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Superstore Data Analysis

Graduation Team Project

Project team members:

Hassnaa Zinhom Ebrahim	Data Cleaning and preprocessing
Nehal Mohamed Mohamed	Exploratory Data Analysis (EDA) using SQL Server Management Studio
Israa Mohamed Metwally	Performance analysis using SQL Server Management Studio
Alaa Elsayed Ragab	Data Visualization using Power BI
Reham Alaa ElDien Mohamed	Recommendations and development
Safaa Abdellatif Ahmed	Project facilitator | Presentation designer

Used Tools:

1.Microsoft Excel:

Extracted and prepared data from an Excel file for analysis.

2. Microsoft SQL Server:

Uploaded data to a SQL database and performed data analysis using SQL queries.

3. Microsoft Power BI:

Created interactive dashboards to support decision-making.

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Objective:

- Understand sales trends over the years and across product categories
- Analyze overall profitability and what drives gains or losses
- Identify best-selling products and most profitable ones
- Spot underperforming regions and suggest improvements
- Recommend strategies to improve efficiency and increase profits

Analysis Steps:

1.Data collection

2.Data cleaning &preprocessing

3.Exploratory data analysis (EDA)

4.Performance analysis

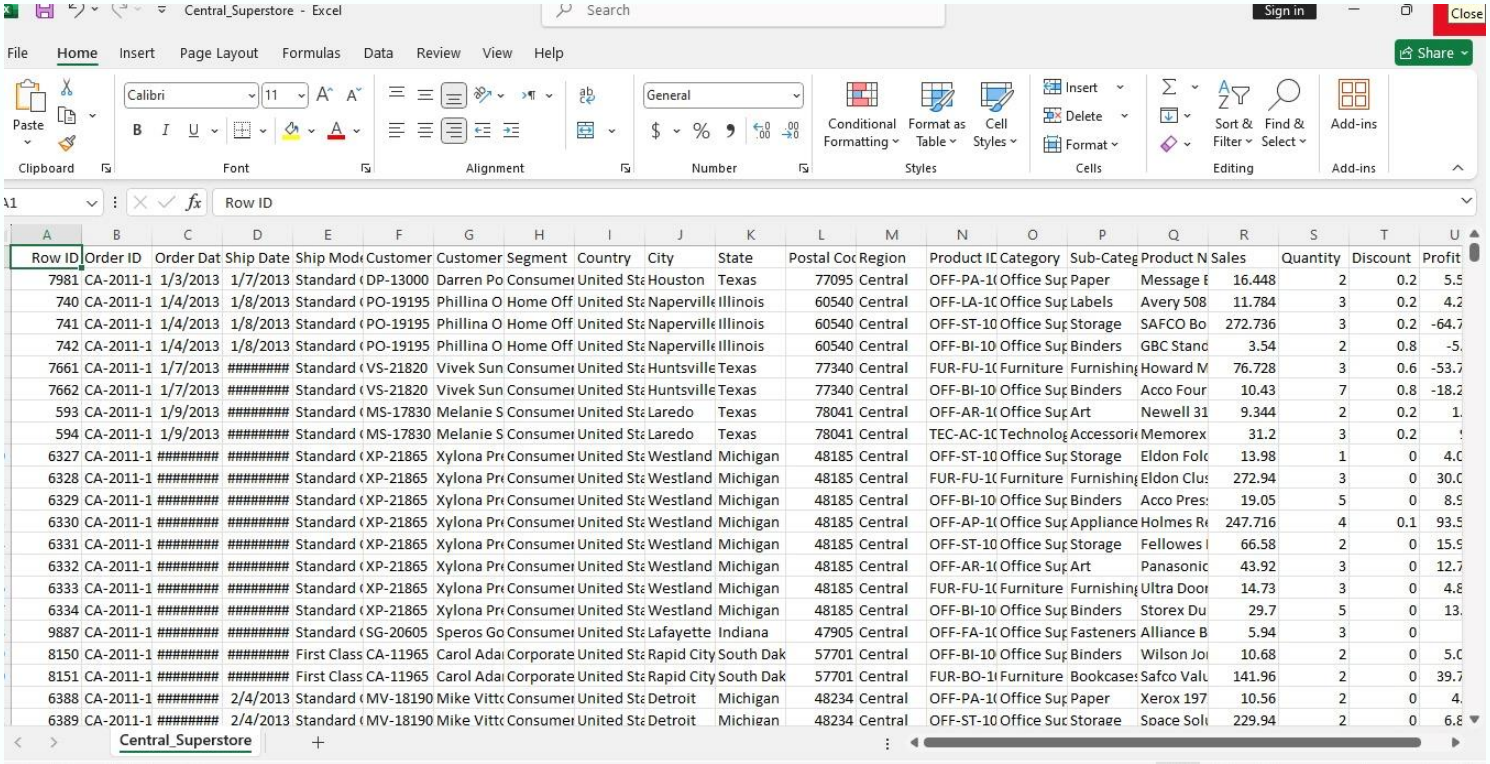
5.Data visualization

6.Recommendations & Development

01

Data collection

Collect data from the initiative's datasets from Excel sheet:



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02

Data cleaning &preprocessing

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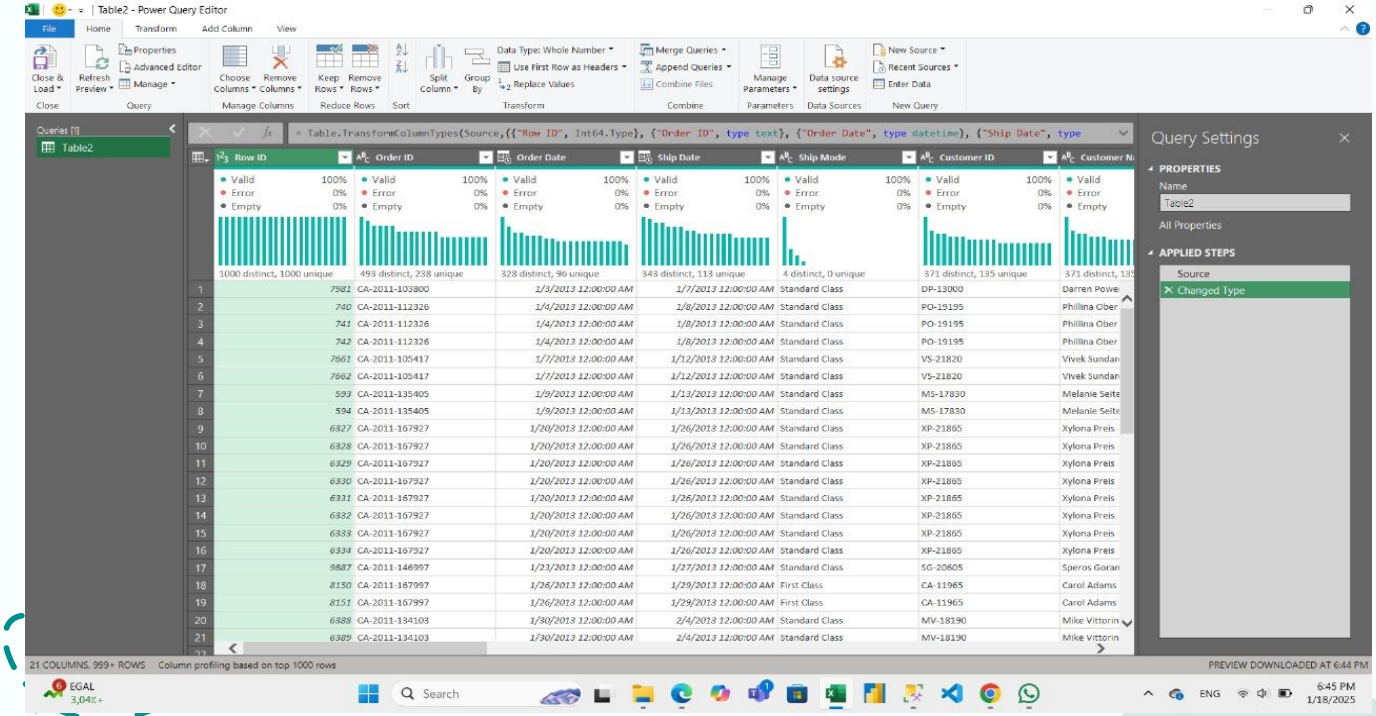
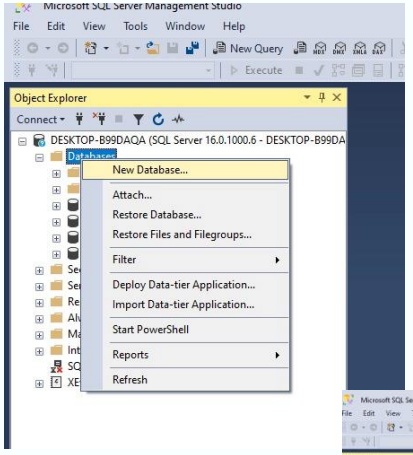
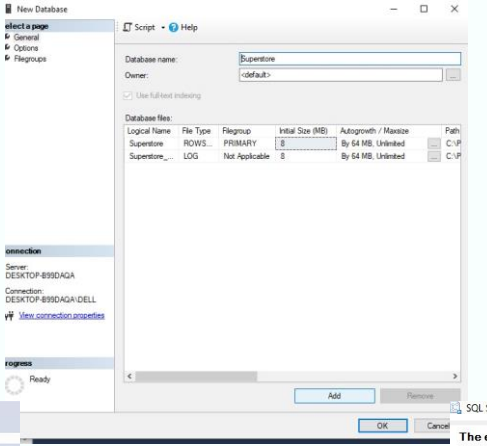
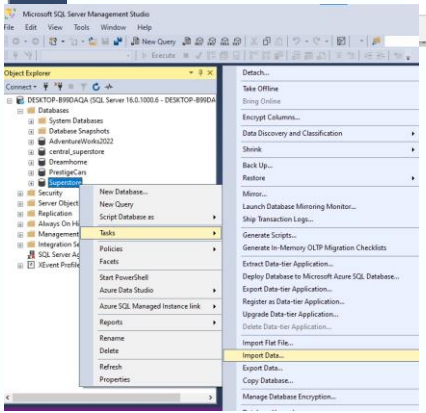
Reviewing the data using Power Query, found it to be free of errors and missing values.

