E-Commerce Sales & Profit Analysis Using Python

1) Project Overview

This project analyses an e-commerce dataset to identify seasonal patterns, category and sub-category performance, profit drivers, and customer segment behaviour. The goal is to convert raw data into clear, actionable insights for business decisions.

2) Objective

Analyse sales and profit trends to identify key performance drivers, profitable product categories, and seasonal **trends. Provide insights that support pricing, promotions, inventory, and marketing strategy.**

3) Tools & Technologies Used:

- Python (Pandas, Matplotlib, Plotly Express)
- Jupyter Notebook
- Data Cleaning & Preprocessing Techniques

4) Key Insights:

1. **Monthly Sales Trend:**

   o November recorded the highest sales, while January had the lowest sales.

Monthly Sale Analysis

2. **Category-wise Sales:**

   o   Technology products lead in sales, followed by Furniture and Office Supplies.
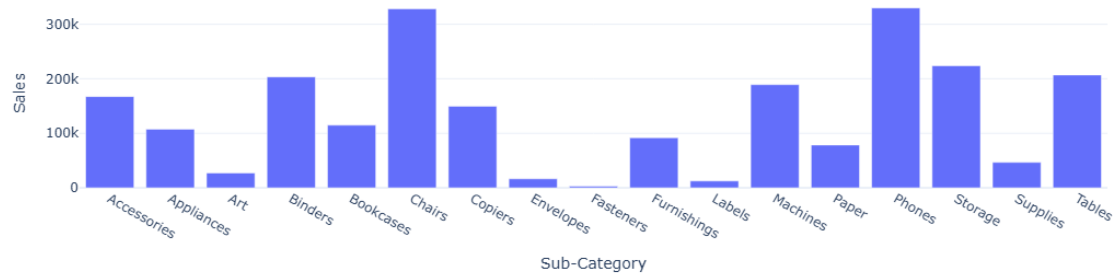
Sales Analysis by category

3. **Sub-Category Insights:**

   o   In Technology: Phones are the highest-selling items.

   o   In Furniture: Chairs have the highest sales.

   o   In Office Supplies: Storage products have the highest sales.

Sale Analysis by Sub-Categories

4. **Monthly Profit Trend:**

   o   December was the highest profit month, January was the lowest.

Profit by Month

5. **Profit by Category:**

   o   Technology products generated the highest profit.

> ○ Office Supplies came second, while Furniture had very low profit margins.

Profit Analysis by Category

Legend: Technology, Office Supplies, Furniture

Office Supplies 42.8%
Technology 50.8%
Furniture 6.44%

6. **Profit by Sub-Category:**

   ○ Copiers, Phones, and Accessories (all Technology items) had the highest profit.

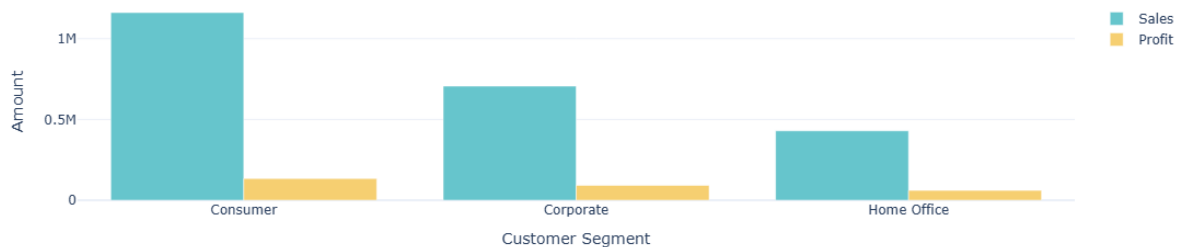   ○ Tables and Bookcases (Furniture items) caused a net loss.

Profit Analysis by Sub-Category
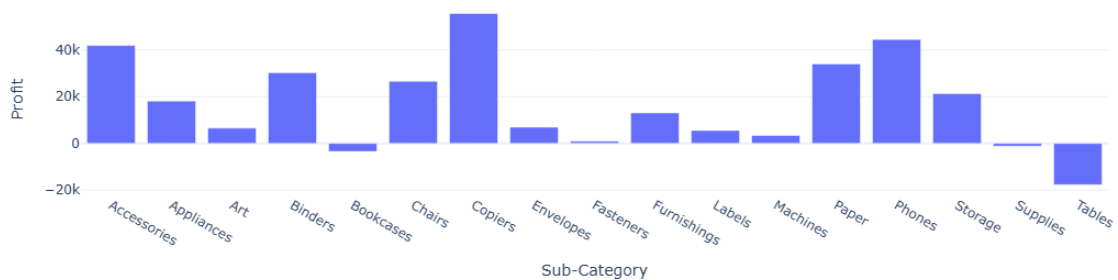
7. **Customer Segment Analysis:**

   ○ The Consumer segment purchases more items and generates the highest profit.

   ○ Corporate comes second, followed by Home Office.

Sales and Profit Analysis by Customer Segment

5) Sales-to-Profit Ratio:

   ○ Highest in the Consumer segment, followed by Corporate, then Home Office.

6) Conclusion:

The analysis shows that Technology products, especially Phones, Copiers, and Accessories, are key revenue drivers. Marketing efforts can be targeted towards these segments, while loss-making categories like Tables and Bookcases should be reevaluated. Seasonal trends indicate that promotional campaigns in the months of November and December could maximize revenue.