

# **SALES ANALYSIS USING POWER BI**

Project submitted in fulfilment of the requirement for the award of the degree of

**BACHELOR OF TECHNOLOGY IN  
COMPUTER SCIENCE AND  
ENGINEERING**

**Affiliated to**



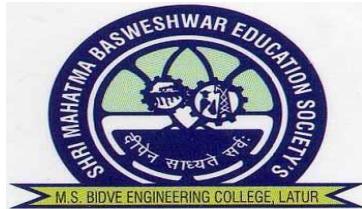
**Dr.Babasaheb Ambedkar Technological University, Lonere**

By

DHONDE GANESH AJAY (67)

**Under the guidance of**

Prof.P.J.KOKANE



**Department of Computer Science and Engineering  
M.S.Bidve Engineering College,  
Latur,Maharashtra. 2023-24**

## **CERTIFICATE**

This is to certify that **Dhonde Ganesh Ajay** has successfully completed his project's on **SALES ANALYSIS USING POWER BI** for the fulfilment of the Degree in the Computer Science and Engineering as prescribed by Dr.Babasaheb Ambedkar Technological University, Lonere during academic year 2023-24.

**Guide**

**Prof.P.J.Kokane**

**H.O.D.**

**Prof.N.G.Dharashive**

**Principal**

**Prof.B.V.Dharne**

## **ACKNOWLEDGEMENT**

We gratefully acknowledge for the assistance, cooperation, guidance and clarifications provided during the development of our project **SALES ANALYSIS USING POWER BI**. My extreme gratitude to **PROF. P.J.KOKANE** who guided us throughout the project. Without his willing disposition, spirit of accommodation, frankness, timely clarification and above all faith in us, this project could not have been completed in due time. His readiness to discuss all important matters at work deserves special attention. We would also like to thank whole of the faculty of the college for their cooperation and important support.

## ABSTRACT

In today's competitive business landscape, effective sales analysis is crucial for making informed decisions and driving growth. This project, titled "Sales Analysis Using Power BI," aims to leverage the powerful data visualization and analytics capabilities of Power BI to analyse sales data comprehensively. The primary objectives of this project are to identify sales trends, understand customer behaviour, evaluate sales performance, and forecast future sales to support strategic business decisions.

The project begins with the collection and preparation of sales data from various sources, ensuring data cleanliness and consistency. By building a robust data model within Power BI, relationships between different datasets are established, enabling comprehensive and insightful analysis. Interactive dashboards and reports are created using a variety of visualizations such as bar charts, line charts, pie charts, and maps to present the data in an easily interpretable manner.

Key performance indicators (KPIs) such as total sales, sales by region, sales by product, profit margins, and customer acquisition and retention rates are analysed. The project delves into trend analysis, comparative analysis, customer segmentation, and performance evaluation of different sales channels and teams. These analyses reveal significant insights into sales patterns and customer preferences, providing a solid foundation for strategic decision-making.

The findings from the analysis are shared through Power BI's publishing and collaboration features, facilitating informed discussions among stakeholders. The project culminates in a detailed report and a presentation that summarizes the methodology, key insights, and actionable recommendations derived from the sales analysis.

By harnessing the capabilities of Power BI, this project not only demonstrates the importance of data-driven decision-making in sales management but also provides a practical framework for organizations to enhance their sales strategies and improve overall business performance.

This abstract provides a concise overview of the project's objectives, methodology, and expected outcomes, giving readers a clear understanding of what the project entails and its significance.

## **TABLE OF CONTENT**

<b>Sr.No.</b>	<b>Content</b>	<b>Page No.</b>
1.	Introduction 1.1Objective 1.2Methodology 1.3technological stack	01
2.	Project overview	02
3.	Description of work	03
4.	Project Design	05
5.	Implementation Details	08
6.	Result	23
7.	Future Scope	27
8.	Conclusion	29
9.	Reference	30

## **INDEX TABLE FOR FIGURES**

<b>Sr.No</b>	<b>Content</b>	<b>Page.no.</b>
4	Project Design Fig4.1: Flowchart representation of working process	7
6	Result Fig6.1: Final view of Dashboard Fig6.2: Visual insights and analysis for central region Fig6.3: Visual insights and analysis for East region	23

# **1.INTRODUCTION**

In the rapidly evolving business environment, organizations are increasingly recognizing the value of data-driven decision-making to maintain a competitive edge. Sales data, in particular, holds a wealth of information that can reveal critical insights into market trends, customer preferences, and overall business performance. However, transforming raw sales data into actionable insights requires sophisticated tools and methodologies. This project, titled "Sales Analysis Using Power BI," seeks to harness the capabilities of Power BI to perform a comprehensive analysis of sales data, thereby enabling informed strategic decisions.

## **1.1 OBJECTIVE**

**1.1.1 Identify Sales Trends:** Analyse historical sales data to uncover patterns and trends over time.

**1.1.2 Understand Customer Behaviour:** Segment customers based on their purchase behaviour and demographic information to tailor marketing and sales strategies.

**1.1.3 Evaluate Sales Performance:** Assess the performance of different products, sales teams, and regions to identify strengths and areas for improvement.

**1.1.4. Forecast Future Sales:** Utilize predictive analytics to forecast future sales, aiding in strategic planning and resource allocation.

## **1.2 METHODOLOGY**

**1.2.1 Data Collection:** Gather sales data from various sources, including CRM systems, ERP systems, and spreadsheets.

**1.2.2 Data Preparation:** Clean and transform the data to ensure accuracy and consistency, handling missing values, duplicates, and standardizing formats.

**1.2.3. Data Modelling:** Build a robust data model in Power BI to establish relationships between different datasets, facilitating comprehensive analysis.

**1.2.4 Visualization Creation:** Develop interactive dashboards and reports using a variety of visualizations such as bar charts, line charts, pie charts, and maps.

## **1.3 TECHNOLOGICAL STACK**

**1.3.1** The project will leverage the following technologies and tools:

**1.3.2 Power BI Desktop:** For data modelling, visualization creation, and report development.  
**Power Query:** For data extraction, transformation, and loading (ETL) processes.

**1.3.3 DAX (Data Analysis Expressions):** For creating custom calculations and measures to enhance analysis.

**1.3.4 Power BI Service:** publishing reports, sharing insights, and collaboration within the organization.

**1.3.4 Data Sources:** Various spreadsheets containing sales data.

## **2.PROJECT OVERVIEW**

Title: Sales analysis using Power BI

Objective:

The primary objective of this project is to utilize Power BI to analyse sales data effectively. The analysis aims to uncover sales trends, understand customer behaviour, evaluate sales performance, and forecast future sales. By achieving these objectives, the project will provide actionable insights that will support strategic planning and decision-making processes within the organization.

Methodology:

This project will follow a systematic approach to achieve the outlined objectives. It begins with data collection from various sources, including CRM systems, ERP systems, and spreadsheets. The collected data will undergo a rigorous cleaning and transformation process to ensure accuracy and consistency. This involves handling missing values, removing duplicates, and standardizing data formats. A robust data model will be built within Power BI to establish relationships between different datasets, facilitating comprehensive analysis. Interactive dashboards and reports will be developed, utilizing a variety of visualizations such as bar charts, line charts, pie charts, and maps. These visualizations will help in identifying trends, evaluating performance, and segmenting customers. Finally, predictive analytics techniques will be applied to forecast future sales trends and performance.

Key Components:

Data Sources: Sales data from CRM systems, ERP systems, and spreadsheets.

Power BI Desktop: Tool for data modelling, visualization creation, and report development.

Power Query: Used for data extraction, transformation, and loading (ETL) processes.

DAX (Data Analysis Expressions): For creating custom calculations and measures to enhance analysis.

Power BI Service: Platform for publishing reports, sharing insights, and collaboration within the organization.

Interactive Visualizations: Bar charts, line charts, pie charts, maps, and other visual elements to represent data.

Significance:

This project highlights the significant benefits of leveraging Power BI for sales analysis. It enhances decision-making by providing actionable insights, improves sales strategies through better understanding of customer behaviour, and optimizes resource allocation with accurate sales forecasting. Additionally, it helps organizations maintain a competitive edge by identifying trends and opportunities. Through comprehensive analysis and interactive visualizations, stakeholders are equipped to make informed and strategic business decisions.

### **3.DESCRIPTION OF WORK**

#### **3.1 Problem Definition:**

- Identifying Analytical Needs: Understanding the specific requirements and objectives of sales analysis within the organization.
- Challenges in Current Analysis Methods: Identifying limitations and inefficiencies in existing sales analysis processes, such as manual data handling and lack of real-time insights.

#### **3.2 Literature Review:**

- Best Practices in Sales Analysis: Reviewing academic literature and industry publications to identify best practices and methodologies in sales analysis.
- Case Studies on Power BI Implementation: Studying case studies and success stories of organizations that have implemented Power BI for sales analysis, to gain insights into potential benefits and challenges.

#### **3.3 Data Collection and Preparation:**

- Source Identification: Identifying and collecting sales data from various sources including CRM systems, ERP systems, and spreadsheets.
- Data Cleaning and Transformation: Performing data cleaning and transformation processes to ensure data accuracy, consistency, and suitability for analysis.

#### **3.4 Model Selection and Implementation:**

- Choosing Data Models: Selecting appropriate data models within Power BI to facilitate analysis, such as star schema or snowflake schema.
- Implementing Visualizations: Developing interactive dashboards and reports using a variety of visualizations to represent sales data effectively.

#### **3.7 Testing and Validation:**

- Data Integrity Testing: Conducting tests to ensure data integrity throughout the analysis process, detecting and rectifying any anomalies or errors.
- Validation with Stakeholders: Validating the analysis results with relevant stakeholders to ensure alignment with business objectives and expectations.

### 3.9 Presentation and Reporting:

- Interactive Dashboards: Creating interactive dashboards that allow stakeholders to explore sales data dynamically and derive insights.
- Comprehensive Reports: Generating comprehensive reports summarizing key findings, trends, and recommendations derived from the analysis.

### 3.11 Feedback and Iterative Improvements:

- Stakeholder Feedback Sessions: Gathering feedback from stakeholders on the usability and effectiveness of the analysis outputs.
- Iterative Refinement: Iteratively refining the analysis based on feedback received, incorporating additional insights or adjusting visualizations as needed.

Through these stages, the project aims to address the challenges in sales analysis, leverage the capabilities of Power BI effectively, and provide actionable insights that support strategic decision-making within the organization.

## **4.PROJECT DESIGN**

### **4.1. Problem Definition:**

- Objective Clarification: Clearly define the objectives of the sales analysis project, including identifying sales trends, understanding customer behavior, evaluating sales performance, and forecasting future sales.
- Stakeholder Engagement: Engage stakeholders to understand their specific analytical needs and challenges faced in the current sales analysis processes.

