

# Retail Business Performance & Profitability Analysis

This project analyzes retail sales data to uncover profit-draining product categories, optimize inventory turnover, and identify seasonal product behavior. It uses SQL, Python, and Tableau to derive actionable business insights from transactional data.

## Objective:

- Identify low-performing categories and sub-categories
- Optimize inventory turnover using sales vs. inventory metrics
- Understand seasonal patterns in sales and profitability
- Provide strategic suggestions for inventory and pricing decisions

## Tools & Technologies Used:

- SQL (PostgreSQL)– For querying, cleaning, and aggregating retail data
- Python (Pandas, Seaborn) – For correlation analysis and data transformation
- Tableau – For dashboard creation and data visualization
- GitHub – For project versioning and deliverable sharing
- Word– For automated PDF report generation

## Project Structure:

– Retail_Business_Insights_Report.pdf	Key findings and strategic recommendations
– Retail_Final_Report.pdf	1–2 page final project summary
– Retail_Profitability_Dashboard.twbx	Tableau interactive dashboard
– profit_margin_turnover.sql	SQL queries used for analysis
– Inventory_turnover.csv	Exported turnover ratio data
– Superstore.csv	Raw transactional dataset
– README.md	This file

### **Dashboard Highlights:**

- **KPIs:** Sales, Profit, Quantity
- **Filters:** Region, Product Type (Sub-Category), Season
- **Slow-Mover Detection:** Products flagged using inventory turnover
- **Trend Charts:** Seasonal patterns and profitability visuals
- **Correlation Plot:** Inventory Days vs Profit Margin

### **Correlation Insight (Python):**

**Correlation between Inventory Days and Profit Margin:** -0.25

A weak negative correlation was observed — longer inventory holding slightly reduces profitability.

### **Key Findings:**

- Certain sub-categories (e.g., Tables, Binders) have high sales but poor profit margins
- Inventory Turnover reveals overstocked and slow-moving items
- Q4 shows highest seasonal demand, especially for Consumer segment
- Shipping delays increase Inventory Days and reduce profitability


### **Recommendations:**

- Reduce stock for slow movers and low-margin categories
- Improve shipping speed to reduce Inventory Days
- Run seasonal promotions to optimize sales cycles
- Focus on high-margin, fast-turnover products

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 **Author**

**Joseph R Pakhuongte**

 josephrpakhuong@gmail.com

 MSc Data Science | Aspiring Data Analyst