CUSTOMER PURCHASE BEHAVIOUR ANALYSIS USING DATA SCIENCE TECHNIQUES

Submitted By :
Aditya Kumar Singh
12304738

Submitted To :
School of Computer Science and Engineering
Lovely Professional University
Jalandhar, Punjab, **144411**

May 7, 2025

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to everyone who supported me throughout the completion of this project.

First and foremost, I am deeply thankful to my subject faculty, for their continuous guidance, encouragement, and insightful suggestions. Their feedback helped me better understand the core concepts of data analysis and apply them effectively throughout this project.

I also wish to thank my department, **Department of Computer Science and Engineering**, and my institution, **Lovely Professional University**, for providing the necessary resources and academic environment to carry out this project successfully.

A special thanks to all the respondents who participated in the survey and provided valuable data, without which this project would not have been possible.

Finally, I am grateful to my friends and family for their constant moral support and motivation during this journey.

This project has not only improved my technical skills in data analysis and visualization but has also given me a better understanding of real-world consumer behavior, especially regarding emotional triggers like FOMO.

Aditya Kumar Singh
12304738

ABSTRACT

This project explores how people behave while shopping online, with a focus on how emotional factors like **FOMO (Fear of Missing Out)** affect their decisions. Using a survey-based dataset, the study applies **Exploratory Data Analysis (EDA)** to understand patterns in age, income, platform preferences, product choices, and shopping habits.

The findings show that **young consumers (mainly aged 18–25)** are the most active in online shopping. Most users prefer platforms like **Amazon, Flipkart, and Myntra**, and commonly buy clothing and electronics. The analysis also reveals that people often **wait for discounts or special sales** and tend to **shop more during festivals**, which shows clear signs of FOMO. Promotions like flash sales, cashback offers, and **"Buy 1 Get 1 Free"** deals strongly influence buying decisions.

The project highlights how modern shoppers are not only price-sensitive but also **influenced by emotions and urgency created by marketing tactics**. Visualizations and insights from the data help explain these behaviors in a clear and meaningful way.

Overall, the project provides useful information for businesses to better understand and connect with their customers by using emotional and time-based strategies.

LIST OF FIGURES

TABLE OF CONTENTS

Contents

CHAPTER 1

1 INTRODUCTION

1.1 Purpose of the Study

In this project, I am going to research Customer Purchase Behavior to identify the factors that affect consumer shopping choices and spending behavior. By analyzing customer shopping habits, preferences, and the effect of promotions, this study will generate useful insights that can assist businesses in enhancing marketing strategies and improving customer satisfaction.

This study attempts to:

- **Recognize Shopping Habits** – Understand where consumers shop, how frequently they shop, and their favorite product categories.

- **Measure Brand Loyalty** – Determine if customers have a favorite brand and what drives their brand preferences.

- **Study Spending Patterns** – Analyze how much customers usually spend on each purchase and how promotions or discounts influence their purchases.

- **Develop an Understanding of Seasonal Buying Habits** – Investigate whether shoppers buy more during holiday periods and what goods they purchase during holidays.

- **Analyze Payment Habits** – Identify the most popular payment options for online shopping and the influence of quick delivery on purchasing decisions.

- **Respond to Customer Frustrations** – Recognize the greatest challenges that shoppers encounter and suggest improvements stores can implement to enhance the shopping experience.

By exploring these dimensions, this study will help businesses and retailers personalize their products, enhance customer interaction, and establish more efficient marketing campaigns to capture and maintain customers.

1.2 Problem Statement

In the rapid retail environment of today, customer buying behavior must be understood so that businesses can stay competitive and satisfy consumers. Yet, few businesses are able to recognize such factors that guide customer choice as brand affinity, expenditure patterns, promotional influence, and seasonal patterns of buying. Without insights, retailers might end up failing to attract and retain customers, with resulting lower sales and poor satisfaction.

This research seeks to solve the following issues:

- **Customer Preference Unawareness** – Companies usually do not have a clear vision of where customers wish to shop, what products they frequently purchase, and what drives their buying habits.

- **Effects of Offers and Discounts** – Retailers are uncertain about how offers, seasonal promotions, and discount prices influence customer behavior and total revenue.

- **Challenges in Shopping Experience** – Shoppers experience several problems including prices that are too high, products that are out of stock, inadequate customer service, and delayed delivery, which can be detrimental to their shopping experience.

- **Online and Digital Role** – With growth in e-commerce, enterprises should be aware of customers' shopping website preferences, payment options, and the need for quick delivery.

Through this survey of customer buying patterns, this study aims to obtain useful insights for businesses to frame their marketing programs, increase engagement with customers, and enhance customers' shopping experiences.

1.3 Importance of Analyzing Customer Behavior

Knowing the behavior of customers is essential for companies since it assists them in keeping up with emerging market trends, enhancing customer satisfaction, and increasing sales. The following are two major reasons why customer behavior analysis is important:

1.3.1 Improving Business Strategies and Customer Experience

Through the study of customer behavior, companies can determine shopping habits, tastes, and expenditures. This enables them to:

- Offer products and services that match customer needs.

- Target marketing campaigns according to customer preferences.

- Enhance the entire shopping experience by resolving common issues like pricing issues, product availability, and delivery speed.

For instance, if an enterprise discovers customers like to make purchases online instead of in-store, they would invest more into online marketing and improve their platform for online business.

1.3.2 Enhancing Marketing and Sales Performance

Customer behavior analysis is useful in helping companies know what drives buying decisions, including price cuts, brand loyalty, and holiday shopping patterns. This allows them to:

- Develop successful promotional campaigns that draw in more customers.

