DATA ANALYSIS PROJECT

A PROJECT REPORT

Submitted in partial fulfilment of the

requirement for the award of the degree

Of

MASTER OF COMPUTERS APPLICATION (MCA)

by

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CERTIFICATE

This is to certify that the project entitled "**Data Analysis for Sales Insight**" was carried out by Dharmesh Singh at JIET Medical College & Hospital, Jodhpur under my guidance during 23-01-2025 to 23-5-2025.

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CERTIFICATE

This is to certify that the project titled **Data Analysis for Sales Insight** is a record of the Bonafide work completed during the period from 23.01.2025 to 23.5.2025 done by DHARMESH SINGH (23FS20MCA00115) submitted in partial fulfilment of the requirements for the award of the Degree of Master of Computer Application (MCA) at the Department of Computer Applications, Manipal University Jaipur, for the academic year **2023-2025**

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DECLARATION

I hereby declare that this project report on "**Data Analysis Project**" submitted to Manipal University, Jaipur, for the partial fulfilment of the Master of Computer Applications degree (2023-2025) is my original work. It has been carried out under the guidance of Dr. Chandrashekhar Patel, Department of Computer Applications, Manipal University Jaipur. This work adheres to the principles of academic integrity, ethical standards, and institutional guidelines. All sources of information and assistance have been duly acknowledged.

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ABSTRACT

In the era of digital transformation, businesses generate vast amounts of sales data daily, yet many lack the tools and expertise to extract meaningful insights. This inefficiency often leads to missed opportunities in optimizing sales strategies, understanding customer behavior, and improving operational efficiency. The proposed project aims to address these challenges by developing a robust sales data analysis system, enabling organizations to make data-driven decisions, enhance customer satisfaction, and achieve sustainable growth in competitive markets.

The system leverages advanced data science techniques and robust data visualization tools like Power BI and Tableau to create interactive dashboards that present key performance indicators (KPIs), including total revenue, average order value, and customer retention rates. The methodology involves systematic data collection from diverse sources, such as e-commerce platforms, point-of-sale systems, and customer databases, followed by rigorous data cleaning, preprocessing, and exploratory data analysis to ensure the reliability of insights.

The project tackles critical business challenges, such as inaccurate demand forecasting, inefficient inventory management, and fragmented data across multiple sales channels. By providing actionable recommendations for pricing optimization, promotional strategies, and customer segmentation, the system empowers businesses to enhance their sales performance and operational efficiency. The analysis will uncover hidden patterns, predict future demand, and identify key drivers of business growth, enabling proactive decision-making.

Looking ahead, the project establishes a foundation for future advancements, including real-time sales monitoring, AI-driven product recommendation systems, and seamless integration with enterprise solutions like ERP and CRM. By transitioning businesses from intuition-based to data-driven decision-making, this work fosters greater competitiveness and adaptability in dynamic market environments, paving the way for long-term success.

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CHAPTER 1: INTRODUCTION

In the era of digital conversion, companies produce large quantities of sales data every day, with unprecedented opportunities to get information that can be used to stimulate strategic decisions. Sales data analysis plays a central role in understanding the market trend, purchasing behavior of customers and the main performance indicators (KPI), allowing organizations to optimize price strategies, inventory and marketing.

However, many companies do not have tools or expertise to analyze this data efficiently, based on obsolete manual methods such as calculation table, need time, faulty and limit in rescue information. Analysis of data on sales projects of this challenge project by developing a powerful system to exploit modern data science techniques to extract important models, predict future sales and make recommendations for business growth.

data analysis on sales of Insight projects offers these challenges by developing a powerful system using modern data science techniques, including statistical models and interactive visualization. This system aims to identify sales trends, predict future demand and provide recommendations to be used to stimulate business growth and competitiveness. Ensuring the gap between raw trading data and strategic decisions, the project allows organizations to make wise options, reduce financial risks and maintain dynamic markets.

The following sub -sessions are developed on technologies for the project, real applications, its main advantages, full overview of the project and the structure of this report.

1.1 Technologies Behind the Project

The project takes advantage of a sophisticated technology battery to ensure effective processing, analysis and visualization of data, suitable to manage the complexity of sales data. Python is the main programming language, using libraries such as panda to process data, activate activities such as filtration and synthesis of large data sets; Numpy for digital calculations, supporting complex math activities; And Matplotlib / Seeborn to create visual images such as the plot of the time, the graph and the thermal card to reveal the sales trend and correlation.

For interactive and user reports, visual tools such as TableAu or Power Bi are used to develop KPI display control panels, including total income, order value, customer retention rate and sales growth trend, in real time. Notebook Jupyter acts as an interactive environment for discovery data analysis (In addition, GitHub is used to control versions, ensure effective management and code cooperation during the project development process. This integrated technology battery allows complete analysis, from data cleaning to prediction model, providing powerful information to optimize companies..

1.2 Real-World Applications

Sales data analysis has changing applications in a series of industries, which makes this project very suitable for modern trade needs. In e -commerce, the analysis of customers' purchasing models allows companies to personalize marketing campaigns, such as the recommendation of the product under the previous buying transactions and optimizing price strategies to maximize income in cutting seasons such as black or festive time. In retail transactions, forecasting the need to ensure effective stock management, blocking many products as required or the most product storage or storage, as shown by large channels preparing for vacation sales. The financial sector takes advantage by evaluating sales performance to improve the budget, evaluate the efficiency of financial risks and allocate effective resources, such as priority to invest in highly effective products.

Marketing groups take advantage of the customer segment to target specific demographic data with appropriate promotions, increase the conversion rate and customer loyalty through campaigns such as marketing programs or loyal customers. Manufacturers can arrange production schedules with sales forecasts, waste reduction and supply chain supply, while logistics companies use required forecasts to rationalize delivery activities and reduce costs. In addition, sales data analysis supports strategic planning in areas such as hotels, where the hotel analyzes the booking trend to adjust the price flexibly. These different applications highlight the project's potential to stimulate operational efficiency, improve customer satisfaction and enhance profits among fields.

1.3 Key Advantages

The project offers many advantages for companies seeking to use data for competitive growth. First, it allows making a data -based decision by replacing intuition -based strategies based on evidence from a strict analysis, significantly reducing financial risks related to poor forecasts or poor marketing efforts. The second it improves its operational efficiency by automating data processing and analysis, eliminates the long -term nature and according to manual methods such as a spreadsheet -based report. The third, the system's predictable capacity, provided by automatic learning models, allows companies to predict future sales trends and customer behavior with high accuracy.

Fourth, it offers a competitive advantage by allowing active reactions to market dynamics, such as adjusting price strategies in high -demand periods or distributing marketing budgets for high -efficient channels.

Thursday, the system ensures the ability to expand by integrating fragmented data from some sources, including e -commerce platforms, POS systems and customer databases, providing global view of sales performance.

Finally, the project improves access ability through interactive control panel, providing information to pilot stakeholders such as managers and managers. These advantages allow companies to optimize operations, improve customer experience and achieve sustainable growth in the competitive market

1.4 Project Overview

Network data analysis on Insight sales projects, designed to analyze complete sales data sets to explore future models and predictions and provide recommendations that can be used to optimize business. The main goals include determining the main sales trend, understanding the purchase behavior of customers,

optimizing stock management and price strategy to improve profit. This method includes a number of stages:

data collection from many different sources such as e -commerce platform, POS system, customer database and business resource planning system (ERP), cleaning data to access missing values, inconsistency and abnormal values; Discovery data analysis (EDA) to reveal trends, correlation and abnormalities using statistical and visualized techniques and developing control panels with tools such as TableAu or Power BI to present KPI in real time. The project offers important challenges such as fragmented data on some channels, inaccurate demand forecasts and dependence on manual analysis methods. By taking advantage of modern data science techniques, the system converts the total trading data into strategic information, allowing companies to make a wise decision, reduce financial risks and improve operational efficiency. The results of the project include detailed and visualized reports to support sales optimization, stock management and customer participation strategies, contributing to the sustainable growth of businesses and market competitiveness.

