CUSTOMER RETENTION PROJECT

BY

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ACKNOWLEDGEMENTS

I WOULD LIKE TO EXPRESS MY DEEP AND SINCERE GRATITUDE TOWARDS FLIPROBO TECHNOLOGIES FOR PROVIDING ME THE INTERNSHIP OPPORTUNITY AND A GREAT CHANCE FOR LEARNING AND PROFESSIONAL DEVELOPMENT. A BIG SPECIAL THANKS TO SME MS. KHUSHBOO GARG FOR PROVIDING NECESSARY HELP IN SOLVING THE PROBLEMS AND FOR PROVIDING CLARIFICATIONS ON TIME THROUGHOUT.

MY SINCERE THANKS TO "DATA TRAINED" WHO ARE THE REASON BEHIND MY INTERNSHIP AT FLIPROBO. LAST BUT NOT LEAST MY ALL WELL WISHERS INCLUDING PARENTS/SPOUSE/FRIENDS WHO HAVE BEEN MY BACKBONE IN EVERY STEP OF MY LIFE.

CHAPTER 1 - INTRODUCTION

INTRODUCTION

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CONCLUSIONS

CHAPTER 1
INTRODUCTION

INTRODUCTION

Customer satisfaction has emerged as one of the most important factors that guarantee the success of online store; it has been posited as a key stimulant of purchase, repurchase intentions and customer loyalty.

A comprehensive review of the literature, theories and models have been carried out to propose the models for customer activation and customer retention.

Five major factors that contributed to the success of an e-commerce store have been identified as: service quality, system quality, information quality, trust and net benefit.

The research furthermore investigated the factors that influence the online customers repeat purchase intention. The combination of both utilitarian value and hedonistic values are needed to affect the repeat purchase intention (loyalty) positively.

CONCEPTUAL BACKGROUND OF THE DOMAIN PROBLEM

The data is collected from the Indian online shoppers. Results indicate the e-retail success factors, which are very much critical for customer satisfaction.

Five major factors that contributed to the success of an e-commerce store have been identified as: service quality, system quality, information quality, trust and net benefit.

The research furthermore investigated the factors that influence the online customers repeat purchase intention.

MOTIVATION FOR THE PROBLEM UNDERTAKEN

This project was given by Flip Robo Technologies as a part of the internship program. This opportunity gives the exposure to real world data and using my skillset in solving a real time problem has been the primary motivation.

In this presentation, the focus will be on

✓ How to analyze the dataset of Customer Retention

✓ What are the criterions to achieve Customer Retention

✓ Overall data analysis on the problem.

DIAGRAMMATIC REPRESENTATION OF CUSTOMER RETENTION
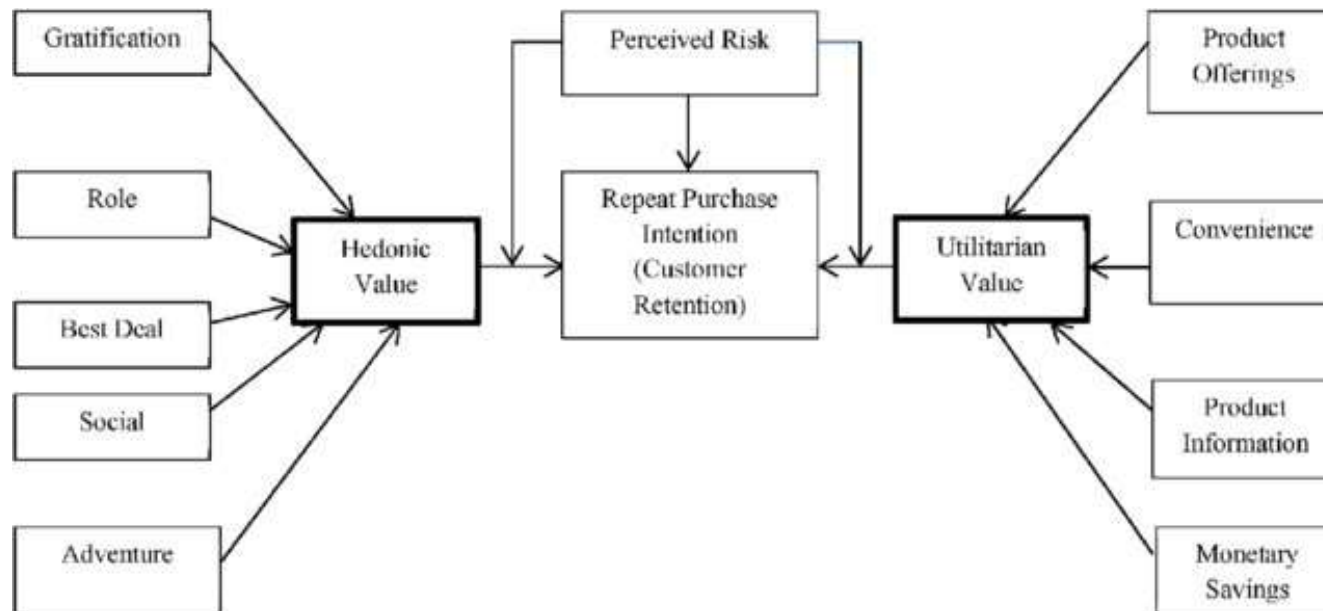
CHAPTER 2
ANALYTICAL PROBLEM FRAMING