- Affirm pricing strategies to induce repeat purchases.

- Enhance customer interaction by offering loyalty rewards and special deals.

As an example, if research indicates customers hold out for discounts before buying, companies can schedule seasonal sale events to generate maximum revenue.

By studying customer habits, companies are better able to make decisions, enhance relationships with customers, and remain competitive.

1.4 Goal

The major aim of this Customer Purchase Behavior study is to identify and learn the major drivers behind consumer purchasing behavior. By scrutinizing the buying preferences, expenses, brand devotion, and promotion influence, the study aims to give valuable recommendations that will help organizations make effective marketing decisions and better enhance customer shopping experience.

1.4.1 Specific Objectives

- **Identify Shopping Trends** – Recognize where customers like to shop (online or offline), how often they shop, and what product categories they buy most.

- **Analyze Brand Preferences** – Identify if customers are brand loyal and what drives their brand preferences.

- **Evaluate Spending Patterns** – Analyze how much customers spend on average per purchase and how discounts or sales affect their purchasing behavior.

- **Know Seasonal Buying Habits** – Determine if customers buy more during holidays and what products they buy during such occasions.

- **Know the Role of Promotions** – Determine which promotions (discounts, cashback, rewards program, etc.) appeal most to customers.

- **Know Payment and Delivery Preferences** – Determine payment methods customers prefer and how critical timely delivery is when making a purchase.

- **Determine Shopping Challenges** – Know the largest problems that customers experience when shopping and collect ideas for change.

By meeting these goals, this research will offer enterprises and retailers concrete advice to boost customer interaction, streamline product ranges, and formulate more successful advertising strategies.

<div align="right">

CHAPTER 2

</div>

2 DATASET-DESCRIPTION

2.1 Data Collection

For the purpose of this Customer Purchase Behavior study, data was collected using a Google Form survey. The survey aimed to obtain thorough information regarding diverse facets of consumer shopping behavior such as preferences, expenditure, brand loyalty, and purchase decision influences.

2.1.1 Survey Methodology

- **Survey Platform:** Google Forms

- **Data Collection Mode:** Online questionnaire

- **Target Audience:** People from different age groups, income levels, and shopping behavior

- **Question Type:** Multiple choice, Likert scale, and open-ended

2.1.2 Survey Topics Covered

- **Demographic Data** – Age segment, gender, location, and income level.

- **Shopping Habits** – Preferred shopping mediums (online or offline), most shopped-for product categories, and brand affinity.

- **Expenditure Habits** – How often one shops, average expenditure per transaction, and shopping habits during festival seasons.

- **Influencing Factors** – Role of discounts, offers, and external factors on purchase decisions.

- **Payment and Delivery Habits** – Preferred mode of payment and value for speedy delivery.

- **Customer Experience** – Overall satisfaction while shopping, problems encountered, and advice for retailers.

The feedback received via Google Forms was then structured and interpreted in order to see patterns and trends in the purchase behavior of the customers. All this data acts as the background for the study, providing relevant insights that can assist companies to enhance their marketing strategies and interaction with the customer.

2.2   DataSet Overview

This dataset contains 357 records collected from a structured online survey aimed at understanding consumer shopping behavior, preferences, and challenges. The dataset captures a variety of qualitative and quantitative attributes related to shopping patterns, demographic traits, and consumer attitudes.

2.2.1   Data Structure

Total Records (Responses): 357
Total Attributes (Columns): 24
Data Type Mix :
Categorical variables: 22
Numerical variable: 1 (Shopping Experience Rating)

Feature	Type	Description
Timestamp	Datetime	Submission date and time of the response
What is your Name?	Categorical (Text)	Name of the respondent (used for identification)
Email?	Categorical (Text)	Email of the respondent
What is your age group?	Categorical	Age bracket (e.g., 18–25, 26–35, etc.)
What is your gender?	Categorical	Gender identity of the respondent
Where do you live?	Categorical	City/State of residence
What is your monthly income range?	Categorical	Income range (e.g., Below ₹10,000, ₹10,000–₹25,000, etc.)
Where do you shop the most?	Categorical	Preferred shopping mode: Online, Offline, or Both
Prefered Product Category?	Categorical	Main product category they usually shop for
Prefer Specific Brands?	Categorical	Whether they prefer specific brands (Yes/No)
Your preferred brands?	Categorical (Text)	Open-ended response on brand preference
How often do you shop?	Categorical	Shopping frequency (e.g., Weekly, Monthly, etc.)
How much do you spend on average per purchase?	Categorical	Spending estimate per shopping instance
What influences your decision to buy?	Categorical	Factors like Discounts, Quality, Reviews, etc.
Do you shop more during festive seasons?	Categorical	Yes/No/Maybe
What do you usually buy during festivals?	Categorical	Categories like Gifts, Clothes, Sweets, etc.
Do you wait for discounts or sales to shop?	Categorical	Yes/No
Which type of promotion influences you the most?	Categorical	Promotion type: Flash Sales, Coupons, Cashback, etc.
How do you usually pay for online purchases?	Categorical	Payment method: UPI, COD, Cards, Wallets
Which online platform do you use the most?	Categorical	Platform like Amazon, Flipkart, Myntra, etc.
How important is fast delivery for you?	Categorical	Importance level: Very Important, Neutral, Not Important
How would you rate your overall shopping experience?	Numerical (Ordinal)	1 to 5 rating scale
What are the biggest challenges you face while shopping?	Categorical (Text)	Open-ended: High Prices, Limited Stock, etc.
What can retailers improve to enhance your experience?	Categorical (Text)	Open-ended suggestions: Faster Delivery, More Variety, etc.

