

Retail Store Sales

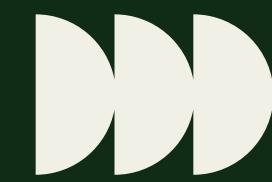
Analytics

Revenue Drivers & Channel Optimization





Context & Problem Statement



Sector Context: Retail Analytics

Retail businesses operate on notoriously thin margins, where revenue growth is inextricably linked to category performance, channel efficiency (Online vs. In-store), and astute pricing strategies. Decision-makers, typically store owners or retail operations heads, require precise insights to navigate this complex landscape.

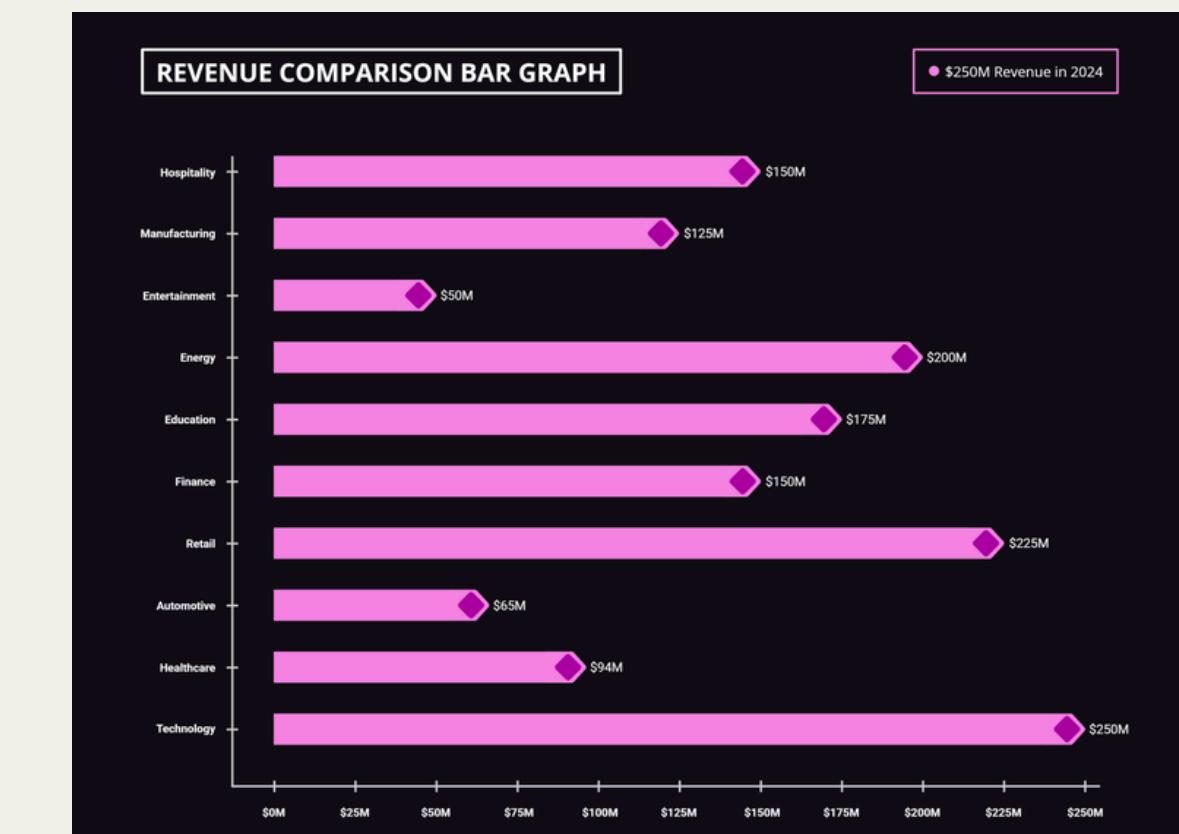


"What factors are driving revenue volatility, and where should the business focus to maximise sustainable growth?"

Project Objectives:

Our objective is to support strategic decisions by providing actionable insights in three critical areas:

- Channel investment prioritization
- Category performance and prioritisation
- Discount policy optimization



Data Engineering: From Source to Insight

Raw Ingestion

Data Cleaning

Feature Engineering

Data Analysis

Our analysis began with a comprehensive Retail Store Sales Dataset, comprising 12,575 rows and 11 columns, spanning the period from 2022 to 2025.