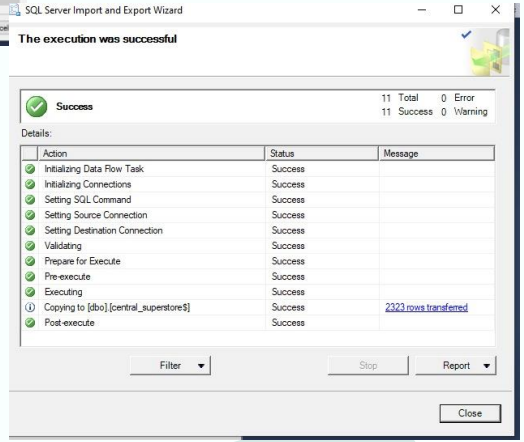


Uploading the data to SQL and Creating physical Database









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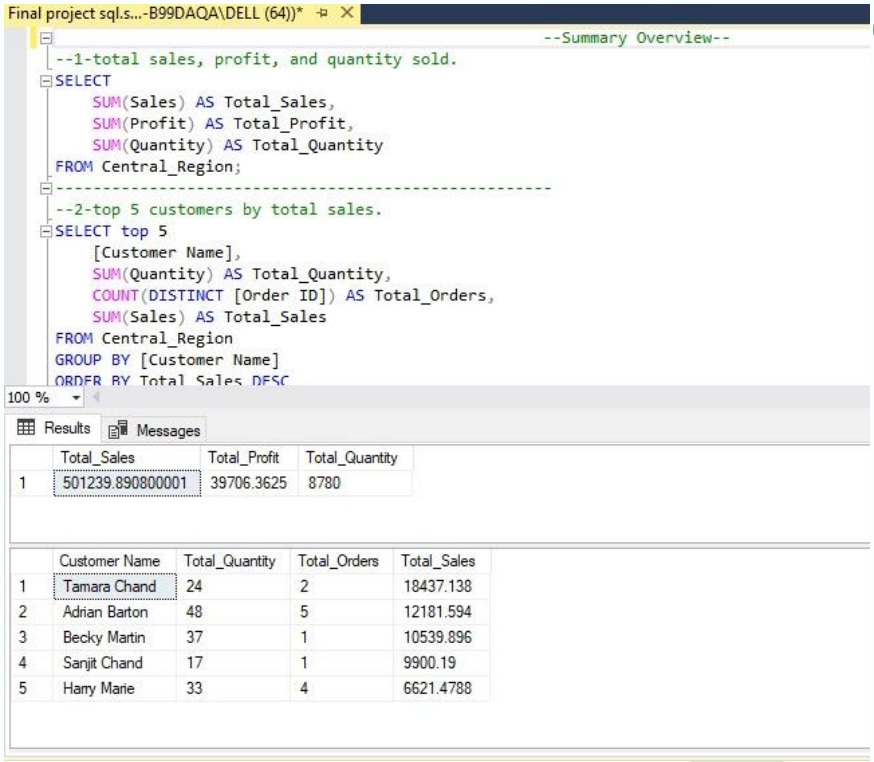
03

Exploratory data analysis (EDA)

Exploratory data analysis (EDA)

- $501K in sales, $39.7K profit, and 8.8K items sold.

-Top 5 customers drove strong revenue, led by Tamara Chand with $18.4K in sales.



Exploratory data analysis (EDA)

- Consumer segment leads with over half of total quantity sold (51.47%)

-Strong growth in YoY profit until 2015, followed by a decline in 2016

Final project sql.s...-B99DAQA\DELL (64))*

```sql
--3-distribution of quantity sold by customer segment.
SELECT
    Segment,
    SUM(Quantity) AS Total_Quantity,
    ROUND(SUM(Quantity) * 100.0 / (SELECT SUM(Quantity) FROM Central_Region), 2) AS Percentage
FROM Central_Region
GROUP BY Segment;
-----------------------------------------------------
--4-Year-over-Year (YoY) profit.
SELECT
    YEAR([Order Date]) AS Year,
    SUM(Profit) AS Total_Profit
FROM
    Central_Region
GROUP BY
    YEAR([Order Date])
ORDER BY
```

100 %

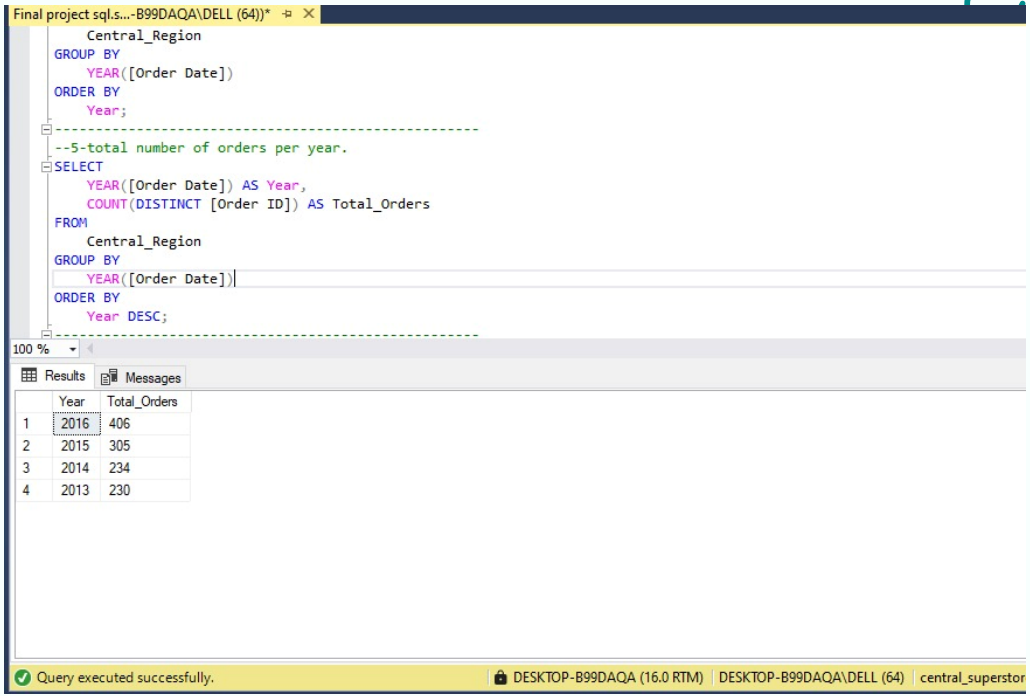
Results | Messages

	Segment	Total_Quantity	Percentage
1	Corporate	2604	29.66
2	Home Office	1657	18.87
3	Consumer	4519	51.47

