A

Project Report

On

Sales Data Analysis

Submitted in partial fulfillment of the requirement for the award of degree of

Bachelor of Computer Application (BCA)
of
Kavikulaguru Kalidas Sanskrit University

Submitted by

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Under the guidance of

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Vashi.

BATCH: 2022-2025

Kavikulaguru Kalidas Sanskrit University's

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Vashi.

CERTIFICATE

This is to certify that the project entitled **Sales Data Analysis** undertaken at the PCP Center: Bakliwal Foundation of Arts, Commerce & Science, Vashi, New Mumbai by **Miss.DISHITA ANIL PATIL** holding **Seat No.67 (Prn No:2022018100095376)** Studying **Bachelor of Computer Applications** Semester – VI has been satisfactorily completed as prescribed by the Kavikulaguru Kalidas Sanskrit University, during the year 2024 – 2025.

Project In-charge   **Co-Ordinator**

External Examiner

Internal Examiner   **Principal**

DECLARATION

This Sales Data Analysis project has been developed with the objective of providing meaningful insights into product sales, customer preferences, and transaction patterns across various regions and product categories.

The project aims to help businesses and stakeholders make informed decisions by visualizing key performance indicators, trends, and segmentation in a simple and interactive format. It focuses on delivering a high-quality, cost-effective analytical solution in a competitive environment.

This report contains only the core logic and design of the dashboard. Detailed technical and backend implementation aspects are not included in this document.

While utmost care has been taken to develop the dashboard accurately and efficiently, the project may still have certain limitations. It is intended to serve as a foundational version, and can be further enhanced or customized in the future based on the evolving requirements of the client.

Dishita Anil Patil

ACKNOWLEDGMENT

I take this opportunity to express my sincere and heartfelt gratitude to all those who have supported and guided me throughout the development of my project titled **"Sales Data Analysis"**.

This project marks a valuable milestone in my learning journey, and its successful completion is not solely the result of my individual effort but also the encouragement and constant support I have received from various individuals.

I am deeply thankful to my project guide, **Prof. Sneha Shashikant Lokhande Ma'am**, for her invaluable support, insightful feedback, and continuous encouragement throughout the project work.

I extend my sincere thanks to **Dr.Sharadkumar Shah - Principal**, **Prof. Sneha Shashikant Lokhande - HOD (BCA)**, as well as **Prof.Shaikh Mohammed Umar, Prof.Divya Patil, Prof. Kalyani Kulkarni, Prof.Ankit Shrivastava** and all the respected faculty members for their guidance, inspiration, and kind cooperation during the course and project development.

Lastly, I express my sincere thanks to all those who directly or indirectly helped me in the successful execution of this project.

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1. <u>Introduction</u>

In today's business world, analyzing sales data is important for understanding product performance, customer preferences, and identifying high-performing regions. However, traditional tools like Excel alone are not always sufficient when dealing with large and complex datasets. In this project, Excel was used as the first step for cleaning and preparing raw sales data — this included removing duplicates, filling missing values, and formatting data for consistency. After cleaning, the data was imported into Power BI, a powerful business intelligence tool, to create interactive dashboards and visual reports. This combination of Excel and Power BI allowed for efficient analysis and clear presentation of insights such as regional performance, payment methods, and customer types. The objective of this project is to help users make smarter and faster business decisions with a dashboard that is easy to use, cost-effective, and informative even for non-technical users.

2. <u>Literature Survey</u>

In today's business environment, analyzing sales data is essential for understanding how products are performing, how customers are interacting with the business, and which regions are generating higher revenue. Traditional tools like Excel have long been used for basic data handling, but they become less effective as data grows larger and more complex.

In this project, Excel was used as the first step to clean and organize the raw sales data. This involved removing duplicates, handling missing values, correcting formats, and preparing the dataset for further analysis. Excel made the initial data preparation easier and more manageable before moving to advanced tools.

After cleaning the data, Power BI was used to create visual dashboards. Power BI allows users to connect to cleaned Excel data, apply simple formulas, and create interactive charts and dashboards. It helps businesses understand their data more clearly and make better decisions in real-time.

Studies and business cases show that combining Excel and Power BI leads to more effective planning, improved product tracking, and deeper customer understanding. However, many businesses still struggle with using their data fully. This project aims to bridge that gap by offering a dashboard that is user-friendly, low-cost, and provides insights like payment methods, sales by region, and customer types.

The overall goal is to help users understand their sales data more clearly and make smarter decisions, even without deep technical skills.

3. <u>Acquisition Of Knowledge</u>

During the development of this project, I gained useful knowledge in the field of data analysis and visualization. The following are the key areas where I enhanced my understanding:

- **Understanding Sales Data:** Learned how to read and work with raw sales data, including customer details, product categories, payment types, quantity sold, and region-wise data.
- **Data Cleaning Using Excel:** Gained practical experience in using Microsoft Excel to clean and prepare the dataset. This included removing duplicate entries, handling missing values, correcting data formats, and ensuring that the dataset was ready for further analysis.
- **Power BI Skills:** Learned how to import cleaned Excel data into Power BI, connect different tables, create relationships, and work with filters, slicers, and formulas to analyze data efficiently.
- **Data Analysis and Visualization:** Understood how to create useful charts like bar graphs, pie charts, and line graphs to identify trends in sales, regional performance, customer preferences, and payment methods.
- **Improved Decision-Making through Visuals:** Learned how meaningful visuals can help businesses make informed decisions without needing to go deep into complex data tables.

