Retail Business Performance & Profitability Analysis

Objective

To analyze transactional retail data to:

- Identify underperforming product categories

- Optimize inventory turnover

- Understand seasonal product trends

Tools Used

- SQL: For data Cleaning and extraction and profit calculations

- Python (Pandas, Seaborn): For data correlation and analysis

- Power BI: For interactive dashboards and visual storytelling

Data Cleaning & Preparation

- Imported datasets into SQL

- Handled missing/null values using IS NULL checks and drop using delete command updated
  values using update command

- Verified data types and formatted date/time fields for seasonal analysis

SQL Analysis Highlights

Profit Margins by Category:

- Clothing: Highest profit ($5.04K)

- Electronics: $4.69K

- Office Supplies: $4.22K

- Furniture: $3.8K

Sales vs. Profit by Sub-Category:

- High sales but low profit in Unknown and Table sub-categories

- Shirts and Pens show promising margins with moderate sales

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Python Insights:

Correlation Analysis:

- 0.2 correlation between inventory days and profitability

  => Indicates overstocked items reduce profit margins

Outlier Detection:

- Detected irregularities in 'Unknown' sub-categories needing further categorization

Seasonal Trends (BI Dashboard)

- Highest Sales Season: Winter ($110.2K)

- Region-wise Insights:

  - West and South lead in Winter sales

  - North maintains consistent performance across all seasons

Key Insights

1. Clothing and Electronics offer the best profit-to-sales ratios.

2. Overstocked Items like Furniture and Unknown sub-categories are draining profits.

3. Seasonal Behavior:

  - Winter is the most lucrative sales season

  - Tailored regional promotions can boost Spring and Summer performance

Strategic Recommendations

- Reclassify or investigate 'Unknown' sub-category products.

- Reduce stock for slow-moving items like Tables and some Furniture.

- Increase inventory and promotion during Winter, especially in West and South regions.

- Focus marketing efforts on high-margin products like Pens and Shirts

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Project Deliverables

- SQL Queries: Included in EL_DA_Project1.sql (.sql file cleaning data)

Python Analysis: Detailed in EL_DA_Project1.ipynb (Python file to calculate correlation)

- Interactive Power BI Dashboard: Filterable by region, category, and season

- This PDF Report: Summary of findings and strategies