### **4.2. Literature Review:**

- Research Methodology: Determine the scope and methodology for conducting a literature review, focusing on best practices in sales analysis and case studies of Power BI implementation in similar projects.
- Data Collection: Gather relevant academic literature, industry publications, and case studies to inform the project's approach and methodology.

### **4.3. Data Collection and Preparation:**

- Source Identification: Identify sources of sales data including CRM systems, ERP systems, and spreadsheets.
- Data Gathering: Collect sales data from identified sources, ensuring completeness and accuracy.
- Data Cleaning and Transformation: Cleanse and transform the collected data to address issues such as missing values, duplicates, and inconsistencies.

### **4.4. Model Selection and Implementation:**

- Data Modeling: Choose appropriate data modeling techniques within Power BI, such as star schema or snowflake schema, to structure the data for analysis.
- Visualization Design: Design interactive dashboards and reports using Power BI's visualization tools to effectively represent sales data.
- Implementation: Implement the chosen data models and visualizations in Power BI, ensuring alignment with project objectives and stakeholder requirements.

#### 4.5. Testing and Validation:

- Data Integrity Testing: Conduct tests to ensure data integrity and accuracy throughout the analysis process.
- Validation with Stakeholders: Validate analysis results with stakeholders to confirm alignment with business objectives and expectations.

#### 4.6. Presentation and Reporting:

- Dashboard Development: Develop interactive dashboards that allow stakeholders to explore sales data dynamically and derive insights.
- Report Generation: Generate comprehensive reports summarizing key findings, trends, and recommendations derived from the analysis.

#### 4.7. Feedback and Iterative Improvements:

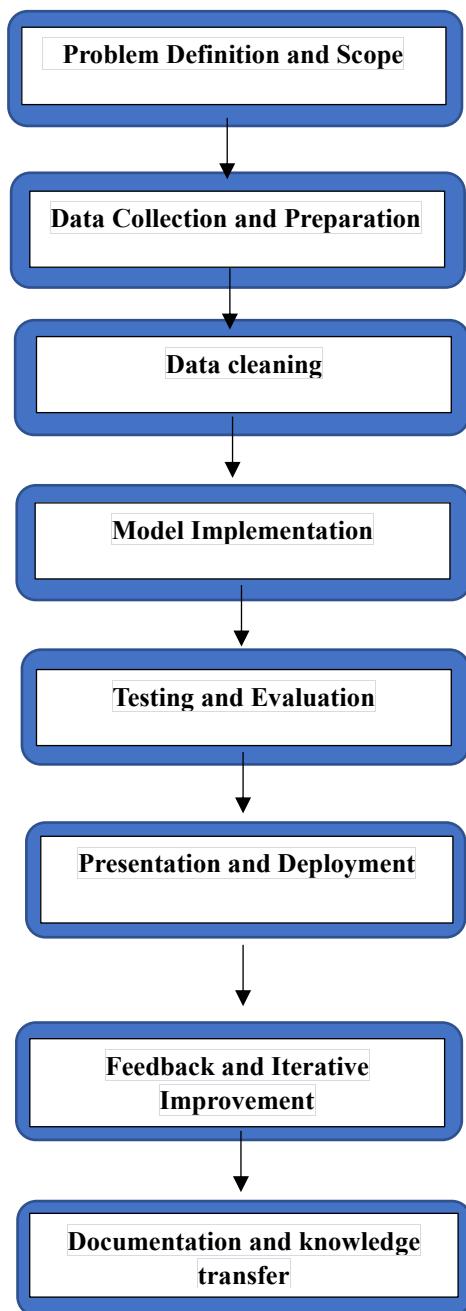
- Feedback Collection: Gather feedback from stakeholders on the usability and effectiveness of the analysis outputs.
- Iterative Refinement: Iterate on the analysis based on stakeholder feedback, incorporating additional insights or adjusting visualizations as needed.

#### 4.8. Documentation and Knowledge Transfer:

- Documentation: Document the entire project design, including methodologies, data sources, analysis techniques, and outcomes, for future reference.
- Knowledge Transfer: Transfer knowledge gained from the project to relevant stakeholders within the organization to ensure sustainability and ongoing improvement in sales analysis processes.

The project design outlines a systematic approach to conducting sales analysis using Power BI, encompassing problem definition, literature review, data collection and preparation, model selection and implementation, testing and validation, presentation and reporting, feedback and iterative improvements, and documentation and knowledge transfer. By following this design, the project aims to provide actionable insights that support strategic decision-making and drive overall business success.

#### 4.2 FLOWCHART REPRESENTATION



**FIG4.1: FLOWCHART REPRESENTATION OF WORKING PROCESS**

(This flowchart provides a high-level overview of the sequential steps involved in the project, illustrating the flow of activities from problem definition to documentation and knowledge transfer.)

## 5. IMPLEMENTATION DETAILS

### 1. Data Collection:

- Identify data sources: CRM systems, ERP systems, spreadsheets, etc.
  - Gather relevant sales data, including transactional data, customer data, and product data.
  - Ensure data quality by addressing issues such as missing values, duplicates, and inconsistencies.

[kaggle.com/datasets/addhyay/superstore-dataset?resource=download](https://kaggle.com/datasets/addhyay/superstore-dataset?resource=download)

**kaggle**

Create

Home

Competitions

Datasets

Models

Code

Discussions

Learn

More

Your Work

Search

HARISH CHAVAN - UPDATED A YEAR AGO

50

New Notebook

Download (753 kB)

Superstore Dataset

General dataset can be used for Power BI exercises

Data Card Code (4) Discussion (5) Suggestions (0)

About Dataset

This file contains data about a superstore. There are 2 sheets in this data file they are as follows.

1. **Orders:** contains the data about orders made by customers for any product. This table also

Usability 7.65

License CC0: Public Domain

Kaggle uses cookies from Google to deliver and enhance the quality of its services and to analyze traffic.

Learn more. OK, Got it.

[kaggle.com/datasets/addhyay/superstore-dataset?resource=download](https://www.kaggle.com/datasets/addhyay/superstore-dataset?resource=download)

### Superstore Dataset.xlsx (763.75 kB)

[Download](#) [Share](#) [Copy link](#)

[Add Suggestion](#)

#### About this file

This file contains data about a superstore. There are 2 sheets in this data file they are as follows.

- Orders:** contains the data about orders made by customers for any product. This table also contains information about customers like name, address, etc. and information about orders like product name, order-id, product category, etc.
- Returns:** contains information about the returned product with their order id and additional information.

Table	Total Rows	Total Columns
Orders	5899	19
Returns	800	2

#### Data Explorer

Version 1 (763.75 kB)

- Superstore Dataset.xlsx
  - Orders
  - Returns

#### Summary

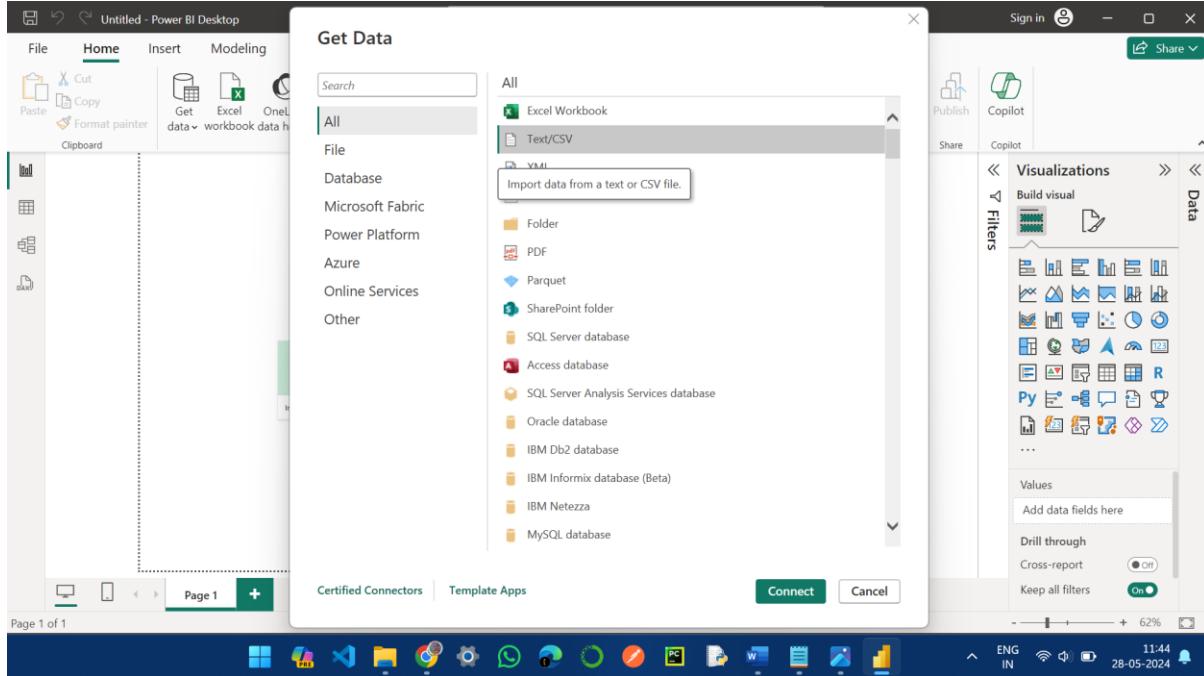
- 1 file
- 21 columns



## 2. Data Preparation:

- Clean and transform the collected data to ensure accuracy and consistency.
- Perform data preprocessing tasks such as filtering, sorting, and aggregating.
- Normalize data formats and resolve any data quality issues.

Importing superStore\_sales\_dataset.csv



Imported superstore\_sales\_Dataset.csv

The screenshot shows the imported dataset in the Power BI Desktop canvas. The table has 19 columns: Row ID, Order ID, Order Date, Ship Date, Ship Mode, Customer ID, Customer Name, Segment, Country, and several other columns. The first few rows of data are visible. The Power BI interface includes a ribbon with Home, Insert, and Modeling tabs, and a visualizations pane on the right. The status bar at the bottom right shows 'Page 1 of 1' and system icons.

Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Customer Name	Segment	Country
4918	CA-2019-160304	01-01-2019	07-01-2019	Standard Class	BM-11575	Brendan Murry	Corporate	United States
4919	CA-2019-160304	02-01-2019	07-01-2019	Standard Class	BM-11575	Brendan Murry	Corporate	United States
4920	CA-2019-160304	02-01-2019	07-01-2019	Standard Class	BM-11575	Brendan Murry	Corporate	United States
3074	CA-2019-125206	03-01-2019	05-01-2019	First Class	LR-16915	Lena Radford	Consumer	United States
8604	US-2019-116365	03-01-2019	08-01-2019	Standard Class	CA-12310	Christine Abelman	Corporate	United States
8605	US-2019-116365	03-01-2019	08-01-2019	Standard Class	CA-12310	Christine Abelman	Corporate	United States
8606	US-2019-116365	03-01-2019	08-01-2019	Standard Class	CA-12310	Christine Abelman	Corporate	United States
9494	CA-2019-105207	03-01-2019	08-01-2019	Standard Class	BO-11350	Bill Overfelt	Corporate	United States
9495	CA-2019-105207	03-01-2019	08-01-2019	Standard Class	BO-11350	Bill Overfelt	Corporate	United States
2898	US-2019-164630	04-01-2019	09-01-2019	Standard Class	EH-13975	Erica Bern	Corporate	United States
5868	CA-2019-158211	04-01-2019	08-01-2019	Standard Class	BP-11185	Ben Peterman	Corporate	United States
5869	CA-2019-158211	04-01-2019	08-01-2019	Standard Class	BP-11185	Ben Peterman	Corporate	United States
863	CA-2019-134474	05-01-2019	07-01-2019	Second Class	AJ-10795	Anthony Johnson	Corporate	United States
864	CA-2019-134474	05-01-2019	07-01-2019	Second Class	AJ-10795	Anthony Johnson	Corporate	United States
865	CA-2019-134474	05-01-2019	07-01-2019	Second Class	AJ-10795	Anthony Johnson	Corporate	United States
2162	CA-2019-101938	07-01-2019	12-01-2019	Standard Class	DW-13480	Dianna Wilson	Home Office	United States
8031	CA-2019-158806	07-01-2019	11-01-2019	Standard Class	NM-18520	Neoma Murray	Consumer	United States
8032	CA-2019-158806	07-01-2019	11-01-2019	Standard Class	NM-18520	Neoma Murray	Consumer	United States
6851	US-2019-100461	08-01-2019	12-01-2019	Standard Class	JO-15145	Jack O'Briant	Corporate	United States
6852	US-2019-100461	08-01-2019	12-01-2019	Standard Class	JO-15145	Jack O'Briant	Corporate	United States

## Dataset cleaning:

Removed empty columns from dataset:

The screenshot shows the Power Query Editor interface with the following details:

- File Bar:** Home, Transform, Add Column, View, Tools, Help.
- Toolbars:** Close & Apply, New Source, Recent Data, Data source settings, Manage Parameters, Refresh Preview, Advanced Editor, Properties, Choose Columns, Remove Columns, Keep Rows, Remove Rows, Sort, Data Type: Text, Use First Row as Headers, Merge Queries, Text Analytics, Append Queries, Vision, Combine Files, Azure Machine Learning, Combine, AI Insights.
- Queries List:** SuperStore\_Sales\_Dataset [1].
- Table View:** Shows a table with columns: Profit, Returns, Payment Mode, ind1, and ind2. A context menu is open over the ind2 column, showing statistics: 0 (0%) Valid, 0 (0%) Error, 1000 (100%) Empty. Below the table, a tooltip says "Remove Empty".
- Properties Panel:** Name: SuperStore\_Sales\_Dataset, All Properties.
- Applied Steps:** Promoted Headers.
- Bottom Status:** PREVIEW DOWNLOADED AT 11:44.

## Replacing #N/A values:

The screenshot shows the Power Query Editor interface with the following details:

- File Bar:** Home, Transform, Add Column, View, Tools, Help.
- Toolbars:** Close & Apply, New Source, Recent Data, Data source settings, Manage Parameters, Refresh Preview, Advanced Editor, Properties, Choose Columns, Remove Columns, Keep Rows, Remove Rows, Sort, Data Type: Text, Use First Row as Headers, Merge Queries, Text Analytics, Append Queries, Vision, Combine Files, Azure Machine Learning, Combine, AI Insights.
- Queries List:** SuperStore\_Sales\_Dataset [1].
- Table View:** Shows a table with a column labeled "Sales". A context menu is open over the "Sales" column, showing the command "Table.RemoveColumns(#"Promoted Headers", {"ind1", "ind2"})".
- Replace Values Dialog:** Replace one value with another in the selected columns. Value To Find: "#N/A", Replace With: "0".
- Properties Panel:** Name: SuperStore\_Sales\_Dataset, All Properties.
- Applied Steps:** Promoted Headers, Removed Columns.
- Bottom Status:** PREVIEW DOWNLOADED AT 11:47.

## Sorting:

The screenshot shows the Power Query Editor interface with the 'Transform' tab selected. A context menu is open over the 'Returns' column header, with 'Sort' highlighted. The 'Sort' dialog box is displayed, showing two options: 'Sort Ascending' and 'Sort Descending'. Below these are 'Clear Sort' and 'Clear Filter' options. A 'Text Filters' section contains a search bar and two checkboxes: '(Select All)' and '0'. At the bottom of the dialog are 'OK' and 'Cancel' buttons, and a note stating 'List may be incomplete.' with a 'Load more' link.

## Change needed datatypes:

The screenshot shows the Power Query Editor interface with the 'Transform' tab selected. A context menu is open over the 'Returns' column header, with 'Sort' highlighted. The 'Sort' dialog box is displayed, showing two options: 'Sort Ascending' and 'Sort Descending'. Below these are 'Clear Sort' and 'Clear Filter' options. A 'Text Filters' section contains a search bar and two checkboxes: '(Select All)' and '0'. At the bottom of the dialog are 'OK' and 'Cancel' buttons, and a note stating 'List may be incomplete.' with a 'Load more' link.

### 3. Data Modelling:

- Design and implement a data model within Power BI using Power Query and/or DAX.
- Define calculated columns and measures to derive meaningful insights from the data.

Created new column for AvgDelivery.

Table: SuperStore\_Sales\_Dataset (5,901 rows) Column: AvgDelivery (9 distinct values)

Dax query:

```
1 AvgDelivery = DATEDIFF('SuperStore_Sales_Dataset'[Order Date], 'SuperStore_Sales_Dataset'[Ship Date], DAY)
```

Created new table for sales forecasting.

Table: salesforecast (643 rows)

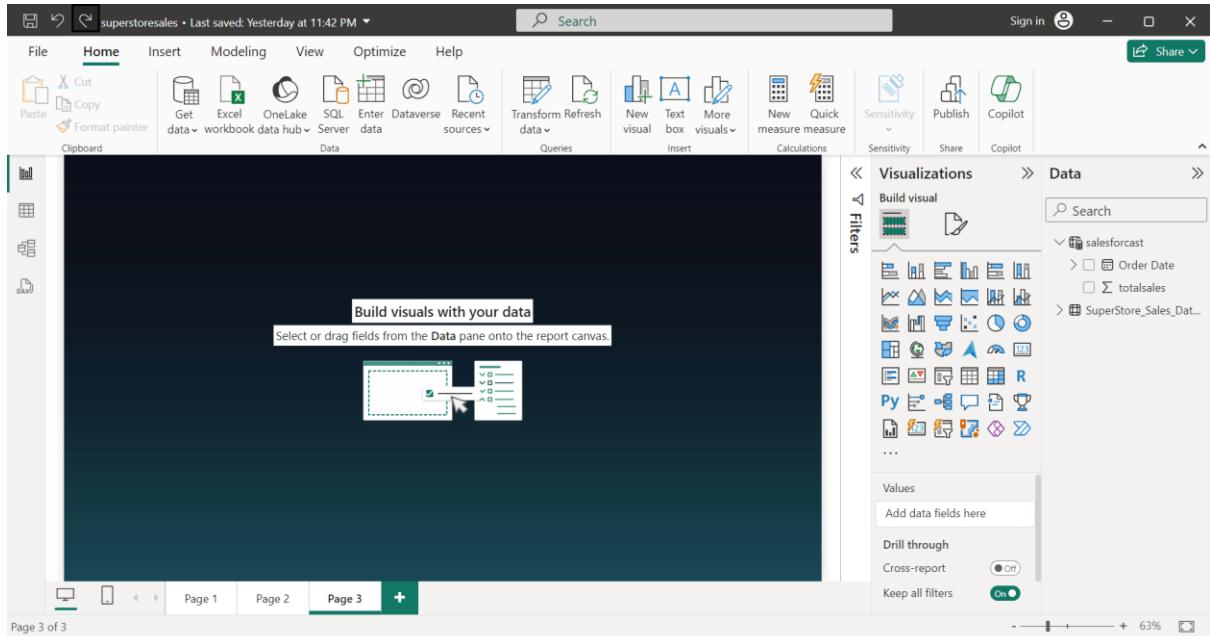
Dax Query:

```
1 salesforecast = SUMMARIZE('SuperStore_Sales_Dataset', 'SuperStore_Sales_Dataset'[Order Date], "totalsales", SUM('SuperStore_Sales_Dataset'[Sales]))
```

#### 4. Visualization Development:

- Develop interactive dashboards and reports using Power BI Desktop.
- Select appropriate visualizations such as bar charts, line charts, pie charts, and maps.
- Customize visualizations to effectively represent sales data and highlight key insights.
- Incorporate slicers, filters, and drill-down capabilities to enhance interactivity.

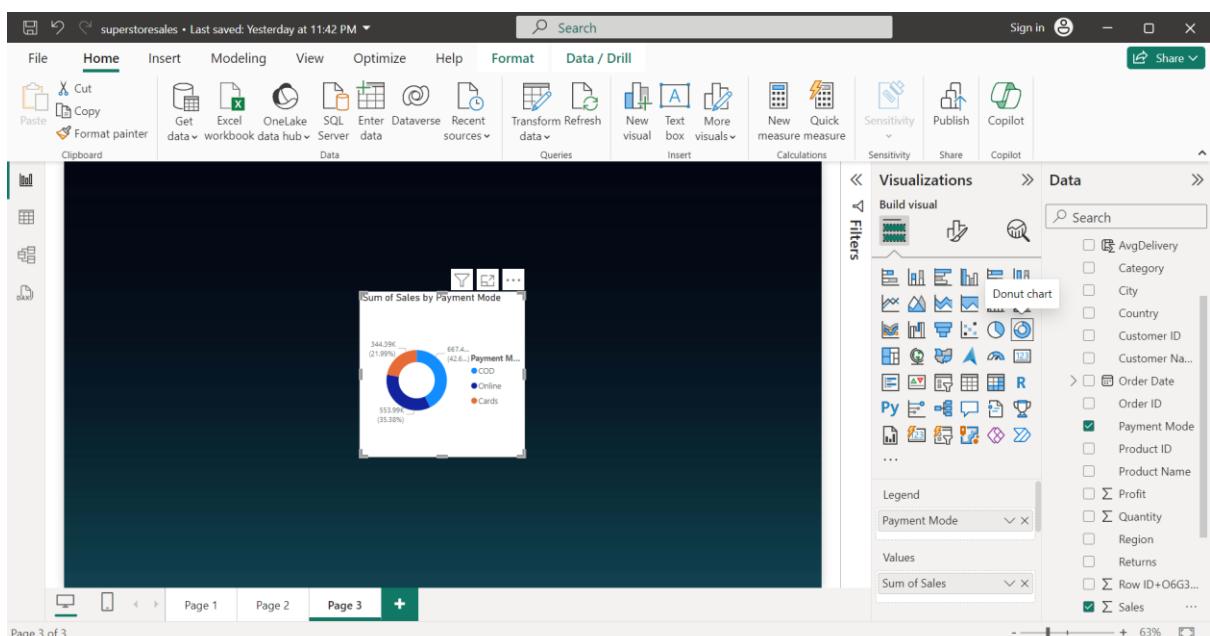
Canvas Background selection.



