Project Title: Retail business Retail Business Performance & Profitability Analysis.

Introduction

The retail industry constantly grapples with challenges around inventory management, category profitability, and adapting to seasonal demand.

To ensure business sustainability and maximize revenue, it's vital to analyze sales and operational data strategically.

This project aims to uncover profit-draining product categories, optimize inventory turnover, and identify seasonal sales patterns using retail transaction data.

Abstract

This project uses a comprehensive dataset of retail transactions to derive actionable insights.

The data includes product-level sales, profit, inventory turnover, category information, and order dates.

By cleaning and analyzing this dataset through SQL and Python, and visualizing the findings in Power BI, the project equips stakeholders with powerful tools to make informed inventory, pricing, and promotion decisions.

Tools Used

SQL (Structured Query Language):
Used for data cleaning, transformation, and aggregating metrics like profit margins, category performance, and seasonal profitability.

Python (Pandas, Seaborn, Matplotlib):
Utilized to perform deeper data exploration such as correlation analysis between inventory days and profitability, and identifying slow-moving or overstocked products.

Power BI:

An interactive dashboard was built to visualize KPIs, category trends, inventory inefficiencies, and seasonal behavior with slicers for region, category, and season.

Steps Involved in Building the Project

1. Data Cleaning & Preparation (SQL & Python):

Removed null/missing records in critical fields.

Calculated profit margins and categorized seasonal data based on order dates.

Derived new metrics like Inventory Turnover and created clean exports for Power BI.

2. Data Analysis (Python):

Identified a negative correlation between inventory days and profit.

Flagged slow-moving and overstocked products.

Grouped data to analyze profit trends by category and season.

3. SQL Queries for Aggregation:

Category-wise and sub-category-wise profit margin analysis.

Seasonal profit breakdowns using date functions.

Inventory insights by product type and region.

4. Power BI Dashboard Development:

Built five interactive pages:

Executive KPIs

Category/Sub-category trends

Inventory Analysis

Seasonal Behavior

Strategic Recommendations

Conclusion

This project demonstrates the power of combining SQL, Python, and Power BI for business intelligence.

The insights derived—such as underperforming categories, seasonal peaks, and slow-moving inventory—can directly guide pricing strategies, promotional planning, and stock management.

It enables retail decision-makers to shift from reactive to proactive strategies, improving profitability and operational efficiency.