

Customer Shopping Behavior Analysis

1. Project Overview

This project focuses on analyzing **customer shopping behavior** by building an **interactive Power BI dashboard** using data processed through **SQL and Python**. The objective was to transform raw customer transaction data into actionable insights related to sales trends, revenue contribution, customer demographics, subscription behavior, and satisfaction levels.

The dashboard provides a high-level overview of **~3,900 customers**, enabling stakeholders to monitor business performance and customer preferences across multiple dimensions.

2. Purpose & Objective

The **Customer Shopping Behavior Dashboard** is designed to provide a comprehensive understanding of how customers interact with products and services.

The primary goals of this project are to help business leaders, marketing teams, and analysts to:

- Analyze customer purchase patterns
- Track average spending behavior
- Evaluate customer satisfaction through ratings
- Identify high-performing product categories
- Understand age-group-wise sales and revenue contribution
- Assess subscription adoption rates
- Support data-driven business and marketing decisions

By combining SQL, Python, and Power BI, the dashboard converts complex datasets into clear, decision-ready insights.

3. Key Features

- **Interactive Power BI Slicers:** Filter by Gender, Subscription Status, Category, and Shipping Type.
- **KPI Cards:** Displays total customers, average purchase amount, and average review rating.
- **Category-Level Analysis:** Sales and revenue comparison across product categories.
- **Demographic Insights:** Sales and revenue distribution by age group.
- **Customer Segmentation:** Subscriber vs. non-subscriber analysis.

4. Visual Components

- **Subscription Status Distribution (Donut Chart):** Shows the percentage split between subscribed and non-subscribed customers.
- **Sales by Category (Column Chart):** Displays purchase volume across categories such as Clothing, Accessories, Footwear, and Outerwear.
- **Revenue by Category (Bar Chart):** Highlights revenue contribution by each product category.

- **Sales by Age Group (Horizontal Bar Chart):** Shows purchase activity across different customer age groups.
- **Revenue by Age Group (Horizontal Bar Chart):** Identifies age groups generating the highest revenue.

5.Tools & Technologies Used

- **SQL** – Data extraction, filtering, joins, aggregations
- **Python** – Data cleaning, transformation, and feature engineering (Pandas, NumPy)
- **Power BI** – Data modeling, DAX calculations, and dashboard visualization
- **Power Query** – Data transformation and preprocessing
- **DAX** – Creation of KPIs and calculated measures

6.Dataset Summary

The dataset contains 3,900 customer records with 18 attributes, covering customer demographics, purchase behavior, product categories, subscription status, shipping preferences, spending patterns, and customer ratings. The dataset supports in-depth analysis of sales trends, revenue contribution, and customer segmentation.

➤ Dataset Size

- **Number of Rows:** 3,900
- **Number of Columns:** 18

➤ Key Attribute

- **Customer ID** – Unique identifier for each customer
- **Gender** – Customer gender classification
- **Age Group** – Segmented age categories
- **Product Category** – Clothing, Accessories, Footwear, Outerwear
- **Purchase Amount** – Transaction value
- **Review Rating** – Customer feedback score
- **Subscription Status** – Subscriber or non-subscriber
- **Shipping Type** – Free Shipping, Express, or 2-Day Shipping

➤ Data Preparation

- Used **SQL queries** to extract, filter, and aggregate raw data
- Cleaned and standardized data using **Python (Pandas & NumPy)**
- Handled missing values and removed duplicates
- Created age group buckets and category standardization
- Loaded processed data into **Power BI** for modeling
- Built calculated columns and DAX measures for KPIs

➤ Key KPIs

- **Total Customers:** 3.9K
- **Average Purchase Amount:** \$59.76
- **Average Review Rating:** 3.75 / 5
- **Subscribed Customers:** 27%**Non-Subscribed Customers:** 73%