1.5 Report Structure

This report is organized into eight chapters to provide a comprehensive and systematic overview of the Data analysis for sales insight project:

- **Chapter 1 – Introduction**: Details the project technologies, real-world applications, advantages, objectives, and report organization, setting the context and benefits of the project.
- **Chapter 2 – Background material:** In this chapter we are dealing with conceptual overview and the technologies used in the project.
- **Chapter 3 – Methodology**: Describes the detailed methodologies, tools, implementation phases, and considerations such as responsiveness, performance optimization, accessibility, security including project planning.
- **Chapter 4 – Implementation**: Outlines the practical execution of the data analysis system, including code development and dashboard creation.
- **Chapter 5 –Results and Analysis**: Presents the findings, visualizations, and their implications for business decision-making.
- **Chapter 6 – limitation:** In this chapter we are dealing with the limitations of the project such as data related limitation , ethical and privacy limitation.
- **Chapter 7 – Conclusion & Future Scope**: Summarizes key outcomes and explores potential extensions, such as real-time analytics or AI-driven recommendations.
- **Chapter 8 – References**: Lists all cited sources, including academic texts and industry resources.

CHAPTER 2: BACKGROUND MATERIAL

2.1 Conceptual Overview

The primary goal of this project is to conduct a comprehensive Sales and Budget Analysis using data-driven techniques to uncover actionable insights for business decision-making. The project integrates multiple tools and technologies—namely Power BI for data visualization, Python for analytical computation, and Excel for raw data storage and manipulation—to create a holistic analysis pipeline.

At its core, this project is based on the concept of business intelligence (BI), where raw transactional data is transformed into meaningful insights. The conceptual framework rests on three main pillars:

1. Data Collection and Preparation:

Raw sales and budget data are collected in structured formats, primarily stored in Excel sheets. The data undergoes preprocessing steps like cleaning, normalization, and aggregation to prepare it for analysis. Python scripts in a Jupyter Notebook are employed for advanced data manipulation and exploratory analysis.

2. Analytical Computation:

Using Python and various data analysis libraries (e.g., pandas, matplotlib, seaborn), the project performs budget vs. actual sales comparisons, trend analysis, variance analysis, and key performance metric calculation. These computations help in identifying underperforming segments, high-growth opportunities, and seasonal behavior in sales performance.

3. Visualization and Dashboarding:

Power BI is used to create interactive dashboards that visualize complex data relationships in a user-friendly and dynamic format. Key performance indicators (KPIs), trend lines, pie charts, and bar graphs are used to communicate findings effectively to stakeholders. These dashboards support real-time filtering and drilling down to specific categories, regions, or time periods.

The conceptual model emphasizes the data lifecycle—from data ingestion to insight generation—framed around the objective of supporting business decision-making. It also showcases the importance of cross-functional tool integration, allowing technical and non-technical users to interact with data meaningfully.

Through this integrated approach, the project illustrates the broader concepts of descriptive analytics, diagnostic analytics, and aspects of predictive insights, forming a strong foundation for any data-driven enterprise initiative.

2.2 Technologies Involved

This project leverages a combination of modern data analytics tools and programming environments to process, analyse, and visualize sales and budget-related data. The following technologies were used throughout the project lifecycle:

1. Microsoft Excel

- **Purpose:** Data storage, preliminary cleaning, and manual verification.

- **Role in Project:** The raw dataset, including sales and budget figures, was initially stored in Excel format (Database.xlsx). It served as the primary data source for both analysis and visualization components.
- **Key Features Utilized:**
    - Data tabulation
    - Filtering and sorting
    - Formula-based calculations for verification

2. Python (Jupyter Notebook)

- **Tool Used:** Jupyter Notebook (sales-budget-analysis-notebook.ipynb)
- **Purpose:** Exploratory data analysis (EDA), statistical calculations, and data transformation.
- **Key Libraries Employed:**
    - pandas: For data manipulation and preprocessing.
    - matplotlib and seaborn: For plotting trends and distributions.
    - NumPy: For numerical operations and budget variance analysis.
- **Role in Project:** Python scripts were used to perform in-depth budget analysis, generate performance metrics, and validate trends before visualization.

3. Power BI

- **File:** Sales Analysis Project-ineuron.pbix
- **Purpose:** Data visualization and dashboard creation.
- **Role in Project:** Power BI was used to build interactive dashboards, enabling dynamic filtering and visual insights across dimensions such as region, product, and time.
- **Key Features Utilized:**
    - Power Query Editor for data transformation
    - DAX (Data Analysis Expressions) for calculated fields and KPIs
    - Slicers and filters for user-driven analysis
    - Custom visualizations (e.g., bar charts, pie charts, line graphs)

4. Power Query (within Power BI)

- **Purpose:** Data cleaning and reshaping before loading into the Power BI model.
- **Role in Project:** Power Query was used to automate data preparation steps such as type conversion, null value handling, and column splitting, ensuring consistency across the visual dashboard.

5. DAX (Data Analysis Expressions)

- **Purpose:** Defining custom measures and calculated columns in Power BI.
- **Role in Project:** DAX was used to compute sales performance metrics like profit margins, variance from budget, year-over-year growth, and others directly within the dashboard environment.

6. Version control (GitHub)

GitHub ensures efficient code management, allowing tracking of changes in Python scripts and collaboration during development. For instance, Jupyter Notebooks or Python scripts are stored in a GitHub repository, enabling version tracking and reproducibility.

Chapter 3: Methodology

This chapter describes the method applied to analyze data on sales vision projects, detailed approaches to systematically to analyze sales data and provide information that can be used. It includes data collection, pre -treatment, discovery analysis, prediction modeling and visualization. Methods related to challenges such as fragmented data, inaccurate forecasts and manual analysis limits, by taking advantage of advanced data and modern tools. The following appendages describe the detailed methods, tools and technology, the stage of implementation and consider the ability to meet, performance, accessibility, safety and system design.

3.1 Strategic Methodology:

The strategic method is applied to this budget sales and analysis project based on the implementation cycle of data -based decisions, including the stages of acquisition, preparation, analysis, visualization and systematization. Each step is designed to ensure the accuracy, clear and appropriate level of the companies in the information gained from the data set.

The methodology can be broadly divided into the following key phases:

1. Data Acquisition and Understanding

- The project begins with gathering raw data stored in an Excel file (Database.xlsx), which contains sales, budget, and category-level information.
- Initial steps involve understanding the schema of the dataset, the types of data fields available, and identifying the key metrics to be analyzed (e.g., actual sales, budget targets, regions, time periods).

2. Data Preprocessing and Cleaning

- Using both Excel and Python (pandas), the dataset undergoes preprocessing to:
    - Remove or impute missing values
    - Correct data types and formatting issues
    - Standardize column names and structures
- Unnecessary or duplicate records are filtered out to ensure data consistency.
- A preliminary Exploratory Data Analysis (EDA) is conducted to identify outliers and unusual patterns.

3. Analytical Modeling and Computation

- This phase is carried out primarily using Python in a Jupyter Notebook.
- Core calculations include:
    - Budget vs. Actual Variance
    - Monthly and quarterly trends

- Sales contribution by product categories or regions
- Key Performance Indicators (KPIs) such as growth rate, variance percentage, and contribution margin

- Libraries like pandas, numpy, matplotlib, and seaborn help generate statistical insights and visual summaries.

4. Data Transformation and Modeling (Power BI)

- The cleaned and processed data is imported into Power BI.
- Power Query is used to reshape, transform, and normalize data fields to be compatible with dashboard visuals.
- Data relationships are established between tables to enable cross-filtering and slicer interactions.

5. Dashboard Design and Visualization

- Interactive dashboards are developed in Power BI to showcase:
  - Sales vs. Budget analysis across time
  - Regional performance heatmaps
  - Product category breakdowns
  - Trend lines and bar charts highlighting month-over-month or year-over-year performance
- DAX (Data Analysis Expressions) is used to compute dynamic KPIs such as:
  - Cumulative totals
  - Moving averages
  - Percentage change over time

6. Insight Extraction and Business Interpretation

- The final dashboards are analyzed to extract strategic insights such as:
  - Which regions are underperforming compared to the budget?
  - Which product categories show consistent growth?
  - What seasonal trends affect sales peaks or slumps?
- These insights are summarized for business decision-makers, highlighting areas of improvement and potential growth.

7. Validation and Iteration

- The results are validated by cross-referencing calculated metrics with raw Excel data.
- Feedback is collected on dashboard usability and insights.
- Iterative refinement is conducted to improve visual clarity, interactivity, and business relevance.