Figure 1: List of Columns

<div align="right">

CHAPTER 3

</div>

3 EXPLORATORY DATA ANALYSIS (EDA)

3.1 Data Cleaning

Total Entries : 357
Missing Values : None across all columns
Irrelevant Columns Dropped : Names and Emails were excluded from analysis to maintain respondent anonymity.
Data Types Validated :
Rating: Confirmed as numerical (integer)
All other fields : Treated as categorical

3.2 Demographics Analysis
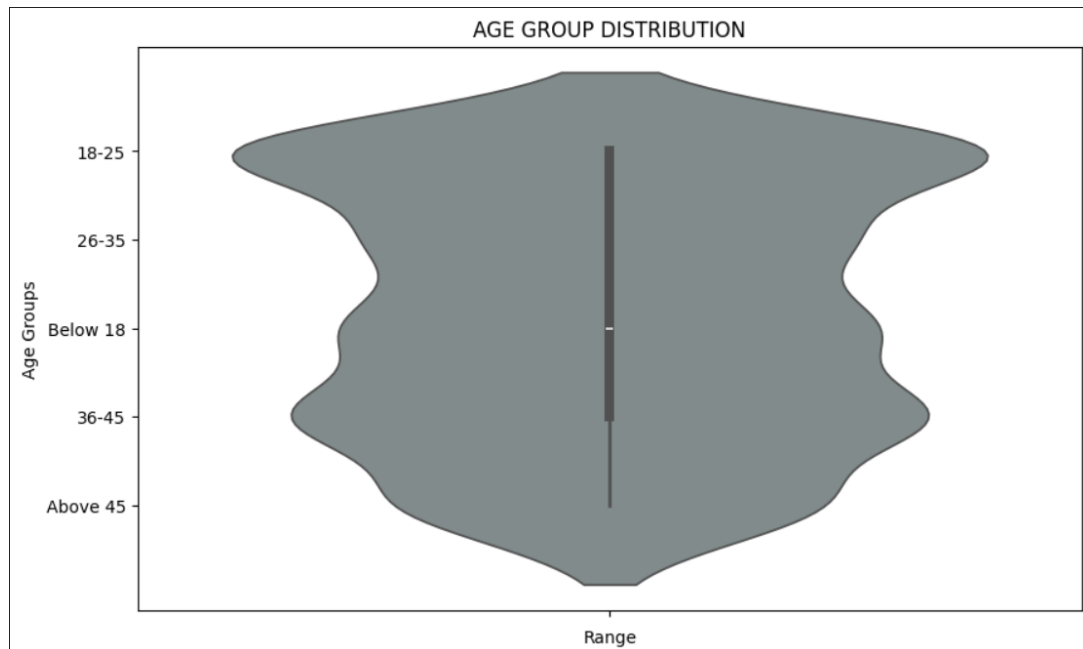
3.2.1 Age Distribution

Visualization : Violin Plot

Figure 2: Age Group Distribution

Insight :-
Target audience for online retail marketing is predominantly youth-centric.

3.2.2 Gender Distribution
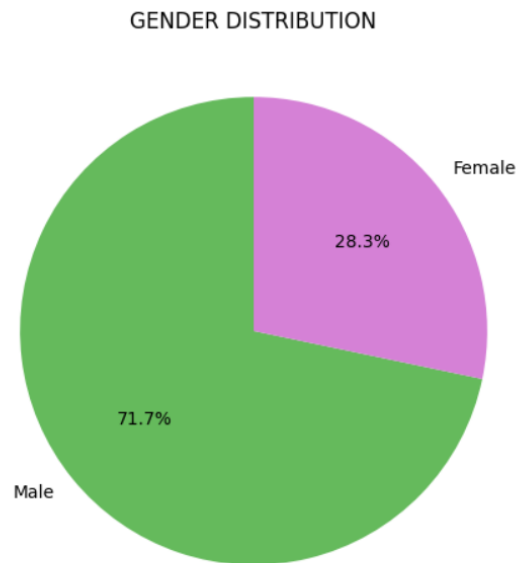
Visualization : Pie Chart

Figure 3: Gender Distribution

Insight :-
Strong male representation; however, female preferences still offer valuable insights, especially for categories like fashion, beauty, and groceries.

3.3 Income and Spending Patterns

3.3.1 Income Range Distribution
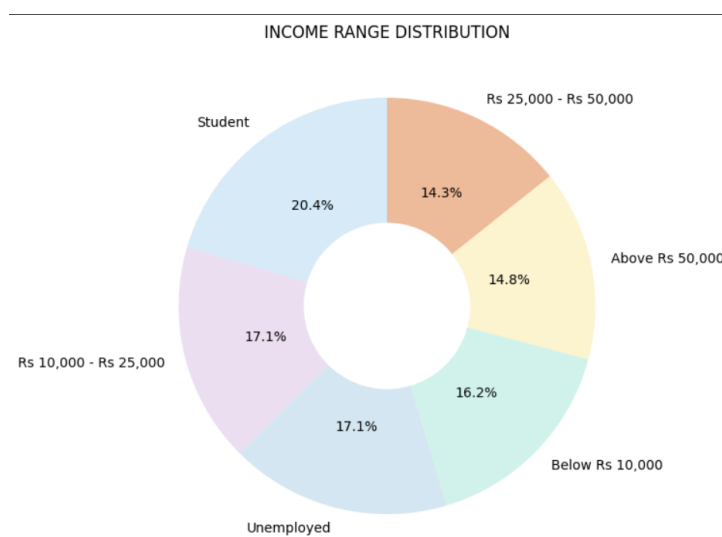
Visualization : Donut Chart

Figure 4: Income Range Distribution

Income Range :

- Most respondents had a monthly income of Below Rs. 25,000, primarily due to student demographic.

