

Case study: Retail Sales Analysis Using Power BI



Case study overview

This project analyzes a publicly available historical retail dataset to simulate a real-world business intelligence scenario. The goal was to transform raw data into meaningful insights by building an interactive Power BI dashboard that highlights monthly sales trends, product category performance, customer demographics and pricing behavior.

Case study problem

This project uses a publicly available historical retail dataset to simulate a real-world business scenario. Retail managers lacked visibility into key performance areas such as monthly sales trends, product category performance, customer demographics and pricing behavior. The challenge was to analyze the historical data and extract insights that could support better decision-making around inventory planning, marketing strategy and revenue growth.

Analysis process

- Imported raw CSV data into Power BI.
- Cleaned and transformed data:
 - Set first row as headers.
 - Verified data types (dates, numeric fields).
- Created calculated fields for revenue, quantity and average price.

- Built visualizations to explore trends summarizing revenue, quantity sold, price behavior and customer demographics.

Visualization

The dashboard consists of the following visuals:

- Sum of Price by Category – Bar Chart
- Monthly Total Amount – Column Chart
- Monthly Transaction Count – Line Chart
- Customer Count by Gender – Bar Chart
- Product Category by Quantity – Horizontal Bar Chart
- Price per Unit Trend – Line Chart
- KPI Cards
 - Total Revenue (456K)
 - Number of Product Categories (3)
 - Total Quantity Sold (1K)

Insight derived

- Category Pricing Strength: Electronics and Clothing show the highest price totals, indicating stronger revenue contribution.
- Monthly Sales Trend: Sales peak in May, October, December and April, revealing clear demand cycles.
- Transaction Activity: Count of transaction in April is low despite it being one of sales peak.
- Customer Distribution: There is only a little distinction in Gender representation implying broad market appeal.
- Product Demand: Clothing shows the highest quantity sold, indicating strong customer preference.
- Price Fluctuation: Price per unit in April is low despite it being one of sales peak.

Approach

- Imported and cleaned the raw CSV dataset in Power BI.
- Standardized column headers and validated data types.
- Created calculated measures for revenue, quantity sold, and price metrics.

- Designed KPI cards and interactive visuals to analyze sales performance, customer segmentation and category trends.

Impact metrics

- Improves sales forecasting accuracy by highlighting month-by-month performance patterns.
- Increases decision-making efficiency by presenting category and gender-based insights.
- Enables targeted marketing efforts by identifying peak months and top-performing product categories.

Business objective

To provide a unified, interactive dashboard that enables retail managers to:

- Understand revenue behavior across months and categories.
- Identify the most profitable product groups.
- Track overall quantity sold and price trends.
- Optimize inventory based on demand trends.

Business recommendation

- Allocate more inventory and marketing resources during peak months (April, May, October and December).
- Prioritize high-revenue product categories such as Electronics and Clothing.
- Strengthen procurement for high-demand items, especially Clothing.
- Monitor price fluctuations to identify potential revenue opportunities or cost inefficiencies.
- Investigate why April shows high revenue despite low price-per-unit and low transaction count.

Reason behind each chart

- Bar Charts: Best for comparing numeric values across categories.
- Column Charts: Easily communicate month-to-month variance.
- Line Charts: Reveal patterns and fluctuations over time.
- Horizontal Bars: Ideal for analyzing distribution. KPI Cards: Instantly communicate the most essential performance metrics.