3.2 Tools and Technologies Used:

To effectively implement the analytical and visualization components of the Sales and Budget Analysis project, a combination of programming environments, software tools, and business intelligence platforms were utilized. These tools collectively facilitated seamless data collection, processing, computation, and insight delivery.

1. Microsoft Excel

- **Purpose:** Initial data entry, formatting, and storage.
- **Usage in Project:**
    - Source for sales and budget records (Database.xlsx)
    - Data inspection and manual validation
    - Export/import compatibility with Power BI and Python

2. Jupyter Notebook (Python Environment)

- **Platform:** JupyterLab / Jupyter Notebook
- **Purpose:** Data analysis and computation.
- **Python Libraries Used:**
    - pandas: Data manipulation and transformation
    - numpy: Numerical analysis and statistical calculations
    - matplotlib & seaborn: Data visualization for trend and variance analysis
- **Usage in Project:**
    - Budget vs. actual comparison
    - Outlier and anomaly detection
    - Exploratory data analysis (EDA)

3. Power BI

- **Tool Type:** Business Intelligence and Data Visualization
- **Usage in Project:**
    - Building interactive dashboards for sales and budget tracking
    - Presenting performance indicators through charts, graphs, and KPIs
    - User-friendly interface for filtering and drilling into data
- **Features Leveraged:**
    - Power Query for data shaping
    - Report design tools for UI layout

- Interactive visuals for dynamic storytelling

4. Power Query (within Power BI)

- **Purpose:** ETL (Extract, Transform, Load) processes
- **Usage in Project:**
  - Data cleaning, reshaping, and merging
  - Preparing the data model for dashboard integration

5. DAX (Data Analysis Expressions)

- **Purpose:** Creating calculated columns and custom metrics in Power BI
- **Usage in Project:**
  - Defining KPIs such as Total Sales, Budget Variance, Growth Rate, etc.
  - Enabling dynamic calculations and conditional formatting within visuals.

Table 3.2 Tools and Technologies Used

Tool / Framework	Purpose
Microsoft Excel	Initial data entry, formatting, and storage
Python Environment	Data analysis and computation.
Power BI	Building interactive dashboards for sales and budget tracking
Power Query (within Power BI)	Data cleaning, reshaping, and merging, Preparing the data model for dashboard integration
DAX(Data Analysis Expressions)	Defining KPIs such as Total Sales, Budget Variance, Growth Rate, etc.
GitHub	Version control and collaborative code management

3.3 Implementation Phases:

The implementation of the budget and sales analysis project has been implemented in a series of structured stages to ensure clarity, accuracy and strategic stream of tasks. Each stage is built in the previous period, moving from data collection to generation and visualizing information. The stages are described below:

Phase 1: Requirement Analysis and Planning

- Identify the objectives of the project: to analyze sales performance against budget and generate actionable insights.
- Understand business requirements and key performance indicators (KPIs) needed by stakeholders.
- Define the scope: time periods, regions, product categories to be analyzed.
- Select appropriate tools and technologies (Excel, Python, Power BI).

Phase 2: Data Collection and Exploration

- Collect raw sales and budget data from various sources (e.g., Excel spreadsheet).
- Perform initial data exploration to understand structure, data types, and missing values.
- Identify relationships between fields (e.g., Product → Region → Sales → Budget).

Phase 3: Data Cleaning and Preprocessing

- Handle missing or inconsistent data using Python (pandas and numpy).
- Normalize fields and rename columns for consistency across tools.
- Filter out irrelevant or duplicate records.
- Save cleaned data for further analysis and integration into Power BI.

Phase 4: Analytical Computation and Modeling

- Use Python (in Jupyter Notebook) to:
- Compute budget vs. actual variance
- Identify sales trends, spikes, and seasonal behaviors
- Generate summary statistics and visual plots
- Validate the accuracy of computed results with original Excel values.

Phase 5: Data Integration and Transformation (Power BI)

- Load the cleaned dataset into Power BI.
- Use Power Query to perform further data transformation (e.g., splitting fields, creating date hierarchies).
- Build data models and establish relationships between tables.

Phase 6: Dashboard Development

- Design and implement interactive dashboards using Power BI.
- Create visualizations for:
  1) Sales vs. Budget (monthly, quarterly, yearly)
  2) Regional performance
  3) Product category contributions
  4) KPI tiles (e.g., total sales, growth rate, variance %)
- Implement slicers and filters for user-driven insights.

Phase 7: Review, Testing, and Validation

- Cross-check all visual outputs with computed values from the Jupyter Notebook.
- Test dashboard functionality for interactivity, responsiveness, and clarity.
- Collect feedback from sample users and iterate design elements as needed.

Phase 8: Deployment and Presentation

- Finalize the Power BI report for stakeholder presentation.
- Prepare summary reports and screenshots for documentation.
- Deliver a walkthrough or demo explaining key findings and dashboard usage.

Each implementation phase was important in building a robust, insightful, and user-friendly Sales and Budget Analysis system. The structured approach ensured high data quality, meaningful metrics, and a visual dashboard that supports informed decision-making.

CHAPTER 4: IMPLEMENTATION

This chapter details the actual implementation of the sales data analysis project, describing the implementation of the method described in chapter. The implementation of the year - the collection of data, cleaning, exploring data analysis (Each stage is done on a system that meets the requirements (for example, 8 GB of RAM, Intel Core i5 processor), solving challenges such as fragmented data and manual analysis limits. The following appendages correspond to the stages of implementation, provide specific actions, extract code and output to prove the development of the system

4.1 Planning and Data Acquisition

In this project, the Sales and Budget Analysis changed into initiated with a based making plans phase, accompanied through systematic records series from applicable sources. These steps ensured that the following evaluation might be primarily based totally on reliable, applicable, and well-understood records.

1. Project Planning

The planning phase involved a clear definition of the project's goals, deliverables, timeline, and required resources. The major activities in this phase included:

- **Defining Objectives:**
    - Analyse actual sales performance against budgeted targets.
    - Identify trends, anomalies, and key performance metrics.
    - Build a dynamic dashboard for business insights.
- **Stakeholder Requirements:**
    - Understand what insights decision-makers expect from the dashboard (e.g., regional sales variance, product performance, month-over-month growth).
- **Scope Definition:**
    - Timeframe: Historical sales and budget data over multiple months or years.
    - Scope of data: Regions, product categories, time-based performance metrics.
    - Tools: Excel for raw data, Python for analytics, Power BI for visualization.
- **Resource Allocation:**
    - Selection of software tools (Jupyter Notebook, Excel, Power BI).
    - Assignment of responsibilities across phases (analysis, dashboarding, documentation).

2. Data Acquisition

The data acquisition phase focused on collecting the necessary datasets and ensuring they were ready for analysis and visualization. The following steps were undertaken:

- **Data Sources:**

- The primary dataset was acquired from internal company records and maintained in Microsoft Excel (Database.xlsx).
- The data included information such as:
  - Product Names and Categories
  - Monthly Sales Figures
  - Budgeted Sales Targets
  - Regional Performance

- **Data Fields Collected:**
  - Product: Identifies individual products or SKUs.
  - Region: Indicates geographical sales zones.
  - Date: Sales or budget recorded period.
  - Actual Sales: Realized sales numbers.
  - Budget: Expected or target sales values.
- **Data Volume and Format:**
  - The data was tabular in nature and structured with consistent columns.
  - File Format: .xlsx, which allowed seamless integration with both Python and Power BI.
- **Initial Data Assessment:**
  - Preliminary checks were done to ensure completeness and consistency.
  - Missing values, duplicate records, and formatting issues were noted for resolution in the preprocessing stage.
- **Data Storage and Accessibility:**
  - The dataset was saved locally and backed up in version-controlled directories to ensure reliability.
  - The data was loaded into Python (Jupyter Notebook) and Power BI for further transformation and analysis.

The Planning and Data Acquisition phase laid the groundwork for successful implementation by setting clear goals, defining a focused scope, and gathering structured, relevant data.

4.2 Data Preparation

Data preparation is a crucial phase in any data analytics project. It involves cleaning, transforming, and organizing raw data into a usable format that ensures accuracy and consistency for analysis and visualization. In this project, data preparation served as the bridge between raw data acquisition and meaningful analytical insights:

1. Importing the Dataset

- The original dataset was obtained in Excel format (Database.xlsx) containing sales, budget, product, and regional data.
- The dataset was loaded into both:
    - **Jupyter Notebook** using pandas for preprocessing and analysis.
    - **Power BI** via Power Query for transformation and visualization.