- Very few earned above Rs. 50,000.

Spending Per Purchase :

- Majority spend between Rs. 500 - 1500 on average per purchase.

- Smaller groups spend either below Rs. 500 or over Rs. 2000.

Insight :-
Budget-conscious behavior reflects typical Gen Z and young millennial spending.

3.4 Shopping Behavior

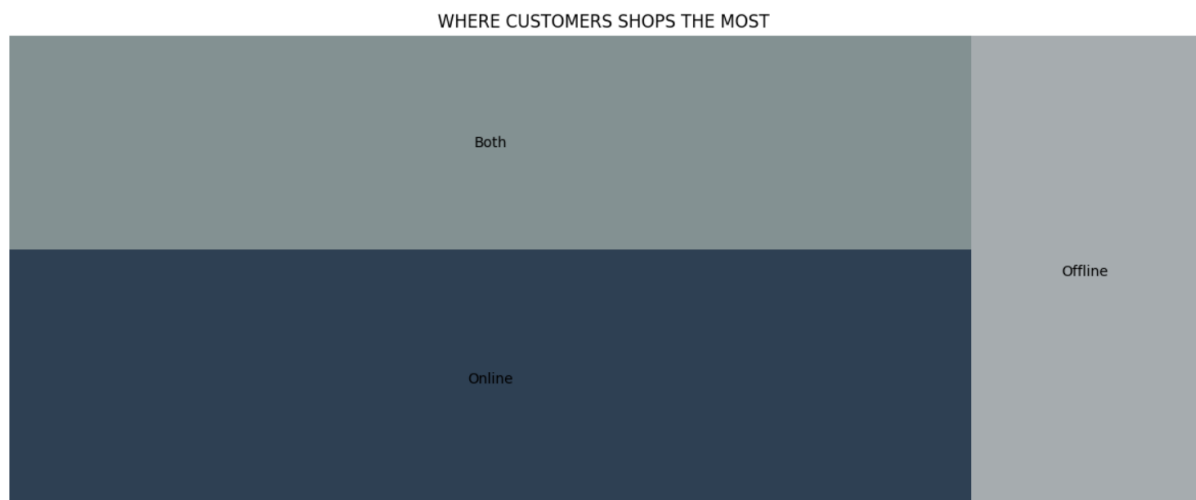### 3.4.1 Shopping Mode Preference

Visualization : Tree Map

Figure 5: Shopping Mode Preference

Insight :-
Online shopping dominates, reflecting current digital commerce trends.

3.4.2 Shopping Frequency
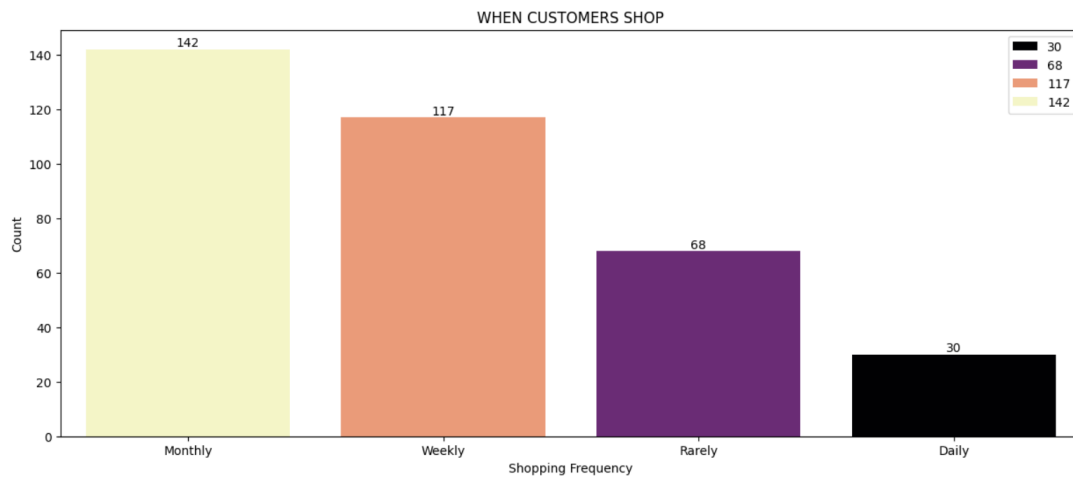
Visualization : Bar Plot

Figure 6: Shopping Frequency

Insight :-
Frequency increases during festivals and major sale events.