This project helped me combine basic tools like Excel with advanced tools like Power BI to transform raw data into useful insights. It gave me hands-on experience in real-world data handling and taught me how data analysis supports smarter business decisions.

4. <u>Domain Knowledge</u>

4.1) <u>Introduction</u>

This project is based on the combined domain of Data Analysis and Business Intelligence. Both of these areas are essential in today's data-driven business environment. Data Analysis focuses on collecting, cleaning, and interpreting raw sales data to find patterns and trends. In this project, Excel was used to prepare the sales data by removing duplicates, handling missing values, and formatting the data for accuracy. This step ensured that the dataset was ready for further analysis.

Business Intelligence involves using tools like Power BI to turn this cleaned data into visual and interactive dashboards. These dashboards help users easily explore and understand their sales performance without needing technical knowledge. Through Power BI, users can view data in the form of charts, graphs, and slicers, making it easier to spot high-performing products, preferred payment methods, customer behavior, and region-wise sales performance.

Understanding this domain helped in creating a practical solution that not only analyzes the data but also presents it in a clear and meaningful way. The goal is to support businesses in making informed decisions based on real-time insights, improving planning, and enhancing customer satisfaction. This project combines theoretical knowledge with real-world application, making it a valuable exercise in both data analysis and business intelligence.

4.2) <u>Advantages of Domain Knowledge</u>

- Helps in understanding the purpose and importance of sales data.
- Makes it easier to clean, organize, and prepare data accurately.
- Allows better selection of relevant metrics and analysis methods.
- Guides the design of visuals and dashboards that match business needs.
- Helps in identifying patterns, trends, and useful insights.
- Supports effective and accurate decision-making.
- Bridges the gap between technical tools and real-world business problems.
- Increases the overall quality and usefulness of the project.
- Enables better communication with non-technical stakeholders.
- Saves time by focusing on what truly matters in the data.

5. <u>System Study</u>

5.1 Benefits of Proposed System

- **Improved Decision-Making**: Power BI and Excel help businesses make data-driven decisions by visualizing data insights and trends, allowing for more accurate forecasting and planning.

- **Increased Efficiency**: Automated reporting and dashboards reduce the time spent on manual data entry and analysis, freeing up time for strategic tasks.

- **Better Data Visualization**: With Power BI's interactive reports and Excel's charts, users can visualize data more effectively, making complex datasets easier to understand.

- **Real-Time Analysis**: Power BI integrates with live data sources, enabling real-time updates and analysis, which is crucial for fast-paced business environments.

- **Collaboration**: Both tools support collaboration by allowing users to share reports and dashboards, making it easier for teams to work together on the same data.

- **Data Accuracy**: The system minimizes human error by automating data collection and processing, resulting in more accurate and reliable analysis.

- **Scalability**: As your business grows, Power BI and Excel can handle larger datasets and more complex analysis, ensuring scalability for future needs.

- **Custom Reporting**: You can create tailored reports and dashboards that meet the specific needs of different stakeholders, enhancing communication and clarity.

- **Cost-Effective**: Excel is widely used and affordable, and Power BI offers a free version with powerful capabilities, making it a cost-effective solution for small to medium businesses.

- **Data Integration**: Power BI allows you to pull data from various sources, integrating disparate data into a single view for easier analysis.

6. Problem Definition & Scope Of Project

6.1) Problem Definition:

Many businesses face challenges in analyzing large volumes of sales data to extract actionable insights. Traditional methods of manual data entry and analysis can be time-consuming, error-prone, and inefficient. Sales teams struggle to quickly access key performance indicators (KPIs), identify trends, and make informed decisions. The lack of an automated, interactive system to visualize and interpret data hinders businesses from leveraging their data to optimize sales strategies, improve forecasting, and enhance decision-making.

6.2) Objective:

- To develop an automated system for analyzing sales data that provides real-time insights.
- To create interactive and dynamic dashboards using Power BI to allow users to visualize sales trends, performance metrics, and KPIs.
- To integrate Excel for detailed data manipulation and analysis, ensuring accuracy and reliability.
- To improve the decision-making process by providing clear and actionable insights into sales performance.
- To enhance business forecasting by identifying trends and patterns in historical sales data.

6.3) Scope:

- **Data Collection & Integration**: Importing and integrating sales data from various sources (e.g., spreadsheets, databases).
- **Sales Data Cleaning & Preparation**: Using Excel for cleaning, sorting, and organizing raw data into a format suitable for analysis.
- **Data Visualization**: Utilizing Power BI to create interactive dashboards and visualizations that display key sales metrics such as sales growth, regional performance, product analysis, and customer segmentation.
- **Trend Analysis**: Analyzing historical sales data to identify trends, patterns, and anomalies that can inform business strategies.
- **Forecasting**: Implementing basic forecasting models to predict future sales trends based on historical data.