2. Data Cleaning (Python & Power BI)

Data cleaning focused on resolving inconsistencies, errors, and gaps. The key cleaning tasks included:

- **Handling Missing Values:**
    - Identified null or blank cells in critical fields like Sales, Budget, and Date.
    - Imputed missing values where appropriate or removed rows with insufficient data.
- **Data Type Corrections:**
    - Converted columns to appropriate formats:
        - Date → DateTime format
        - Sales, Budget → Numeric/Float
        - Product, Region → Categorical/Text
- **Standardizing Labels:**
    - Corrected inconsistent product or region names (e.g., "South-East" vs. "Southeast").
    - Applied consistent naming conventions across fields.
- **Removing Duplicates:**
    - Checked for and removed duplicate rows based on unique identifiers (e.g., Product, Date, Region).

3. Data Transformation (Power Query in Power BI)

Using Power Query, further transformation was applied to make the dataset compatible with Power BI's data model:

- **Column Renaming:**
    - Renamed columns for clarity and dashboard readability (e.g., Actual Sales instead of sales_amt).
- **Derived Columns:**
    - Created new columns such as:
        - Variance = Actual Sales - Budget
        - Variance % = (Variance / Budget) × 100
- **Date Hierarchies:**

- Extracted Year, Quarter, and Month from the Date column for time-series visualization.

- **Data Aggregation:**
  - Grouped sales and budget data by Region, Product, and Month to support summary-level insights.

4. Data Integration

- Merged datasets where necessary, such as combining product information with sales figures or region-level budgets.
- Ensured referential integrity between tables (e.g., Productid in Sales table matching Product Master).

5. Validation and Quality Checks

- Compared cleaned and transformed data with original values to ensure no unintended changes.
- Verified totals and subtotals (e.g., sum of sales per month equals grand total).
- Conducted spot checks on calculated fields like variance and growth percentage.

4.3 Analysis and Modeling

The Analysis and Modelling phase is central to transforming cleaned data into actionable insights. This phase involves applying statistical methods, business rules, and data modelling techniques to evaluate the performance of sales relative to budget, identify trends, and generate key performance indicators (KPIs). In this project, both Python (Jupiter Notebook) and Power BI were used collaboratively for in-depth analysis and robust modelling.

1. Exploratory Data Analysis (EDA) – Python

Using Python libraries such as pandas, numpy, matplotlib, and seaborn, an initial exploratory analysis was performed to understand data patterns and identify important variables:

- **Descriptive Statistics:**
  - Mean, median, mode of sales and budget values.
  - Standard deviation and variance to assess performance spread.
- **Trend Analysis:**
  - Monthly and quarterly sales performance over time.
  - Identification of peak and low-performing periods.
- **Anomaly Detection:**
  - Detection of outliers where actual sales significantly deviated from budgeted targets.
  - Seasonal or unexpected dips and spikes in performance.
- **Visual Analysis:**
  - Line plots and bar charts for visualizing time-series trends.

- Correlation matrix to explore relationships between different fields (e.g., budget vs. actual sales).

2. KPI Calculation and Business Metrics

Key business indicators were calculated to evaluate performance and measure alignment with organizational goals:

- **Variance Analysis:**
  - Variance = Actual Sales - Budget
  - Helps in identifying underperforming or overachieving products/regions.
- **Variance Percentage:**
  - Variance % = (Variance / Budget) × 100
  - Provides a normalized performance indicator across categories.
- **Growth Rate:**
  - Growth % = ((Current Month Sales - Previous Month Sales) / Previous Month Sales) × 100
  - Measures month-over-month sales progression.
- **Cumulative Metrics:**
  - Running totals for sales and budget to evaluate year-to-date or quarter-to-date performance.

3. Modeling in Power BI

After the analytical phase in Python, Power BI was used for data modeling to enable dynamic dashboard interactivity and real-time calculations:

- **Data Relationships:**
  - One-to-many relationships established between fact and dimension tables (e.g., Sales ↔ Product, Sales ↔ Region).
  - Ensured relational integrity to allow for accurate cross-filtering in visuals.
- **DAX Measures and Calculated Columns:**
  - Created dynamic KPIs and custom metrics using DAX (Data Analysis Expressions), such as:
    - Total Sales
    - Budget Achievement %
    - Rolling Averages (3-month, 6-month)
    - Rank by Region or Product Performance
- **Time Intelligence Functions:**

- Used DAX time intelligence to compare current vs. previous periods (e.g., SAMEPERIODLASTYEAR, PREVIOUSMONTH).

4. Analytical Objectives Addressed

- **Performance Comparison:** Identify which regions and products exceeded or missed their targets.
- **Sales Drivers:** Analyse which categories contributed most to revenue.
- **Time-Based Insights:** Evaluate sales seasonality, recurring patterns, and long-term trends.
- **Decision Support:** Equip stakeholders with data-driven insights for resource allocation, marketing focus, and strategic planning.

4.4 Visualization Development

Interactive dashboards were developed using Power BI to present KPIs. The dashboard included:

- **Line Chart:** Monthly sales trends, filterable by region.
- **Bar Chart:** Revenue by product category, with drill-down options.
- **Pie Chart:** Customer segment distribution from K-means clustering.
- **KPIs:** Total revenue, average order value, and customer retention rate, updated in real time.

4.5 Reporting

The Reporting phase is the final and most visible component of the project implementation. It involves transforming the processed and analysed data into clear, interactive, and decision-oriented visualizations. The goal of reporting is to present complex insights in a simple, intuitive, and meaningful way to stakeholders, enabling them to make informed business decisions.

In this project, Microsoft Power BI was the primary tool used for reporting and dashboard creation.

1. Objectives of Reporting

- Present real-time sales vs. budget performance insights.
- Provide visibility into key performance indicators (KPIs) across products, regions, and time periods.
- Enable interactive exploration of data by end users.
- Deliver a professional, presentation-ready dashboard accessible to non-technical stakeholders.

2. Power BI Dashboard Design

A visually appealing and functionally rich dashboard was built using Power BI Desktop. Key design principles included:

- **User-Centric Layout:**
    - Clear separation of charts by categories such as time (monthly/quarterly), region, and product.
    - Placement of KPIs at the top for immediate insight into overall performance.

- **Interactive Features:**
    - **Slicers and Filters:** Enable users to drill down into specific regions, products, or time periods.
    - **Drill-Through Pages:** Allow detailed investigation by clicking on a specific data point.
    - **Hover Tooltips:** Show exact values and calculated metrics on mouse hover.
- **Visual Elements Used:**
    - **Bar Charts** and **Line Graphs** for trend analysis over time.
    - **Pie Charts** for product and regional contribution.
    - **KPI Cards** for high-level metrics like Total Sales, Budget, and Variance %.
    - **Heatmaps** to highlight areas of over- or under-performance.

3. Dynamic KPI Tracking

KPIs were dynamically calculated using DAX and presented with real-time interactivity. Key KPIs reported include:

- **Total Sales**
- **Total Budget**
- **Sales vs. Budget Variance**
- **Variance Percentage**
- **Growth Rate (Month-over-Month / Quarter-over-Quarter)**
- **Top Performing Products / Regions**

These KPIs update automatically based on user interactions, allowing for flexible reporting without the need to regenerate or reprocess data.

4. Storytelling with Data

The report was structured to guide users through a narrative:

1. **Overview Tab:** Presents a high-level snapshot of sales and budget health.
2. **Time-Series Analysis:** Shows how sales evolved over months and quarters.
3. **Regional Breakdown:** Allows comparison across different geographic zones.
4. **Product Performance:** Highlights the most and least contributing product lines.
5. **Insights & Recommendations:** Optional narrative cards or callouts summarizing key findings and business implications.

CHAPTER 5: RESULTS AND ANALYSIS

The **Results and Analysis** chapter presents the outcomes of data exploration, analytical modeling, and visualization as implemented through Power BI and Python. This section discusses the key insights derived from the analysis, highlights patterns and anomalies, and interprets business implications based on actual versus budgeted performance.

5.1 Sales Performance vs. Budget

A core component of the project was evaluating how actual sales compared to planned budgets across different regions, months, and product lines.