Key Columns Selected for Analysis

- Transaction Date
- Category
- Total Spent
- Quantity
- Location (Online/In-store)
- Payment Method
- Discount Applied

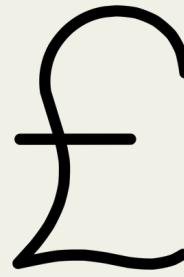
Major Data Cleaning Operations

- Imputation of missing values within the 'Discount' column.
- Removal of null entries in critical 'Price', 'Quantity', and 'Total Spent' fields.
- Standardisation of date formats for robust time-series analysis.



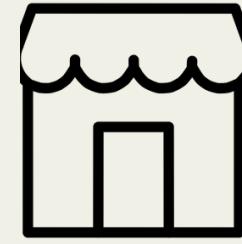
KPI & Metrics Framework

To provide a holistic view of performance and guide strategic decisions, we established a comprehensive framework of Key Performance Indicators (KPIs) and metrics.



Total Revenue

Measures the overall business scale and financial intake.



Average Order Value

Quantifies customer spending intensity per transaction.



Revenue by Channel

Guides investment allocation between online and physical stores.



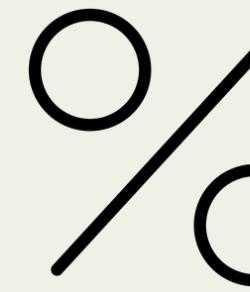
Year-over-Year Growth

Indicates momentum and highlights periods of volatility.



Revenue by Category

Informs product mix strategy and identifies high-performing segments.

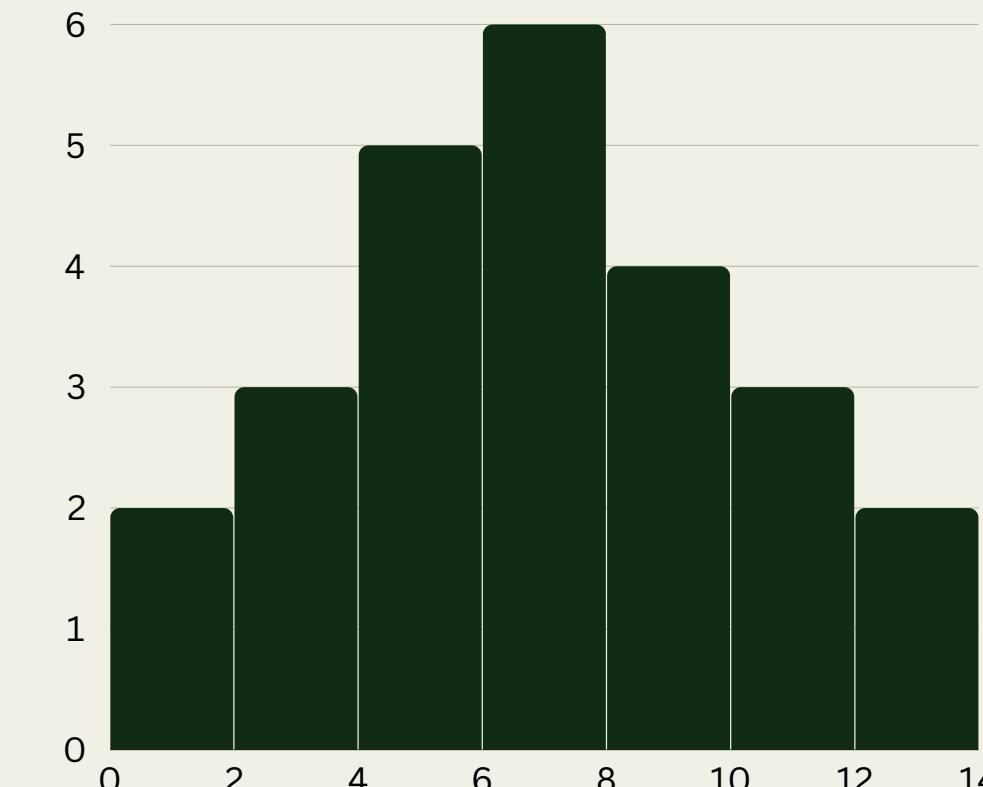


Discount Impact on AOV

Assesses the efficiency and effectiveness of promotional pricing.

Exploratory Data Analysis (EDA)

- Revenue is concentrated within a limited high-value customer segment.
- Excessive discounting reduces margin without proportional revenue gain.
- Dispatch planning should prioritize high-value orders for efficiency.
- Revenue risk increases when dependent on low-engagement customers.