DATA SOURCES AND THEIR FORMATS

The dataset is provided by FlipRobo and it contains the data of the Indian online shoppers. There are two sheets (one is detailed) and second one is encoded in the excel file.

```python
# Reading xls file
file=pd.read_excel("customer_retention_dataset.xlsx" , sheet_name=None)
```

```python
file.keys() # Checking for multiple sheets in xls file
```

```
dict_keys(['datasheet', 'codedsheet'])
```

```python
# Creating a dataframe with required data sheet in the excel
df=file['datasheet']
pd.set_option('display.max_columns',None) # This shows all truncated columns
df.head()
```

There are total 269 rows and 71 columns in this dataset

HARDWARE & SOFTWARE REQUIREMENTS WITH TOOL USED

Hardware Used -

1. Processor — Intel i7 processor 8th Generation

2. RAM — 32 GB

3. GPU — 4GB NVIDIA Graphics card

Software utilized -

1.Anaconda – Jupyter Notebook

Libraries Used –

Different libraries are used while building Machine Learning model and Visualization of data.

```python
# importing required initial libraries
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt

import warnings
warnings.filterwarnings("ignore")
```

DATA PRE-PROCESSING

Data integrity is checked by checking for duplicate values, white spaces and missing values

```python
duplicate = df[df.duplicated()]

print("Duplicate Rows :",len(df[df.duplicated()]))

# Print the resultant Dataframe with duplicate rows except first duplicate row
duplicate
```

```
Duplicate Rows : 166
```

```python
(df==" ").all().any()   # Check for white spaces in all columns
```

```
False
```

```python
# Checking sum of null values from all the columns
df.isnull().sum().sum()
```

```
0
```

There are 166 duplicate rows found in the entire dataset. Dropped remaining duplicate rows except "first" duplicate rows

Removed tabs in the columns names

15

CHAPTER 3
MODELS DEVELOPMENT & EVALUATION

IDENTIFICATION OF POSSIBLE PROBLEM-SOLVING APPROACHES

There are many features in dataset. Objective is to find key conclusions on customer retention using data analysis. The features are categorized into few sections so the analysis can be performed section wise on particular area. They are enlisted as below:

➢ General feature describing Population and online shopping feature

➢ Features of different aspects of personal choices of device and internet services

