

Project Title: FashionWave—Retail Sales & Profitability Optimization

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Role: Business Analyst/Data Analyst

Tools Used: Python, Pandas, Plotly, Power BI

Duration: 2-3 Weeks

Executive Summary

FashionWave is a mid-sized retail fashion chain operating 50 stores across India. In recent months, the business has observed stagnant weekend sales, inconsistent discounting behavior, and varying category-level profitability.

This project analyzes two years of transaction-level data (sales, category, store, customer type, and discount information) to identify the drivers of sales, understand weekend behavior, evaluate discount impact on profitability, and highlight underperforming stores.

Using Python-based EDA, interactive Plotly visualizations, and a multi-page Power BI dashboard, the analysis reveals that:

- The Men's category consistently drives the highest revenue.
- Women's apparel shows lower margin and inconsistent performance.
- There is no significant difference between weekend and weekday AOV (t-test $p > 0.05$).
- Discounts above 20% significantly reduce profit (ANOVA $p < 0.05$).
- Discounts above 30% violate company policy and appear frequently in some stores.
- Underperforming stores rely heavily on discounting to generate sales.

Based on findings, strategies are recommended to increase weekend sales by 15%.

Business Background & Problem Statement

FashionWave's management reports that weekend sales — traditionally the strongest retail period — have stagnated despite increased customer traffic nationwide. They also observed that profit margins are decreasing due to inconsistent discounting and weak category performance in some segments.

Key challenges identified:

1. Weekend Performance Issue

Weekends contribute a smaller-than-expected share of total revenue. Despite expectations that customers shop more during weekends, FashionWave does not experience such uplift.

2. Discount Mismanagement

Discounts above 30% violate company policy but appear in the dataset. These discounts severely reduce profit margin and lead to financial leakage.

3. Margin Variability by Category

Some categories generate high revenue but low margin. Women's category underperforms relative to Men's.

4. Store Performance Variability

Certain stores repeatedly show lower revenue, lower AOV, and higher discount dependency.

5. Lack of central decision-making dashboard

No unified KPI dashboard exists for store-level performance.

Business Objectives

The project aims to support FashionWave's business goals through data-driven insights.

Primary Objectives

1. Increase weekend sales by 15% over the next quarter.
2. Improve product-level profitability by identifying low-margin categories.
3. Optimize discount strategy and eliminate >30% policy breaches.
4. Identify top-performing and underperforming stores.
5. Build a Power BI dashboard for real-time tracking.

KPIs Used

- Total Sales
- Total Profit
- AOV (Average Order Value)
- Profit Margin
- Units Sold
- Weekend vs Weekday Ratio
- Discount Impact
- Store Revenue Ranking

Dataset Overview

Dataset File: fashionwave_sales_cleaned.csv

Rows: 50000

Columns: 23

Assumptions

- Discounts > 30% = policy breaches.
- Missing discount = 0%.
- Missing CustomerType = "Unknown".

Data Cleaning Process

Performed using Python (Pandas):

Step 1: Type Conversions

Converted UnitPrice, Cost, Quantity, Discount into numeric formats.

Step 2: Missing Value Treatment

- Discount: Filled missing with 0
- CustomerType: Imputed with "Unknown"

Step 3: Remove Invalid Records

- Negative Quantity
- Zero/negative Price
- Incorrect dates removed

Step 5: Derived Columns

- IsWeekend (Saturday/Sunday)
- Year, Month, WeekNum, YearWeek
- DiscountBin:
 - 0–5%
 - 5–10%
 - 10–20%
 - 20–30%
 - 30% (violation)

The screenshot shows a Jupyter Notebook titled 'Fashion_wave_sales.ipynb'. The table displayed has the following columns: InvoiceNo, Date, StoreID, StoreCity, ProductID, Category, SubCategory, UnitPrice, Cost, Quantity, TransactionAmount, Profit, IsWeekend, Week, and Year. The table contains 5 rows of data.

