

# Retail Business Performance & Profitability Analysis

## Introduction

In today's competitive retail environment, businesses must continuously analyze their sales and profit data to identify inefficiencies, reduce losses, and improve decision-making. Retail organizations often face challenges such as profit-draining product categories, slow-moving inventory, and seasonal demand fluctuations.

This project focuses on analyzing retail transactional data to evaluate business performance, identify loss-making categories and products, understand seasonal sales behavior, and derive actionable business insights using data analytics tools.

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## Abstract

This project performs an end-to-end retail performance and profitability analysis using transactional sales data. SQL was used for data cleaning and profitability analysis at category and sub-category levels. Python (Pandas, Seaborn) was used to simulate inventory turnover using quantity sold and to analyze its correlation with profitability. Tableau was used to create an interactive dashboard that visualizes sales trends, profit patterns, and seasonal behavior across regions and product categories. The analysis helps identify slow-moving and overstocked items, loss-making categories, and high-risk seasonal periods, enabling data-driven strategic recommendations.

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## Tools Used

- **SQL (SQLite)**  
Used for data storage, cleaning, aggregation, and profitability calculations by category and sub-category.
  - **Python (Pandas, Matplotlib, Seaborn)**  
Used to perform inventory turnover proxy analysis, correlation analysis, and exploratory visualization.
  - **Tableau**  
Used to design an interactive dashboard with filters for region, category, and sub-category, and to visualize seasonal sales and profit trends.
  - **Dataset**  
Sample Superstore retail dataset downloaded from Kaggle.
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## Stepas Involved in Building the Project

1. **Data Import & Cleaning (SQL)**
  - Imported the retail dataset into SQLite using DB Browser.
  - Checked for missing and invalid records.

- Created a cleaned table by removing records with invalid sales values while retaining loss-making transactions for analysis.

## **2. Profitability Analysis (SQL)**

- Calculated total sales and total profit by category and sub-category.
- Computed profit margin percentages to identify profit-draining and high-risk product segments.
- Identified sub-categories with negative or low profit margins.

## **3. Inventory Turnover Proxy & Correlation (Python)**

- Since direct inventory data was unavailable, inventory movement was approximated using total quantity sold per sub-category.
- Created an inventory days proxy where lower quantities indicated slow-moving inventory.
- Performed correlation analysis between inventory movement and profitability.
- Visualized relationships using scatter plots to identify overstocked and loss-making products.

## **4. Seasonality & Dashboard Creation (Tableau)**

- Built bar charts for sales and profit by category.
- Created monthly sales and profit trend analysis to identify seasonal behavior.
- Added interactive filters for region, category, and sub-category.
- Combined all visuals into a single professional dashboard and exported results as PDF.

## **Conclusion**

The retail performance analysis revealed that high sales do not always translate into high profitability, with several sub-categories contributing disproportionately to losses. The inventory turnover proxy analysis showed that slow-moving products often correlate with lower profitability, indicating potential overstock and inefficient inventory management. Seasonal trend analysis highlighted periods of high sales but weak margins, suggesting pricing or cost optimization opportunities.

Overall, this project demonstrates how SQL, Python, and Tableau can be combined to perform practical retail analytics, uncover hidden business risks, and support data-driven strategic decision-making.