➢ Features of shopping purchase decision & payment

➢ Features of Website options & performance related

➢ Features of Online shopping customer service requirement

➢ Features related to Customer online shopping experiences

➢ Features of Opinion on Online Shopping Platform Websites by Customers

VISUALIZATIONS

1. General feature describing Population and online shopping feature
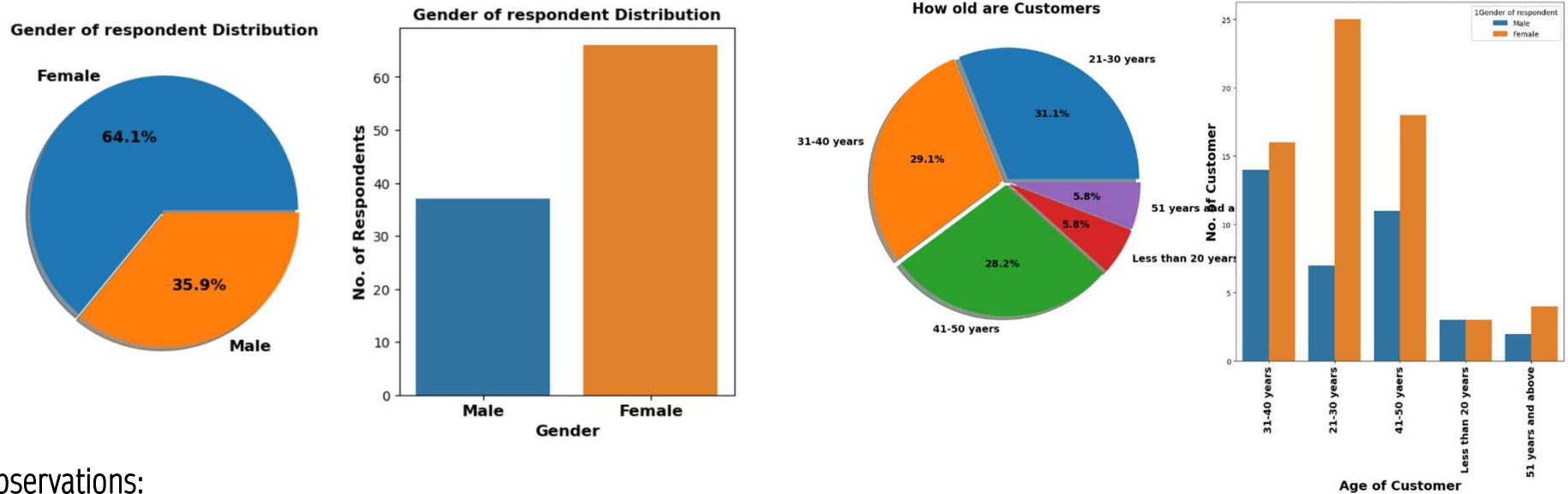
Observations:
- ✓ Females (64.1%) are responding more compared to Males (35.9%).i.e. Females are doing more shopping compared to males
- ✓ Majority of the respondents are falling in the age group of 21-30 years (31.1%), followed by 31-40 years (29.1%) and 41-50 years (28.2%), out of which female respondents are more in all these groups
- ✓ Majority of the female respondents are falling in the age group of 21-30 years
- ✓ The male customers in the age group of 31-40 years are doing more shopping, followed by 41-50 years
- ✓ The customers with age < 20 years and > 50 years are doing less shopping including both males and females