	Year	Total_Profit
1	2013	539.553399999996
2	2014	11716.802
3	2015	19899.1629
4	2016	7550.84419999999

Exploratory data analysis (EDA)

-The total number of orders has steadily increased year over year, reaching 406 orders in 2016, showing a positive growth trend from 230 orders in 2013



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04

Performance analysis

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KPIS:

Sales Analysis

Profitability Analysis

Performance analysis

Sales Analysis:

-Sales were stable, peaking in 2015 with $147.4K and slightly dropping to $147.1K in 2016.

```
                                                --Sales Analysis--

--6-Total Sales by Year
SELECT
    YEAR([Order Date]) AS Year,
    SUM(Sales) AS Total_Sales
FROM
    Central_Region
GROUP BY
    YEAR([Order Date])
ORDER BY
    Year DESC;
-------------------------------------------------
--7- total sales by quarter.
SELECT
    DATEPART(QUARTER, [Order Date]) AS Quarter,
    YEAR([Order Date]) AS Year,
```

.00 %

Results | Messages

	Year	Total_Sales
1	2016	147098.1282
2	2015	147429.376
3	2014	102874.222
4	2013	103838.1646

Performance analysis

Sales Analysis:

-Q4 showed the highest sales, with 2016 outperforming earlier years

Final project sql.s...-B99DAQA\DELL (64))*

```
----------------------------------------------------
--7- total sales by quarter.
SELECT
    DATEPART(QUARTER, [Order Date]) AS Quarter,
    YEAR([Order Date]) AS Year,
    SUM(Sales) AS Total_Sales
FROM
    Central_Region
GROUP BY
    YEAR([Order Date]), DATEPART(QUARTER, [Order Date])
ORDER BY
    Year DESC, Quarter;
----------------------------------------------------
-- 8-Average sales per category.
SELECT
    [Category],
    AVG(Sales) AS Average_Sales
```

100 %

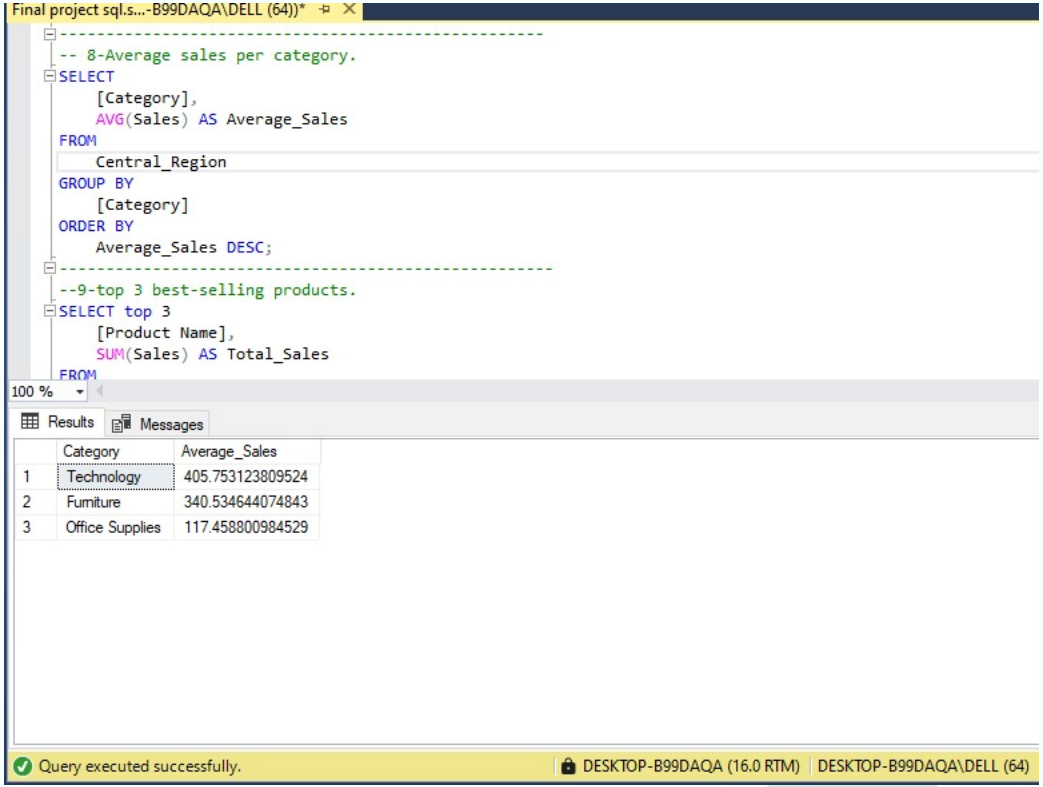
Results | Messages

	Quarter	Year	Total_Sales
1	1	2016	40530.0572
2	2	2016	27938.739
3	3	2016	32468.947
4	4	2016	46160.385
5	1	2015	20211.697
6	2	2015	25709.345
7	3	2015	33428.3802
8	4	2015	68079.9538
9	1	2014	11768.3656
10	2	2014	23979.145
11	3	2014	24485.5382

Performance analysis

Sales Analysis:

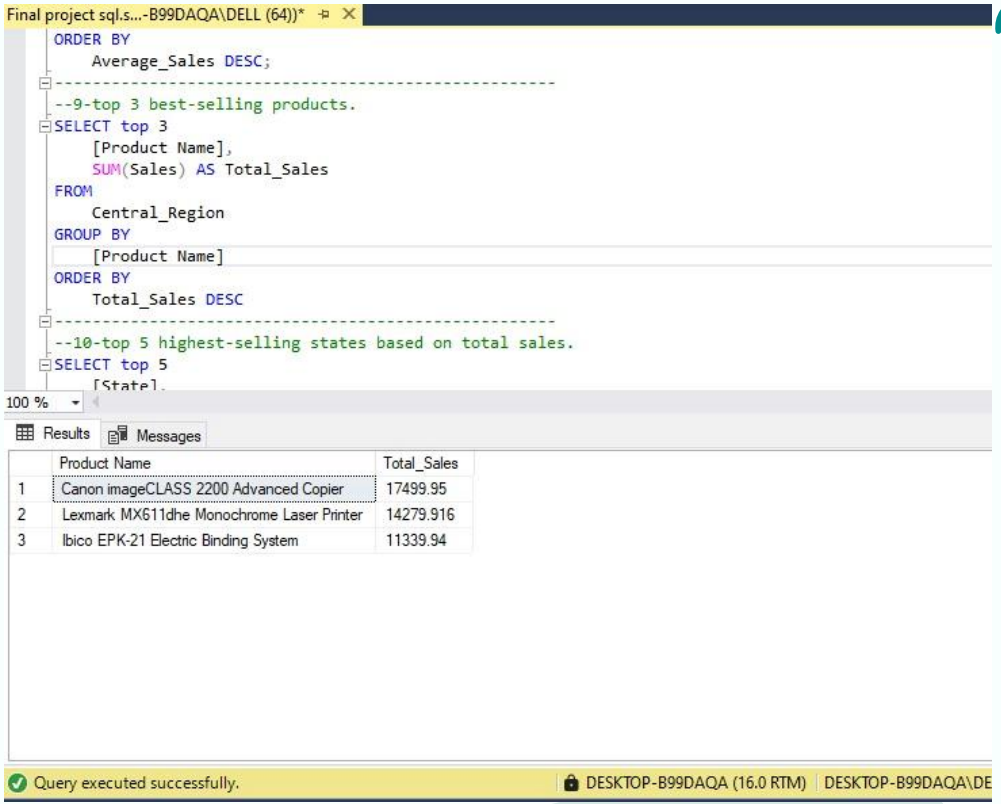
-Technology has the highest avg. sales per order, while Office Supplies have the lowest.



