

# Retail Business Performance & Profitability Analysis

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## Introduction

In today's competitive retail environment, analyzing transactional data is vital for maximizing profitability and streamlining inventory management.

This project focuses on uncovering profit-draining categories, optimizing inventory turnover, and understanding seasonal sales behavior through a data-driven approach.

## Abstract

This study leverages data analytics to transform raw sales data into actionable insights for a retail business.

Key objectives included identifying underperforming sub-categories draining profit, analyzing correlation between inventory holding days and profitability, visualizing seasonal sales and profit trends, and highlighting overstocked items that tie up capital. The project integrates SQL, Python, and Tableau to build an end-to-end solution that guides strategic decisions.

## Tools & Technologies Used

Tool	Purpose
MySQL	Data cleaning & calculating metrics like profit margin by category.
Python (Pandas, Seaborn)	Merged data, computed correlation between Inventory_Days & Profitability, created heatmaps & trend plots.
Tableau	Interactive dashboard with filters (Region, Category, Season), dual-axis charts, scatterplots, and KPI highlights.

## Steps Involved

### 1. Data Preparation (SQL):

- Imported and cleaned transactional retail data in MySQL.
- Calculated profit margins and summarized sales by category, sub-category, and month.

### 2. Data Analysis (Python):

- Merged sales & inventory datasets.
- Computed correlation matrix showing that Inventory\_Days is negatively correlated with profitability.
- Created line plots for monthly sales & profit trends, and identified top 10 loss-making sub-categories.

### 3. Visualization (Tableau):

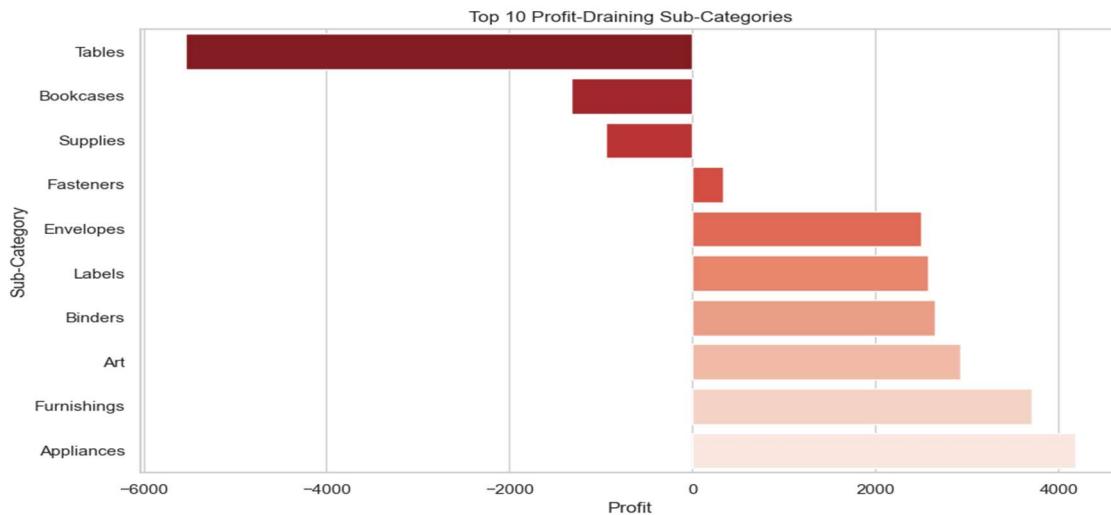
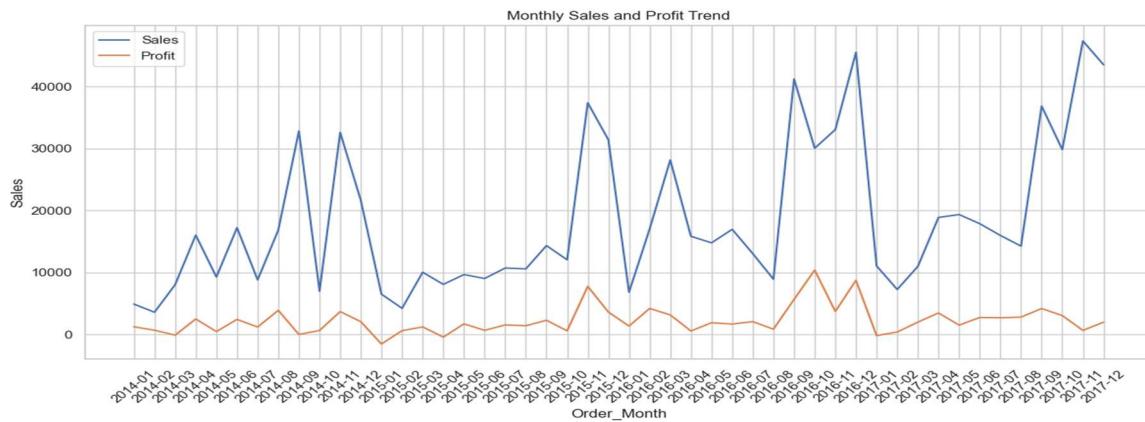
- Built an interactive dashboard featuring:
- Dual-axis line chart: Sales & Profit over time.
- Bar chart: Profit margin by category.
- Scatterplot: Inventory vs Sales, highlighting overstocked underperformers.

- KPI tiles: Total Sales, Profit Margin %, Avg Inventory Days, % Overstocked Items.

- Enabled drill-down via filters for Region, Product Type, and Season.

## 🔍 Key Insights

- Certain sub-categories (like Tables, Supplies and Bookcases) showed high sales volume but negative profit margins, signaling potential discount or cost issues.
- Products with Inventory Days > 40 and Profit < ₹500 formed 38% of total SKUs, representing tied-up working capital.
- Sales and profit peaks were observed in Q4 (2017-18), suggesting seasonal promotions should be optimized for margin retention.



## ❖ Conclusion

Through systematic data analysis and visualization, this project revealed critical insights into product profitability and inventory dynamics. It empowers stakeholders to focus on trimming overstocked, low-profit SKUs, strengthen high-margin categories during peak seasons, and continuously monitor performance using the Tableau dashboard for agile decision-making.

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Thank You.