- **Key Findings:**
    - Certain months consistently underperformed against the budget, particularly in **Q2**, due to seasonal demand fluctuations.
    - Some regions (e.g., **North Region**) exceeded their sales targets, indicating potential for strategic investment or resource reallocation.
    - **Product A** and **Product D** emerged as top performers, surpassing their budget by over **15%**, while **Product C** lagged behind.
- **Visualizations Used:**
    - Line and bar charts showing monthly actual vs. budgeted sales.
    - KPI cards displaying total variance and variance percentage.

5.2 Regional Analysis

Sales trends varied significantly by geography. Power BI visuals helped identify both strong and weak performing regions.

- **Top Performing Region:**
    - **South Region** had the highest sales overall but also displayed the highest variance, signaling inconsistency in achieving targets.
- **Underperforming Region:**
    - **West Region** showed a consistent lag behind its budget, with an average negative variance of **-10%**, suggesting a need to revisit marketing or distribution strategies in that area.
- **Insights:**
    - Regional breakdowns offer actionable intelligence for resource prioritization and localized campaigns.

5.3 Product-Level Insights

Analysing individual product performance helped identify demand trends and profitability at a granular level.

- **Observations:**
    - Products with higher marketing spend or recent launches showed a spike in sales.
    - **Product B**, despite being budgeted aggressively, consistently underperformed—indicating possible issues in pricing, quality, or market fit.
- **Power BI Highlights:**
    - Pie charts and stacked bar graphs visualizing product-wise contribution to total sales.
    - Ranking visuals to show best and worst-performing products.

5.4 Time Series and Trend Analysis

A trend-based review over time provided insights into seasonal patterns and recurring performance spikes or drops.

- **Trends Identified:**
    - Q4 showed the strongest sales momentum—likely driven by holidays and year-end campaigns.
    - Sluggish sales in Q1 might suggest a post-holiday slump or budgetary restrictions early in the fiscal year.
- **Modeling Techniques Used:**
    - Python's time-series analysis via matplotlib and seaborn to visualize trends.
    - Power BI's time intelligence (Month, Quarter, Year) for timeline comparisons.

5.5 Variance and Growth Rate Insights

A critical metric in the analysis was the variance between actual sales and budget, both in absolute and percentage terms.

- **Variance Analysis:**
    - Average variance across all regions was **+5.3%**, indicating a general over-performance.
    - However, product-specific variances showed high volatility.
- **Growth Rate Findings:**
    - Some months had **>20% month-over-month growth**, especially during promotion periods.
    - Growth stagnated mid-year, suggesting the need for campaign interventions.

5.6 Business Implications

From the above analyses, several actionable insights were derived:

- Increase marketing investment in regions showing consistent positive variance.
- Reassess the sales targets for underperforming products and adjust future budgeting models.
- Focus on high-growth quarters for launching new products or campaigns.
- Build a more robust sales forecasting model that incorporates historical trends and seasonality.

5.7 Outputs:

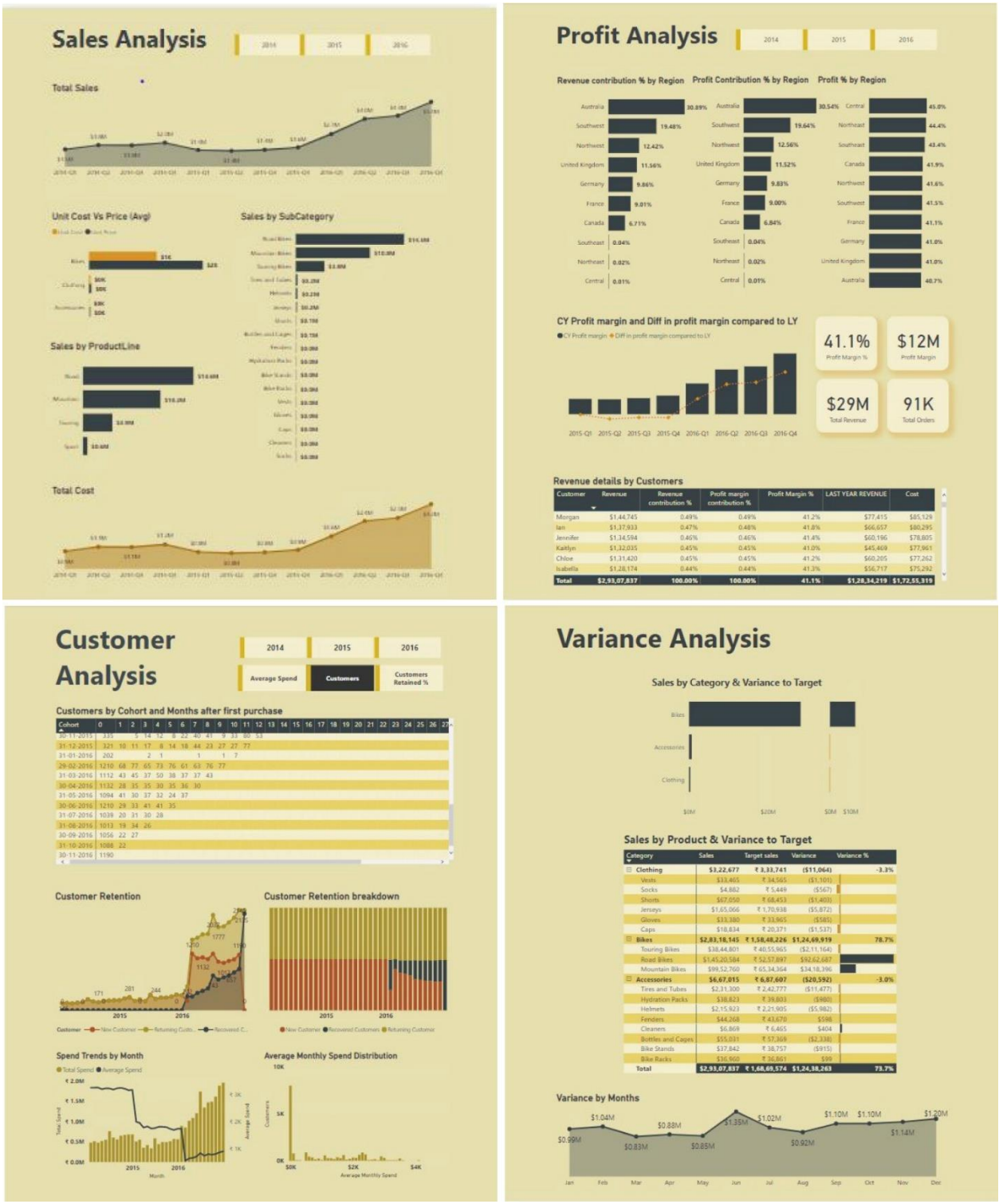

Figure 1- Comprehensive Business Performance Dashboard: Sales, Profit, Customer, and Variance Analysis