3.4.3 Preferred Categories

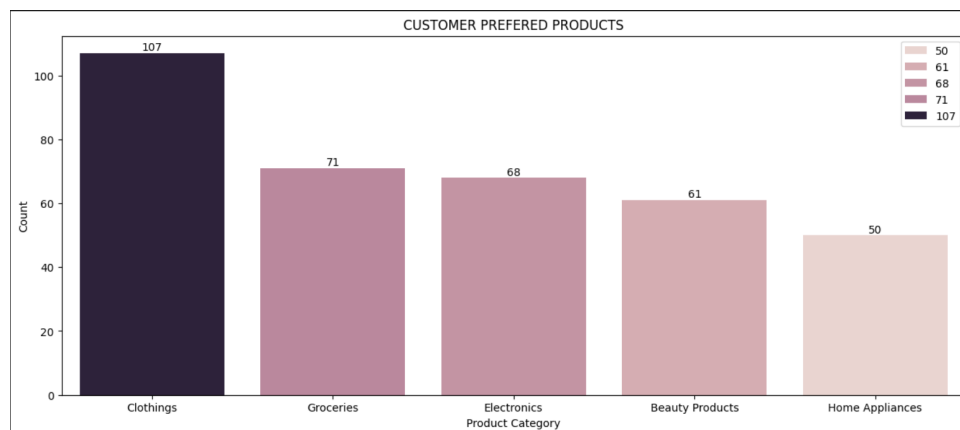**Visualization** : Bar Plot

Figure 7: Preferred Categories

- **Top Choices** : Clothing, Electronics, Groceries

- **Others** : Footwear, Beauty Products, Books

Insight :-
Apparel and gadgets are the most sought-after segments.

3.5 Behavioral and Psychological Patterns

3.5.1 Brand Loyalty

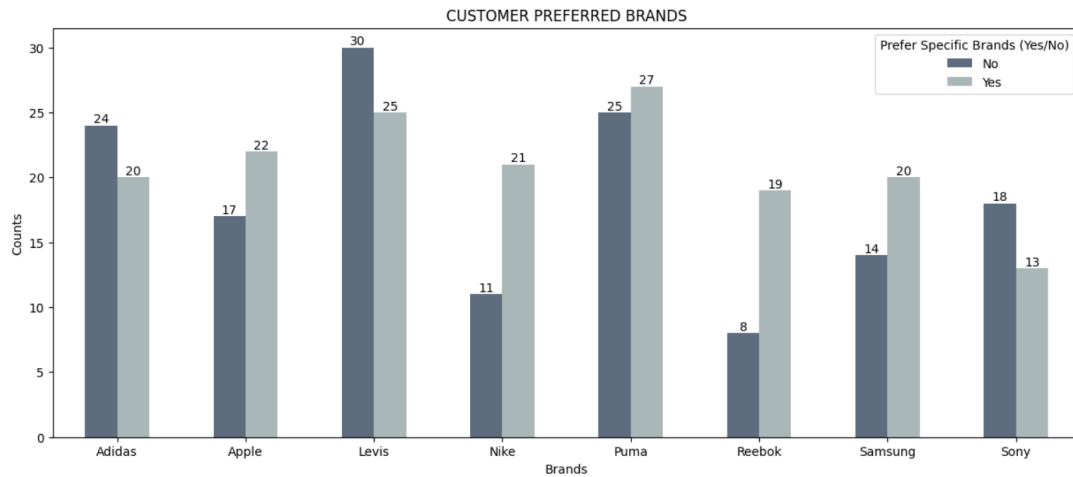**Visualization** : Grouped bar chart

Figure 8: Brand Loyalty

- 65% prefer specific brands, especially in electronics, fashion, and skincare.

- **Common mentions** : Nike, Samsung, H&M, Apple.

3.5.2 Purchase Influencers

Visualization : Word Cloud

Figure 9: Purchase Influencers

- **Top drivers** : Discounts, Reviews, Brand Image

- **Secondary drivers** : Peer Recommendations, Ads

Insight :-
External validation and financial incentives play key roles.

3.5.3 Festive Season Impact

Visualization : Sunburst Chart

FESTIVE SHOPPING PREFERENCES

Figure 10: Festive Season Impact

- Around 75% shop more during festivals, primarily for gifts, clothes, and décor.

- A significant number wait for sales and discount events.

3.6 Promotions, Platforms & Payment

3.6.1 Promotion Preference

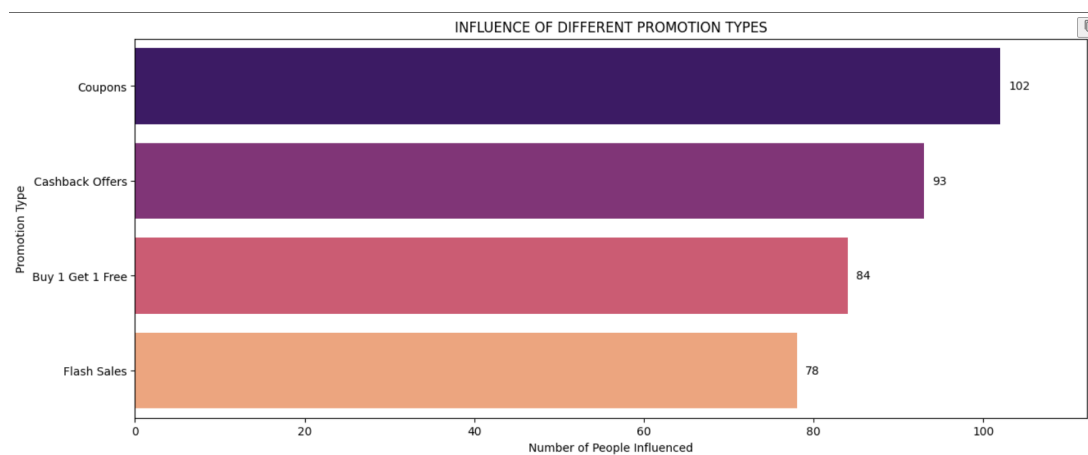**Visualization** : Bar chart

Figure 11: Promotion Preference

- Coupons and Cashback offers were the most influential.