Performance analysis

Sales Analysis:

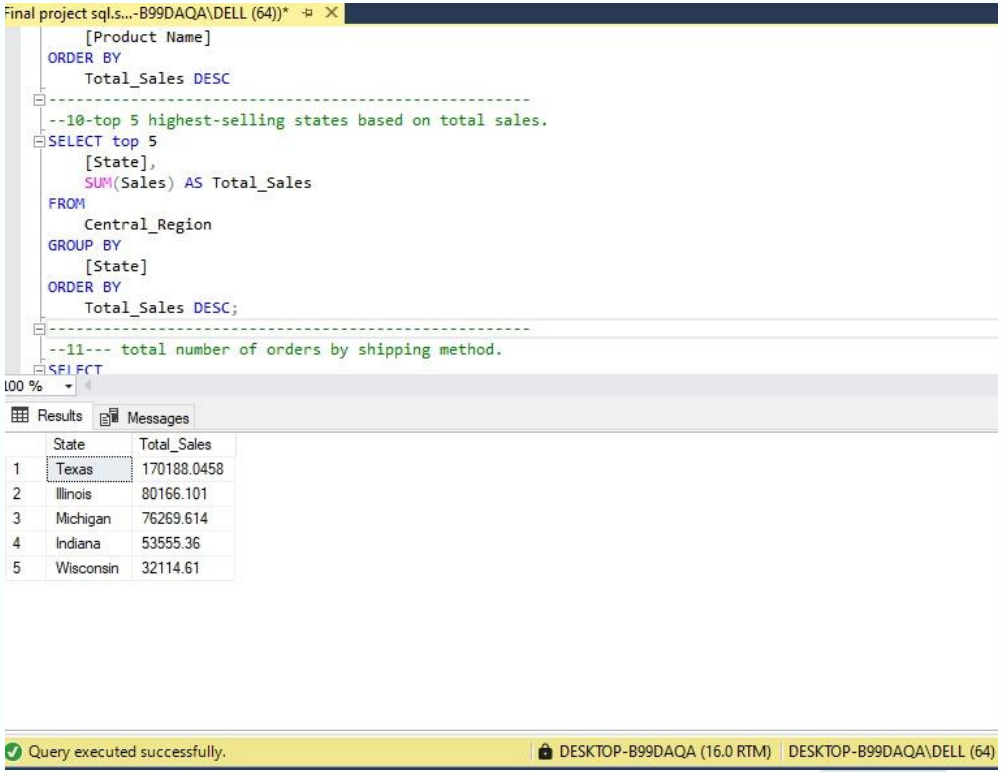
-High-end office machines lead sales, with Canon image CLASS topping at $17.5K.



Performance analysis

Sales Analysis:

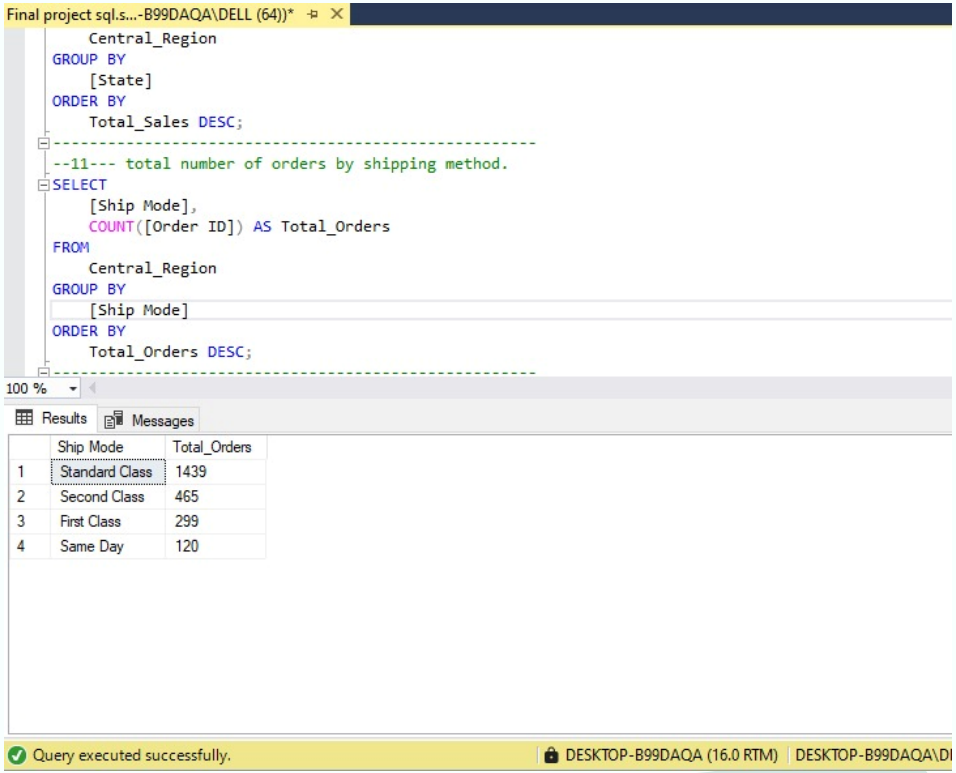
-Texas leads sales by a wide margin, followed by Illinois and Michigan



Performance analysis

Sales Analysis:

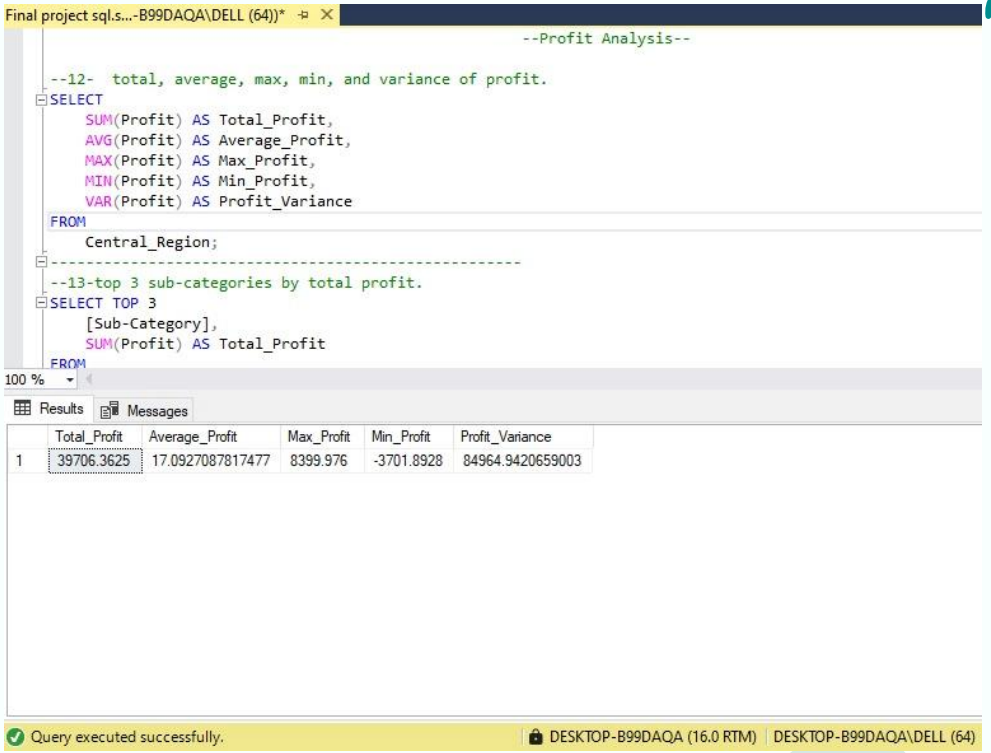
-Standard Class dominates shipping, while Same Day is rarely used



Performance analysis

Profit Analysis:

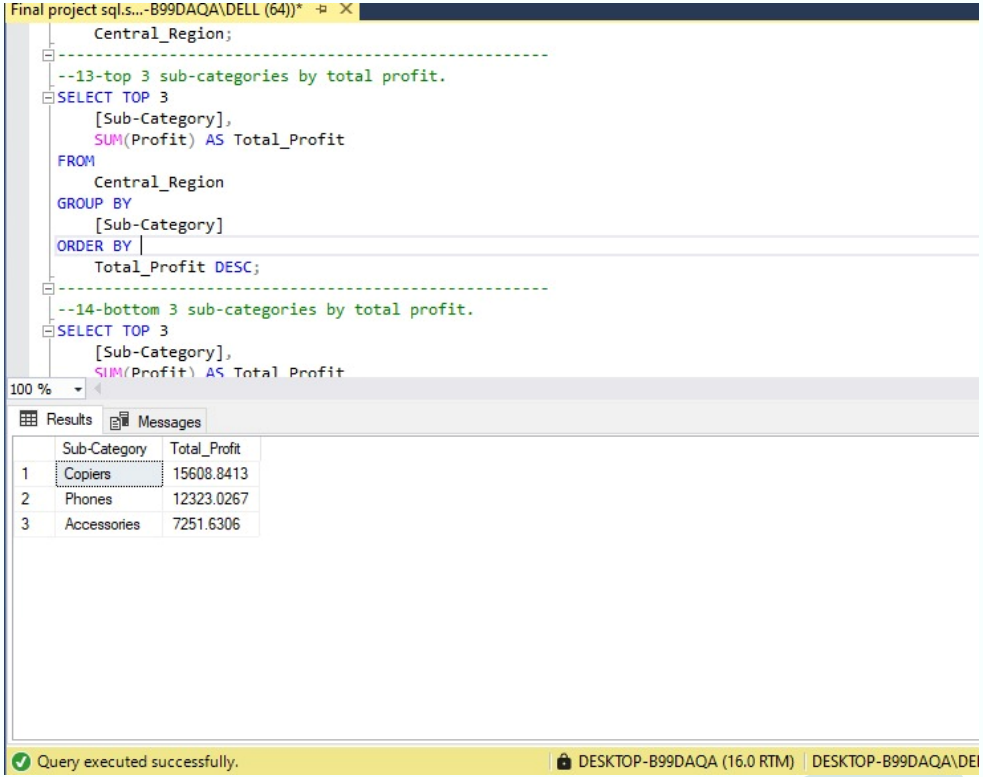
-High profit variability total: $39.7K, avg: $17.09, max: $8.4K, min: -$3.7K and a high variance (~84.9K) suggests wide fluctuation in profitability



Performance analysis

Profit Analysis:

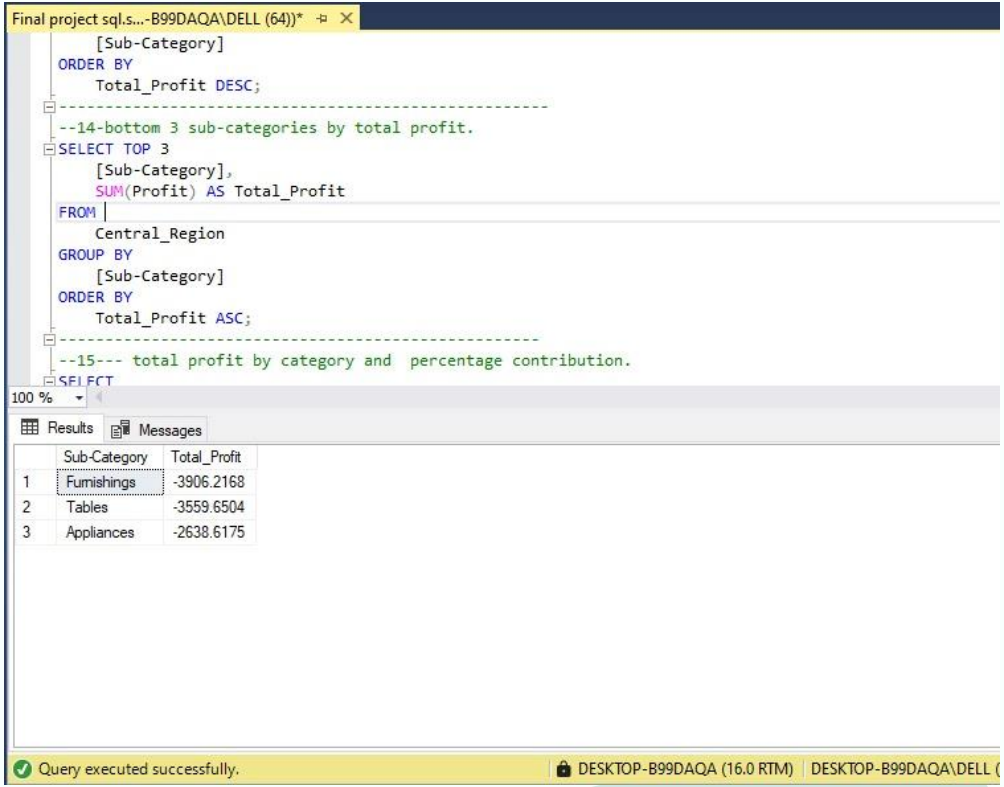
-Copiers, Phones, and Accessories are the region’s top profit drivers



Performance analysis

Profit Analysis:

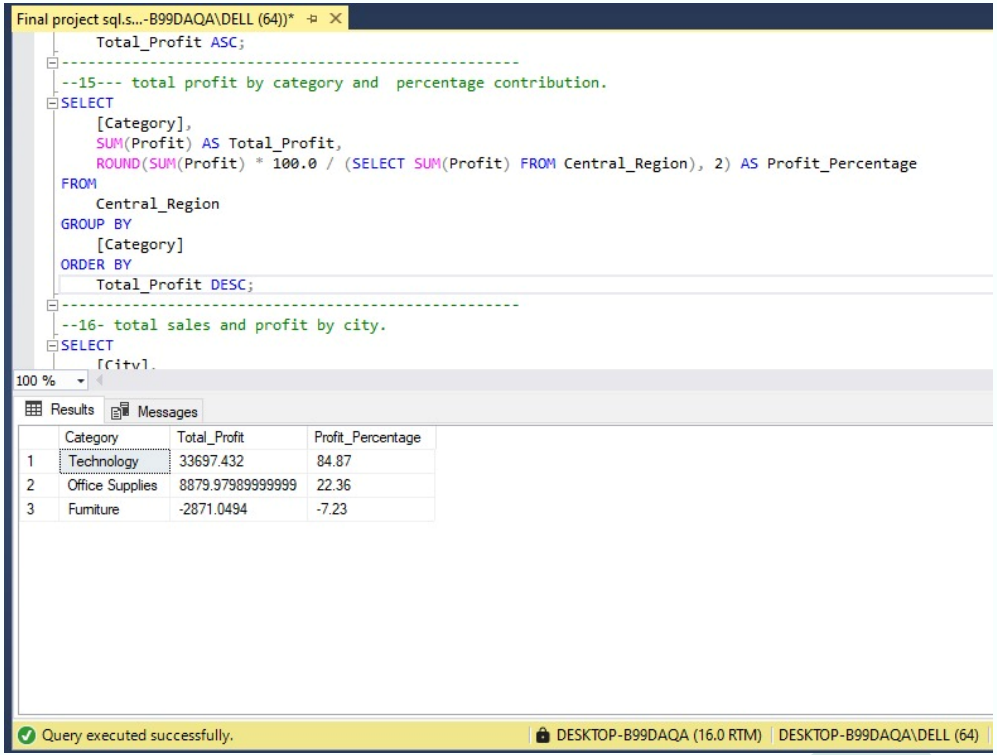
-These sub-categories are unprofitable, with Furnishings leading losses



Performance analysis

Profit Analysis:

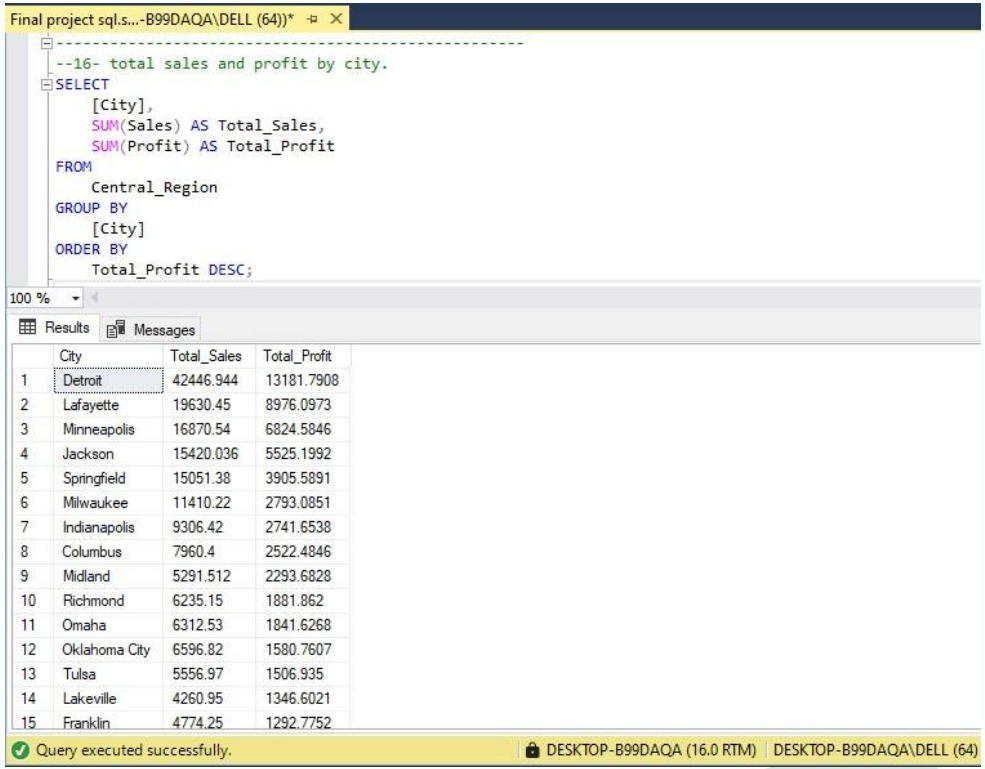
-Technology is the primary profit driver, contributing ~85% of total profit. Office Supplies add moderate value (22%), while Furniture shows a loss, negatively impacting overall profitability.



Performance analysis

Profit Analysis:

-Despite high sales, **Houston** and **Chicago** suffer from major losses, indicating operational inefficiencies or discount-heavy strategies.



	City	Total_Sales	Total_Profit
1	Detroit	42446.944	13181.7908
2	Lafayette	19630.45	8976.0973
3	Minneapolis	16870.54	6824.5846
4	Jackson	15420.036	5525.1992
5	Springfield	15051.38	3905.5891
6	Milwaukee	11410.22	2793.0851
7	Indianapolis	9306.42	2741.6538
8	Columbus	7960.4	2522.4846
9	Midland	5291.512	2293.6828
10	Richmond	6235.15	1881.862
11	Omaha	6312.53	1841.6268
12	Oklahoma City	6596.82	1580.7607
13	Tulsa	5556.97	1506.935
14	Lakeville	4260.95	1346.6021
15	Franklin	4774.25	1292.7752

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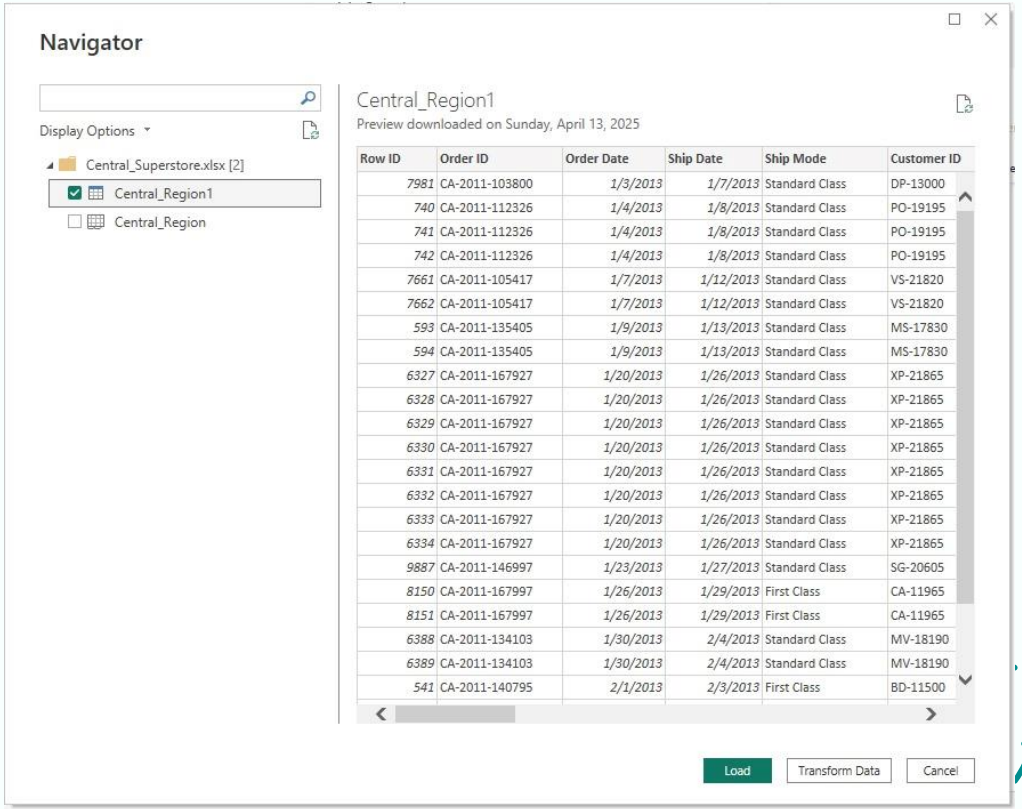
05

Data visualization

Data visualization

Using Power BI

-Get data from the Excel sheet and load it to Power BI for visualization.