- **Performance Metrics**: Tracking KPIs such as sales conversion rates, average order value, and customer acquisition costs.

- **Reporting**: Generating automated reports and summaries that can be shared with key stakeholders for decision-making.

- **User Interface**: Creating a user-friendly interface for easy navigation and interaction with the dashboards.

7. <u>Requirement Analysis</u>

7.1) <u>Analysis</u>

Requirements are descriptions of the functionalities and constraints that your system must meet. These range from high-level service specifications to detailed system constraints. The process of **Requirements Engineering** helps establish what the system should deliver and the limitations under which it will operate.

- **User Requirements**: The needs and expectations of the end-users, which describe how the system will be used.
- **Functional Requirements**: Specific behaviors and functions the system must exhibit.
- **Non-Functional Requirements**: Constraints on the system's operation, such as performance, security, and scalability.
- **System Requirements**: Hardware and software requirements necessary for the system to operate properly.

System Requirements:

- The application should be compatible with Windows operating systems for running Power BI and Excel, as they are the primary platforms for analysis.
- The application must be able to handle large datasets efficiently (e.g., sales data from multiple regions, time periods, etc.).
- The application must support internet connectivity for importing real-time data and sharing reports.
- The system should be able to integrate with various data sources, such as databases, CSV files, and Excel sheets.
- The user interface should be user-friendly and easy to navigate for business users with basic technical knowledge.
- The system must have the capability to generate interactive dashboards and detailed reports for stakeholders.

Functional Requirements:

- The system should import data from various sources such as Excel and CSV files and process it automatically.

- It should have the ability to generate sales performance dashboards, sales growth graphs, regional performance, and other KPIs.

- The system should be able to create customized reports based on the user's specifications.

- The application should allow for real-time updates and automatic data refreshes from external data sources.

- Users must be able to filter and segment the data based on various parameters (e.g., region, product, time period).

Non-Functional Requirements:

- **Performance**: The system should be able to handle large datasets (e.g., over a million rows of sales data) without performance degradation.

- **Scalability**: The application should be scalable to allow the addition of more data sources, more users, and more advanced features in the future.

- **Usability**: The user interface must be intuitive and easy to use for business users with minimal training.

- **Security**: The system should ensure that data privacy is maintained, especially when dealing with sensitive sales and customer information.

7.2 Feasibility Study

Before moving forward with your project, it is essential to evaluate the **feasibility** of implementing the Sales Data Analysis system. Feasibility is generally divided into **Technical** and **Economic** feasibility.

Technical Feasibility:

This focuses on evaluating the technical aspects required to build the system, ensuring that the hardware and software used are appropriate and achievable.

- **Hardware**:
  - The system needs a computer with a reliable processor and sufficient memory to run Power BI and Excel, especially when processing large datasets.
  - Minimum hardware requirements might include:

- **Processor**: Intel i5 or higher for optimal performance when handling large data volumes.
- **RAM**: 8 GB or higher, as Power BI and Excel can consume significant memory during heavy data processing.
- **Hard Disk**: SSD with 256 GB storage for faster read/write operations.

- **Software**:
  - **Operating System**: Windows 10 or later, as Power BI and Excel are best supported on Windows-based platforms.
  - **Power BI**: Power BI Desktop for creating reports and dashboards.
  - **Excel**: Microsoft Excel 2016 or later for data analysis and manipulation.
  - **Other Tools**: Access to the internet for cloud-based data sources or integration.

- **Integration**:
  - The system must integrate smoothly with various data sources (e.g., SQL databases, Excel files, etc.), which requires ensuring compatibility with Power BI's data connectors.

- **Economic Feasibility:**
- Economic feasibility evaluates the cost-effectiveness of implementing the system, weighing the benefits against the costs.

- **Cost-Benefit Analysis**:
  - **Costs**:
    - Software licenses for Power BI (though the free version can be used for small-scale applications).
    - Hardware upgrades if needed.
    - Time and effort for setting up the system and training users.
  - **Benefits**:
    - **Improved Decision-Making**: With Power BI's interactive dashboards, users can make faster, data-driven decisions.
    - **Efficiency**: Automated data analysis reduces the time spent on manual reporting and data manipulation.
    - **Accuracy**: The system minimizes human errors in analyzing large datasets, ensuring more reliable results.
    - **Time-Saving**: Quick and accurate reports mean less time spent gathering and preparing data for analysis.

- **Conclusion**: If the benefits (efficiency, better decision-making, and time savings) outweigh the costs (software, hardware, and implementation), the system can be considered economically feasible for the organization.

7.3) Hardware Requirements:

- **Processor**: Intel i5 or equivalent.
- **RAM**: 8GB (Recommended for optimal performance).
- **Hard Disk**: SSD with 256 GB storage for efficient data processing and quick access.

Software Requirements:

- **Operating System**: Windows 10 or later for compatibility with Power BI and Excel.
- **Power BI**: Power BI Desktop for dashboard creation.
- **Excel**: Microsoft Excel 2016 or later for data manipulation and analysis.
- **Data Storage**: Cloud storage or local database to store large datasets for quick access and processing.

