

E-commerce Sales Data Analysis for Performance Optimization

Index :

- Executive Summary
- Introduction
- Methodology
- Results
- Visualization – Charts
- Dashboard
- Discussion
- Findings & Implications
- Conclusion

Executive Summary:

- The purpose of this project is to analyze an e-commerce dataset to optimize sales performance and better understand customer behavior. The data includes key features such as customer demographics, purchase history, discount usage, and sales trends. By answering ten specific business questions, the project aims to provide insights into top-selling products, discount effectiveness, sales trends by region and demographics, and customer loyalty, which will help the business improve strategies for marketing, inventory management, and customer retention.

Introduction:

- This analysis focuses on leveraging e-commerce sales data to gain valuable insights into customer behavior and optimize performance. With growing competition in the e-commerce space, understanding how discounts, product categories, and demographics affect sales is essential for a company to stay competitive. The project aims to identify trends, patterns, and customer preferences to improve overall business strategy.

Methodology:

- Data Collection: The dataset consists of sales transactions, including information on product categories, discount details, customer demographics, and purchase methods.
- Data Cleaning: The data was preprocessed to handle missing values, inconsistencies, and outliers.
- Exploratory Data Analysis (EDA): This phase includes initial investigation using statistical methods and visualizations to identify trends and anomalies in the dataset.
- Advanced Analysis: Customer segmentation, discount performance analysis, and seasonality trends were examined.
- Visualization: Power BI and Python were used to visualize the findings through various charts (pie, bar, line, area, and clustered bar charts).

