Retail Business Performance & Profitability Analysis

1. Introduction

The retail industry faces challenges in maintaining profitability across diverse product lines, regions, and seasons. This project analyzes retail transaction data to uncover profit-draining categories, optimize inventory turnover, and identify seasonal product behavior. The findings aim to empower retail managers with actionable insights to improve financial performance and operational efficiency.

This project was developed as part of my internship evaluation; its outcome will be used to assess my readiness for a full-time data analyst role.

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2. Abstract

This analysis leverages **SQL, Python (Pandas, Seaborn), and Power BI** to transform raw retail transaction data into actionable business insights. The Power BI dashboard presents an interactive exploration of sales, profit margins, inventory turnover, and seasonality.

Key insights identified loss-making sub-categories such as **Tables, Bookcases, Appliances** with negative profit margins, while highlighting high-profit contributors like **Phones, Accessories, and Paper**. A strong negative correlation between delivery time and profitability was discovered, indicating inefficiencies in shipping operations.

By aligning product strategy with profitability, optimizing inventory levels, and addressing slow-moving items, the business can drive higher margins and operational gains.

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3. Tools Used

Tool	Purpose
SQL	Data cleaning, profit margin calculation
Python	Correlation analysis, EDA
Power BI	Interactive dashboard & visualization
Excel	Initial data review

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4. Steps Involved in Building the Project

1. **Data Understanding & Cleaning**
   - Reviewed transactional data (9,994 records, 2014–2018)
   - Cleaned missing/null records using SQL and Excel
2. **SQL Analysis**
   - Calculated profit margins by category & sub-category
   - Queried sales & profit across regions and years
3. **Python Analysis**
   - Ran correlation analysis between delivery time and profit
   - Visualized delivery time vs profitability using Seaborn

4. **Power BI Dashboard Development**
    - o Built 4 dashboards:
        1. Sales Overview
        2. Profitability Analysis
        3. Inventory & Delivery Insights
        4. Seasonal Trends
    - o Integrated filters for Region, Category, Season, Year
5. **Insights Reporting**
    - o Summarized findings & recommendations in dashboard and report

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5. Key Insights

Total Sales: ₹2.30 Million | Total Profit: ₹286,400 | Average Profit Margin: 12%

a) **Profit-draining sub-categories:**

- Tables: **-₹17,700** (Profit Margin: -47%)
- Bookcases: **-₹3,470** (Profit Margin: -29%)
- Appliances: **-₹18,140** (Profit Margin: -73%)

b) **Top-performing sub-categories:**

- Accessories: ₹41,900 (Profit Margin: +169%)
- Phones: ₹44,500 (Profit Margin: +106%)
- Paper: ₹34,050 (Profit Margin: +583%)

c) Strong negative correlation (**-0.98**) between delivery time and profitability → longer delivery times reduce profits
d) Fall season generated highest sales (~₹800K), Summer highest profitability driven by Technology products

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6. Conclusion

This project demonstrates a full data analytics lifecycle—transforming raw transactional data into actionable business recommendations. By identifying loss-making categories, optimizing inventory turnover, and aligning stock with seasonal trends, the analysis provides a roadmap for improving retail profitability.

The project reflects my ability to integrate **SQL, Python, and Power BI** into a unified business intelligence solution, with strong communication of insights through interactive dashboards and written reports.

This experience has strengthened my analytical, visualization, and business storytelling skills, preparing me to contribute effectively as a full-time Data Analyst in a professional setting.

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