Retail Business Performance & Profitability Analysis

Executive Summary

In a competitive retail environment, identifying areas of inefficiency is crucial. This project analyzes transactional retail data to identify underperforming sub-categories, evaluate inventory effectiveness, and reveal seasonal and regional patterns. Using SQL for data preparation, Python for statistical analysis, and Tableau for visual storytelling, we deliver a comprehensive performance review with strategic recommendations.

Project Objectives

- Calculate profit margins across product categories and sub-categories.

- Examine the relationship between inventory turnover and profitability.

- Identify seasonal demand patterns.

- Highlight region-wise profitability distribution.

- Suggest strategic actions based on findings.

Tools & Technologies

Tool	Purpose
SQLite	Data import, structure, and cleaning
Python (Pandas, Seaborn, Matplotlib)	Data analysis and visualization
Tableau	Dashboard creation and data storytelling

Dataset Overview

The dataset used is the 'Sample - Superstore' dataset, a commonly used retail data sample. It was initially in `.xls` format and later converted to `.csv` for ease of analysis. It contains over 10,000 records with transactional, geographic, and product-level data.

Data Cleaning and Preparation (SQL)

Data was imported and cleaned using DB Browser for SQLite. Steps included:

- - Removing rows with missing or null values in important columns.
- - Validating data types for numerical and categorical fields.
- - Standardizing and formatting date fields.
- - Ensuring consistent product categories and region entries.

SQL Analysis: Profit Margin by Sub-Category

We calculated profit margins using SQL to understand which sub-categories are profitable. Sub-categories like Tables, Bookcases, and Supplies showed negative or low profit margins.

Python Correlation Analysis

Using Pandas and Seaborn, we simulated 'Inventory Days' and calculated 'Profit Margin (%)'. A negative correlation (-0.49) was observed between inventory days and profit margin, indicating that slow-moving inventory affects profitability.

Seasonality Analysis

Seasons were derived using the Order Date. Sales peaked in Summer and Fall seasons, especially in the Technology and Furniture categories. Spring showed relatively lower activity.

Tableau Dashboard Summary

The Tableau dashboard includes the following charts:

- - Bar Chart: Sales and Profit by Sub-Category
- - TreeMap: Region-wise Profitability
- - Scatter Plot: Inventory Days vs Profit Margin
- - Line Chart: Monthly Sales Trend
- - Stacked Bar: Seasonal Sales Overview
- - KPI Tiles: Total Sales, Profit, Quantity

Insights Summary

- - Sub-Categories like Tables had high sales but poor profitability.
- - High inventory days correlated with low profit margins.
- - Summer and Fall saw the highest sales across categories.
- - West region contributed most to profit.

Strategic Recommendations

- - Re-evaluate pricing for low-margin sub-categories.
- - Reduce inventory holding periods to improve cash flow.
- - Align inventory and marketing to seasonal demand.
- - Focus on high-margin, fast-selling products.
- - Improve regional performance through localized strategies.

Deliverables

- - final_superstore_for_tableau.csv – Cleaned dataset for Tableau
- - profit_margin_queries.sql – SQL queries used in analysis
- - Tableau Dashboard (twbx or screenshots)
- - This detailed report (PDF/Docx)

Conclusion

This project provided data-driven insights into retail business performance. Through SQL analysis, Python correlation, and Tableau visualization, we identified key issues in product profitability, inventory management, and seasonal planning. The findings support informed decision-making that can enhance operational efficiency and maximize profit.