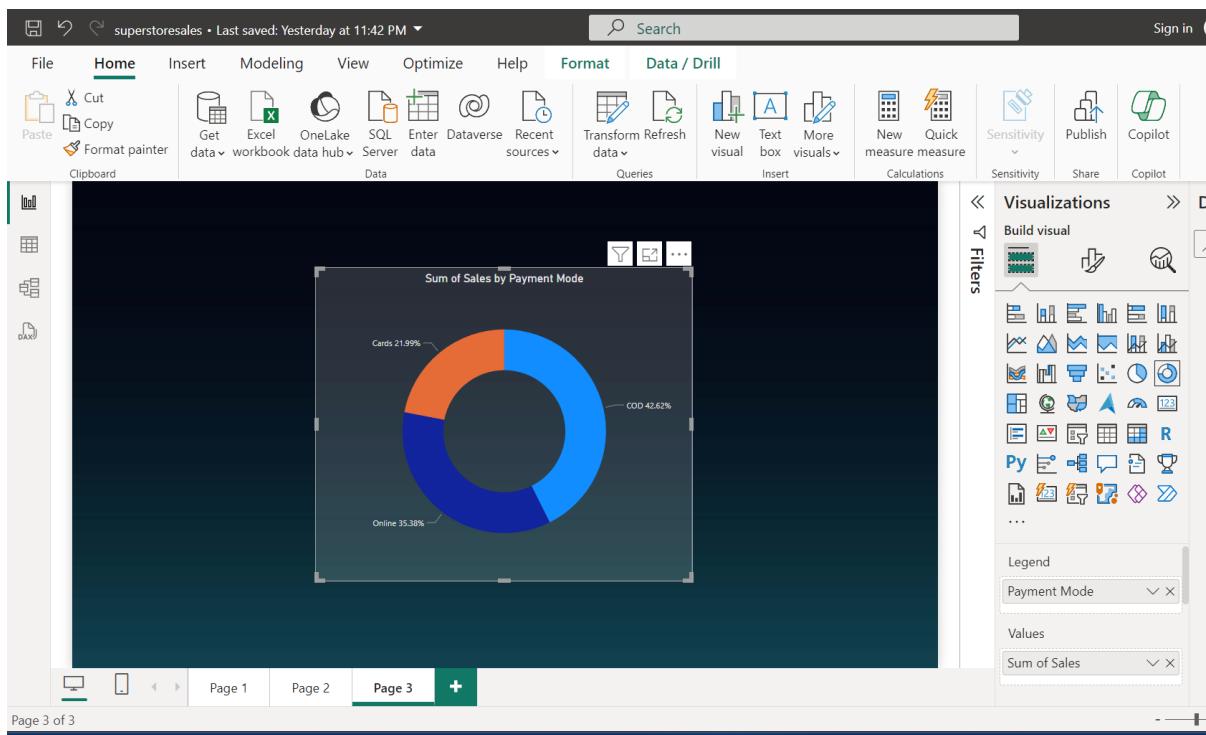
Creating Donut chart model for showing sum of sales by payment mode:

Legend: Payment mode

Value: Sum of Sales



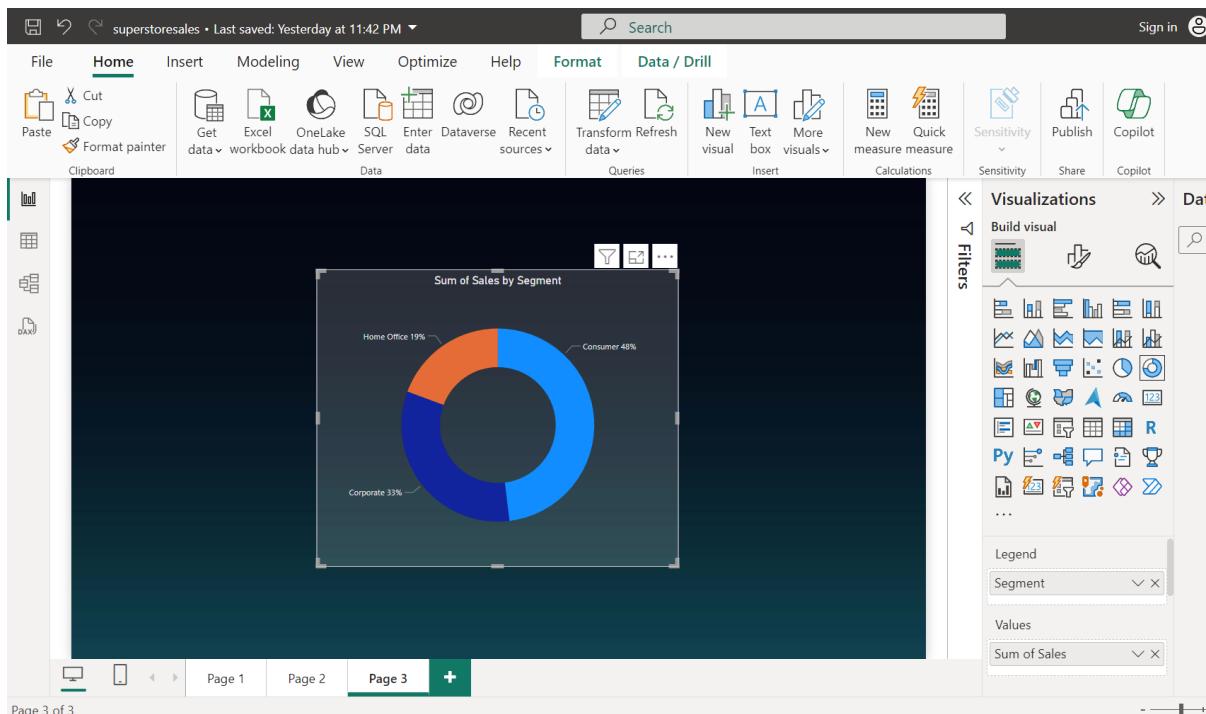
## View after formatting:



Donut chart model for showing sum of sales by segment:

Legend: Segment

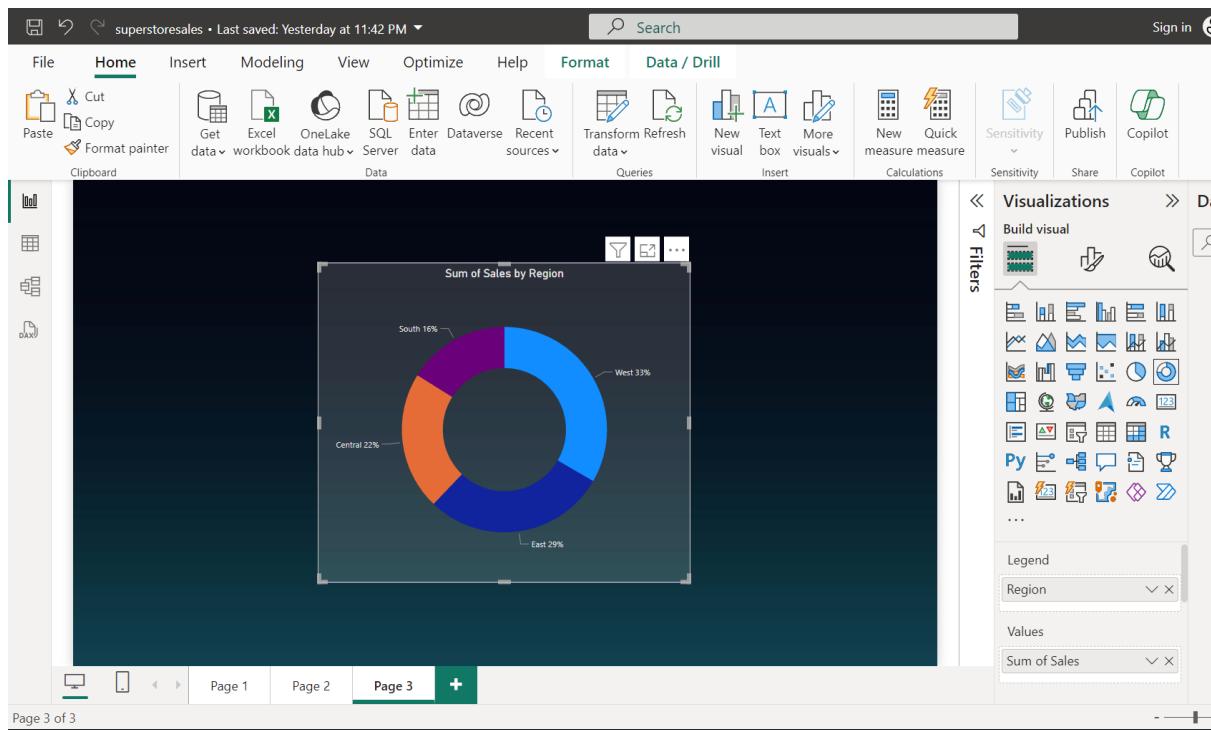
Values: sum of sales



Donut chart model for showing sum of sales by Region:

Legend: Region

Values: sum of sales

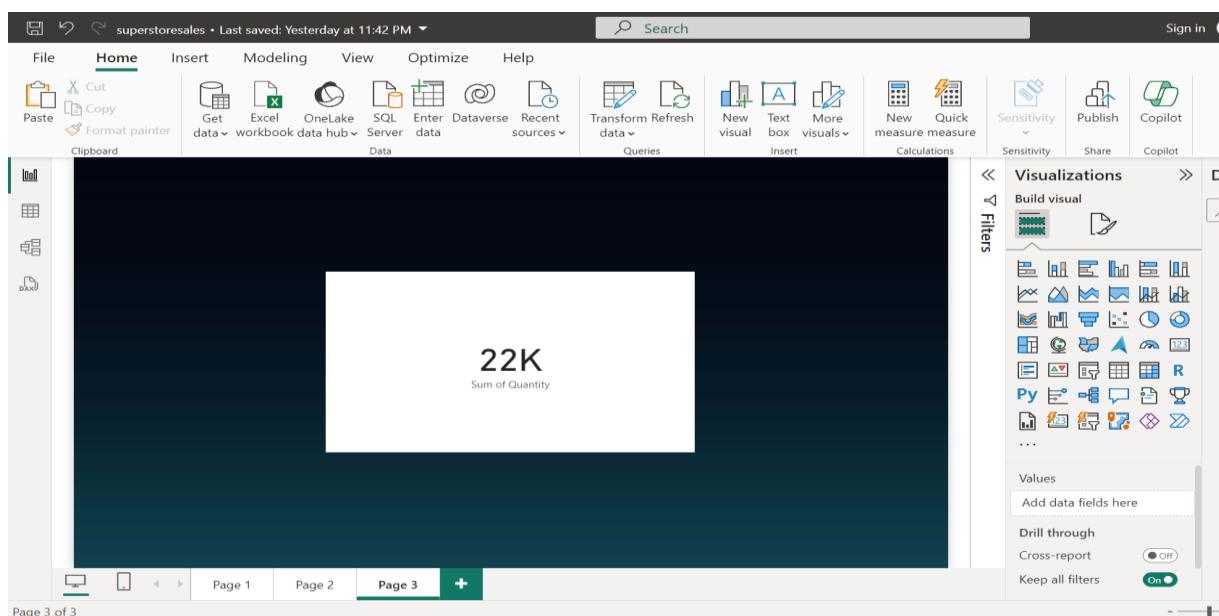


Creating kpi's (Key Performance Indicator):

field: sum of quantity

tooltips: on

title: on



After formatting:

The screenshot shows the Power BI desktop interface with a single KPI visual on the canvas. The visual displays the value "22K" with the label "Quantity" above it. The ribbon at the top is set to the "Home" tab, and the "Visualizations" pane on the right shows various visualization options like charts and maps.

