

Retail Business Performance & Profitability Analysis

1. Introduction

In today's competitive retail environment, businesses must continuously monitor sales, profitability, and inventory performance. This project aims to analyze retail transaction data to uncover profit-draining categories, optimize stock levels, and identify seasonal sales patterns. The insights generated support data-driven decision-making and inventory management improvements.

2. Abstract

The project focuses on analyzing retail business performance using SQL, Python, and Power BI. SQL was used for data extraction and profit margin computation, Python handled cleaning and correlation analysis, and Power BI visualized KPIs and trends interactively. The outcome highlights the relationship between profitability, inventory days, and category-level performance across regions.

3. Tools Used

- **SQL** – for data querying and profit calculation
- **Python (Pandas, NumPy, Seaborn)** – for cleaning and correlation analysis
- **Power BI** – for visualization and interactive dashboard creation

4. Steps Involved in Building the Project

1. **Data Collection & Import:** Imported the dataset into SQL and Python for preprocessing.
2. **Data Cleaning:** Removed duplicates, filled missing values, and calculated new columns such as *Profit* and *Profit Margin (%)*.

3. **SQL Analysis:** Derived key metrics like category-wise and region-wise profit, top-performing and low-performing sub-categories.
4. **Python Correlation:** Analyzed relationships between *Inventory Days* and *Profit Margin* to understand stock efficiency.
5. **Power BI Dashboard:** Built an interactive dashboard with KPIs, category charts, and filters for Region, Category, and Date.
6. **Insights Derivation:** Identified slow-moving products, high-profit categories, and seasonal demand variations.

5. Key Insights

- **Electronics and Furniture** generated the highest revenue, but **Fashion** had the best profit margins.
- **High inventory days** correlated with **lower profit margins**, suggesting overstock issues.
- **South and West regions** showed strong performance; **East region** required marketing improvement.
- Seasonal analysis revealed peak sales in **November and December** due to festive demand.

6. Conclusion

The analysis successfully identified the main profit drivers and inefficiencies in the retail business. Optimizing inventory turnover and focusing on profitable product lines can significantly boost overall profitability. Power BI's interactive dashboard allows management to monitor key metrics in real time and make strategic, data-backed decisions.