- Customer Segmentation based on engagement and revenue contribution
- High-Value Customer Identification for targeted dispatch optimization
- Revenue Trend Analysis to detect growth patterns and seasonality
- Discount Impact Analysis to assess profitability risk

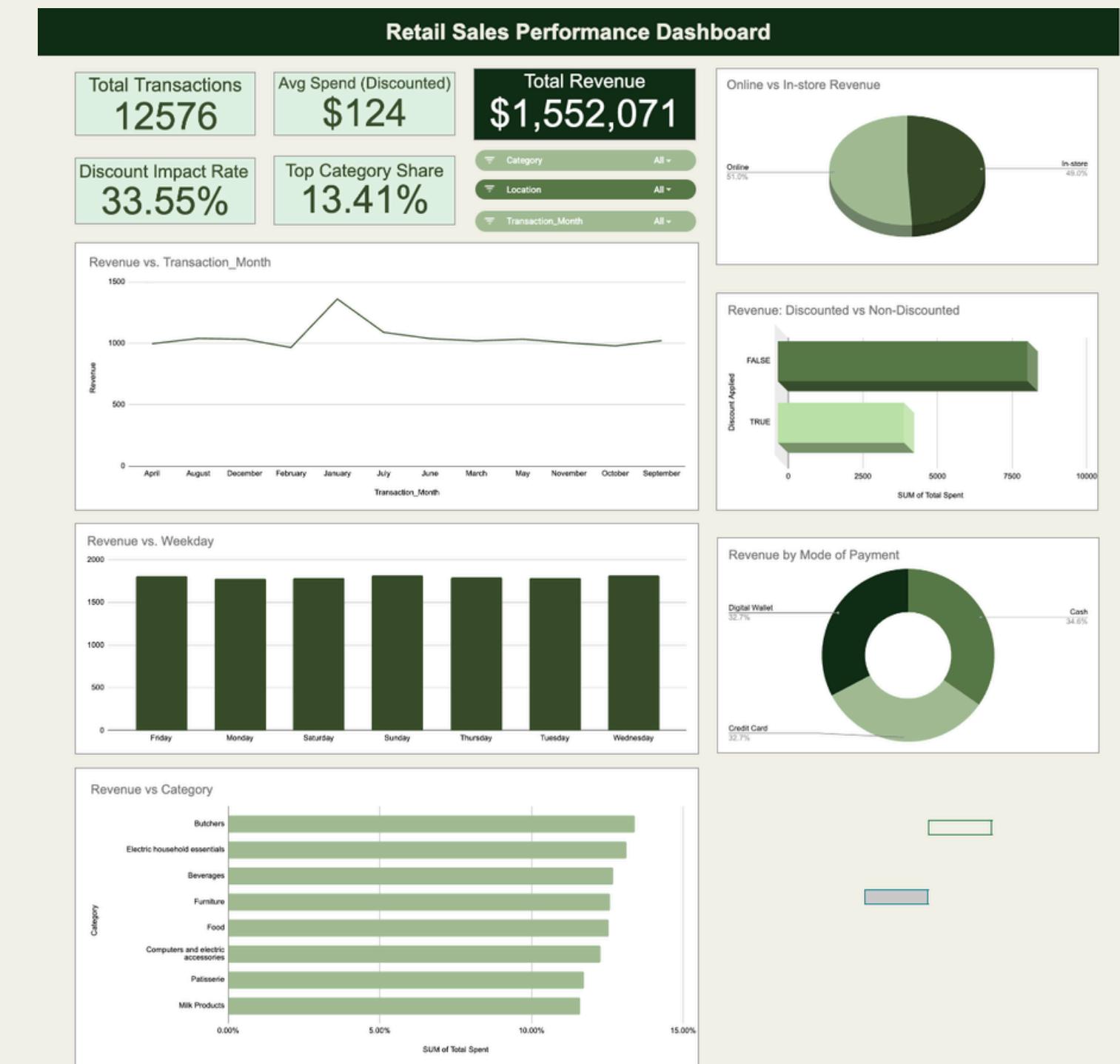
Dashboard Walkthrough

Executive View

- Snapshot of key KPIs (Revenue, Transactions, AOV, High-Value %)
- Monthly revenue trend for performance tracking
- Customer segment contribution overview
- Discount impact on overall profitability

Operational View

- Year-Month slicer for time-based filtering
- Segment-wise performance breakdown
- Top-performing product categories



Advanced Analysis: Uncovering Root Causes

Root Cause: Category-Level Fluctuations

Revenue volatility is primarily driven by significant fluctuations at the category level, rather than overall changes in transaction counts. This suggests that the instability is structural within the product mix, not a general collapse in customer demand.