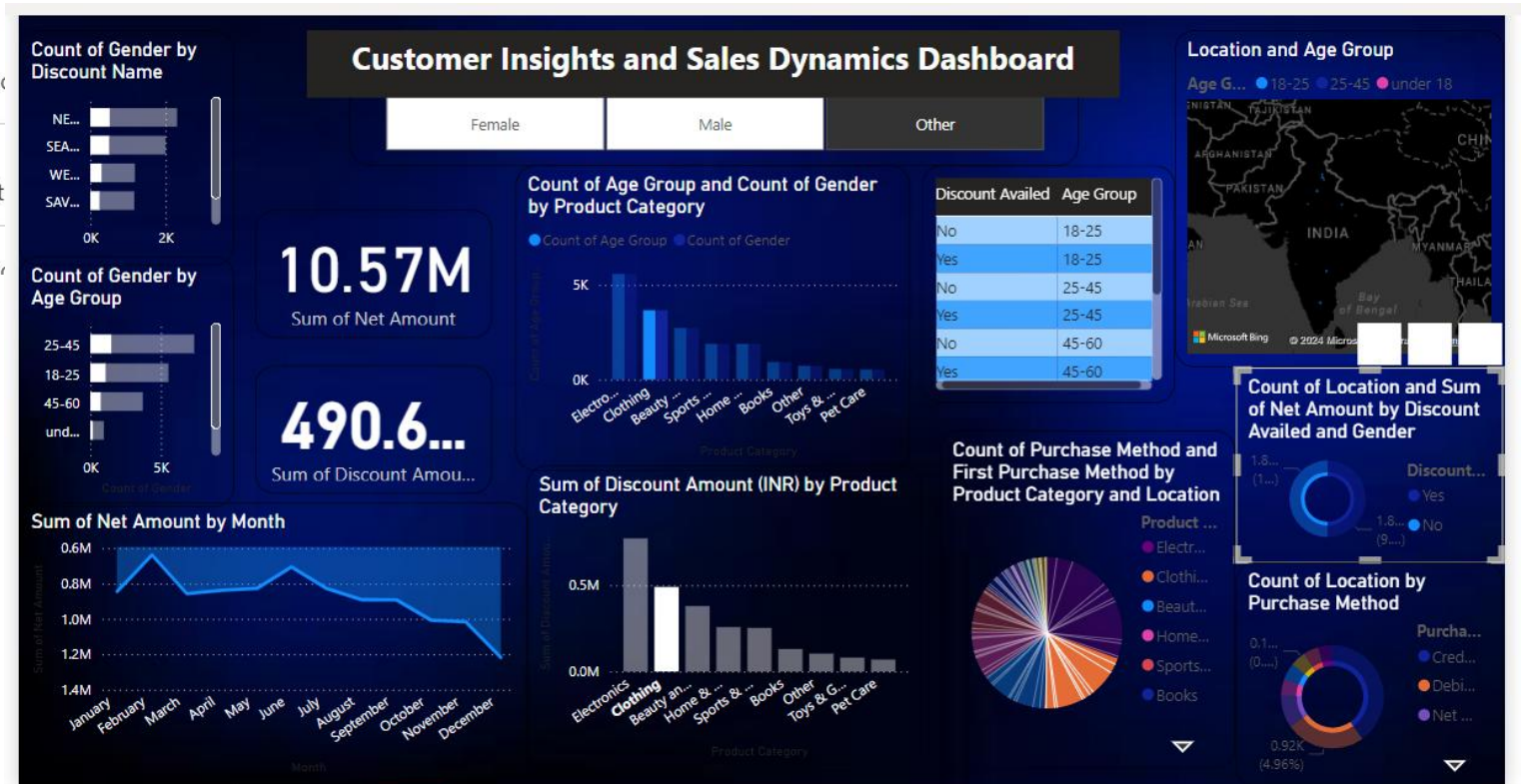
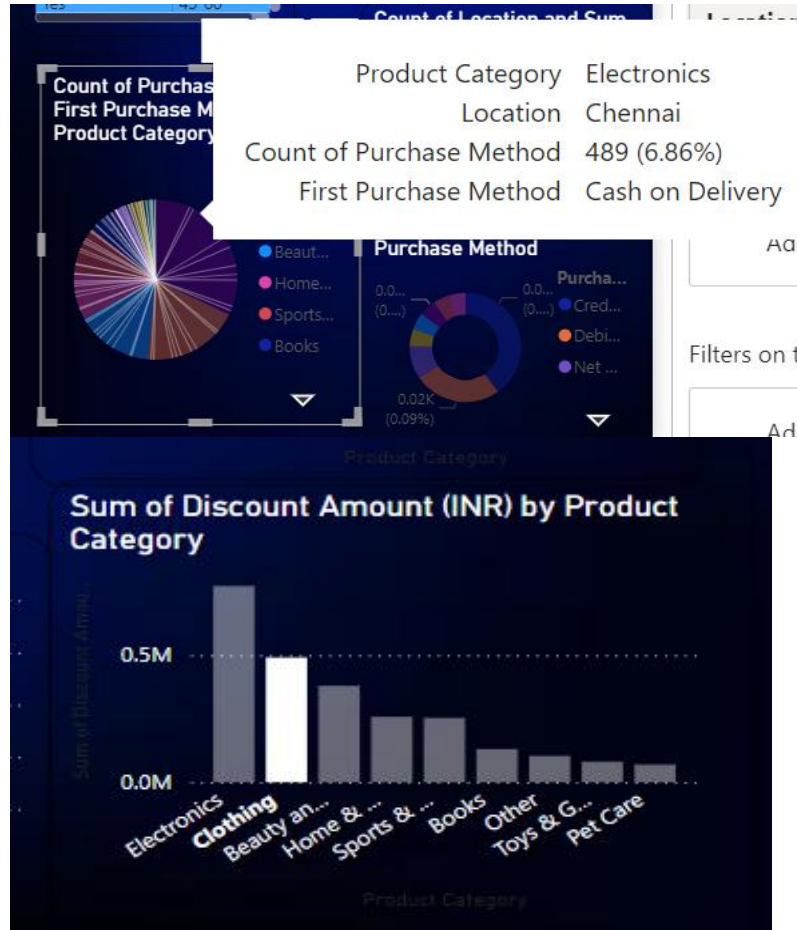
Results:

- Top Product Categories: High-performing product categories were identified using sales volume and revenue data.
- Discount Usage Impact: Discount usage was found to positively impact both net and gross amounts for certain products and demographics.
- Customer Demographics: The most active gender and age group in terms of purchases were analyzed.
- Regional Trends: The analysis revealed location-based product preferences and regional sales performance trends.
- Seasonal Sales Peaks: Purchase Date data revealed seasonal and monthly peaks in sales performance.
- Purchase Methods: A comparison between different purchase methods (online vs in-store) showed differences in average net amount and discount usage.
- Customer Loyalty: Patterns in customer loyalty were identified based on age group, gender, and location.