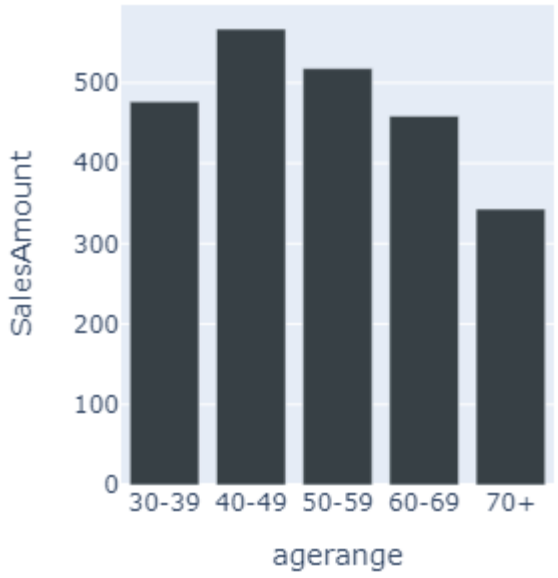

Figure 2- Sales Distribution by Age Group

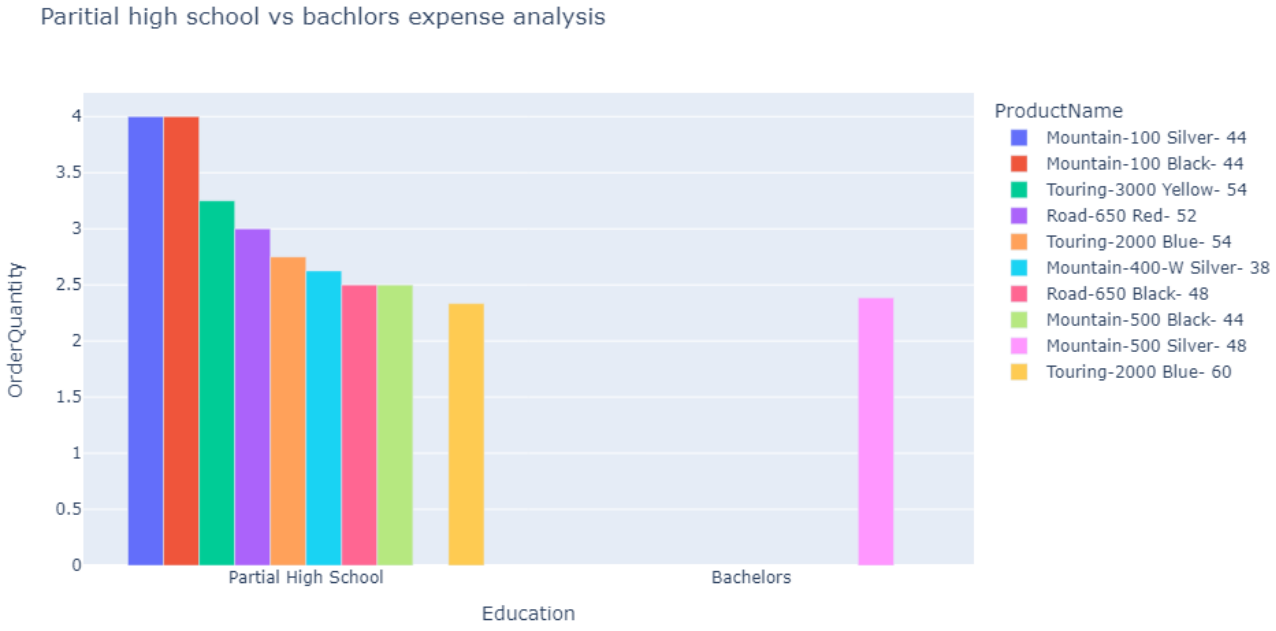

Figure 3- Product Order Comparison by Education Level

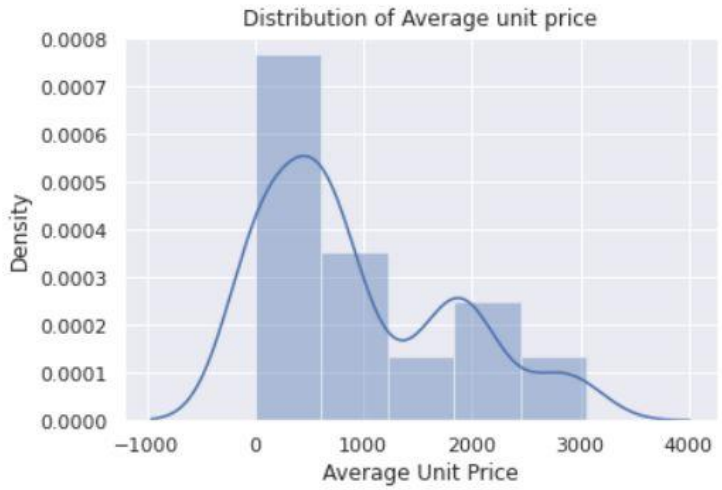

Figure 4- Distribution of Average Unit Price

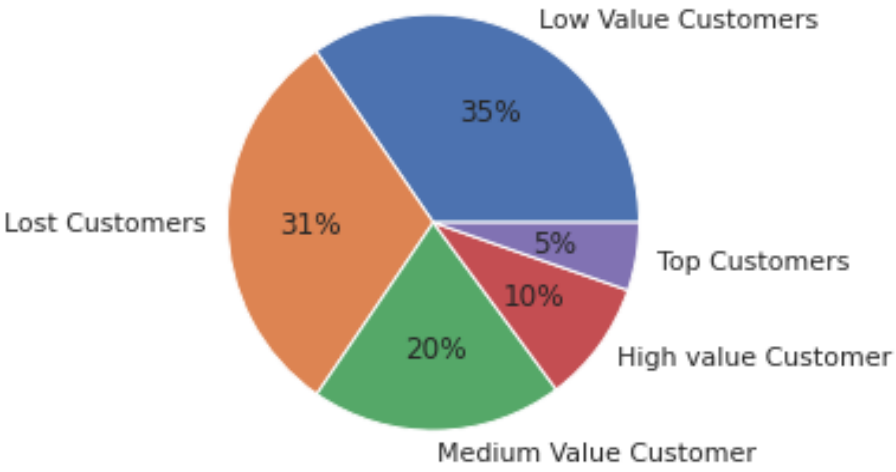

Figure 5- Customer Value Segmentation

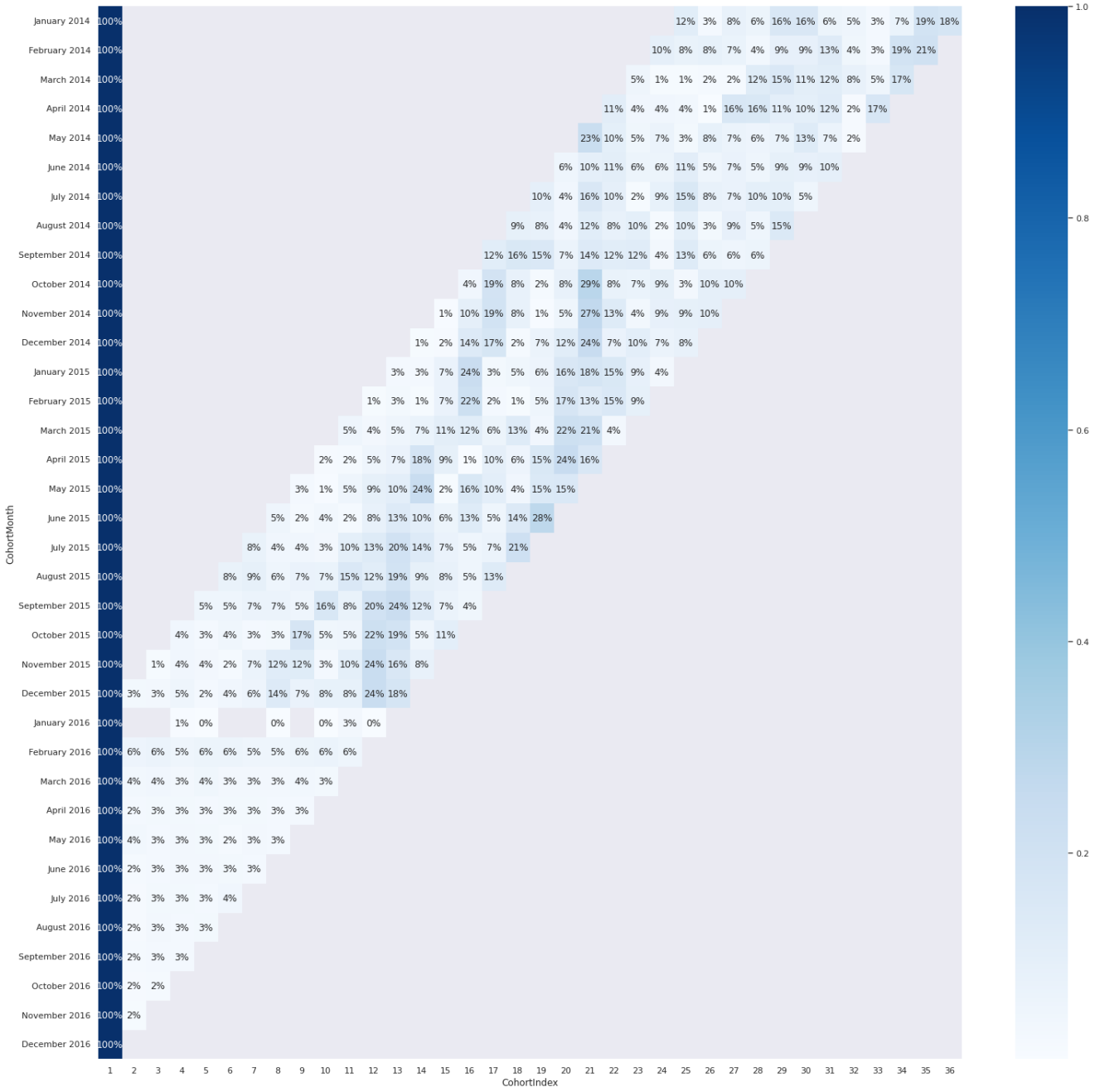

Figure 6- Customer Retention Heatmap by Cohort Month

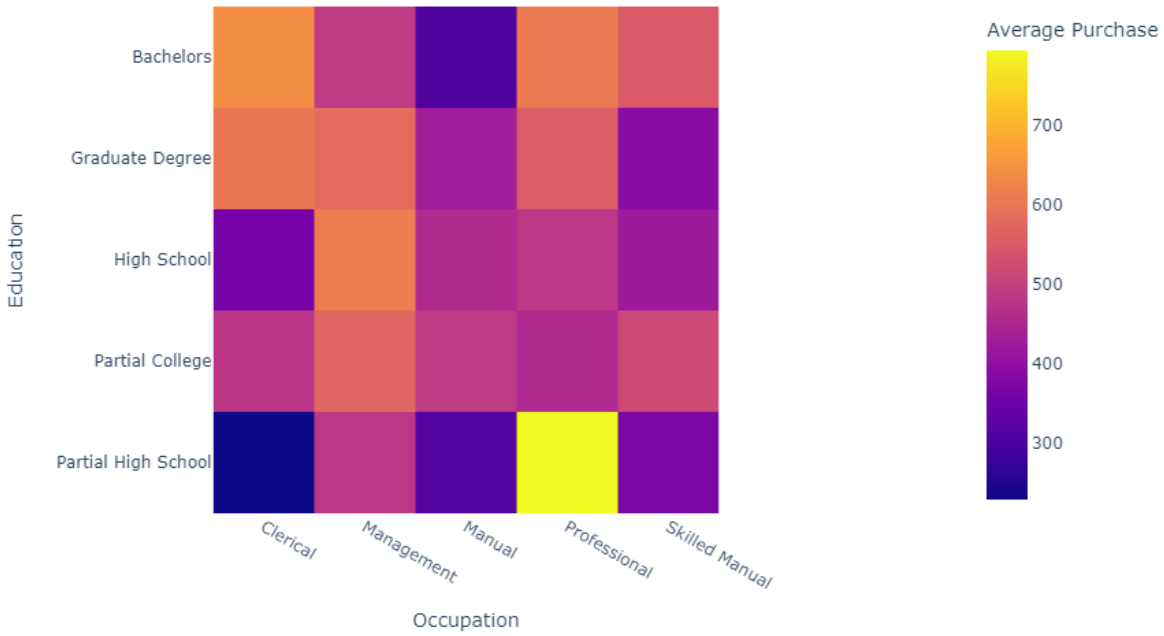

Figure 7- Heatmap of Average Purchase by Education and Occupation

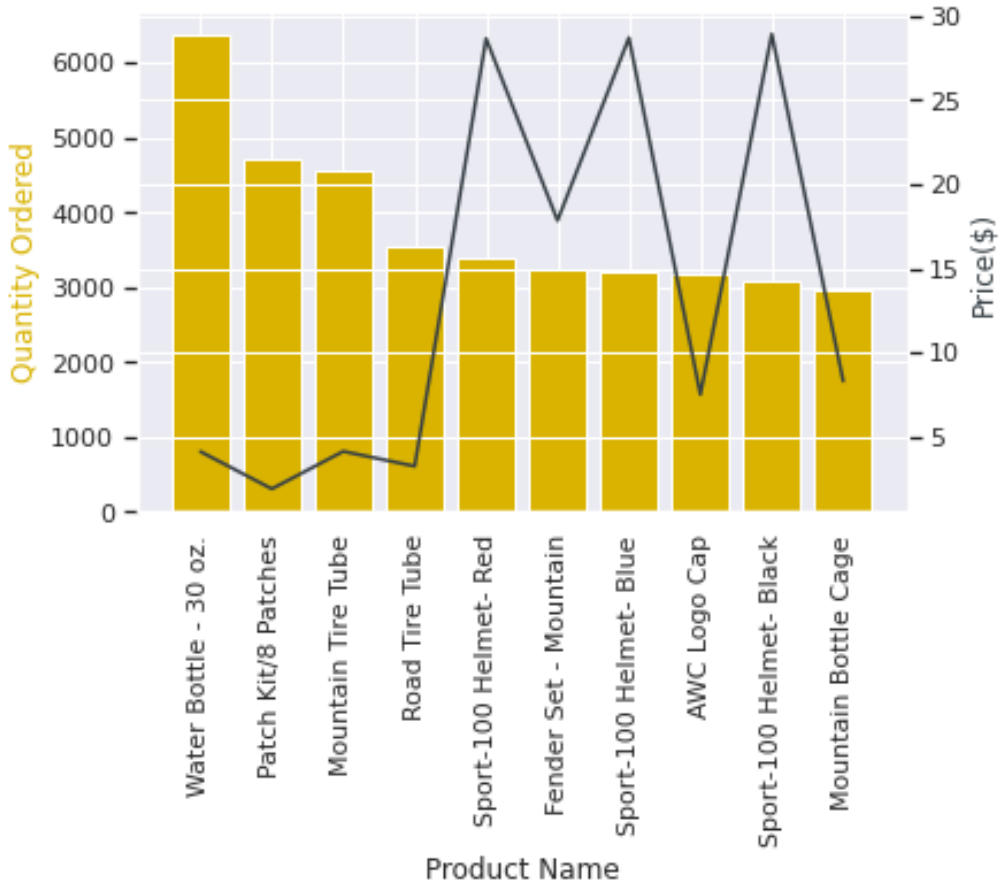

Figure 8- Top Products by Quantity Ordered and Price

CHAPTER 6: LIMITATION OF THE STUDY

Each data-driven extend, no matter how thoroughly arranged and executed, is subject to certain confinements. These restrictions can emerge from the nature of the information, instruments utilized, suspicions made, or broader relevant components past the analyst's control. In this chapter, we diagram and fundamentally look at the key restrictions that affected the scope, exactness, and interpretability of the Deals and Budget Examination extend. Recognizing these imperatives is basic not as it were for straightforwardness but moreover for surrounding reasonable desires almost the conclusions and potential trade applications inferred from this think about.

6.1 Limited Dataset Scope

One of the essential limitations of this think about was the restricted scope of the dataset in terms of time run, item assortment, and geographic scope.

- The dataset fundamentally secured a particular monetary year or select quarters, subsequently confining the capacity to identify longer-term deals cycles or multi-year patterns. Regular patterns were deduced as it were inside a brief window, and year-over-year development measurements seem not be evaluated comprehensively.
- The item information centered on a settled set of things and districts, which may not completely speak to the whole trade portfolio. This seem lead to skewed experiences in the event that critical item lines or territories were not included within the investigation.