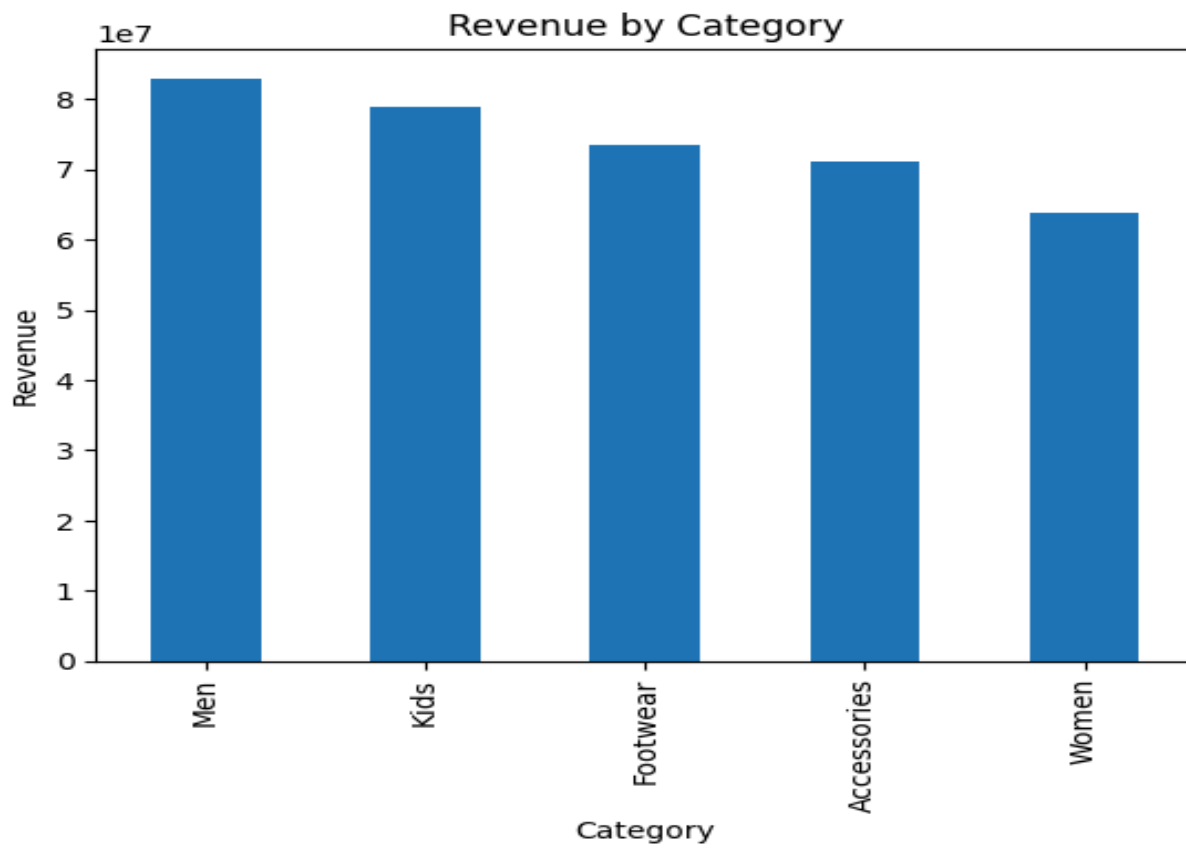
InvoiceNo	Date	StoreID	StoreCity	ProductID	Category	SubCategory	UnitPrice	Cost	Quantity	TransactionAmount	Profit	IsWeekend	Week	Year
INV100000	2025-07-06	S017	Ahmedabad	P1007	Women	Tops	2510.37	1403.64	5	9967.42	2949.22	True	27	20
INV100001	2024-06-03	S034	Bengaluru	P1052	Kids	Kids-Jeans	4620.79	2970.12	2	8455.12	2514.88	False	23	20
INV100002	2024-11-15	S045	Lucknow	P1035	Men	T-Shirts	1020.71	617.60	2	1550.66	315.46	False	46	20
INV100003	2024-04-28	S001	Kolkata	P1099	Footwear	Flipflops	2510.00	1734.35	4	8157.50	1220.10	True	17	20
INV100004	2024-04-26	S046	Ahmedabad	P1022	Men	Shirts	5369.45	3854.94	2	7583.81	-126.07	False	17	20