3.6.2   Payment Methods
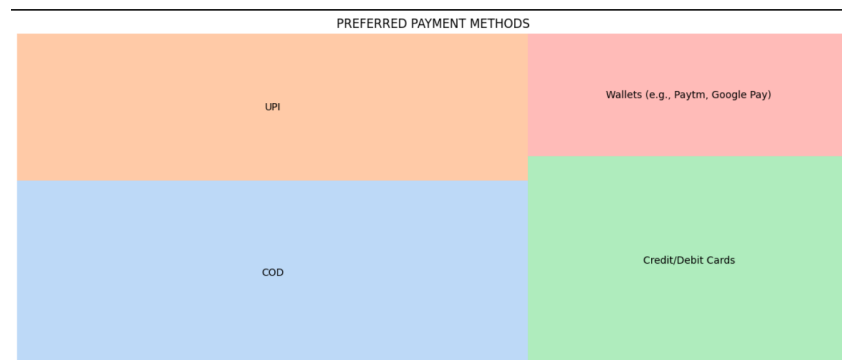
Visualization : Tree Map

Figure 12: Payment Methods

- **Most used** : COD & UPI

- **Others** : Wallets (Paytm, G Pay), Credit/Debit Cards

3.6.3   Preferred Platforms

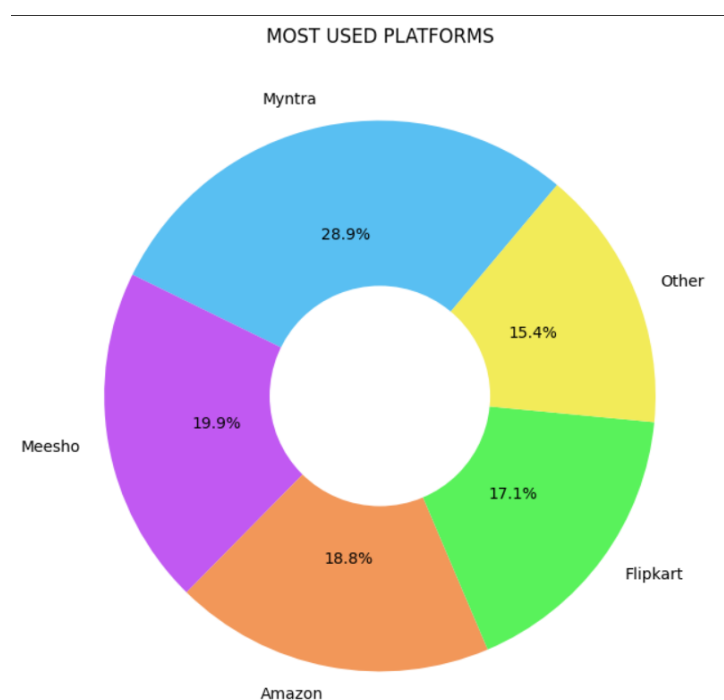**Visualization** : Doughnut Chart

Figure 13: Preferred Platforms

- **Top 3** : Myntra, Meesho, Amazon

- **Others** : Flipkart, Other

3.7 Shopping Experience & Feedback

3.7.1 Overall Shopping Experience

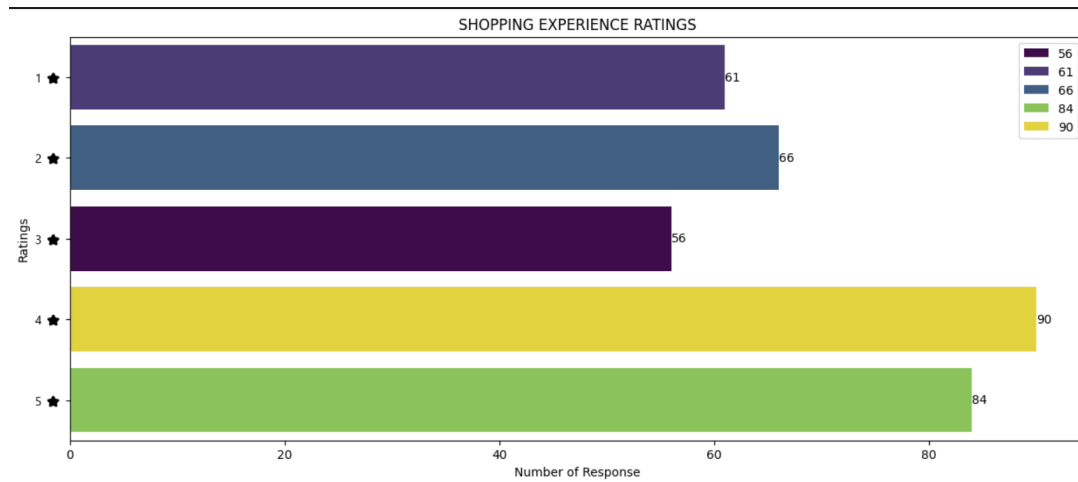**Visualization** : Bar chart / Star Rating chart

Figure 14: Overall Shopping Experience

Rated on a scale of 1 to 5 :