Customer Shopping Behavior

3.9K

Number of Customers

\$59.76

Average purchase amount

3.75

Average review rating

Gender

Female

Male

Subscription Status

No

Yes

Category

Accessories

Clothing

Footwear

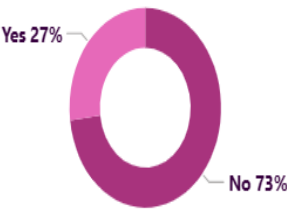
Shipping Type

2-Day Shipping

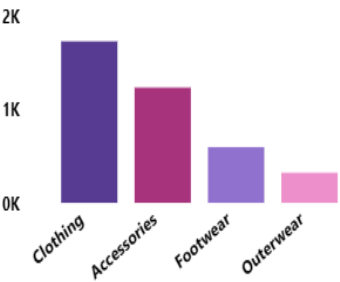
Express

Free Shipping

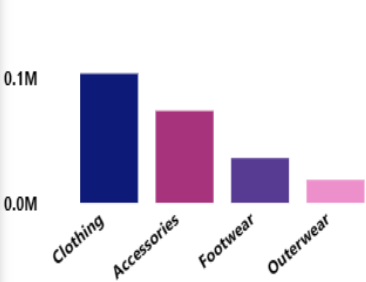
% of customer by subscription status



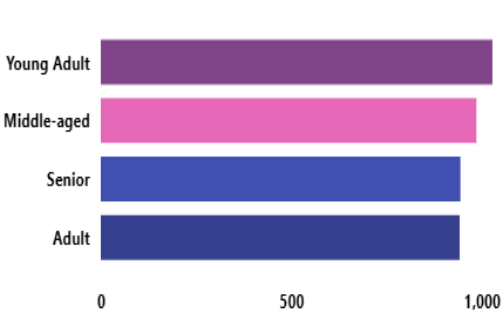
Sales by Category



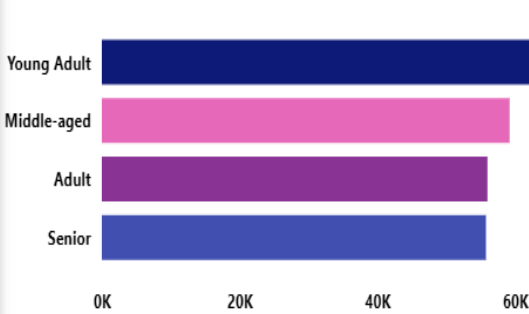
Revenue by Category



Sales by Age Group



Revenue by Age Group



7.Key Performance Indicators (KPI Section)

At the top of the dashboard, KPI cards provide quick business insights:

◆ **Total Customers – 3.9K**

Represents the total customer base analyzed.
Helps understand customer reach and business scale.

◆ **Average Purchase Amount – \$59.76**

Indicates average customer spending behavior.
Useful for revenue forecasting and pricing strategy.

◆ **Average Review Rating – 3.75 / 5**

Reflects overall customer satisfaction.
Suggests moderate satisfaction with scope for service or product improvement.

8. Visual Analysis Sections

➤ Subscription Status Analysis

- **Subscribed Customers:** 27%
- **Non-Subscribed Customers:** 73%

Insight: Most customers are non-subscribers, indicating a strong opportunity for targeted subscription campaigns.

➤ Sales by Category

- Clothing records the highest sales volume
- Accessories follow as the second-highest category
- Footwear and Outerwear show lower sales

Insight: Clothing is the most popular category and drives overall sales volume.

➤ Revenue by Category

- Clothing generates the highest revenue
- Accessories contribute significantly
- Footwear and Outerwear generate comparatively lower revenue

Insight: High sales volume categories also deliver strong revenue performance.

➤ Sales by Age Group

- Young Adults show the highest purchase activity
- Middle-aged customers follow closely
- Adults and Seniors contribute lower sales

Insight: Younger customers are the most active buyers.

➤ Revenue by Age Group

- Young Adults generate the highest revenue
- Middle-aged customers are strong contributors
- Seniors and Adults contribute moderately

Insight: Younger demographics represent the most valuable customer segment.

9. Business Insight

- Strong customer base with consistent purchasing trends.
- Clothing and Accessories are top-performing categories.
- Young adults drive both sales volume and revenue.
- Subscription adoption is low, presenting growth opportunities.
- Moderate customer ratings highlight the need for experience improvement.
- Data-driven insights support targeted marketing and inventory planning.

10. Conclusion

This project analyzed **3,900 customer records (18 columns)** using **SQL, Python, and Power BI** to understand shopping behavior and sales performance. The insights showed that Clothing and Accessories are the top revenue-generating categories, while Young Adult and Middle-aged customers contribute the most to sales. A low subscription rate (27%) highlights growth potential, and an average rating of 3.75 suggests scope for improving customer experience. Overall, the project demonstrates effective end-to-end data analysis and visualization for data-driven business decisions.