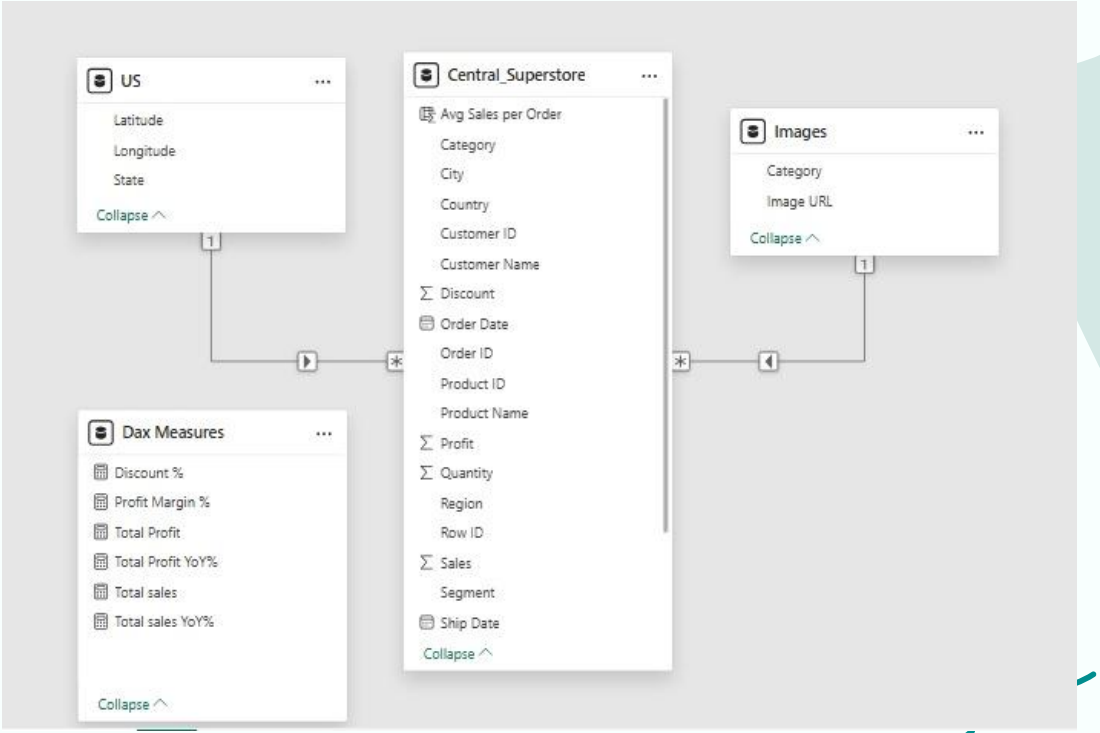
Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID
7981	CA-2011-103800	1/3/2013	1/7/2013	Standard Class	DP-13000
740	CA-2011-112326	1/4/2013	1/8/2013	Standard Class	PO-19195
741	CA-2011-112326	1/4/2013	1/8/2013	Standard Class	PO-19195
742	CA-2011-112326	1/4/2013	1/8/2013	Standard Class	PO-19195
7661	CA-2011-105417	1/7/2013	1/12/2013	Standard Class	VS-21820
7662	CA-2011-105417	1/7/2013	1/12/2013	Standard Class	VS-21820
593	CA-2011-135405	1/9/2013	1/13/2013	Standard Class	MS-17830
594	CA-2011-135405	1/9/2013	1/13/2013	Standard Class	MS-17830
6327	CA-2011-167927	1/20/2013	1/26/2013	Standard Class	XP-21865
6328	CA-2011-167927	1/20/2013	1/26/2013	Standard Class	XP-21865
6329	CA-2011-167927	1/20/2013	1/26/2013	Standard Class	XP-21865
6330	CA-2011-167927	1/20/2013	1/26/2013	Standard Class	XP-21865
6331	CA-2011-167927	1/20/2013	1/26/2013	Standard Class	XP-21865
6332	CA-2011-167927	1/20/2013	1/26/2013	Standard Class	XP-21865
6333	CA-2011-167927	1/20/2013	1/26/2013	Standard Class	XP-21865
6334	CA-2011-167927	1/20/2013	1/26/2013	Standard Class	XP-21865
9887	CA-2011-146997	1/23/2013	1/27/2013	Standard Class	SG-20605
8150	CA-2011-167997	1/26/2013	1/29/2013	First Class	CA-11965
8151	CA-2011-167997	1/26/2013	1/29/2013	First Class	CA-11965
6388	CA-2011-134103	1/30/2013	2/4/2013	Standard Class	MV-18190
6389	CA-2011-134103	1/30/2013	2/4/2013	Standard Class	MV-18190
541	CA-2011-140795	2/1/2013	2/3/2013	First Class	BD-11500

Data visualization

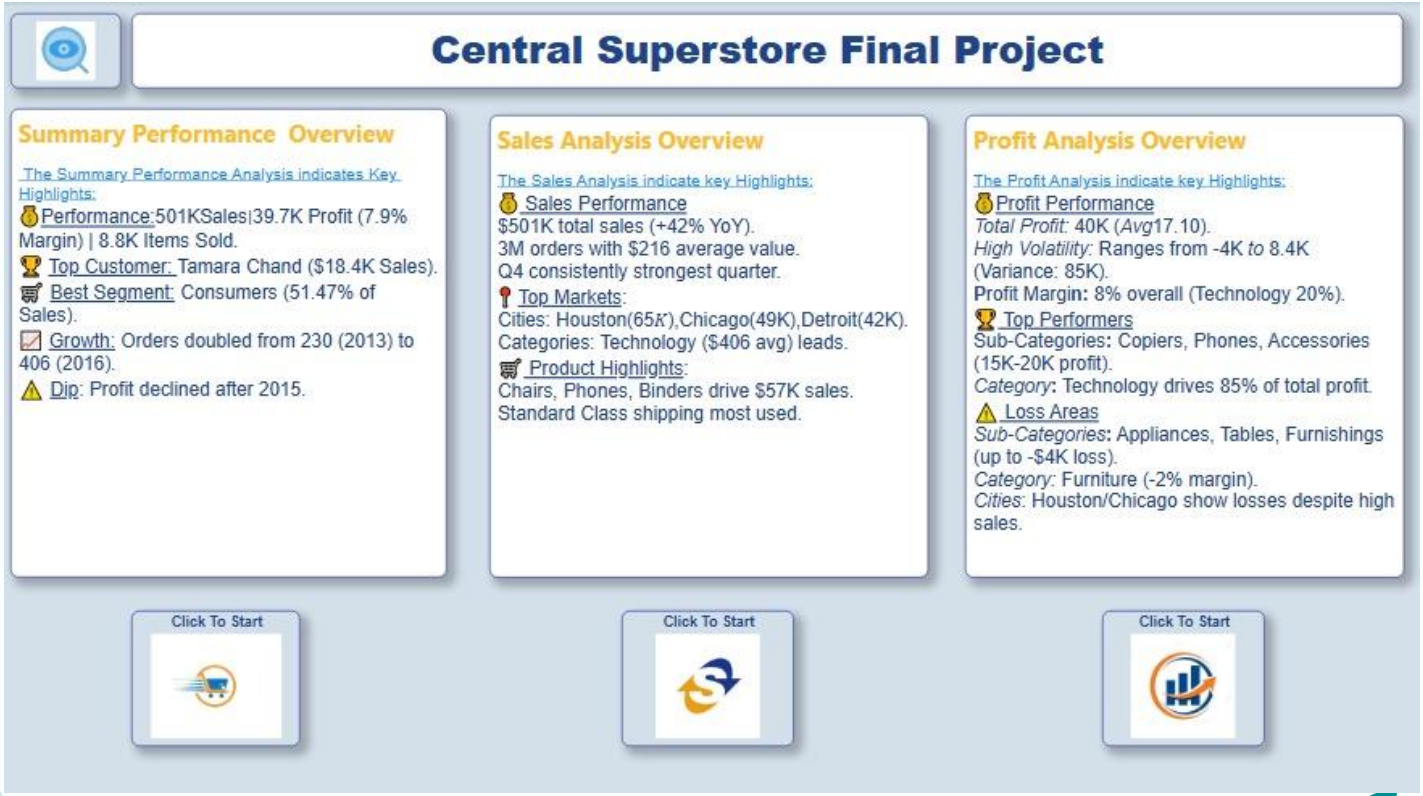
Using Power BI

- To facilitate Visualization, we created 2 new tables, one for: adding Images URLs for the categories, and another for adding the longitudes and latitudes of the states.