Exploratory Data Analysis

Category Performance

1. The Men's category has the highest revenue contribution.
2. Women's category shows lower margins.

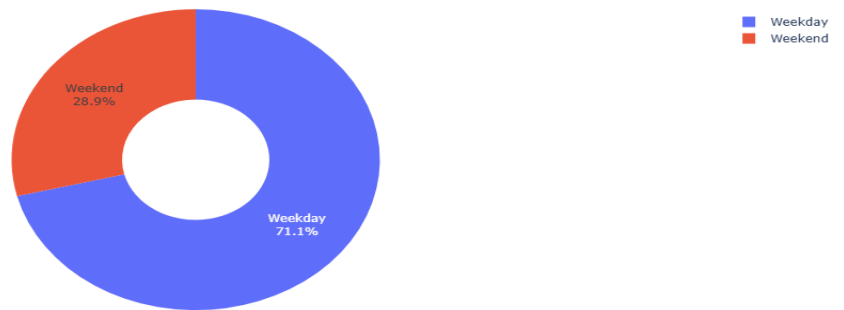
3. Accessories have moderate sales but strong profits.



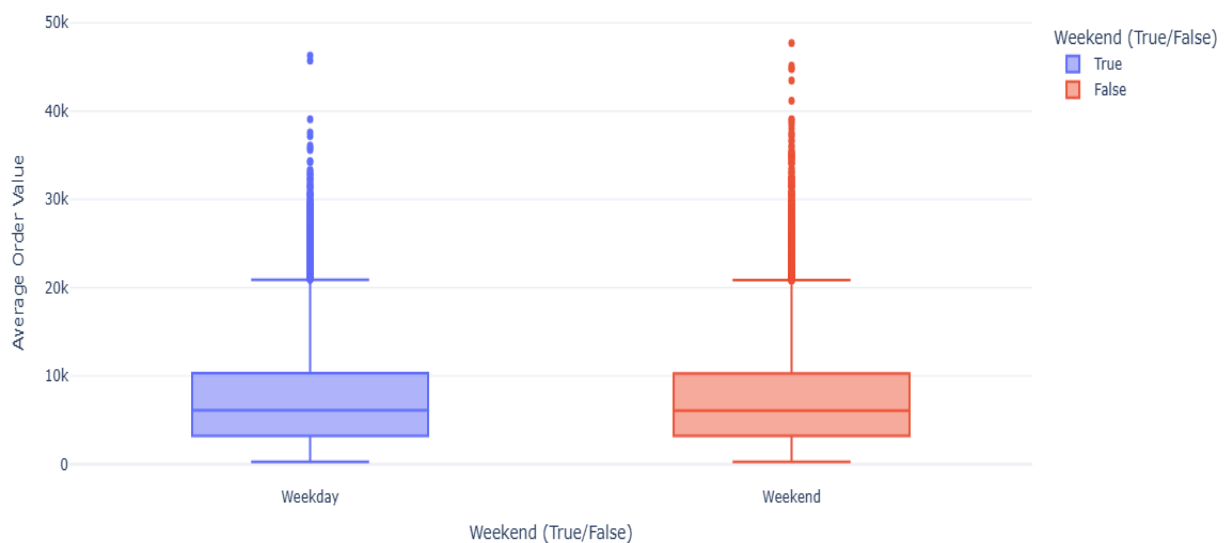
Weekend vs Weekday Behavior

- Weekend contributes lower proportion of revenue compared to weekdays.
- Average Order Value shows no significant difference (t-test $p = 0.43$).