8. <u>Planning</u>
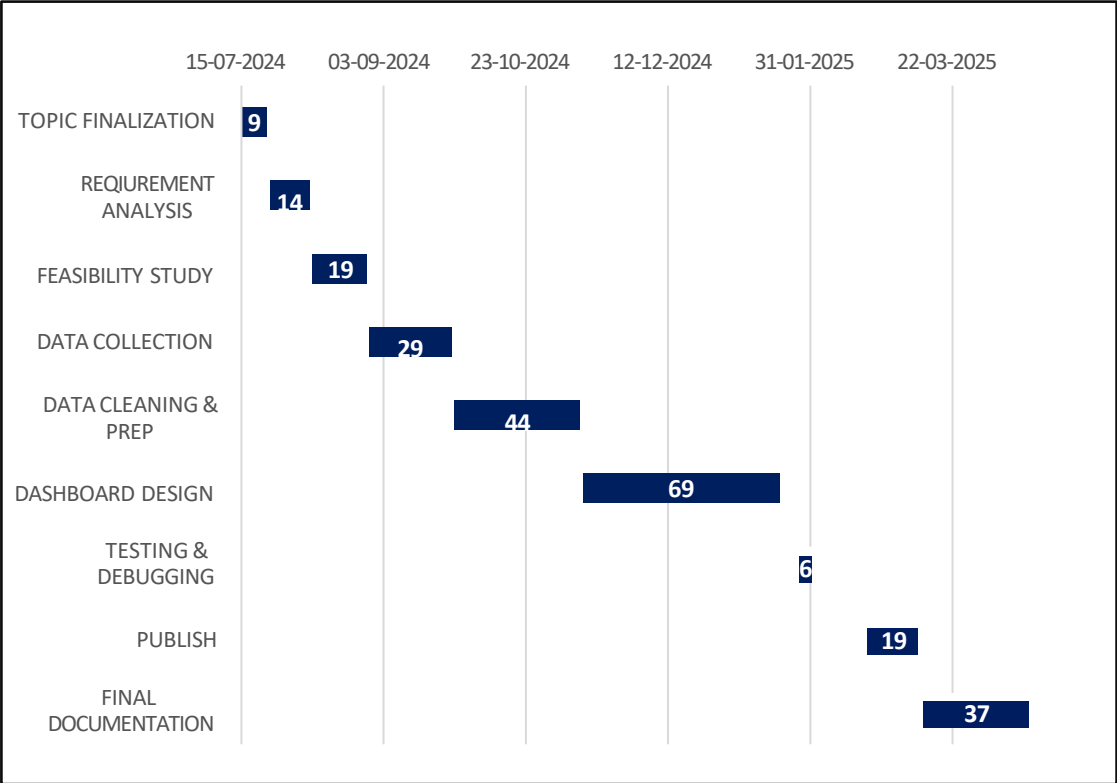
9. <u>Methodology</u>

- **Data Collection:** The sales data was collected from a reliable source. It included fields like customer name, product name, sales date, region, quantity, payment method, and profit/loss details.

- **Data Cleaning (Using Excel):** Excel was used to clean the raw data. This included removing duplicates, handling missing values, correcting date and number formats, and making sure the data was consistent and ready for analysis.

- **Data Import in Power BI:** The cleaned data was imported into Microsoft Power BI for visualization. Relationships were created between tables (if needed) to ensure smooth filtering and slicing.

- **Data Analysis:** Various measures and filters were applied to analyze trends such as high-selling products, top-performing regions, preferred payment methods, customer types, and overall sales patterns.

- **Dashboard Design:** Power BI was used to create interactive dashboards. Visuals like bar charts, pie charts, line graphs, cards, and slicers were added to display insights in a user-friendly way.

- **Publishing the Power BI Dashboard:** The Power BI dashboard was published to the Power BI service for easy access and sharing. It was configured with appropriate permissions to allow stakeholders to view the reports and make data-driven decisions while ensuring data security.

- **Final Documentation:** The final documentation includes a detailed explanation of the dashboard's features, design, and data sources. It provides insights into how users can interact with the dashboard, filter data, and interpret the results, ensuring clarity and usability for non-technical users.

10. Operating Tools and Development Environment

- **Power BI Desktop:** Power BI Desktop was the primary tool used for creating, designing, and developing the sales analysis dashboard. It offers a user-friendly interface for importing data, creating relationships, and building interactive reports and visualizations. Power BI Desktop also allows for the integration of multiple data sources, including Excel and databases, making it ideal for analyzing and presenting large datasets.

- **Power BI Service:** After developing the dashboard in Power BI Desktop, it was published to the Power BI Service for online sharing and collaboration. The Power BI Service enables the dashboard to be accessed by stakeholders from any device, with features like real-time data updates, sharing reports, and setting up automated data refreshes.

- **Microsoft Excel:** Excel was used for data preparation, cleaning, and initial analysis before importing it into Power BI. The raw sales data was often stored in Excel files, where basic transformations like filtering, sorting, and aggregating were performed. Excel also helped to ensure that the data was structured appropriately for use in Power BI.

- **SQL Server (if applicable):** If the sales data was stored in a relational database like SQL Server, Power BI Desktop was connected to SQL Server for importing and querying large datasets. SQL queries were used to extract relevant data and optimize the performance of the reports.