VISUALIZATIONS

1. General feature describing Population and online shopping feature
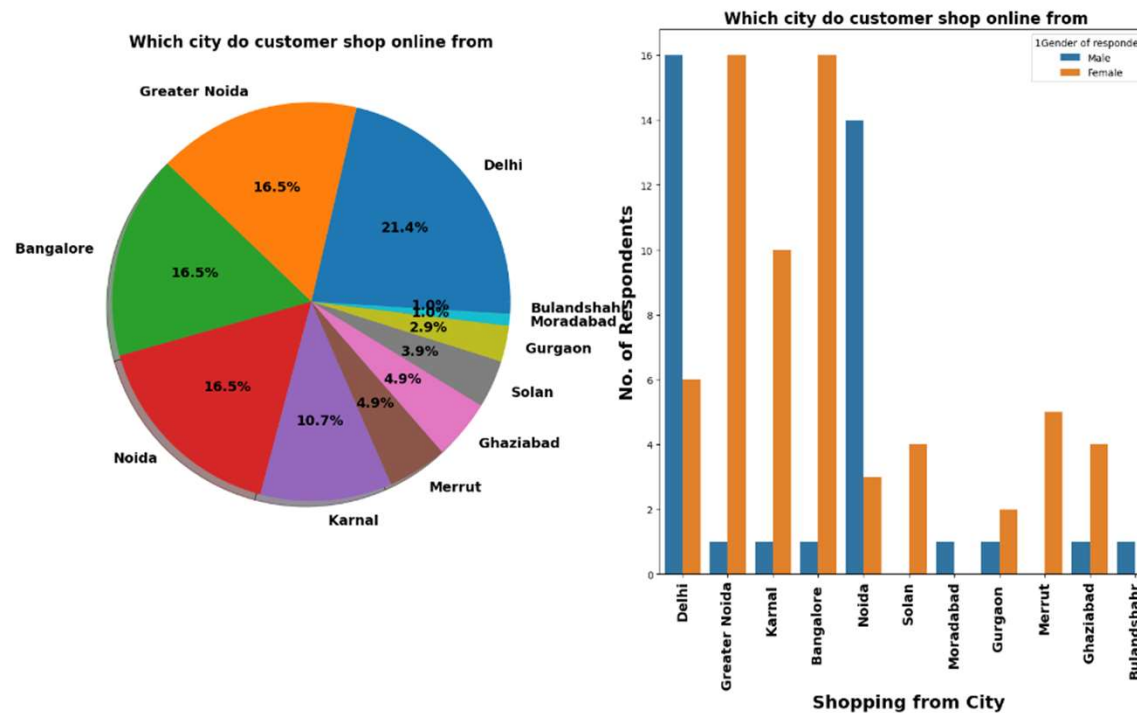
Observations:
- ✓ Most of the customers are shopping from Delhi, Bengaluru, Noida, Greater Noida
- ✓ More male customers are from Delhi, Noida
- ✓ More female customers are from Bangalore and Greater Noida
- ✓ Customers from remaining cities are less. Majority of customers are Females

VISUALIZATIONS

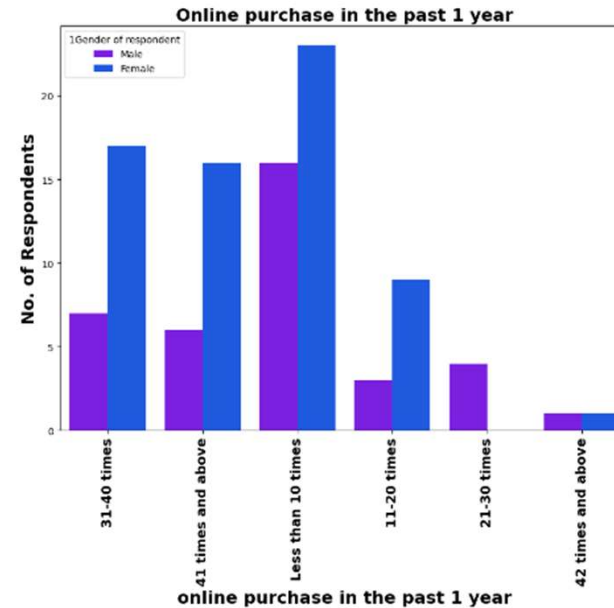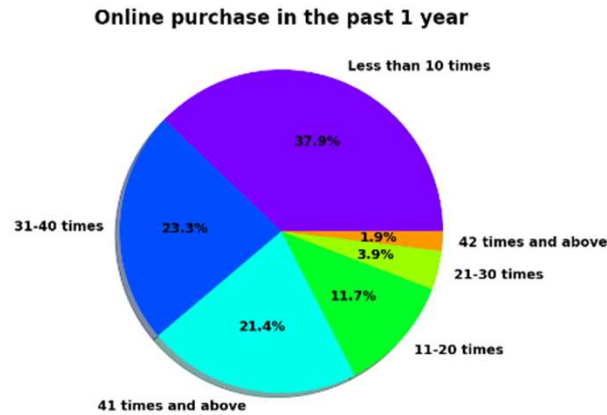1. General feature describing Population and online shopping feature

Observations:
✓ Majority of the customers (37.9%) are shopping online for more than 4 years
✓ Majority of the female and male customers are shopping online for more than 4 years

VISUALIZATIONS

1. General feature describing Population and online shopping feature

Online purchase in the past 1 year

Online purchase in the past 1 year

Observations:

✓ 37.9% customers in last 1 year made online shopping less than 10 times
✓ 21.4% customers in last 1 year made online shopping more than 41 times
✓ Majorly females made the shopping in last 1 year
✓ No female made online shopping in the range of 21-30 times in last 1 year

VISUALIZATIONS

1. General feature describing Population and online shopping feature
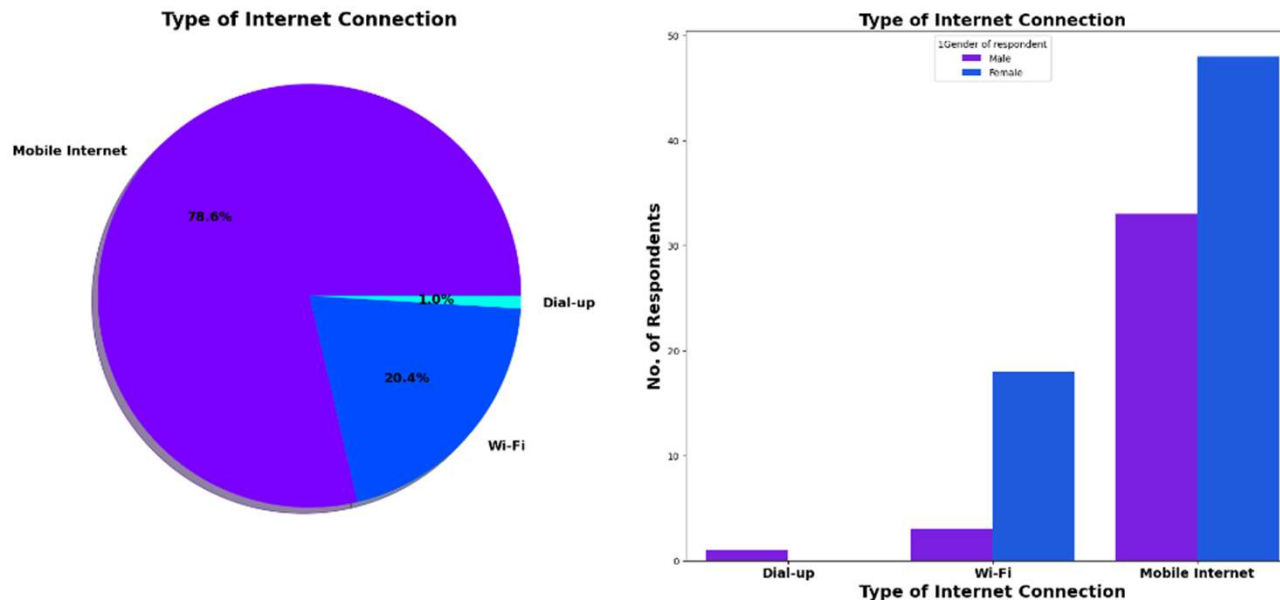
Observations:
- ✓ Majority of the customers are using mobile internet (78.6%) followed by Wi-Fi
- ✓ Only 1.0% of customers are using Dial up Connection
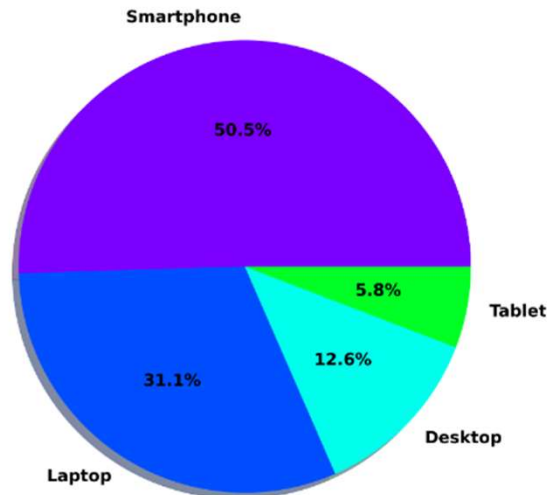- ✓ Most of the Female and Male customers are using Mobile Internet

