051.77	25.55	Good
Keyboard 4	21,60,130.34	25.61	Good
Paper Pack 6	20,39,322.55	25.61	Good
Pen Set 7	19,46,343.57	25.01	Good
Folder 10	18,38,258.64	25.66	Good
Monitor 3	16,52,917.42	26.04	Good
Printer 2	15,36,143.02	26.13	Good
Mouse 5	9,21,211.54	26.64	Good
Total	**1,96,43,656.07**	**25.60**	**Good**

Profit Margin was calculated using DAX:

Profit Margin % =

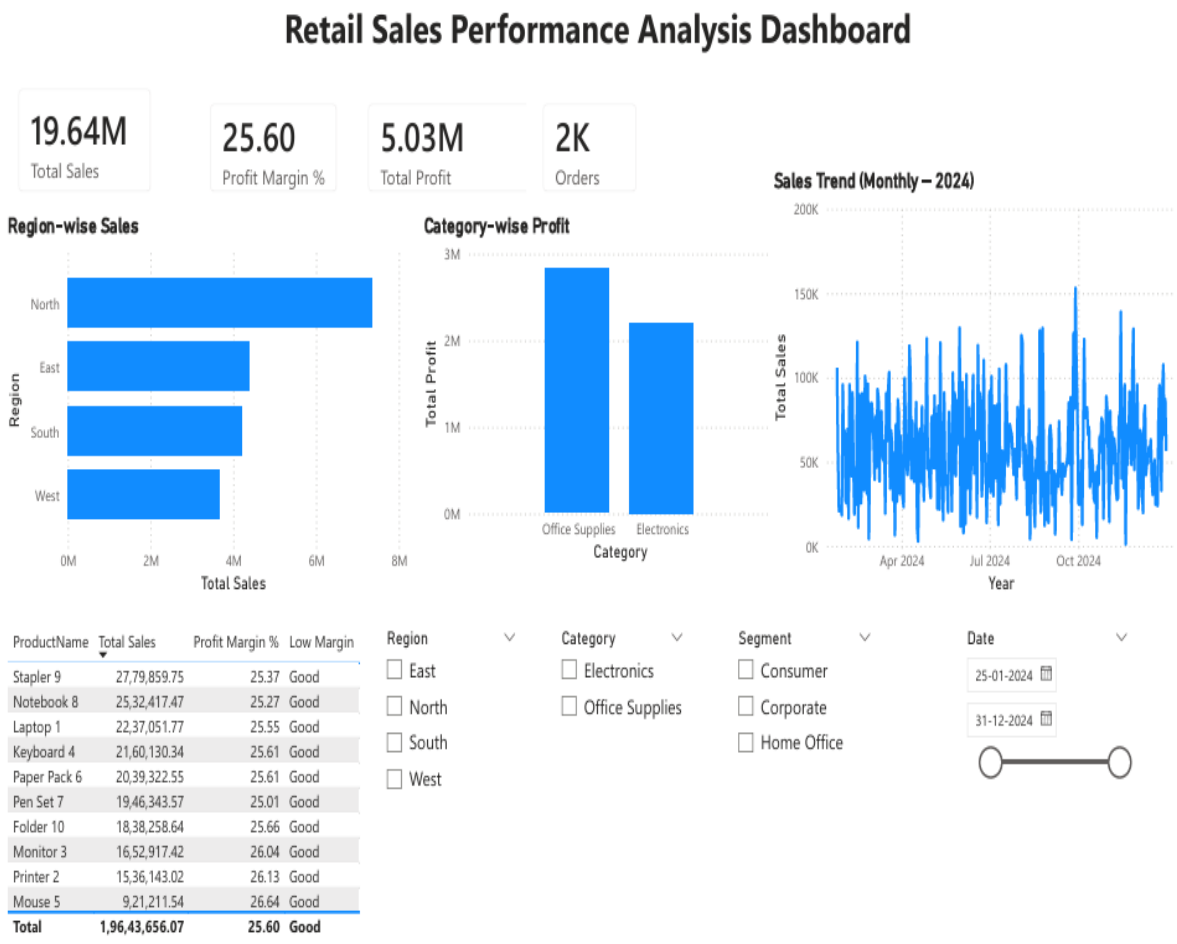
DIVIDE([Total Profit], [Total Sales]) * 100

Analysis Results:

- Several products, especially in the Electronics category, show **low profit margins** despite high sales.
- These low-margin products were identified using table visuals and conditional formatting.