- **Power Query Editor:** The Power Query Editor in Power BI was used for transforming raw data into a clean and usable format. This tool enabled data cleansing operations like removing duplicates, merging tables, handling missing values, and applying various transformations to ensure the data was ready for analysis.

- **Visualization and Reporting Tools:** Power BI's built-in visualization tools (such as bar charts, line charts, tables, maps, and pie charts) were leveraged to create insightful and interactive reports. Custom visuals were also used to meet specific needs for data presentation, ensuring that key insights were easily understood by stakeholders.

11. <u>Designing</u>

The design phase of the Sales Data Analysis Power BI dashboard is a critical step that involves planning, structuring, and visualizing data in an intuitive and engaging way. The goal was to create a dashboard that not only presents key sales metrics but also offers an interactive and user-friendly experience. This phase ensures that all aspects of the dashboard are aligned with the user requirements and business goals.

11.1) <u>Steps</u>

1. Excel Sheet – Raw Data Preparation

- Collect all raw data in Excel files (CSV or XLSX).
- Remove unnecessary blank rows or columns.
- Check for duplicate rows and remove them.
- Standardize formats (e.g., date formats, text casing, etc.).
- Save cleaned Excel files.

2. Load File into Power BI

- Open Power BI Desktop.
- Go to Home > Get Data > Excel.
- Select and load the file(s) you cleaned in Excel.

3. Power Query Editor (Transform Data)

- Click on Transform Data to open Power Query Editor.
- Do the following transformations:

  Power Query Cleaning Steps:
  - Remove extra headers or repeated headers.
  - Change data types (Date, Text, Number).
  - Remove duplicates (if not done in Excel).
  - Split or merge columns if needed.
  - Rename columns to meaningful names.
  - Fill down or up for missing values if required.
  - Filter unnecessary rows.

4. Append or Merge Files (If needed)

- If you have multiple similar Excel files (e.g., monthly reports), use Append Queries.
- If combining data from different sources, use Merge Queries.

5. Load Data

- Click Close & Apply to load the transformed data into Power BI.

6. Data Modelling

- Define relationships between tables.
- Create a star schema if needed (fact + dimension tables).
- Set correct cardinality (one-to-many, many-to-one).
- Hide unnecessary columns from report view.

7. DAX Formulas

- Create Calculated Columns and Measures using DAX. Examples:

8. Visualization

- Use different visuals like:
  - Bar charts, Line charts, Pie charts
  - KPI cards, Tables, Slicers
- Use filters and slicers to make the dashboard interactive.
- Group visuals logically (sales, customers, trends, etc.).

9. Publish to Power BI Service

- Click Publish from Power BI Desktop.
- Choose the workspace where you want to publish the report.
- Set up scheduled refresh if Excel files are updated regularly.

12. **Implementation (Screenshots)**

1) **Raw Data**

2) **Cleaning Process**

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3) Transform and Load Data in Power Query
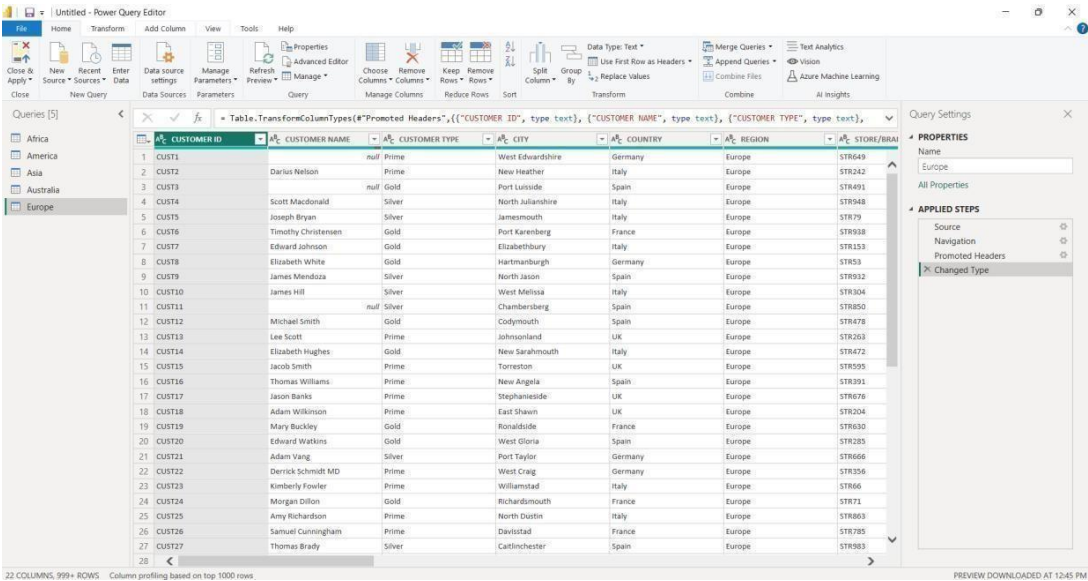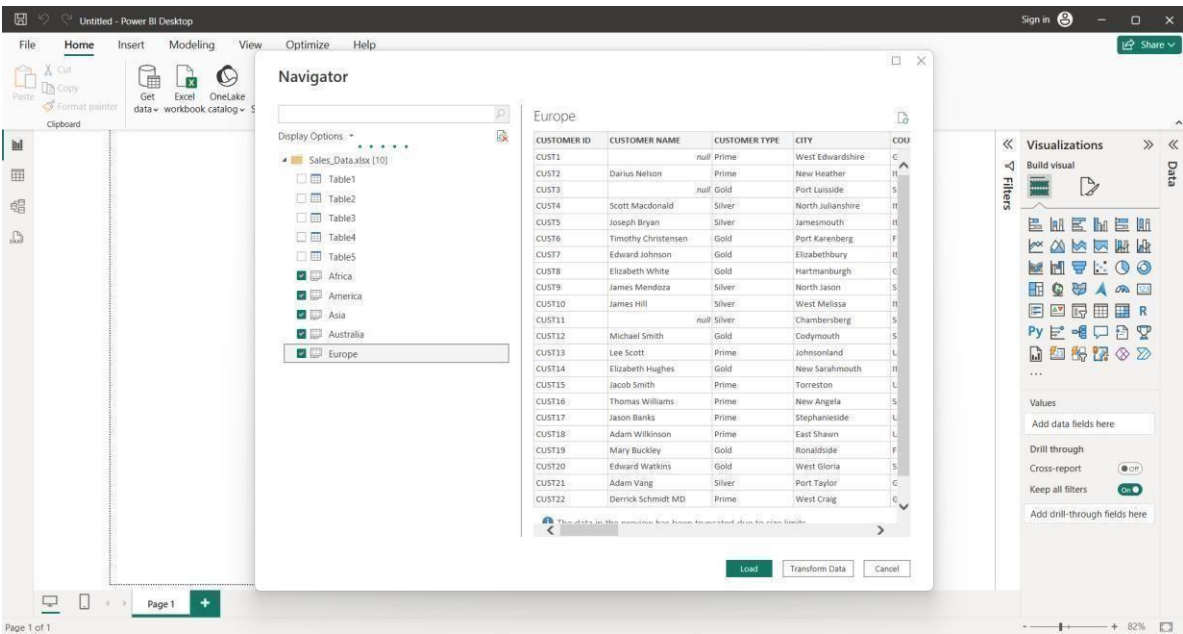
4) Cleaning in Power Query