VISUALIZATIONS

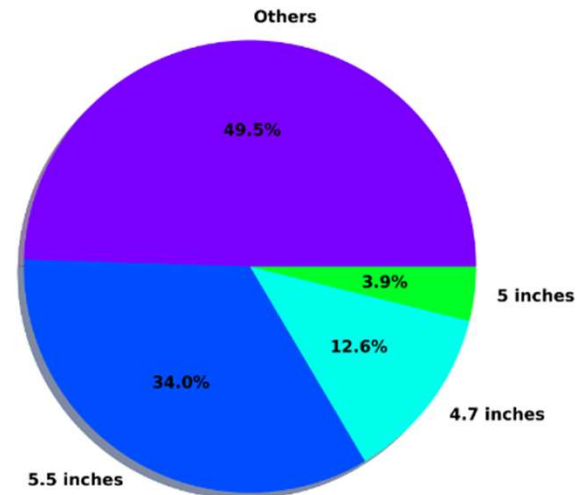2. Exploring features of different aspects of personal choices of device and internet services

```
# Exploring features of different aspects of personal choices of device and internet services
df.columns[7:13]
```

```
Index(['8 Which device do you use to access the online shopping?',
       '9 What is the screen size of your mobile device?                    ',
       '10 What is the operating system (OS) of your device?                 ',
       '11 What browser do you run on your device to access the website?
',
       '12 Which channel did you follow to arrive at your favorite online store for the first time?
',
       '13 After first visit, how do you reach the online retail store?                    '],
      dtype='object')
```

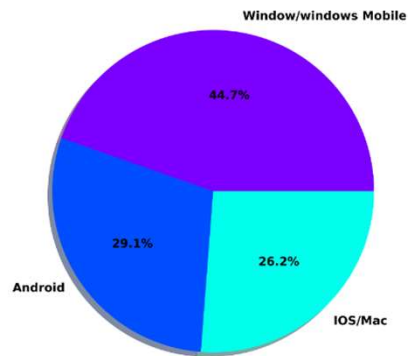**8 Which device do you use to access the online shopping?**

Smartphone 50.5%
Tablet 5.8%
Desktop 12.6%
Laptop 31.1%

9 What is the screen size of your mobile device?

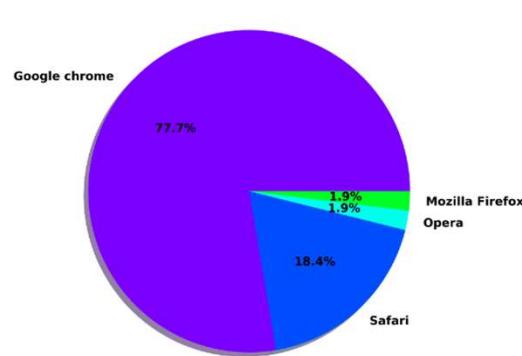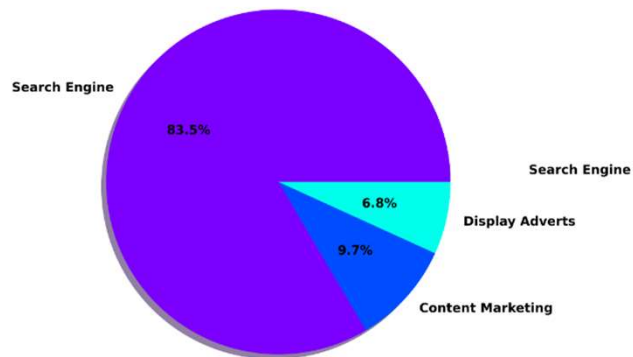Others 49.5%
5 inches 3.9%
4.7 inches 12.6%
5.5 inches 34.0%