- Due to this impediment, the comes about of this consider are most appropriate to the current dataset and may not generalize to distinctive time periods or inconspicuous categories.

6.2 Data Quality and Integrity Challenges

In spite of the fact that critical exertion was contributed in cleaning and changing the information, issues related to information quality held on and may have influenced the vigor of the examination.

- A few records contained lost, inadequate, or conflicting passages, especially in areas such as Item Title, Locale, and Deals Figures. Standard preprocessing methods such as ascription, expulsion of nulls, and normalization were connected, but these strategies carry an inborn chance of data misfortune or twisting.
- Since the dataset started from inside Excel-based following, it is likely that a few degree of manual passage or classification mistake was show. Human mistakes, such as typos or inaccurate categorizations, may have presented commotion into the examination.
- Additionally, the need of a centralized or normalized database structure driven to dreary sections that required broad deduplication.

6.3 Assumptions in Budget Forecasting

A major explanatory center of the ponder was the comparison between genuine and budgeted deals values. Be that as it may, it is vital to note that budgeted values are inalienably theoretical and subject to human or model-driven predisposition.

- The budgeted figures were treated as a fixed benchmark for comparison, but these estimates may not have considered unanticipated market events, policy changes, or competitive dynamics.
- Furthermore, the analysis assumed that the budget values remained constant and unadjusted throughout the evaluation period. In real-world scenarios, budgets are often revised mid-year based on new information, which was not accounted for in this study.