- **Most Common Rating** : 4
- **Average Rating** : 3

3.7.2 Common Challenges
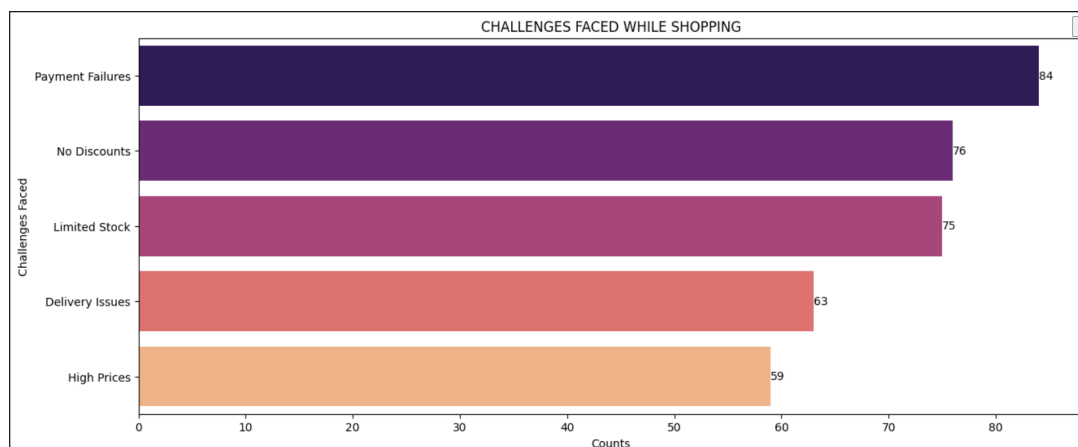
Visualization : Bar Chart

Figure 15: Common Challenges

- **Common Challenges** : Payment Failures, No Discount, Limited Stock

3.7.3 Suggestions to Retailers
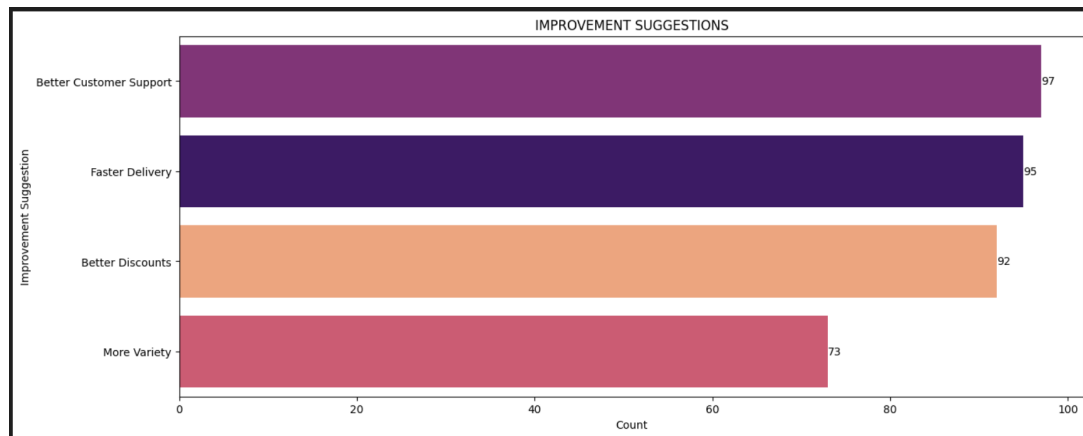
Visualization : Bar Chart

Figure 16: Suggestions to Retailers

- **Common Suggestions** : Better Support Channels, Faster Delivery, Better Discount

CHAPTER 4

4 FOMO (Fear of Missing Out) Analysis

4.1 What is FOMO in Shopping?

FOMO in shopping means people feel concerned or excited when they think they might miss out on a **special deal, limited-time offer**, or a **trending product**. This emotional reaction often **pushes them to buy quickly**, even if they didn't plan to.

4.2 How FOMO Appears in my Dataset

Column in Dataset	FOMO-Related Behavior
Do you wait for discounts or sales to shop?	Shows if people hold back purchases just to grab deals later
Do you shop more during festive seasons?	Indicates whether people increase shopping due to seasonal offers
Which type of promotion influences you the most?	Reveals emotional triggers (flash sales, coupons, cashback, etc.)
How often do you shop?	Frequent shopping during discounts is a sign of FOMO
What influences your decision to buy?	Lists FOMO-related factors like price drops, peer pressure, and urgency

Figure 17: FOMO related columns

4.3 Explanation of FOMO Patterns

1. Waiting for Discounts/Sales

- A large number of respondents said **"Yes"** to waiting for discounts.

- This shows they **delay their shopping until there's a sale**, which is classic FOMO behavior - they don't want to miss a good deal.

2. Shopping More During Festivals

- Many people said they shop more during festivals like **Diwali or New Year**.

- Why? Because that's when **brands throw big sales**, and everyone is buying - so they don't want to feel left out.

3. Promotion Influence

The most powerful motivators were :-

- Flash Sales (e.g., 1-hour deals)

- Cashbacks

- Buy 1 Get 1

These create urgency, making people feel like they'll lose out if they don't buy right now.

4. Peer Influence

People often buy things because :-

- Friends are buying them

- Influencers are promoting them

- They see reviews and feel left behind

4.4   Insights :-

FOMO increases during festivals

- People shop more due to big sales, ads, and social excitement.

Discounts & Flash Sales are strong FOMO triggers

- Shoppers feel rushed to grab "limited time" offers.

Many delay purchases to wait for sales

- Indicates FOMO-driven purchase planning.

Influencers and social media drive FOMO

- Users trust what others recommend and follow trends.

Brands use urgency as a tool

- By creating countdowns and "only 3 items left" tricks, brands push people to buy fast.

