

# Analytical Study of Retail Profitability Drivers Using Transaction-Level Data

Sector: Retail & Commerce

Group Number: 9

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# Context & Problem Statement

## Context

This project analyzes retail transaction data to assess category-level sales, profit, and operational efficiency for informed managerial decision-making.

## Decision Maker

Business leadership & operations heads responsible for margin recovery and store performance.

## Core Problem

The business lacks clarity on which categories drive sustainable profit and where margin or operational inefficiencies exist.

## Objective

To build a category-focused dashboard that supports performance evaluation and strategic profit optimization.



# Data Engineering: Source → Sink

**Source dataset:** Superstore (~9,800–9,900 rows, 19 columns).

**Workbook contains sheets:** Cleaned Data, Pivot Tables, Dashboard .

## Key Cleaning Steps

- **Null handling:** removed/filled missing values
- **Date normalization:** consistent Order Date format
- **Numeric corrections:** sales, profit, discount converted to numeric types

## Column Directory

Order Date, Category, Sales, Profit, Quantity, and Shipping Delay, Segment, Order size and operational analysis.

# KPI Framework: What We Measure and Why

**\$2.29M**

## Total Sales

Overall revenue across the dataset (drives scale metrics)

**~\$209K**

## Total Profit

Absolute profitability ,primary outcome to optimize

**13%**

## Profit Margin (%)

Margin is key to sustainable growth and operations funding

**16%**

## Average Discount

Discounting behavior that impacts realized margin

**9,987**

## Number of Orders

Volume indicator informs operational load and fulfillment cost

**37,832**

## Units Sold

Quantity sold informs assortment and inventory planning

## Why These KPI's ??

The selected KPIs measure revenue generation, profitability, and operational efficiency at the category level. They directly address the problem by highlighting high-performing segments and identifying margin or efficiency gaps.

# Key Insights

## Performance Volatility

A high standard deviation indicates inconsistent sales or profit performance, reflecting category instability and higher business risk.

## High Sales, Low Profit

Some products drive high revenue but reduce overall profitability, indicating margin erosion despite strong sales volume.

## Operational Impact

Categories with higher average shipping delays show relatively weaker profitability, indicating operational inefficiency affects margins.

## Discount Sensitivity:

Certain categories show a clear decline in profit margin as discount levels increase, indicating high sensitivity to price reductions and potential margin erosion due to aggressive discounting strategies.

## Revenue Concentration:

A single category contributes the highest share of total revenue, indicating strong demand concentration and dependency on limited segments.

**Note:** High revenue does not always translate into high profit, highlighting margin pressure in certain categories.

# Advanced Analysis: Discount Bands & Margins

## Root Cause & Segmentation Analysis

A structured segmentation analysis was conducted by evaluating categories across revenue contribution, average profit margin, discount sensitivity, and performance variability (standard deviation). This helped classify categories into high-profit stable performers, high-revenue but margin-eroding segments, and volatile performers with inconsistent returns.

## New Understanding

The analysis revealed that profitability gaps are primarily driven by discount sensitivity and operational inefficiencies rather than low sales volume, enabling more targeted performance improvement strategies.



# Dashboard Walkthrough

- Executive KPI Panel (Top Section):** Displays Total Revenue, Total Profit, Average Profit Margin (13%), and Total Orders to provide an immediate financial performance snapshot.
- Category Revenue Distribution:** Donut chart highlights revenue contribution by major categories, helping identify dominant revenue drivers.
- Sales vs. Profit Trends:** Growth analysis section tracks quarterly movement of sales and profit to evaluate performance consistency over time.
- Operational & Risk Analysis:** Shipping delay comparison and loss severity tracker help assess operational efficiency and financial risk exposure.
- Category & Sub-Category Performance:** Detailed breakdown of sales, profit, and margin at sub-category level to identify high-profit and margin-eroding segments.
- Stability & Pattern Recognition:** Standard deviation analysis shows profit volatility, while discount pattern analysis reveals margin sensitivity across discount ranges.
- Interactive Filters:** Slicers for Category, Region, Shipping Speed, Loss Severity, Segment, and Quarter enable dynamic drill-down for strategic decision-making.



# Recommendations



## Optimize Discount Strategy:

Reduce aggressive discounting in high-revenue but low-margin categories to prevent margin erosion and improve overall profitability.



## Strengthen High-Margin Categories

Increase inventory focus and promotional efforts on stable, high-margin categories to balance profit concentration risk.



## Improve Operational Efficiency:

Reduce shipping delays in underperforming segments to enhance customer satisfaction and protect profit margins.



## Reassess Low-Profit Sub-Categories:

Review pricing, supplier contracts, or product mix for sub-categories consistently generating low or negative profit.



## Diversify Profit Drivers:

Develop growth strategies for emerging categories to reduce over-dependence on a limited number of profit-contributing segments.



# Impacts & Values

## Estimated Business Impact

- Improved overall profit margin through discount optimization
- Reduced operational inefficiencies and delay-related costs
- Stronger revenue stability via diversified profit drivers
- Better category-level cost and pricing control

## Why Stakeholders Should Approve ??

- Enables data-driven strategic decisions
- Identifies clear profit drivers and risk areas
- Supports sustainable revenue growth and margin improvement

# Limitations & Next Steps

## Limitations

- Analysis is based on historical transactional data; external market factors were not included.
- Limited visibility into cost breakdown (fixed vs. variable costs) may affect margin precision.
- Potential data biases due to category concentration and discount-heavy sales patterns.

## Recommended Next Steps

- Integrate external factors such as seasonality and market trends for deeper forecasting.
- Incorporate detailed cost components to improve margin accuracy.
- Implement predictive analytics for demand forecasting and profitability optimization.

