Retail Business Performance & Profitability Analysis

Data Source: Kaggle Retail Sales Dataset
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➢ Introduction

The Retail Business Performance & Profitability Analysis project aims to uncover actionable insights from 2023 retail sales data to optimize inventory, marketing, and sales strategies. Using the Kaggle Retail Sales Dataset, we developed an interactive Power BI dashboard to visualize sales trends, seasonal patterns, and inventory turnover. The dataset includes transaction details such as customer age, gender, product categories (Electronics, Clothing, Beauty), and sales amounts. Key objectives include identifying peak sales periods, understanding customer demographics, and improving inventory efficiency. This report details the project's findings, tools, and development process.

➢ Abstract

The project revealed critical insights into retail performance:

• **May Peak:** Highest sales (£53,150), led by Electronics (£23,245) and Clothing (£17,455).

• **Q4 Sales Peak**: Electronics sales reached high in December, driven by holiday demand among under25 customers.

• **Q3 Sales Dip**: Beauty sales fell in September, indicating post-holiday slowdown.

• **Strong Growth**: Q4 sales grew 33% over Q3, surpassing the 10% growth target.

• **Product Trends**: Electronics (£156,905) and Clothing (£155,580) lead overall, Beauty peaks in July (£16,090).

• **Seasonal Insight**: Q1 (Jan–Mar) struggles, especially March (£28,990), with Electronics at £3,380

• **Inventory Challenges**: Clothing takes more days to sell, compared to Electronics, highlighting excess stock.

• **Customer Trends**: Under-25 shoppers dominate Beauty product sales in Q4.

The Power BI dashboard features filters for ProductCategory, MonthName, and Quarter, with visuals like heatmaps, KPIs, scatter plots and area charts to explore these trends interactively.

➢ Tools Used

• **Power BI Desktop**: Built interactive dashboard with visuals (heatmap, KPI, area chart).

• **Power Query**: Transformed data, adding MonthName, Quarter.

• **DAX**: Created measures like QuarterlySalesGrowth and PreviousQuarterSales.

• **Python**: Pandas, NumPy for inventory-sales correlation.

• **MySQL**: Stored data in retail_analysis database.

• **LaTeX**: Generated this report using PDFLaTeX

➢ Steps Involved in Building the Project

The dashboard was developed through a structured process:

1. Data Acquisition and SQL Profit Analysis:

- Loaded sales data into MySQL database (retail_analysis). Used SQL to calculate profit margin (0.4 * TotalAmount), segmented by AgeGroup and Gender.
  Example query: SELECT AgeGroup, AVG(0.4 * TotalAmount) AS ProfitMargin FROM retail_transactions GROUP BY AgeGroup, revealing higher profits for under-25 Beauty buyers.

2. Python Inventory and Trend Analysis:

- Used Python (Pandas) to analyze AvgInventory days, sales correlation (Negative Correlation), and seasonal trends. Script (trend_analysis.py) identified Q4 strength and May peak.

3. Power BI Transformation and Visualization:

- Transformed data in Power Query, adding MonthName, Quarter. Created visuals: heatmap (May £53,150), area chart, KPI (33% Q4 growth), and slicers for ProductCategory, MonthName, Quarter.

➢ Conclusion

The project highlights May (£53,150) and Q4 (£44,690 in Dec) as peak periods, with Electronics leading. September (£23,620) and Q1 (Mar: £28,990) suggest promotional opportunities. Recommendations: stock Electronics for May/Q4, reduce Clothing, promote Beauty in July (£16,090). The dashboard enables trend exploration.