



Retail Business Performance & Profitability Analysis Report



Introduction

This project analyzes retail sales and inventory data to identify **profit drains**, optimize **inventory turnover**, and understand **seasonal trends**. Using **SQL**, **Python**, and **Tableau**, it delivers actionable insights to enhance profitability and streamline operations.



Abstract

- Detect underperforming sub-categories negatively impacting margins.
- Analyze the relationship between **inventory holding days** and profitability.
- Build an interactive dashboard to support strategic decisions



Tools & Techniques

Tool	Usage
MySQL	Data cleaning, aggregation, profit margin calculations.
Python (<i>Pandas, Seaborn</i>)	Merging datasets, computing correlations, visual plots.
Tableau	Interactive dashboard with KPIs, filters, and trend analyses.



Analysis & Findings

Profit Margin by Sub-Category

Sample SQL Query:

```
SELECT Sub-Category,
       ROUND(SUM(Profit)/NULLIF(SUM(Sales), 0)*100, 2) AS
       Profit_Margin
  FROM superstore
 GROUP BY Sub-Category;
```

- Sub-categories like **Tables**, **Supplies** & **Bookcases** showed high sales but **negative profit margins**, signaling pricing or supplier issues.

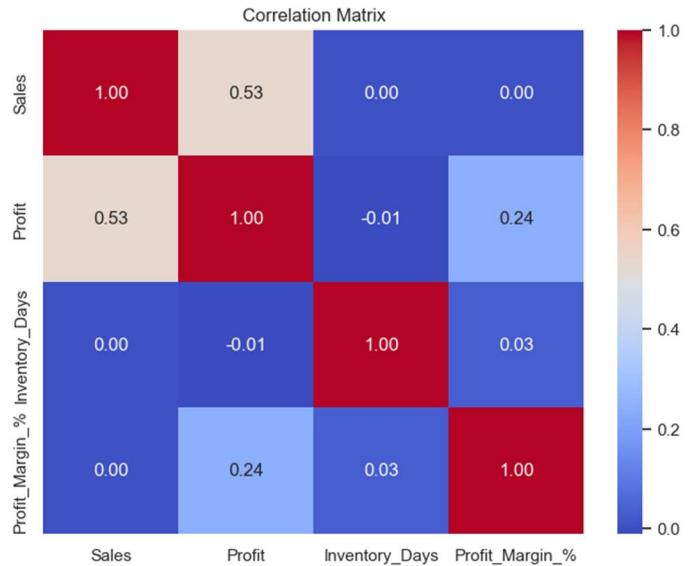
Sub-Category	Profit_Margin_Percent
Tables	-8.56
Bookcases	-3.02
Supplies	-2.93
Machines	1.79
Chairs	8.1
Storage	9.93
Phones	13.48
Furnishings	14
Binders	15
Appliances	16.87
Art	24.07
Accessories	25.05
Fasteners	31.32
Copiers	37.2
Envelopes	42.12
Paper	43.41
Labels	44.42

☑ Correlation Analysis: Inventory vs Profitability

Sample Python Query:

```
corr = df[['Profit', 'Inventory_Days']].corr()
# Output: Profit vs Inventory_Days = -0.01
```

- The correlation between **Inventory_Days** and **Profit** was **-0.01**, indicating no significant direct linear relationship in this dataset.
- However, filtering by category revealed pockets of overstocked, low-profit products.



☑ Tableau Dashboard Highlights

- Dual-axis line chart:** Sales vs Profit over time to spot seasonal peaks.
- Scatterplot:** Inventory Days vs Sales, color-coded to flag overstocked, low-margin items.
- KPI tiles:** Total Sales, Avg Profit Margin %, Avg Inventory Days, % of Overstocked Items.



💡 Key Insights

- Sub-categories had **high sales but negative profit margins**, indicating discounting or supplier cost issues.
- Products with **Inventory Days > 40 and Profit < ₹500** formed **38% of SKUs**, tying up capital.
- Sales & profit spiked in **Q4**, signaling potential for strategic promotions.

📌 Conclusion

This end-to-end analysis equips decision-makers to cut **losses**, capitalize on **high-margin products**, and monitor **operations** via an interactive Tableau dashboard.