Different KPI's for different fields:

Field: sum of sales.

Field: sum of profit

Field: Average of Avgdelivery

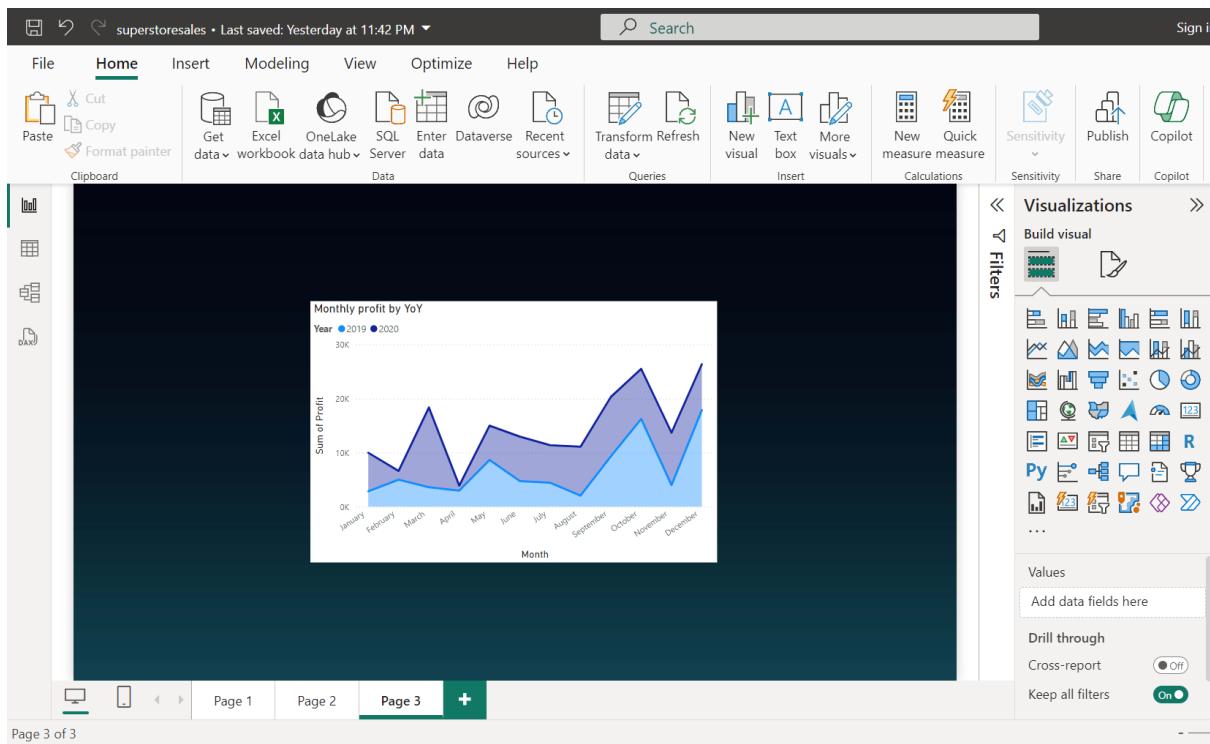
The screenshot shows the Power BI desktop interface with four KPI visual cards on the canvas, each displaying a different metric: "Quantity" (22K), "Sales" (1.57M), "Profit" (175.26K), and "Ship days" (4). The ribbon at the top is set to the "Home" tab, and the "Visualizations" pane on the right shows various visualization options.

Creating stacked area chart to show monthly profit of different years:

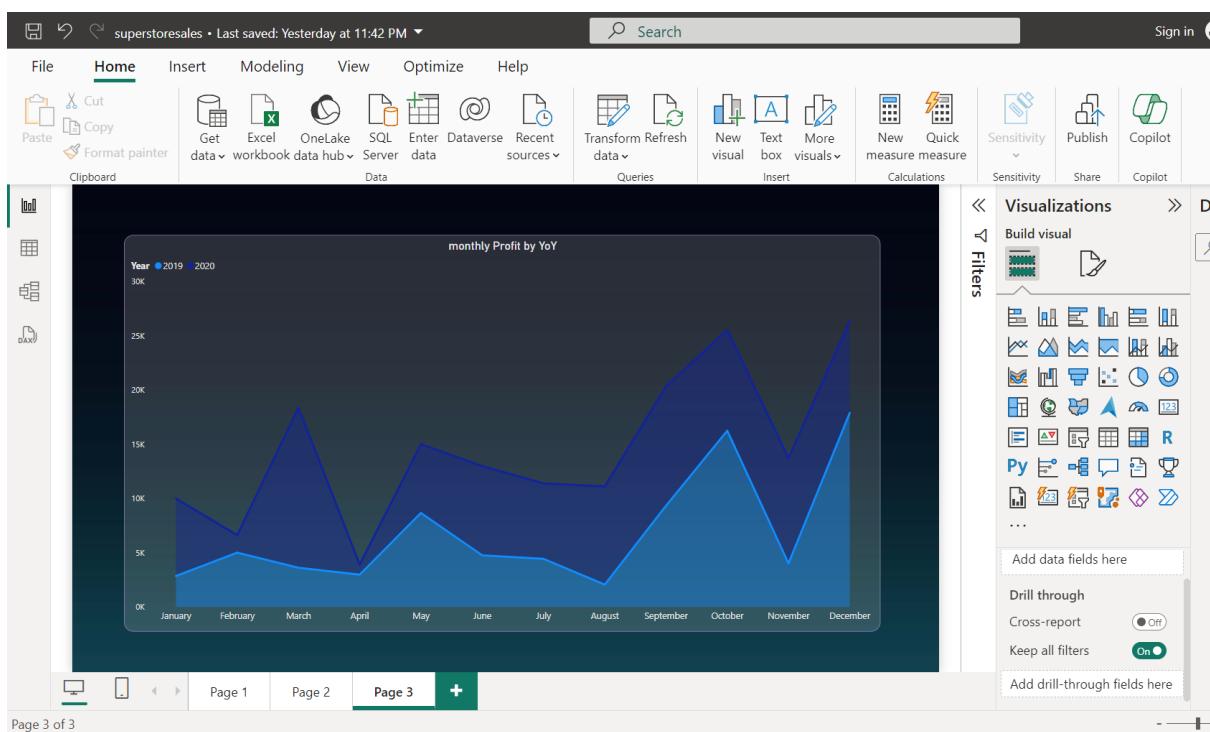
On x-axis: field (order date), subfield (month, day)

On y-axis: field (sum of profit)

Legend: field (order date), subfield(year)



After formatting:

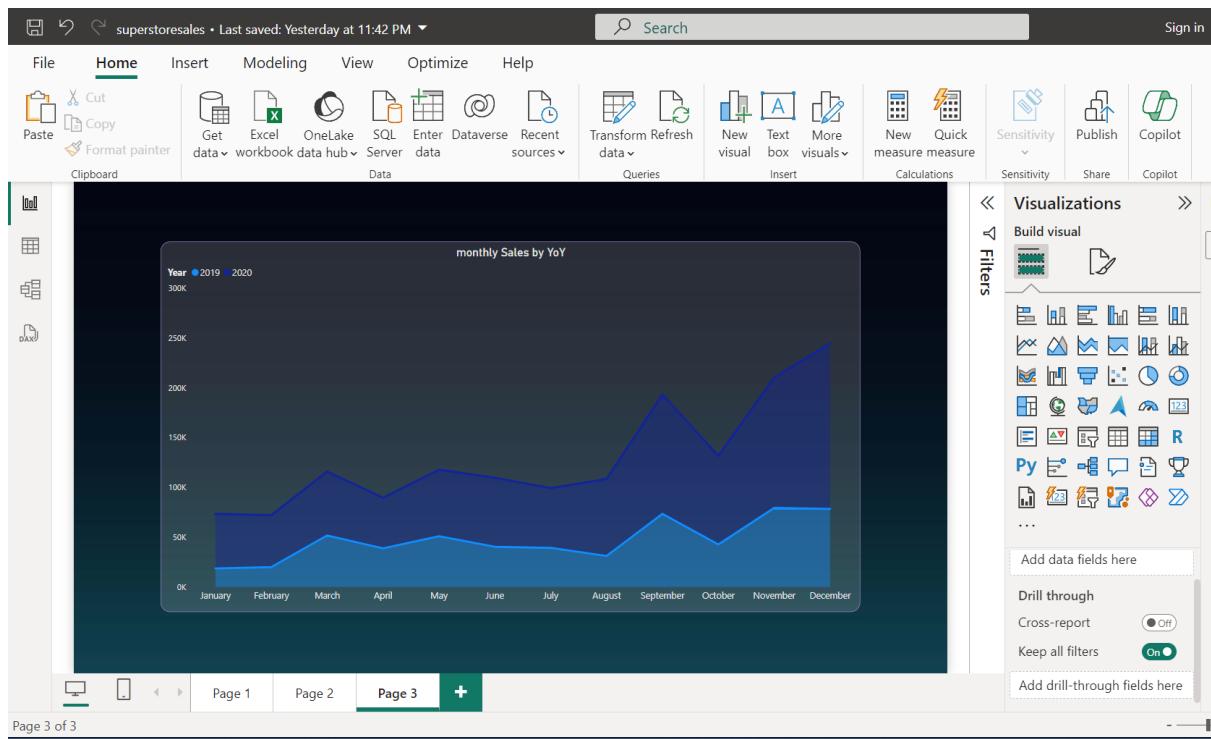


Creating stacked area chart to show monthly profit of different years:

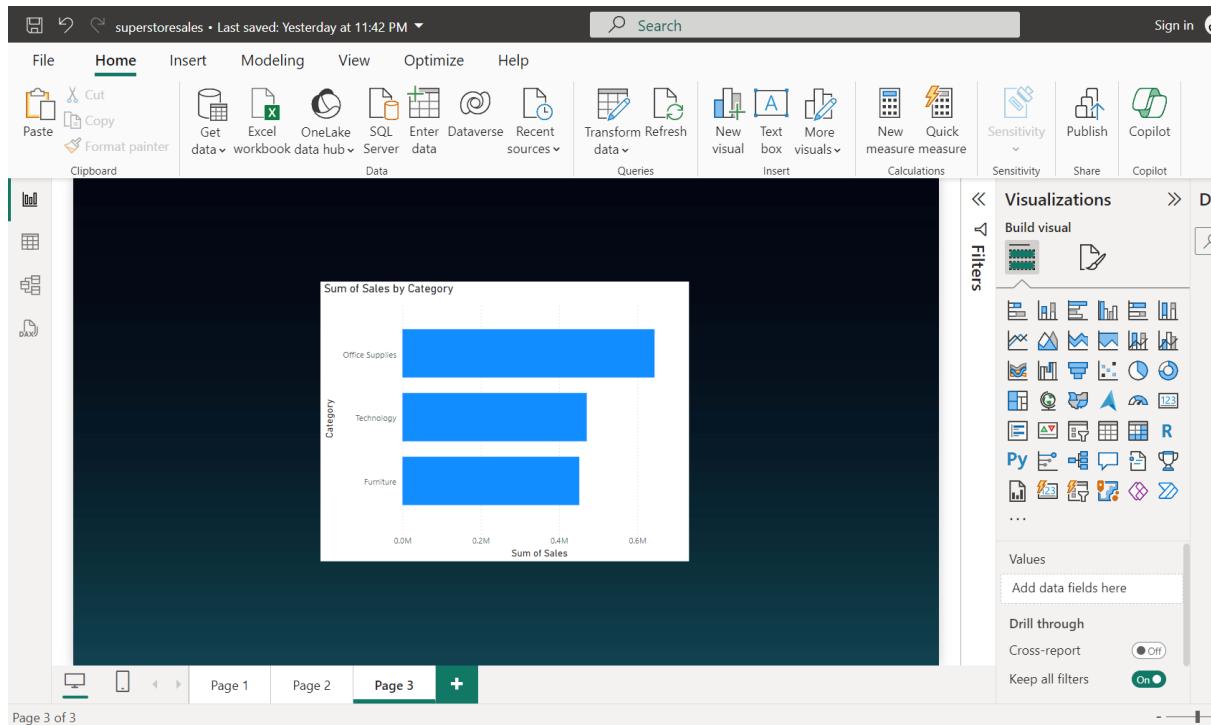
On x-axis: field (order date), subfield (month, day)

On y-axis: field (sum of sales)

Legend: field (order date), subfield(year)



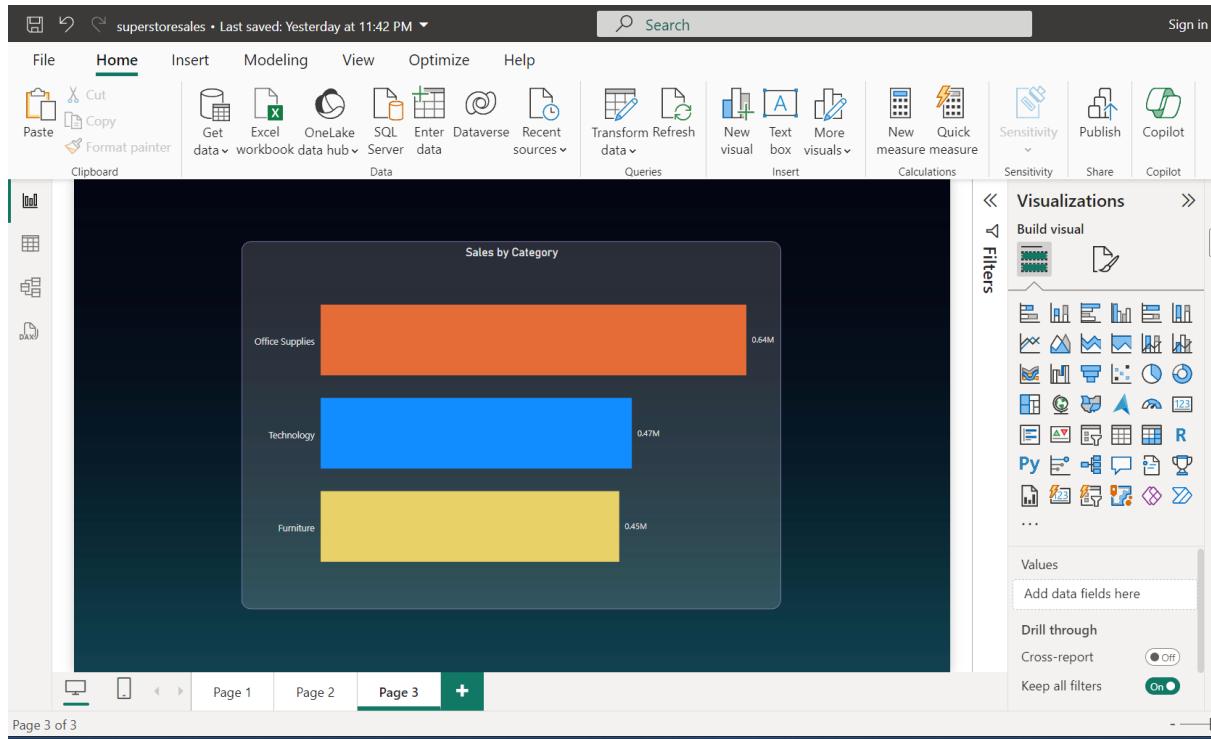
Creating clustered bar chart to get high level idea of sales by various category.



After formatting:

Y-axis: field (category)

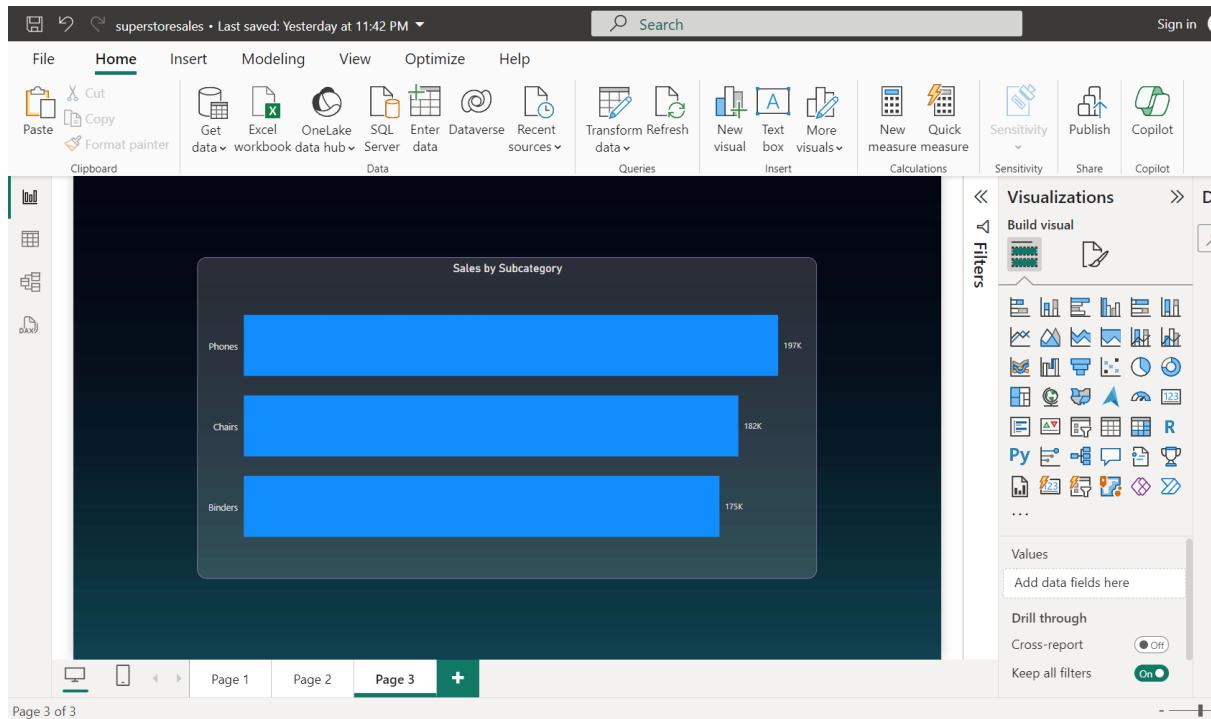
X-axis: field (sum of sales/sales)



Creating clustered bar chart for sum of sales by sub-category:

Y-axis: field (subcategory)

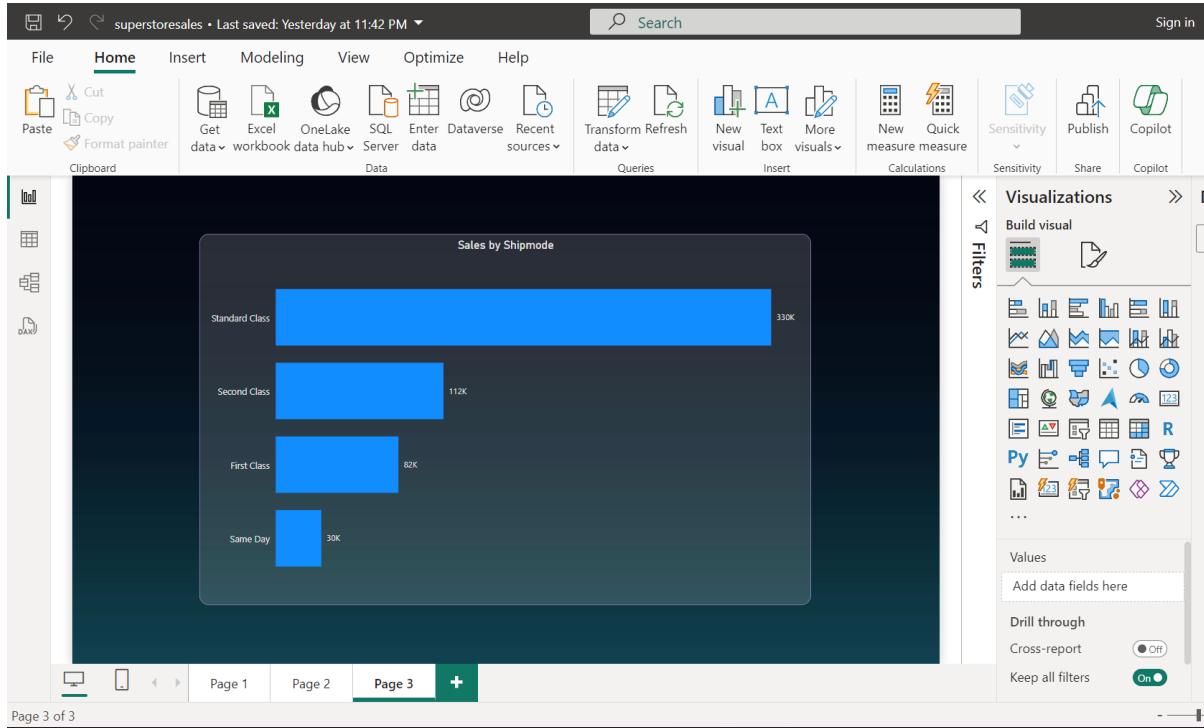
X-axis: field (sum of sales/sales)