8. Which products should be discontinued or promoted based on analysis?

Dashboard Design



A single-page Power BI dashboard was designed to present actionable insights.

The dashboard includes:

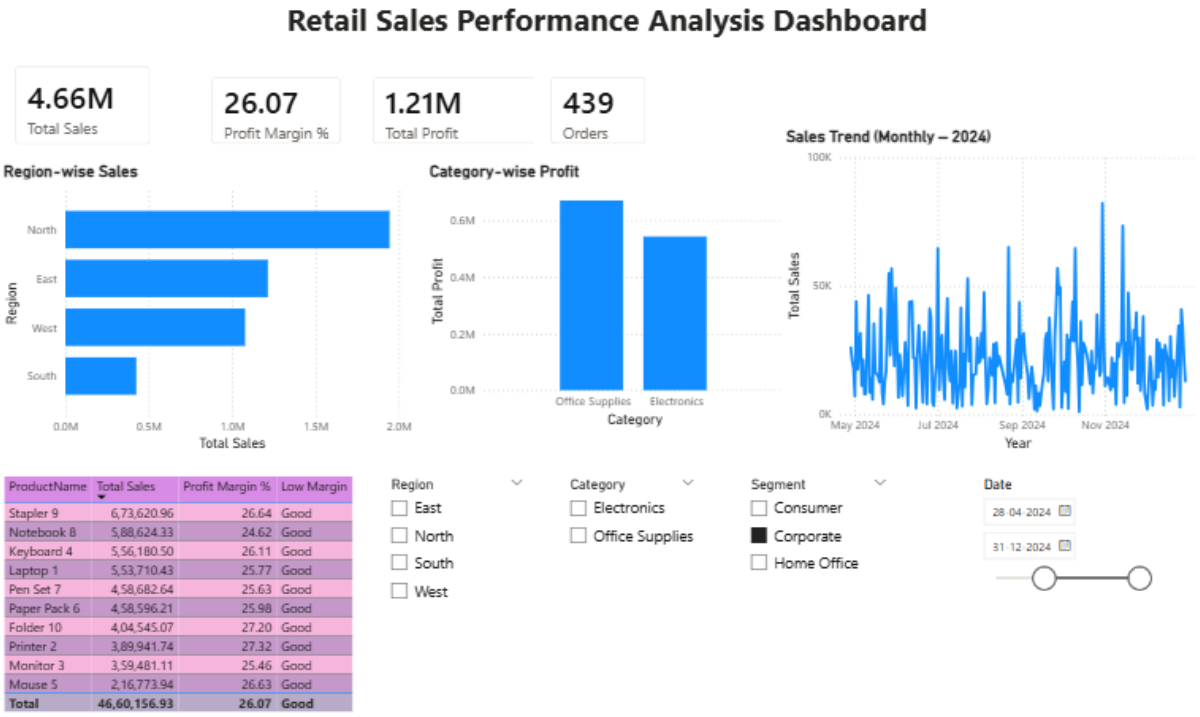
- KPI cards for Total Sales, Total Profit, Profit Margin, and Orders
- Region-wise sales comparison
- Category-wise profit analysis
- Monthly sales trend visualization

- Interactive slicers for Region, Category, Segment, and Date

This design allows management to quickly understand performance and drill down into specific areas.

9. Which products should be discontinued or promoted based on analysis?

Business Recommendations



Based on the analysis:

Products to Promote:

- Office Supplies due to high profit margins and stable demand

Products to Review or Discontinue:

- Electronics products with high sales but low profit margins
- These products require pricing, cost, or promotion strategy review

Conclusion

The Power BI dashboard provides a comprehensive view of sales and profitability across regions and product categories.
It helps identify profit gaps, supports data-driven decision-making, and enables effective planning for promotions and inventory management.