Weekend vs Weekday Revenue Share

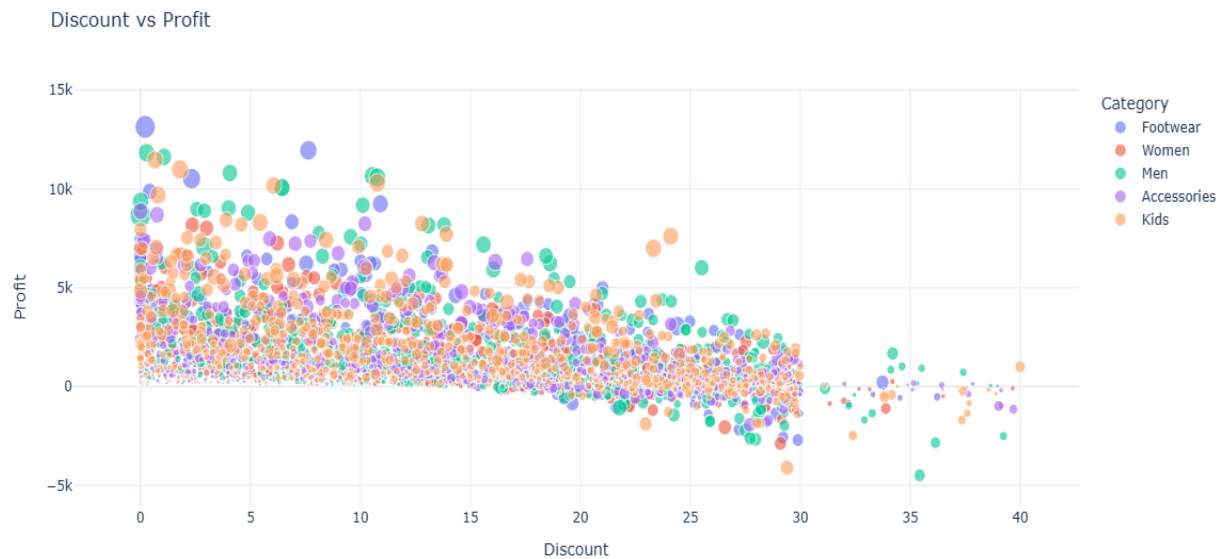
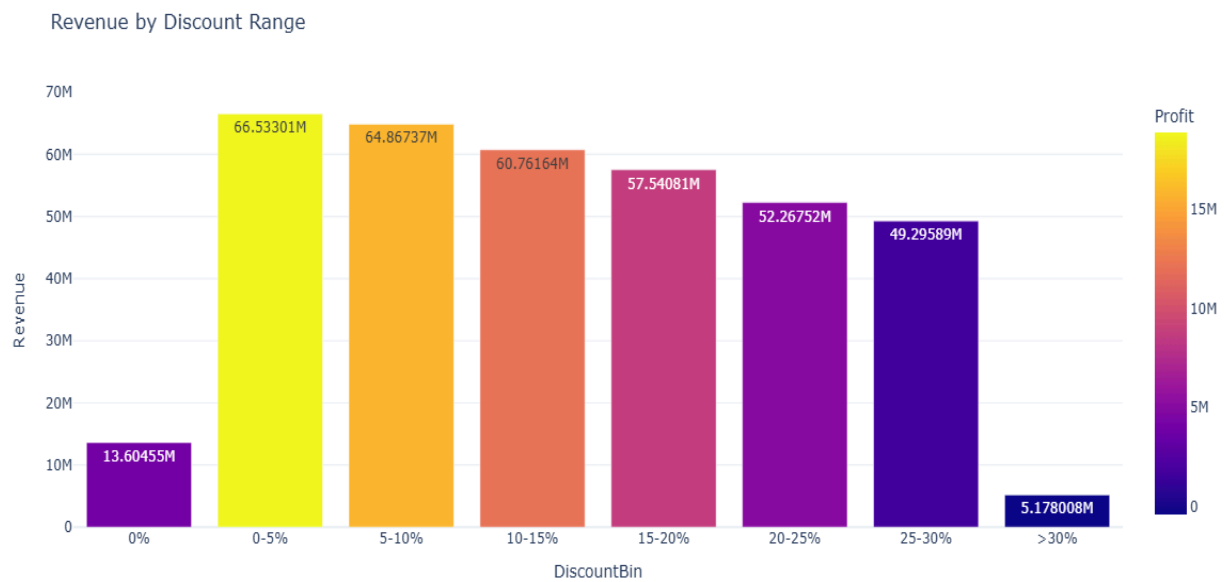


AOV: Weekday vs Weekend



Discount Impact Analysis

- Discounts greater than 20% sharply reduce profit.
- Discounts < 10% maintain stable profitability.
- ANOVA test confirms discount has a significant effect ($p < 0.05$).