Creating clustered bar chart for sum of sales by sub-category:

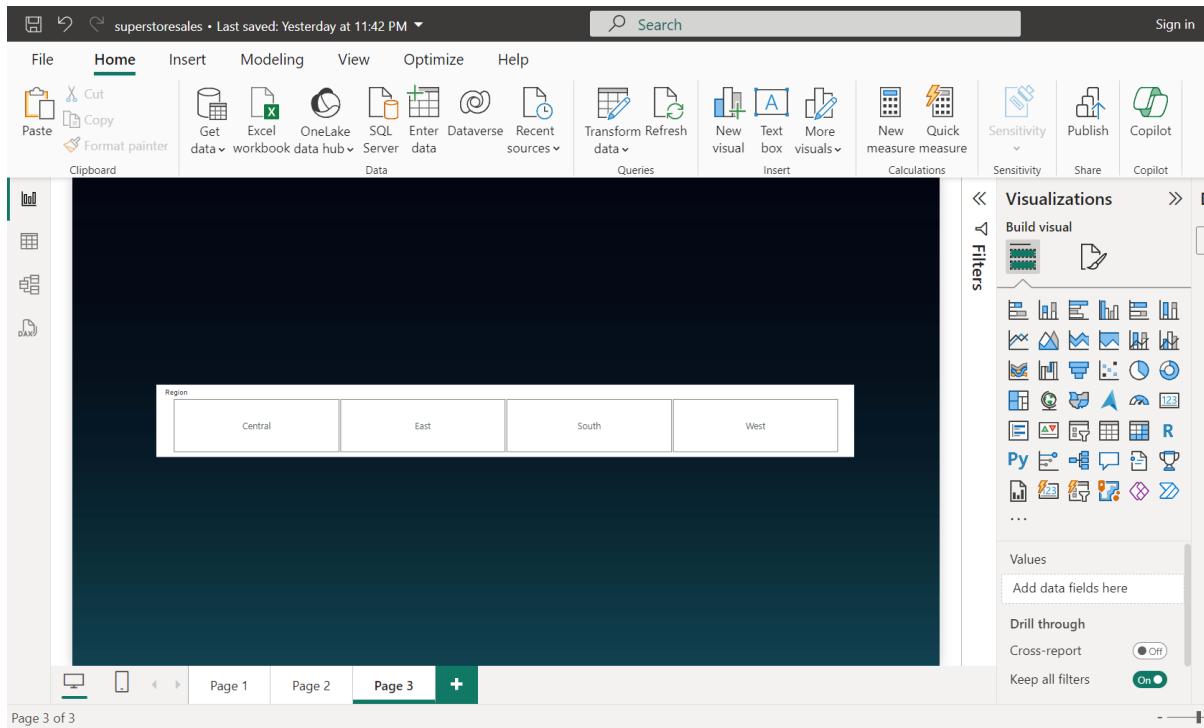
Y-axis: field (ship mode)

X-axis: field (sum of sales/sales)



Creating slicer to get insights of different regions:

Field: region



After formatting:

The screenshot shows a Microsoft Power BI desktop interface. At the top, the ribbon menu includes Home, Insert, Modeling, View, Optimize, and Help. The Home tab is selected. Below the ribbon are various toolbars for clipboard operations, data management, queries, insertions, and calculations. A large central area displays a dashboard with four blue rectangular cards labeled 'Central', 'East', 'South', and 'West'. To the right of the dashboard is a 'Visualizations' pane containing a grid of icons representing different chart types like bar charts, line graphs, and maps. Below the grid are sections for 'Values' (with a placeholder 'Add data fields here'), 'Drill through', 'Cross-report' (with an off/on switch), and 'Keep all filters' (with an on/off switch). The bottom of the screen shows navigation buttons for Page 1, Page 2, Page 3, and a plus sign for adding new pages.

Creating map visual to represent sum of sales by state:

Location: field(state)

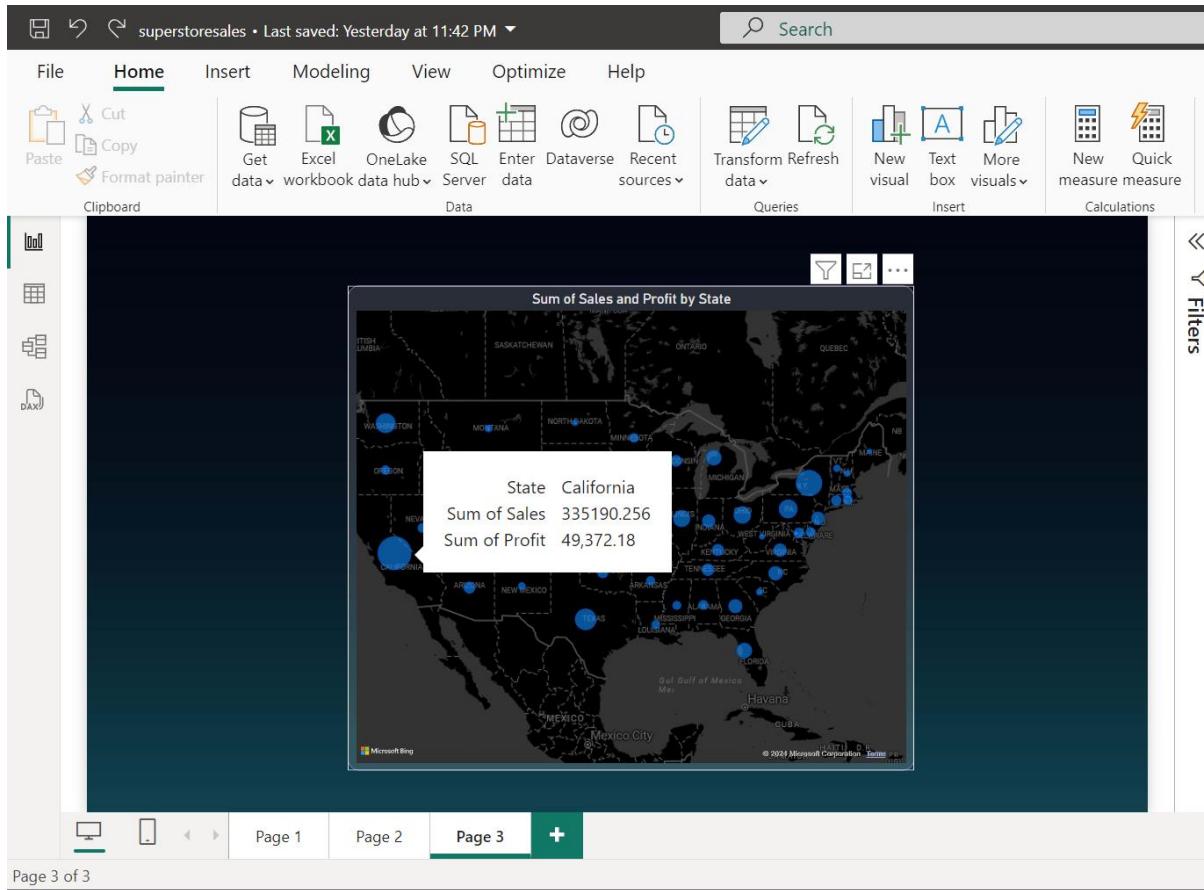
Bubble size: field (sum sales)

The screenshot shows the same Microsoft Power BI desktop interface as the previous one. In the central workspace, there is a map of the United States and parts of Canada and Mexico. The map uses bubble sizes to represent the sum of sales for each state. The bubbles are larger in states like California, Texas, and New York, and smaller in others. The map is titled 'Sum of Sales by State'. The background of the workspace is dark, and the ribbon menu at the top is identical to the first screenshot. Navigation buttons at the bottom indicate this is Page 3 of 3.

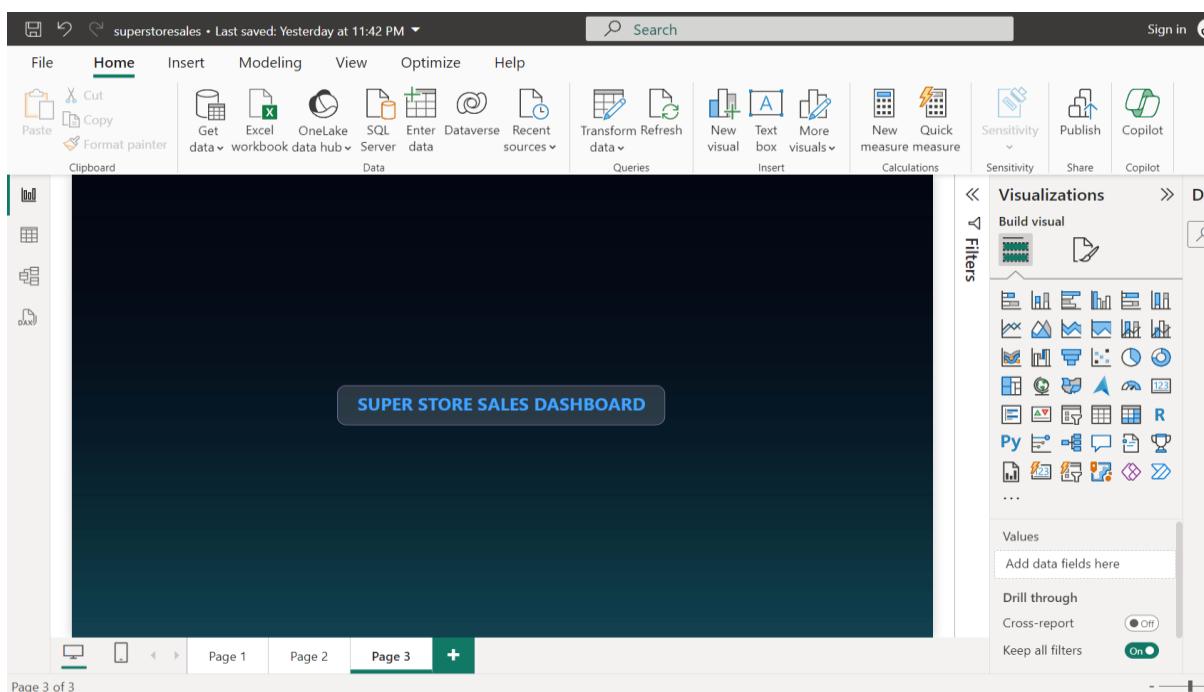
After formatting:

Style: dark

Tooltip: sum of profit



Creating label for dashboard store name:



## 6.RESULT

After arranging all the visuals and functions in proper manner final view of Dashboard is:



Fig6.1: Final view of Dashboard



Fig6.2: Visual insights and analysis for central region

## Sales Insights

**Total Sales:** The dashboard indicates a significant sales volume, with the total sales amounting to 150K. This reflects the overall health and market penetration of the business.