1.2 DISCOUNT APPLIED	1.2 PROFIT MARGIN
0.12	0.25
0.12	0.18
0.17	0.22
0.04	0.22
0.11	0.26
0.03	0.18
0.05	0.21
0.06	0.16
0.18	0.19
0.07	0.1
0.07	0.24
0.07	0.16
0.17	0.14
0.18	0.29
0.09	0.27
0.19	0.13
0.18	0.12
0.08	0.1
0.07	0.16
0.14	0.16
0.2	0.16
0.1	0.18
0.13	0.14
0.2	0.16
0.13	0.29
0.16	0.18
0.11	0.14

% DISCOUNT APPLIED	% PROFIT MARGIN
12.00%	18.00%
17.00%	22.00%
4.00%	22.00%
11.00%	26.00%
3.00%	18.00%
5.00%	21.00%
6.00%	16.00%
18.00%	19.00%
7.00%	10.00%
7.00%	24.00%
7.00%	16.00%
17.00%	14.00%
18.00%	29.00%
9.00%	27.00%
19.00%	13.00%
18.00%	12.00%
8.00%	10.00%
7.00%	16.00%
14.00%	16.00%
20.00%	16.00%
10.00%	18.00%
13.00%	14.00%
20.00%	16.00%
13.00%	29.00%
16.00%	18.00%
11.00%	14.00%
20.00%	15.00%
11.00%	17.00%

5) Append Query

Append

Concatenate rows from three or more tables into a single table.

○ Two tables   ⦿ Three or more tables

Available tables
| Europe (Current) |
| Africa |
| America |
| Asia |
| Australia |

Add >>

Tables to append
| Europe (Current) |
| Africa |
| America |
| Asia |
| Australia |