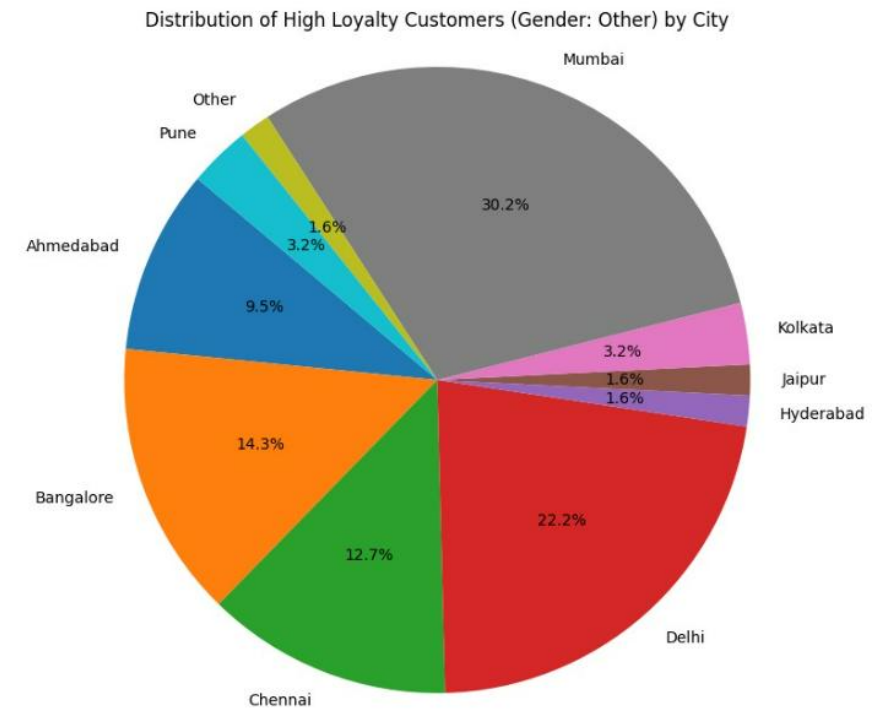
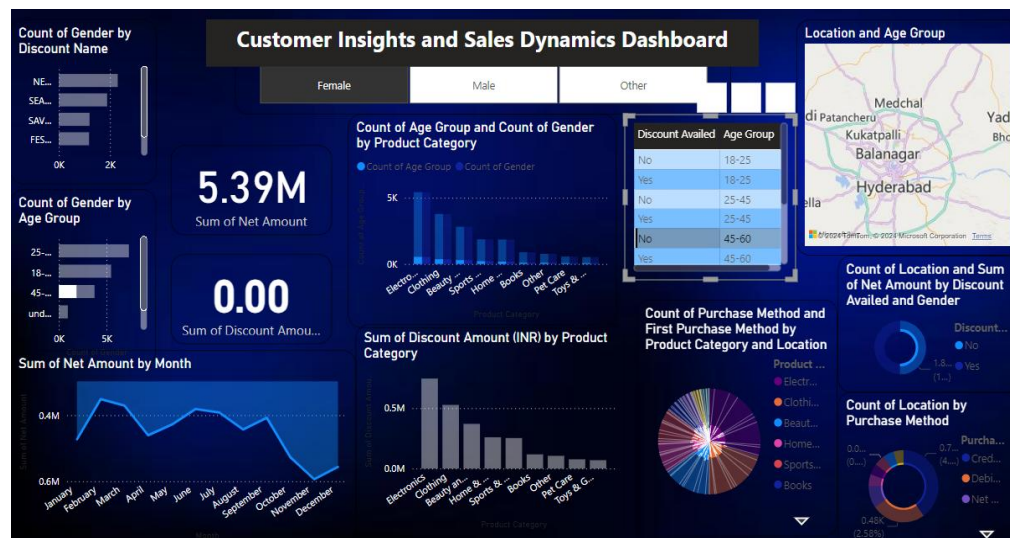
Visualization – Charts:

- Clustered Bar Charts: Comparison of gender and age group in terms of product category performance and discount usage.
- Area Charts: Display of monthly/seasonal sales trends.
- Pie Charts: Analysis of discount performance by gender and location.
- Donut Charts: Visualization of the percentage of total sales coming from various product categories.
- Stacked Bar Charts: Comparison of sales across different locations and product categories.

Dashboard:

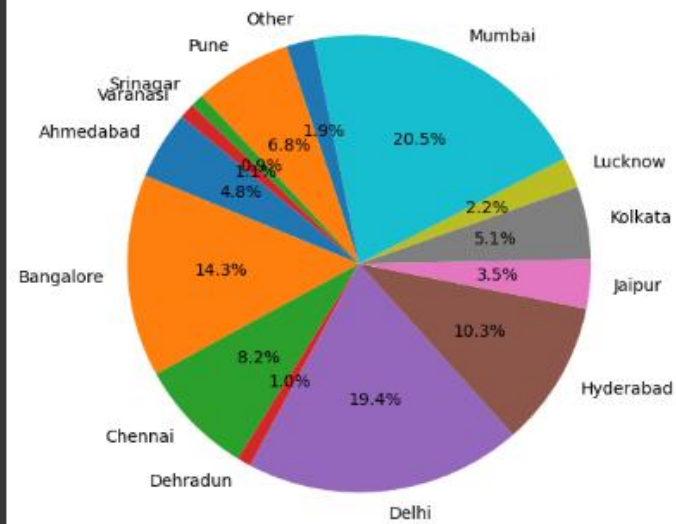


Dashboard Insights:

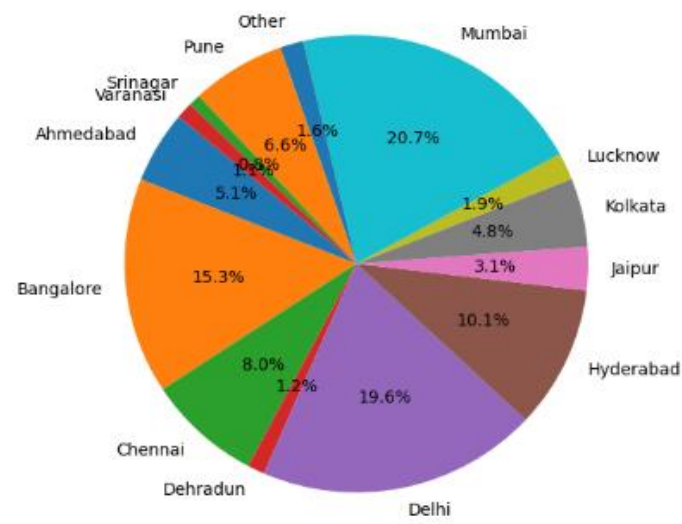


Discounts Insights :

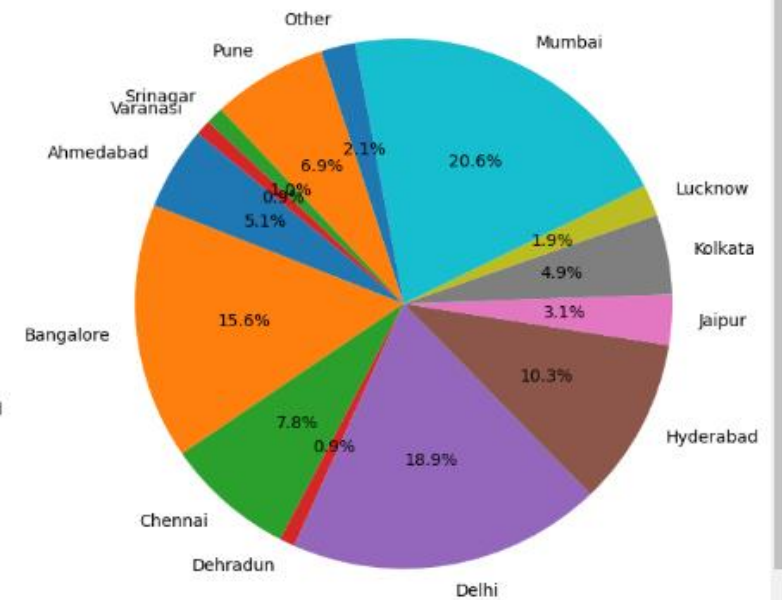
Total Discount Amount for Female Customers by City