4.5   How Brands Can Use FOMO

If a retailer sees this behavior, they can :-

- Launch time-limited deals (e.g., 2-day flash sales)

- Use social proof ("1,000 people bought this today!")

- Send notifications like "Offer ends in 3 hours!"

- Run influencer campaigns showing what others are buying
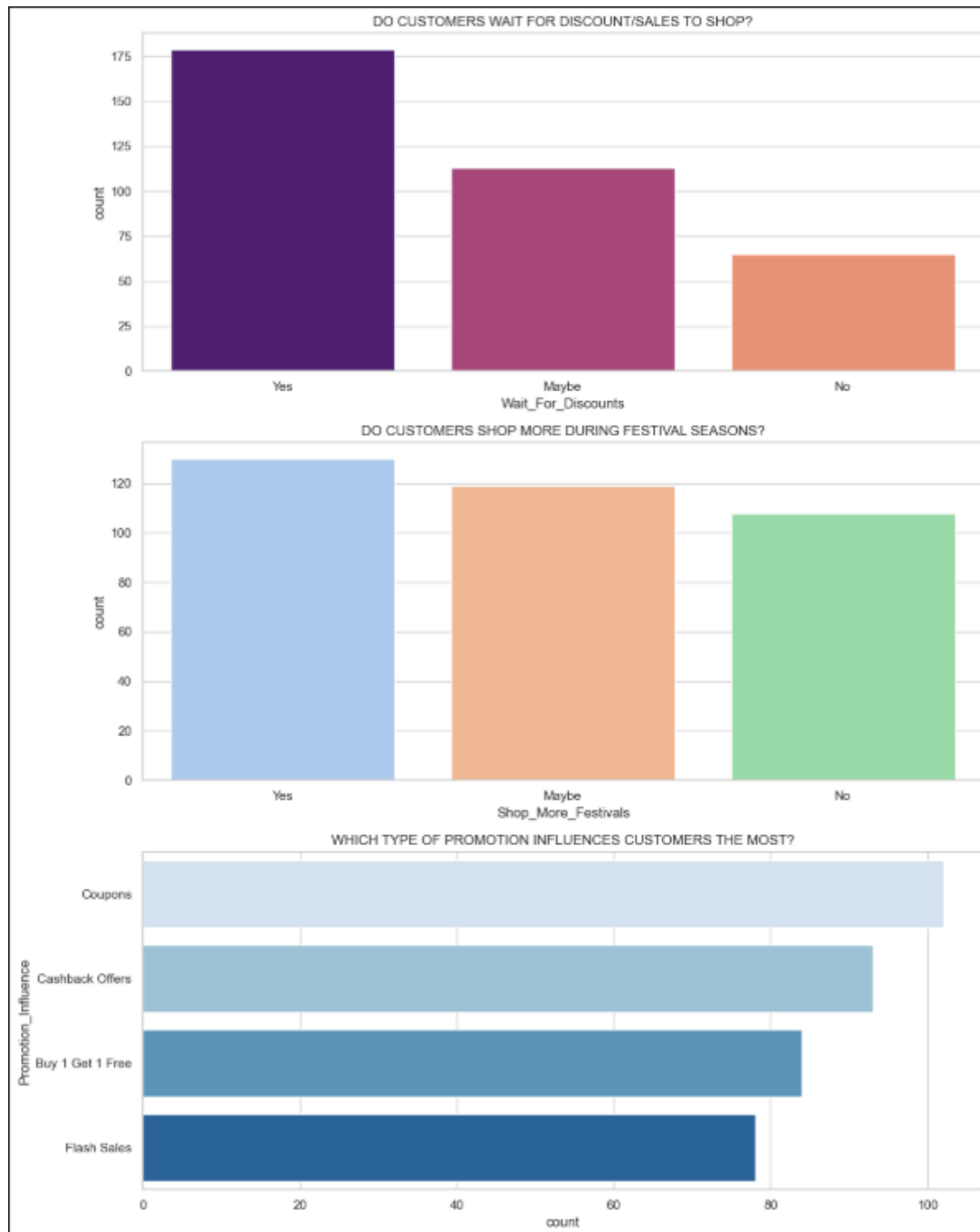
4.6 FOMO Graph

Figure 18: FOMO Analysis

Insights from Graphs :-

1. Most people wait for discounts

→ A clear sign of FOMO, especially when offers are time-limited.

2. Festivals trigger more shopping

→ Indicates how emotional and seasonal cues influence consumers.

3. Flash Sales, Cashback, and BOGO are major influences

→ These promotions create urgency, making users feel they'll miss out if they don't act fast.

CHAPTER 5

5   CONCLUSION

This project aimed to analyze consumer shopping behavior using real-world survey data. Through detailed Exploratory Data Analysis (EDA), we discovered that the majority of respondents were **young, digitally active consumers**, mostly aged between 18–25, with limited income but high engagement in online shopping. Popular shopping platforms included **Amazon, Flipkart, and Myntra**, with categories like clothing and electronics being the most preferred.

A key finding from the **FOMO (Fear of Missing Out)** analysis was that emotional and time-based triggers - such as **flash sales, festive discounts, and influencer recommendations** - have a strong impact on shopping decisions. Consumers tend to wait for sales and shop more during festivals, highlighting how fear of missing out drives their actions.

In conclusion, modern consumers are **price-sensitive, emotionally driven, and socially influenced**. For businesses, this means that **creating urgency, offering value-based deals, and using social influence strategies** are essential to attracting and retaining customers in today's digital marketplace.