OK   Cancel

Queries [6]   ‹

⊞ Africa
⊞ America
⊞ Asia
⊞ Australia
⊞ Europe
⊞ Append1

Queries [6]   ‹

⊞ Africa
⊞ America
⊞ Asia
⊞ Australia
⊞ Europe
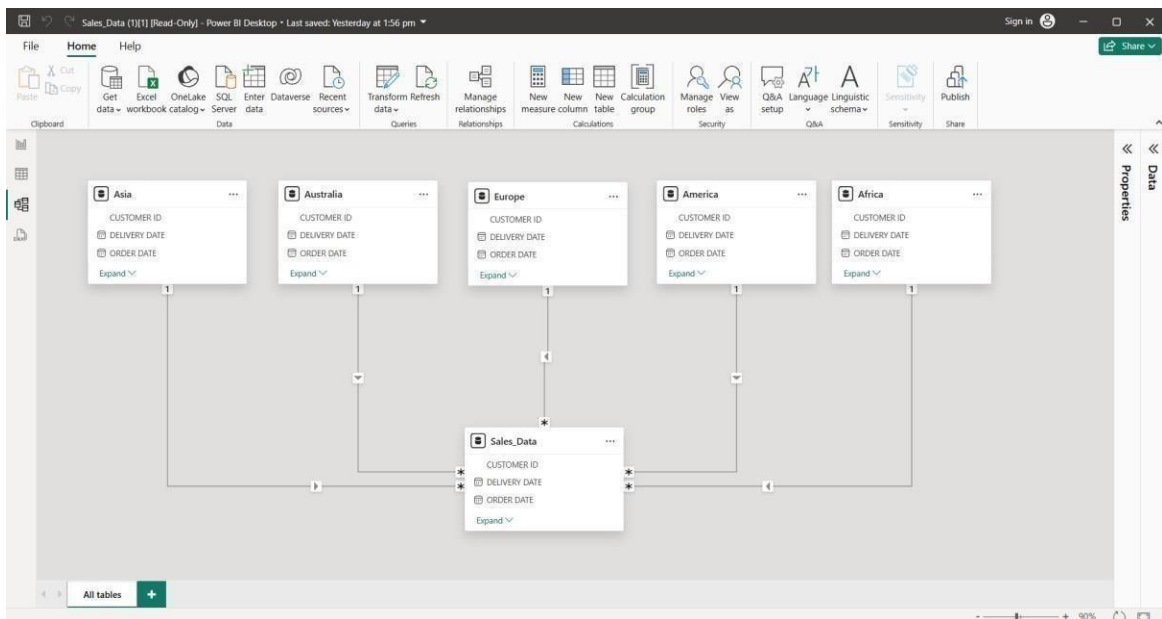⊞ Sales_Data

6) load data

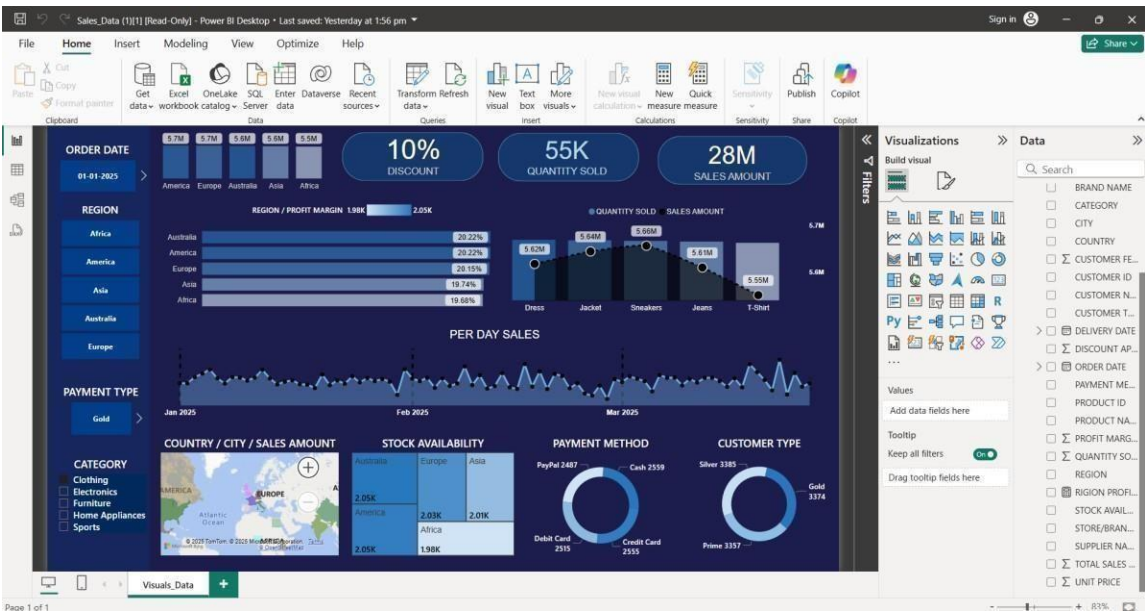
7) modeling

9) Dax formula

```
1 RIGION PROFIT MARGIN % =
2 DIVIDE(
3     SUM('Sales_Data'[PROFIT MARGIN]),
4     CALCULATE(SUM('Sales_Data'[PROFIT MARGIN]), ALL('Sales_Data'[REGION]))
5 )
6
```

10) visualization

11) publish

13. <u>Testing</u>

Testing is a crucial phase in the Power BI project lifecycle to ensure data accuracy, consistency, and performance of the dashboard. It involves validating the data at each stage—from initial Excel cleaning to transformations done in Power Query, data modeling, DAX calculations, and final visualizations. The goal of testing is to confirm that the report displays the correct insights, filters work as expected, and users can interact with the dashboard without any errors. This process also checks whether relationships between tables are defined properly, calculations return accurate results, and the report performs efficiently during refresh and use. By conducting thorough testing, we ensure that the Power BI dashboard is reliable, error-free, and ready for end-user consumption.

Sure! Here are some **testing points** for your Power BI project based on the steps you shared. These will help you check that everything is working correctly from data cleaning to dashboard visuals:

13.1) <u>Testing Points for Power BI Project</u>

Excel Data Cleaning (Before Import)

- Are date formats and number formats consistent?

- Have all duplicate rows been removed?

