



Customer Shopping Behavior Analysis

Data-Driven Insights from 3,900 Transactions

Analyzing 3,900 Purchases Across Categories

Comprehensive analysis of customer transactions reveals patterns in spending, segments, and subscription behavior

Dataset: 3,900 rows, 18 columns

Missing data: 37 values in Review Rating column

- Dataset comprises **3,900 customer purchases** with 18 feature variables tracking demographics, purchase details, and behavior
- Key features include customer age, gender, location, subscription status, item purchased, category, purchase amount, and season
- Shopping behavior metrics capture discount application, promo usage, previous purchases, frequency, review ratings, and shipping type
- Data quality assessment identified **37 missing values** in Review Rating column, addressed through median imputation by category



Three-Phase Analysis Using Python, SQL, PowerBI



- **Python phase** executed data loading, exploratory analysis, null value handling using median imputation, and column standardization
- **Feature engineering** created age group binning and purchase frequency metrics while eliminating redundant columns after correlation verification
- **MSSQL Server integration** established database connectivity and loaded cleaned data for structured business query execution and transactional analysis
- **Power BI visualization** provides interactive dashboard for stakeholder exploration of insights across customer segments and revenue drivers

Loyal Customers Drive Revenue Growth

- SQL segmentation classified customers into **New** (first-time buyers), **Returning** (2-5 purchases), and **Loyal** (5+ purchases) segments based on previous purchase history
- Revenue analysis by gender identified spending patterns and total revenue contributions from male versus female customer segments enabling targeted marketing strategies
- Subscription status comparison revealed average spend differences and total revenue generated by subscribers versus non-subscribers, indicating subscription program effectiveness
- Repeat buyer analysis demonstrated correlation between purchase frequency exceeding 5 transactions and increased likelihood of subscription enrollment, validating customer lifetime value optimization strategies



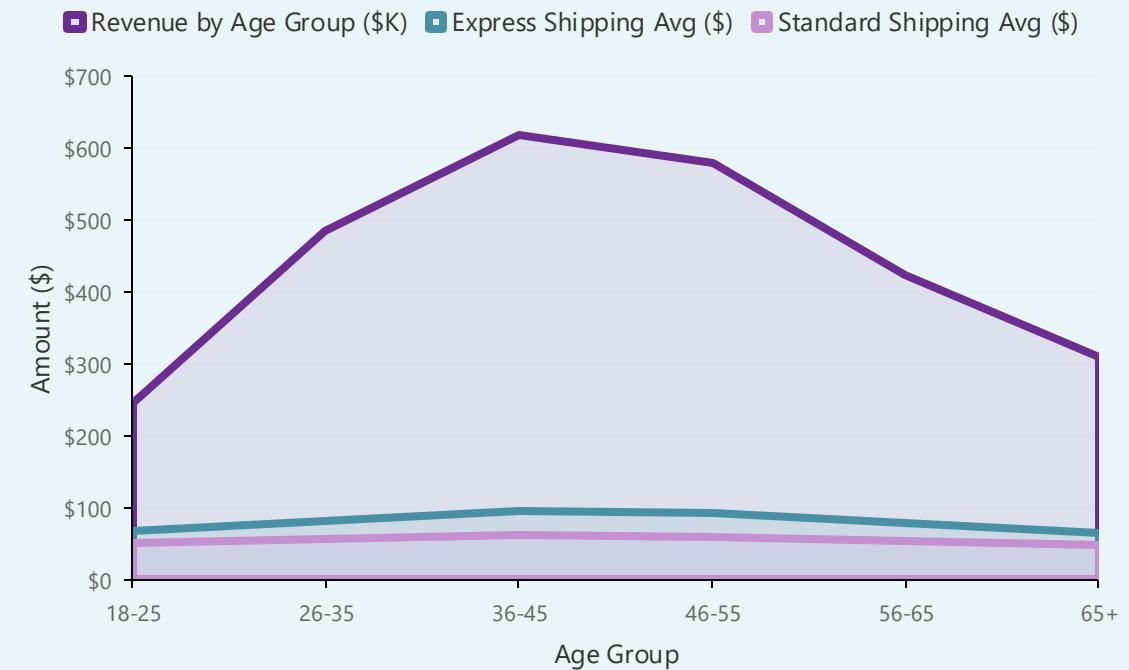
Product Performance and Discount Impact



- Top 5 products analysis ranked items by **average review ratings**, identifying highest customer satisfaction products for promotional emphasis and inventory prioritization
- Discount dependency analysis identified 5 products with **highest percentage of discounted purchases**, signaling potential pricing elasticity issues or overreliance on promotions for sales conversion
- Category-level product ranking listed **top 3 most purchased items** within each product category, revealing consumer preferences and bestseller patterns for merchandising strategy
- High-spending discount users identification isolated customers using discounts while maintaining above-average purchase amounts, representing valuable segment for loyalty program targeting

Shipping Preferences and Age Demographics

- Shipping type comparison calculated **average purchase amounts** between Standard and Express shipping customers, revealing willingness to pay premium for faster delivery
- Express shipping users demonstrated **higher average transaction values**, indicating premium customer segment with greater urgency and higher lifetime value
- Age group revenue analysis segmented **total revenue contribution** across demographic cohorts, identifying highest-value age segments for marketing investment
- Demographic insights enable **precise audience targeting** in advertising campaigns, optimizing marketing spend allocation toward strongest revenue generation potential



Five Strategic Actions for Growth

1 Boost Subscriptions

Promote exclusive benefits, early access, and special pricing for subscribers to convert high-frequency purchasers into recurring revenue stream.

2 Customer Loyalty Programs

Implement reward systems for repeat buyers to accelerate transition from Returning to Loyal segments, increasing customer lifetime value through tiered benefits.

3 Review Discount Policy

Balance promotional sales boosts against margin erosion by analyzing discount-dependent products and developing non-discount value propositions to reduce reliance on price cuts.

4 Product Positioning

Highlight top-rated and best-selling products in marketing campaigns, website placement, and promotional materials to capitalize on proven customer preferences and maximize conversion rates.

5 Targeted Marketing

Concentrate advertising spend and outreach efforts on **high-revenue age groups** and **express-shipping users** who demonstrate premium purchasing behavior and higher average transaction values.