6.4 Technological and Tool-Related Constraints

Whereas both Control BI and Python (Jupyter Scratch pad) advertised vigorous usefulness for information investigation and visualization, the apparatuses had certain imperatives that affected execution and yield.

• The utilize of the free form of Control BI Desktop limited get to to progressed AI-powered analytics, report sharing capabilities, and cloud-based collaboration highlights.

• For huge datasets, execution issues such as moderate revive rates, memory restrictions, and preparing delays sometimes disturbed the workflow, particularly amid real-time sifting and dashboard cutting.

• Python's libraries such as Pandas and Matplotlib given adaptability but required critical manual coding for assignments like information change and visualization, expanding the edge for script-level mistakes.

6.5 Exclusion of External Influencing Variables

This consider depended exclusively on inside deals and budget information without joining outside macroeconomic or market-driven factors that seem give a more all encompassing see.

- Variables such as expansion, buyer patterns, competitor estimating, or worldwide supply chain issues were not coordinates into the investigation. As a result, execution deviations ascribed exclusively to inside wasteful aspects may have really been caused by outside weights.
- So also, client behavior information such as criticism, buy inclinations, and devotion pointers were not included. This exclusion constrained the understanding of the "why" behind deals execution designs, particularly for underperforming items.

6.6 Generalizability and Reproducibility

Due to the specific business context and proprietary nature of the dataset, the findings of this study are not universally generalizable.

- The patterns and insights identified are context-bound and may not apply to different companies, industries, or market conditions.
- Furthermore, reproducibility is limited by data access constraints. Other analysts would require similar access to internal records to replicate the analysis or validate the results.

6.7 Subjectivity in Interpretation

In spite of the fact that objective measurements and visualizations were utilized to conduct the examination, the elucidation of comes about included a degree of subjectivity.

• Bits of knowledge such as "underperforming locale" or "tall change item" are based on edges and viewpoints that will change from one investigator or commerce unit to another.

• Furthermore, inclination may emerge in distinguishing the root causes of execution deviations, particularly within the nonattendance of subjective information such as deals group criticism or client fulfillment measurements.

Whereas this extend effectively conveyed profitable bits of knowledge through data-driven strategies, it is imperative to recognize and regard its impediments. Imperatives related to information quality, explanatory assumptions, tool capabilities, and relevant scope have all molded the ultimate results. These impediments serve as a update that any information examination ought to be translated inside its setting and complemented with space ability, nonstop checking, and iterative advancement.

CHAPTER 7: CONCLUSION AND FUTURE SCOPE

7.1 Conclusion

The Deals and Budget Examination venture set out to investigate how information analytics can be tackled to pick up a comprehensive understanding of deals execution inside an organization. Through the deliberate utilize of devices such as Python for information preprocessing and Control BI for visualization, the ponder has effectively illustrated how organized information can be changed into noteworthy trade bits of knowledge.

The extend taken after a data-centric approach, starting with fastidious arranging and procurement of inside deals information, taken after by careful cleaning, change, and improvement of the dataset. The usage of energetic dashboards empowered an intelligently involvement for partners, encouraging the revelation of execution patterns, budget fluctuations, and deals dissemination over items and districts.

Key insights from the analysis include:

- **Performance Tracking**: Identification of top-selling products, underperforming categories, and revenue-driving regions helped assess operational success.
- **Budget Comparison**: Monthly and quarterly comparisons against budgeted sales revealed both positive and negative variances, highlighting opportunities for cost optimization or targeted intervention.
- **Trend Analysis**: Seasonal sales trends and historical comparisons offered visibility into demand cycles and potential growth periods.
- **Data-Driven Reporting**: Stakeholders were empowered with visually engaging dashboards, enabling fast, intuitive understanding of complex data relationships.

This ponder serves as a down to earth outline of the potential that lies in leveraging commerce insights and information analytics. In spite of limitations in information scope and device restrictions, the results given profitable course for execution audit and key arranging. It is clear that when businesses receive data-driven methodologies, they are superior situated to form educated, opportune, and objective choices.

7.2 Further Scope

While this project has laid the groundwork for effective sales and budget analysis, it also opens up numerous possibilities for future enhancement. Expanding the depth and breadth of analysis will not only improve insight generation but also enable predictive and prescriptive capabilities that go beyond simple historical reporting.

1. Adoption of Predictive and Prescriptive Analytics

- **Forecasting Models**: Implement machine learning algorithms such as ARIMA, Prophet, or LSTM to predict future sales trends, considering seasonality and growth patterns.
- **What-If Scenarios**: Incorporate simulation tools to assess the impact of pricing changes, marketing campaigns, or supply chain disruptions on future sales.

2. Enrichment with External Datasets

- **Market Data**: Integrate macroeconomic indicators (e.g., GDP growth, consumer confidence index) to correlate sales performance with market dynamics.
- **Competitor Insights**: Introduce benchmarking mechanisms by comparing sales with industry peers or publicly available data.
- **Customer Behavior**: Leverage customer segmentation, satisfaction surveys, and digital engagement data to uncover deeper insights into purchasing patterns.

3. Real-Time Data Monitoring and Automation

- **Live Dashboards**: Transition from static reports to real-time dashboards by integrating with APIs or cloud data warehouses.
- **Automated Alerts**: Set up rule-based alerts for KPIs to notify stakeholders when performance metrics deviate significantly from thresholds.

4. Scalability and Deployment

- **Enterprise-Level BI Solutions**: Consider deploying the dashboard on platforms such as Power BI Service or Tableau Server to support broader organizational use and user-level access control.
- **Multi-Year Data Integration**: Expand the dataset to include multiple financial years, allowing for deeper time-series analysis and strategic planning.

5. Enhanced Visualization and UX Design

- Utilize advanced visualization techniques such as **sankey diagrams**, **forecast cones**, and **geo-heat maps** for intuitive storytelling.
- Improve user interaction by adding slicers, drill-through pages, and dynamic filters tailored to different stakeholder needs (e.g., executives, regional managers, finance analysts).

6. Performance Optimization and Governance

- Optimize data models for speed and efficiency by minimizing complex transformations and using star schema modeling.
- Implement version control, audit logs, and role-based access to ensure data security, reliability, and collaboration among analysts.

7.3 Final Thoughts

In a quickly advancing advanced scene, businesses must move from intuition-based choices to insight-driven techniques. This venture underscores the esteem of information analytics as a catalyst for operational greatness and key premonition. By giving a comprehensive see of deals execution in connection to budget desires, the investigation not as it were highlighted existing wasteful aspects but too cleared the way for more precise estimating, focused on showcasing, and way better asset allotment.

Looking forward, the execution of more progressed analytics procedures, extended information inputs, and real-time observing frameworks can advance raise this explanatory system into a completely

coordinates Trade Insights (BI) environment. Such advancement would bolster nonstop advancement, more grounded client introduction, and a more honed competitive edge.

The victory of this extend lays a solid establishment for future work that can advance from clear experiences to prescient foresight—turning information into a center key resource for the organization.

CHAPTER 8: REFERENCES

[1] Microsoft Power BI Documentation: Microsoft Learn. (n.d.). *Power BI Documentation*. Retrieved from https://learn.microsoft.com/en-us/power-bi/

[2] Pandas Documentation: The Pandas Development Team. (n.d.). *Pandas User Guide*. Retrieved from https://pandas.pydata.org/docs/

[3] Matplotlib Documentation: Hunter, J. D. et al. (n.d.). *Matplotlib Documentation*. Retrieved from https://matplotlib.org/stable/contents.html

[4] Power BI Tutorials and Learning Resources: YouTube. (n.d.). *Power BI Dashboard Design and Sales Analysis Tutorials*. Channels such as Guy in a Cube, Simplilearn, and Enterprise DNA.

[5] Jupyter Notebooks and Python Environment: Project Jupyter. (n.d.). *Jupyter Documentation*. Retrieved from https://jupyter.org/documentation

[6] Online Articles and Blogs: Various data analytics blogs and forums were referenced for best practices in dashboard design, data transformation, and DAX usage.

[7] Academic and Industry Research: Relevant whitepapers, case studies, and academic literature on business intelligence, sales analytics, and performance measurement.

Dharmesh kumar

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