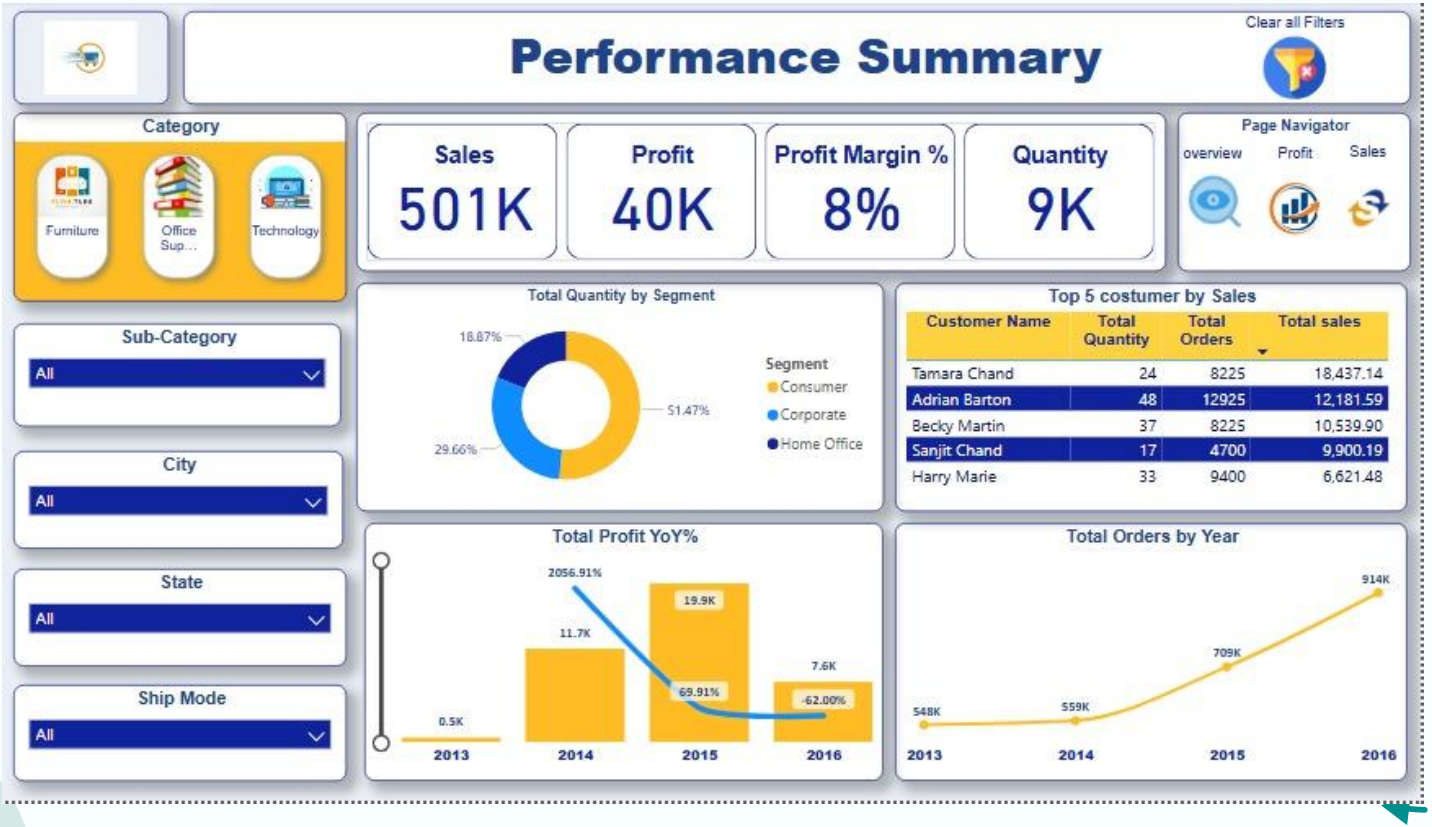
-Create required Dax measures for analysis.



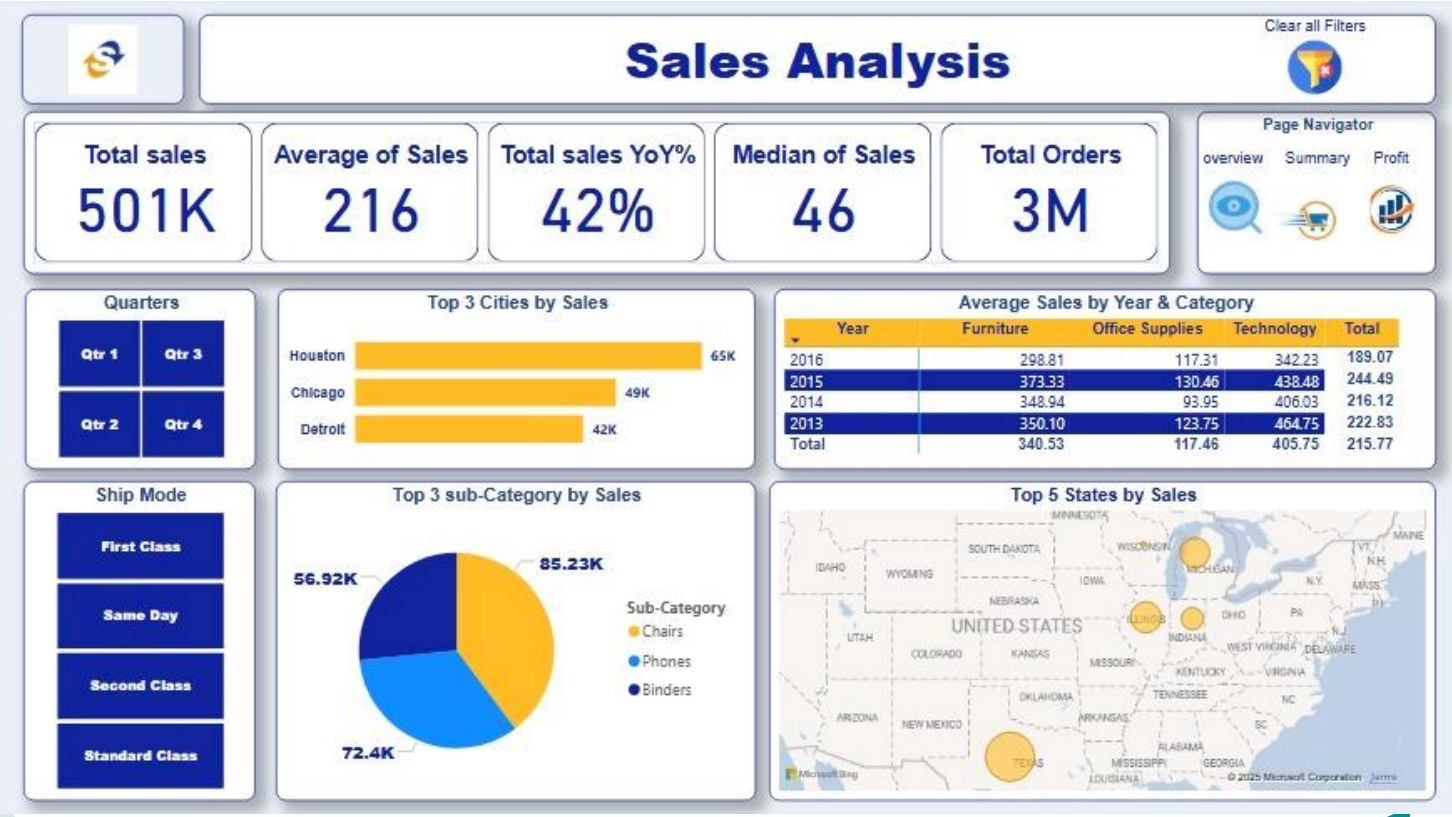
Data visualization



Data visualization



Data visualization



Data visualization

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06

Recommendations & Development

Recommendations & Development

-Optimize Unprofitable Regions:
Investigate losses in Houston and Chicago likely due to high costs or excessive discounts.
➤ Conduct cost-to-serve analysis and adjust pricing/operations.

-Leverage Technology Segment:
Tech drives ~85% of profit. Focus on Copiers, Phones, Accessories.
➤ Expand product lines and tailor offers to high-performing categories.

Recommendations & Development

-Reevaluate Furniture Strategy:
Furniture shows consistent losses.
➤ Consider reducing SKUs or revising pricing/coststructure.

-Maximize Q4 Opportunities:
Q4 leads in sales across all years.
➤ Strengthen seasonal campaigns and optimize inventory ahead of Q4.

Recommendations & Development

-Strengthen Customer Loyalty:
Top 5 customers contribute significant revenue.
➤ Develop loyalty programs and targeted incentives.

-Improve Shipping Efficiency:
Standard Class dominates; Same Day underused.
➤ Reassess shipping options and potential pricing adjustments.

Recommendations & Development

-Stabilize Profit Margins:
High profit variance indicates pricing inconsistency.
➤ Implement margin-based pricing strategies.

-Forecast and Plan Proactively:
Slight sales dip in 2016 after peak in 2015.
➤ Use predictive analytics to guide inventory and sales strategy.

Recommendations & Development

-Expand Sales Channels through Online Store:
Current sales are limited to traditional methods, which may restrict growth potential.

➤ Launching an online store can reach a wider customer base, increase convenience, and boost both sales and profitability.

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Thanks!

Do you have any question?
Feel free to ask!

GitHub repo link for the project

Google Drive Link for the project