Channel Efficiency: Online Monetization

While both channels generate comparable transaction volumes, the online channel consistently yields slightly higher revenue. This indicates a stronger monetization capability in the digital space, potentially due to higher average item prices or more effective cross-and up-selling.

Discount Effectiveness: Margin Erosion

Analysis revealed only a minimal difference in Average Order Value (AOV) between discounted and non-discounted transactions. This points to an inefficient promotional strategy that likely erodes margins without significantly influencing customer purchasing behaviour or uplifting sales volume.

This deeper analysis provides a critical new understanding: growth instability is structural at the category level, not merely a reflection of customer demand collapse.

Strategic Recommendations for Sustainable Growth

1

Invest in Top-Performing Categories

Allocate resources and marketing efforts disproportionately towards high-revenue generating categories to capitalize on existing strengths and mitigate dependency risks (Insight from EDA, Advanced Analysis).

2

Strengthen Digital Channel Infrastructure

Optimise the online platform for user experience, conversion, and logistics, leveraging its higher monetization capability (Insight from EDA, Advanced Analysis).

3

Optimise Discount Strategy

Replace blanket discounts with targeted, data-driven promotional campaigns that drive specific behavioural changes rather than eroding margins without AOV uplift (Insight from EDA, Advanced Analysis).

4

Implement Quarterly Category Monitoring

Establish a rigorous monitoring process for category-level growth to proactively identify and address potential revenue volatility (Advanced Analysis).

5

Develop Predictive Tracking

Build models for early signal detection of revenue decline within categories or channels to enable timely intervention and strategy adjustment.

Project Impact & Value Proposition



Estimated Business Impact

- Margin Efficiency: Optimizing discount strategies could realistically improve overall margin efficiency by 3-5%, translating to significant profit growth.
- Online Revenue Growth: Focused channel optimization is projected to increase the online revenue share, capturing more of the higher-monetisation digital market.
- Reduced Volatility: Proactive category monitoring and strategic adjustments will substantially reduce revenue volatility risk, leading to more predictable financial outcomes.

Justifying Stakeholder Approval

Our data-driven strategy minimises guesswork and **enhances resource allocation efficiency across the entire retail operation**. By focusing investments where they yield the greatest return and mitigating identified risks, this project provides a clear roadmap for sustainable and profitable growth. The insights deliver tangible value by transforming raw data into actionable intelligence, empowering store owners and retail operations heads to make confident, evidence-based decisions.

Limitations & Future Enhancements



Next Steps & Future

- Customer Segmentation Integration: Incorporate customer demographics and behaviour for targeted marketing and loyalty programmes.
- Revenue Forecasting Model: Develop a robust predictive model to forecast future revenue trends with higher accuracy, aiding inventory and resource planning.
- Profitability Analysis: Integrate cost data to perform a comprehensive profitability analysis, identifying true profit drivers and loss centres.
- Real-Time Dashboard Tracking: Implement a system for real-time data ingestion and dashboard updates, allowing for immediate response to market changes.

Current Project Limitations

- Customer Segmentation: The current dataset lacks granular customer-level data, limiting the ability to perform detailed segmentation and personalise recommendations.
- Time-Series Length: The available time-series data is limited, which can constrain the robustness of long-term trend analysis and forecasting models.
- Cost & Margin Data: Absence of detailed cost and gross margin data prevents a full profitability analysis per category or transaction.

Challenges & Solutions

Challenges

Solution



Incomplete and inconsistent data across sources



Apply data cleaning and standardization process



Difficulty identifying meaningful patterns



Use data visualization and EDA techniques



Insights not easily understood by stakeholders



Present results through clear dashboards

Summary & Key Takeaways

Data Overview

The analysis was conducted using relevant data to identify key patterns, trends, and overall performance

Key Findings

Several important insights were identified that have a direct impact on performance and decision-making

Business Impact

The analysis highlights areas for improvement as well as opportunities for optimization

Action Points

The insights can be used as a foundation for defining the next strategic actions

Final Insights & Business Impact



Insight Generated

Data analysis reveals key patterns and opportunities



Business Impact

Insights support smarter and faster decisions



Value Delivered

Improved efficiency, performance, and strategy alignment



Thank You



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