- Are column headers correctly named and clear?

- Are all sheets/files saved in the correct format?

Power BI Data Load

- Are all required files loaded into Power BI correctly?

- Are there any errors or warnings during the import?

Power Query Cleaning

- Are unnecessary rows (like repeated headers) removed?

- Are data types (text, date, number) correct for each column?

- Are null or missing values handled properly?

- Are all merged/split columns, correct?

- Are transformations applied consistently across all files?

Append/Merge Queries

- Are all similar files successfully appended?

  Are there any unmatched or null values after merge?

Data Model

- Are all relationships created correctly (one-to-many, etc.)?

- Is the relationship direction correct?

- Are any unnecessary tables or columns hidden?

- Are dimensions and fact tables organized properly?

DAX Formulas

- Are calculated columns giving expected values?

- Are measures working correctly (e.g., Total, Average, Count)?

- Are time intelligence formulas showing correct period-based data (YTD, MTD, etc.)?

Visualizations

- Do all visuals display data correctly (no errors or blanks)?

- Are slicers and filters working as expected?

- Are charts using the correct axes and labels?

- Are titles and legends clear?

- Is the layout user-friendly and visually appealing?

Performance

- Is the dashboard loading fast?

- Are visuals responsive when filters are applied?

Publishing & Access

- Is the dashboard published to the correct workspace?

- Do users have corrected access permissions?

- Is the report working properly in the Power BI Service (web version)?

13.2) <u>Test Cases:</u>

Component	Data Cleaning (Excel)				
Purpose	To Validate that Excel data is Cleaned properly before importing into Power BI				
Sr.no	**Test case**	**Test input**	**Expected output**	**Actual output**	**Remark**
1	Check for duplicate records	Use —Remove Duplicates‖	Duplicate records should be removed	Duplicate records removed	Passed
2	Validate date and number format	Viewdate / number columns	Format should be consistent	Format is consistent	Passed

Component	Data Load in Power BI				
Purpose	To verify file loading and connection in Power BI				
Sr.no	**Test case**	**Test input**	**Expected output**	**Actual output**	**Remark**
1	Import Excel file in Power BI	Use "Get Data" > Excel	File should load without error	File loaded successfully	Passed
2	Check for schema mismatch	Load all sheets/tables	All columns must match schema	Schema matched	Passed

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Component	Power Query Transformations				
Purpose	Validate data transformations in Power BI Power Query Editor				
Sr.no	**Test case**	**Test input**	**Expected output**	**Actual output**	**Remark**
1	Validate data types	Change type (Date/Text/ Number)	All data types should be appropriate	Datatypes corrected	Passed

Component	Data Modeling				
Purpose	Validate relationship creation and table structure				
Sr.no	**Test case**	**Test input**	**Expected output**	**Actual output**	**Remark**
1	Create relationships	Connect tables via keys	Correct one-to-many or many-to-one	Relationships created properly	Passed

Component	DAX Measures				
Purpose	Validate DAX calculations for KPIs				
Sr.no	**Test case**	**Test input**	**Expected output**	**Actual output**	**Remark**

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1	Calculate Feilds	Create DAX Formula	Returns Correct amount	amount correct	Passed

Component	Visualizations				
Purpose	Ensure visuals are working properly and interactive				
Sr.no	**Test case**	**Test input**	**Expected output**	**Actual output**	**Remark**
1	Bar chart displays correct data	Use Sales by Region	Regions shown with values	Chart displayed correctly	Passed
2	Slicer filters visuals	Adddate slicer	Visuals should filter by date	Filterworks properly	Passed
3	Pie chart responds to selection	Click on pie section	Other visuals filter accordingly	Works as expected	Passed

Component	Publishing				
Purpose	Validate published report				
Sr.no	**Test case**	**Test input**	**Expected output**	**Actual output**	**Remark**
1	Publish to Power BI Service	Click Publish	Fileuploaded to workspace	Published successfully	Passed

14. <u>Limitation & Enhancement</u>

14.1) <u>Limitations</u>

- The dashboard is created based on sample sales data; real-time dynamic data updates are not integrated.
- The analysis is limited to the available fields like region, payment method, and product type — deeper business factors are not considered.
- It requires basic knowledge of Power BI for any modification in visuals or data sources.
- Only historical data is used; predictive analysis or forecasting is not included.
- Some advanced features of Power BI like AI visuals, DAX optimization, or custom visuals were not used due to scope and time limitations.

14.2) <u>Future Enhancement</u>

- Integrate real-time sales data using cloud-based sources or APIs for live monitoring.
- Add forecasting features using Power BI's predictive tools to predict future sales trends.
- Include customer feedback or review analysis for deeper customer insights.
- Use advanced DAX functions for more detailed and complex calculations.
- Enhance the visual appeal by adding themes, tooltips, and customized visual elements.
- Develop a mobile-friendly version of the dashboard for access on smartphones and tablets.
- Include user login and data security features if deployed in a live business environment**.**

15. <u>Bibliography</u>

- Microsoft Power BI Documentation – https://learn.microsoft.com/power-bi

- Microsoft Excel Help Canter – https://support.microsoft.com/excel

- YouTube Tutorials on Power BI and Excel