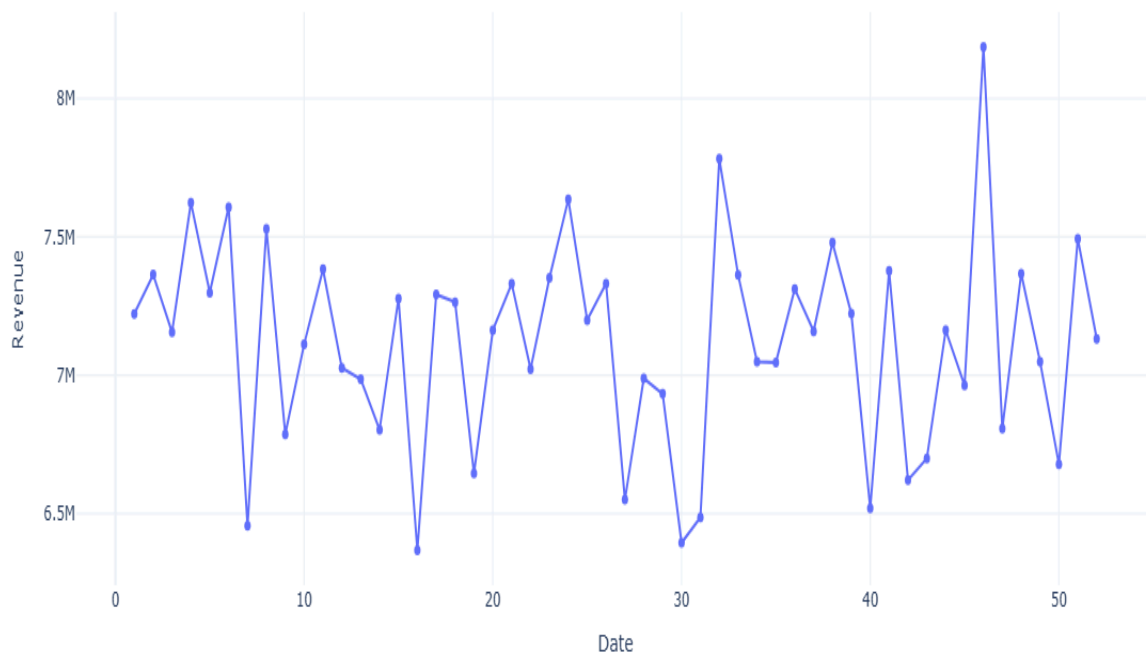
Store Performance

- Top-performing stores have strong AOV, low discount usage.
- Bottom stores rely heavily on discounts to generate sales.

Time Series Analysis

- Weekly sales show festival-season spikes.
- Growth opportunities during holiday periods.

Weekly Revenue Trend



Statistical Analysis

T-Test — Weekend vs Weekday AOV

- p-value = 0.43 → Not significant
- Conclusion: No evidence that customers spend more on weekends.
- Sales issue = footfall, not ticket

ANOVA — Discount Bin vs Profit

- p-value < 0.05 → Significant
- High discounts lead to negative profit margins.

Recommendations

Weekend Sales Strategy

- Weekend-only promotions (Buy 2 Get 10%).
- Push high-margin accessories.
- Improve store staff engagement on weekends.

Discount Optimization

- Cap discounts at 20–25%.
- Eliminate >30% breaches.

- Introduce loyalty-based discounts.

Category Improvements

- Strengthen Men's category assortment.
- Refresh underperforming women's segments.
- Promote accessories bundles.

Conclusion

This analysis identifies strong opportunities to increase revenue and profitability for FashionWave. The insights reveal that weekend underperformance is caused by reduced customer footfall rather than low spending. Optimizing discount strategies, strengthening category assortment, and elevating store execution can drive substantial improvement.

The Power BI dashboard empowers real-time monitoring and supports leadership in making data-driven decisions.