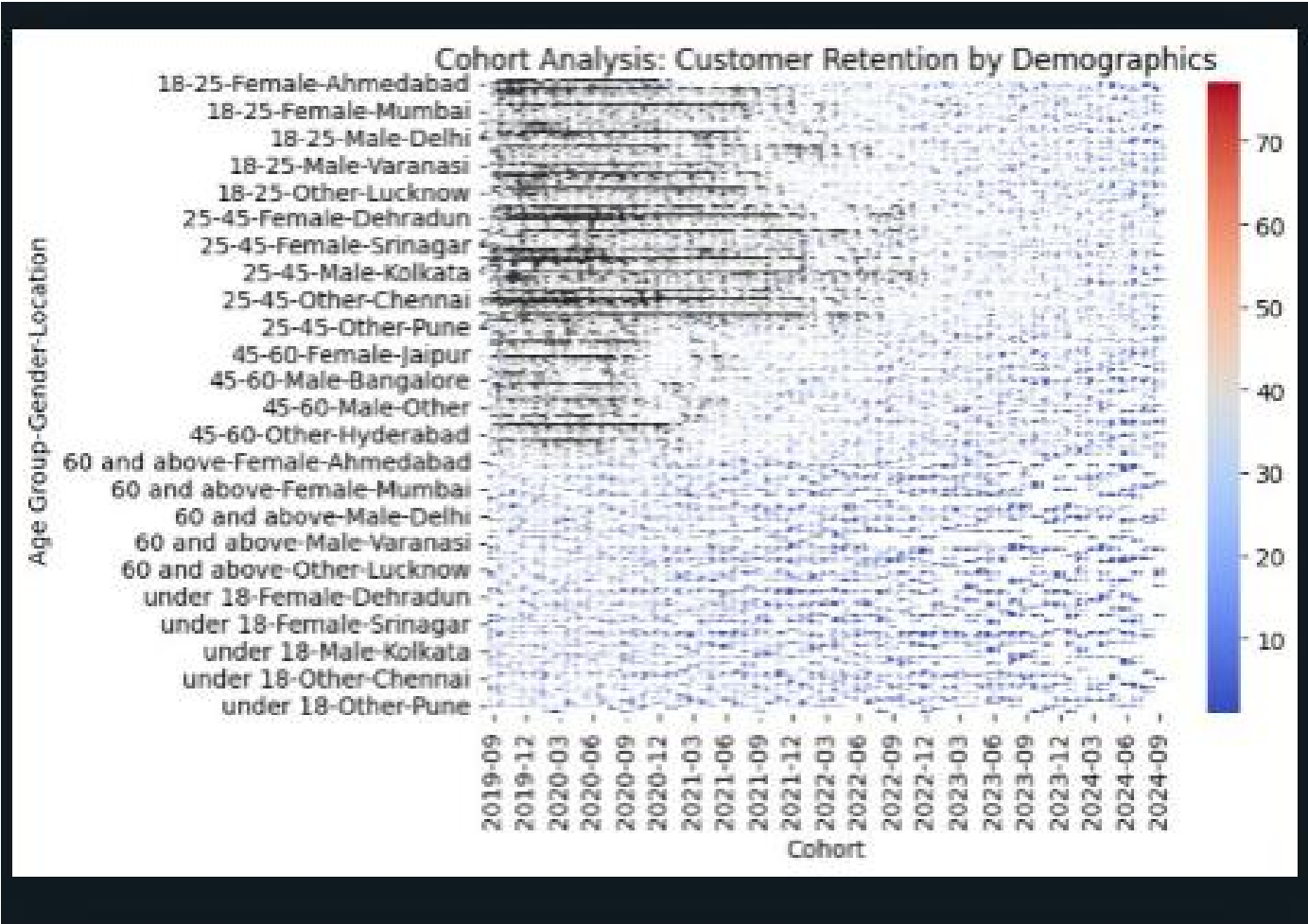
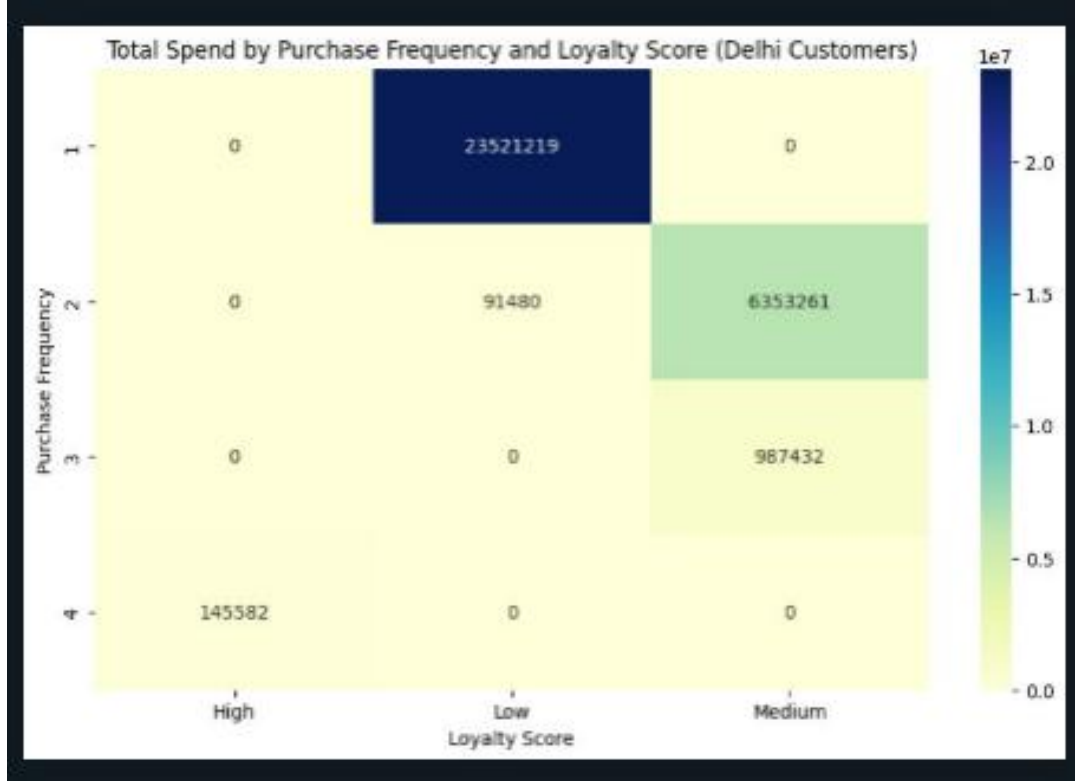


Total Discount Amount for Male Customers by City



Total Discount Amount for Other Customers by City





Business Solutions:

- Targeted Discounts: Focus discounts on high-conversion products or customer segments to boost sales.
- Inventory Management: Align stock levels with high-demand product categories identified through the analysis.
- Regional Campaigns: Tailor marketing campaigns to regions with high sales performance.
- Customer Retention: Use demographic insights to improve customer loyalty programs.

Discussion:

- The findings suggest that targeted discounts, product-specific marketing, and region-based strategies can help optimize sales. Seasonal peaks should also be leveraged for promotions and product launches.
- Findings & Implications:
 - Discounts are effective but need to be tailored to specific products and demographics.
 - Gender and age segmentation offer opportunities for personalized marketing.

Conclusion:

- The analysis highlights key areas for growth, including personalized discount strategies, regional marketing, and inventory optimization.
- The findings provide actionable insights that will help the business optimize sales performance.