**Sales by Region:** The Central region contributes the most to the total sales, accounting for 44%. This suggests that marketing efforts and resources could be further optimized in other regions to balance the sales distribution.

**Monthly Sales Trends:** The line chart comparing monthly sales for 2019 and 2020 reveals seasonal trends and growth patterns. Notable spikes in certain months indicate periods of high demand, which can be leveraged for future marketing campaigns.

## Profit Insights

**Total Profit:** The total profit stands at 6.48K, reflecting a positive margin. However, the profit margin compared to sales can be analyzed further to identify areas for cost reduction or price optimization.

**Monthly Profit Trends:** The line chart for monthly profit shows fluctuations throughout the year. Identifying the causes of these fluctuations can help in stabilizing and improving profit margins.

**Profit by State:** The map visualization shows profit distribution across states, highlighting high and low performing areas. States with lower profit margins might require strategic adjustments in pricing, marketing, or operational efficiency.

## Quantity Insights

**Total Quantity Sold:** A total of 3277 units sold indicates a strong market presence and demand for products. Monitoring this metric over time helps in understanding sales trends and inventory needs.

**Quantity by Category and Subcategory:** Detailed analysis of quantities sold by category and subcategory provides insights into product performance. For instance, high sales volume in specific subcategories like Binders suggests strong demand, guiding inventory and procurement strategies.

## Category Insights

**Top Performing Categories:** Office Supplies lead in sales with 0.15M, followed by Furniture and Technology. This indicates a higher demand for office-related products, which can inform product development and marketing strategies.

**Sales Distribution by Category:** Understanding the sales distribution helps in balancing the product portfolio. Categories with lower sales might need re-evaluation in terms of product offerings, pricing strategies, or promotional efforts.

## Subcategory Insights

**Top Performing Subcategories:** Binders, Chairs, and Phones are among the top-selling subcategories. High sales in these areas suggest customer preference and market trends, which can be capitalized on through targeted promotions and stock management.

**Sales by Subcategory:** Detailed insights into subcategory performance allow for precise inventory management. For example, ensuring sufficient stock of high-demand items like Binders can prevent stockouts and lost sales.



**Fig6.3: Visual insights and analysis for East region**

## Sales Insights

**Total Sales:** The dashboard shows a total sales value of 450K. This is a significant figure that indicates strong market performance and revenue generation.

**Sales by Region:** The East region contributes 100% of the displayed sales. This might indicate that the current data view is filtered to show only the East region. It's important to compare with other regions to get a comprehensive view.

**Monthly Sales Trends:** The monthly sales graph for 2019 and 2020 shows an upward trend, especially towards the end of the year. This indicates potential seasonality effects or successful sales campaigns during those months.

## Profit Insights

**Total Profit:** The total profit is 53.40K, reflecting a healthy profit margin. Comparing this with total sales, the business seems to be operating profitably.

**Monthly Profit Trends:** The monthly profit graph indicates fluctuations, with notable peaks towards the end of the year. This suggests higher profitability during specific months, possibly due to increased sales during holiday seasons or successful marketing strategies.

## Quantity Insights

Total Quantity Sold: A total of 6251 units sold, showing robust demand across different product lines.

Quantity by Category and Subcategory: Detailed insights into which categories and subcategories contribute the most to the quantity sold help in managing inventory and supply chain more effectively.

## Category Insights

Top Performing Categories: Office Supplies lead with 0.19M in sales, followed by Technology (0.14M) and Furniture (0.12M). This indicates that office supplies are the most demanded product category.

Category Sales Distribution: Understanding the distribution of sales across these categories can help in strategic planning, ensuring that inventory and marketing efforts are aligned with customer demand.

## Subcategory Insights

Top Performing Subcategories: Phones (60K), Chairs (56K), and Binders (53K) are the top-selling subcategories. This shows a high demand for these specific products.

Detailed Sales by Subcategory: These insights can guide inventory management and promotional activities. Ensuring adequate stock of high-demand items like Phones, Chairs, and Binders can prevent stockouts and lost sales opportunities.

## **7.FUTURE SCOPE**

### **1. Advanced Analytics and AI Integration**

- Predictive Analytics: Enhance the predictive capabilities by integrating advanced machine learning models to forecast sales trends, customer churn, and market demand more accurately.
- AI-Driven Insights: Implement artificial intelligence to automatically identify patterns and anomalies in sales data, providing proactive insights and recommendations.

### **2. Real-Time Data Analysis**

- Real-Time Dashboards: Develop real-time dashboards that update dynamically as new sales data comes in, allowing for immediate analysis and decision-making.
- Streaming Data Integration: Integrate streaming data sources to analyse sales data in real-time, enabling businesses to react promptly to changes in the market.

### **3. Enhanced Data Integration**

- More Data Sources: Expand the range of data sources to include social media analytics, web traffic data, and other external data sources that can provide additional context to sales performance.
- Data Lake Integration: Utilize data lakes to store vast amounts of structured and unstructured data, allowing for more comprehensive and in-depth analysis.

### **4. Customization and Personalization**

- User-Specific Dashboards: Develop customized dashboards tailored to the needs of different users within the organization, such as executives, sales managers, and marketing teams.
- Personalized Insights: Use machine learning algorithms to deliver personalized insights and recommendations based on individual user roles and preferences.

### **5. Collaboration and Sharing**

- Collaborative Platforms: Integrate Power BI with collaboration platforms like Microsoft Teams, enabling team members to discuss insights and make decisions directly within the reporting environment.
- Shared Workspaces: Create shared workspaces where teams can collaboratively build and refine reports and dashboards, fostering a culture of data-driven decision-making.

## 6. Enhanced User Experience

- Improved UX Design: Continuously improve the user interface and experience of Power BI dashboards to make them more intuitive and accessible for non-technical users.
- Mobile Optimization: Ensure all dashboards and reports are fully optimized for mobile devices, allowing users to access insights on-the-go.

## 7. Scalability and Performance

- Scalability Improvements: Enhance the scalability of the Power BI environment to handle larger datasets and more complex queries without compromising performance.
- Performance Tuning: Continuously optimize data models and queries to improve the performance of dashboards and reports, ensuring fast and responsive user experiences.

## 8. Training and Skill Development

- Ongoing Training Programs: Implement ongoing training programs to upskill employees on advanced Power BI features and data analysis techniques.
- Certifications and Workshops: Encourage team members to obtain Power BI certifications and participate in workshops to stay updated with the latest developments in data analytics.

## 9. Security and Compliance

- Enhanced Data Security: Implement advanced security measures to protect sensitive sales data, including encryption, access controls, and regular security audits.
- Regulatory Compliance: Ensure that the sales analysis processes comply with relevant data protection regulations and industry standards, such as GDPR and CCPA.

## 10. Integration with Business Processes

- Workflow Automation: Integrate Power BI with business process management tools to automate workflows based on insights derived from sales data.
- Decision Support Systems: Develop decision support systems that leverage Power BI insights to guide strategic business decisions across various departments.

By focusing on these future developments, the sales analysis project using Power BI can continuously evolve to meet the changing needs of the organization, drive innovation, and maintain a competitive edge in the market.

## **8.CONCLUSION**

The "Sales Analysis Using Power BI" project has successfully demonstrated the transformative potential of data analytics in enhancing business decision-making processes. By leveraging Power BI's robust data visualization and analytical capabilities, we have developed a comprehensive framework that provides actionable insights into sales trends, customer behaviour, and overall sales performance.

The project's structured approach began with a thorough problem definition, identifying the key analytical needs and challenges within our sales processes. This foundational step ensured that our objectives were aligned with the broader strategic goals of the organization. The subsequent literature review provided a robust theoretical foundation, incorporating best practices and lessons from successful case studies of Power BI implementations.

Data collection and preparation were critical phases, involving the aggregation of sales data from diverse sources such as CRM systems, ERP systems, and spreadsheets. Rigorous data cleaning and transformation ensured that the data was accurate and consistent, ready for in-depth analysis. This meticulous preparation laid the groundwork for the development of a robust data model within Power BI.

Throughout the project, we meticulously followed a systematic approach that included problem definition, literature review, data collection and preparation, model selection and implementation, testing and validation, and presentation and reporting. Each phase was designed to ensure the accuracy and relevance of the insights derived, ultimately supporting the strategic objectives of the organization.

Key achievements of the project include the creation of interactive dashboards and reports that allow stakeholders to dynamically explore sales data, the identification of significant sales trends and patterns, and the provision of detailed recommendations to optimize sales strategies. Additionally, the project has laid the groundwork for future enhancements, such as integrating advanced analytics and AI, real-time data analysis, and improved data integration.

The project's success underscores the importance of data-driven decision-making in today's competitive business landscape. By continuously refining and expanding the capabilities of our sales analysis framework, we can ensure that the organization remains agile, informed, and poised to capitalize on emerging opportunities.

Looking ahead, the future scope of this project is vast. Opportunities for integrating advanced analytics and AI will further enhance our predictive capabilities, while real-time data analysis will enable more agile and responsive decision-making.

In conclusion, this project not only fulfils its immediate objectives but also sets a foundation for ongoing innovation and improvement in sales analysis. The insights gained and the methodologies developed will serve as valuable assets in driving sustained business growth and success. As we move forward, the integration of advanced technologies and the expansion of our analytical capabilities will further enhance our ability to make informed, strategic decisions that propel the organization toward its goals.

## **9. REFERENCES**

[1] Adamala, S. & Cidrin, L. (2011). Key Success Factors in Business Intelligence. *Journal of Intelligence Studies in Business*, Vol. 1(1).

[2] Alaskar, T., & Efthimios, P. (2015). Business Intelligence Capabilities and Implementation Strategies.

*International Journal of Global Business*, Vol. 8 (1), pp. 34- 45.

[3] <https://hevodata.com/learn/10-best-power-bi-reports-examples/>

[4] <https://powerbi.microsoft.com/en-us/>

[5] <https://rigorousthemes.com/blog/best-power-bi-dashboard-examples/>

[6] <https://inblog.in/Power-BI-Projects-HdlkEZeaXK>