VISUALIZATIONS

2. Exploring features of different aspects of personal choices of device and internet services

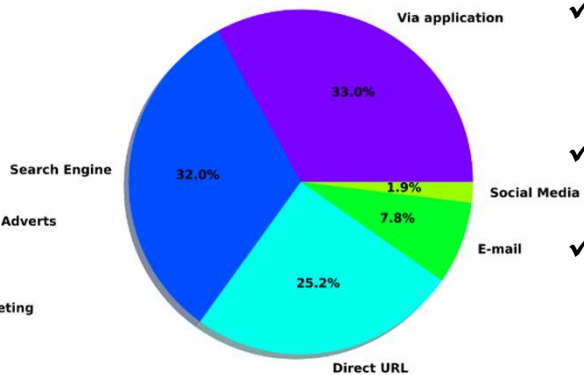**10 What is the operating system (OS) of your device?**
- Window/windows Mobile 44.7%
- Android 29.1%
- IOS/Mac 26.2%

11 What browser do you run on your device to access the website?
- Google chrome 77.7%
- Safari 18.4%
- Mozilla Firefox 1.9%
- Opera 1.9%

12 Which channel did you follow to arrive at your favorite online store for the first time?
- Search Engine 83.5%
- Display Adverts 6.8%
- Content Marketing 9.7%

13 After first visit, how do you reach the online retail store?
- Via application 33.0%
- Search Engine 32.0%
- Direct URL 25.2%
- E-mail 7.8%
- Social Media 1.9%

Observations:
- ✓ Majority of the customers are using smartphone (50.5%) for online shopping followed by Laptop (31.1%)
- ✓ Almost 50% of the customers are not using smartphone hence there are not screen size details available for Others
- ✓ 34.0% of the customers are using 5.5 inches mobile screen size
- ✓ 44.7% of the customers are using Windows operating systems followed by 29.1% customers are using Android and 26.2% customers are using IOS/Mac
- ✓ 77.7% of the customers are using Google Chrome web browser and less % of customers are using other browsers
- ✓ 83.5% of the customers using Search Engine to access online shopping platform
- ✓ After first visit, 33.0% of the customers reaches online retailer store via mobile application followed by search engine (32.0%)
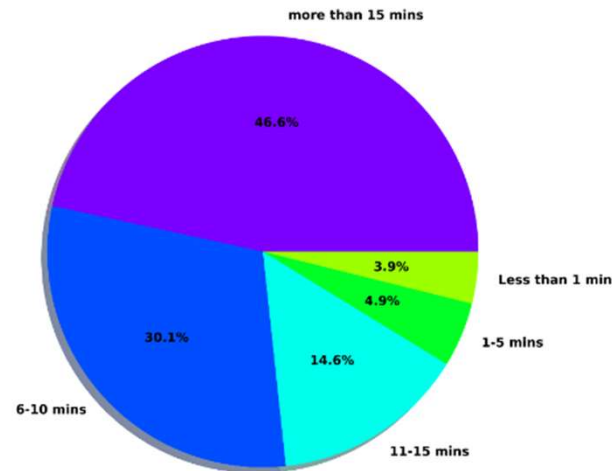
VISUALIZATIONS

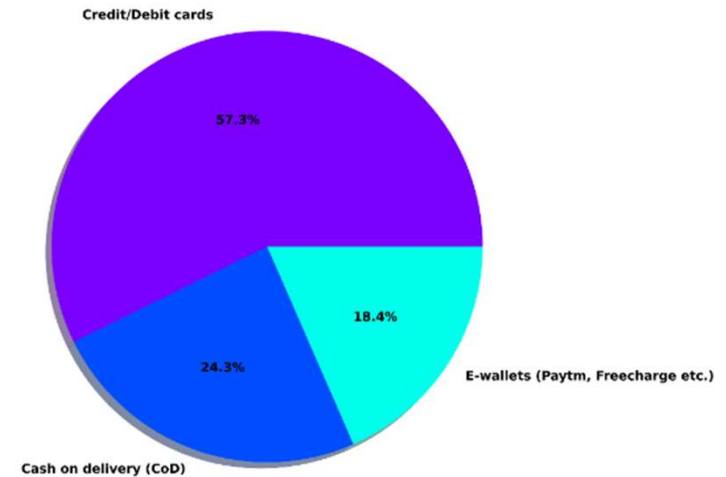3. Exploring features of shopping purchase decision & payment

```
# Exploring features of shopping purchase decision & paymnet
df.columns[13:17]
```

```
Index(['14 How much time do you explore the e- retail store before making a purchase decision?
',
      '15 What is your preferred payment Option?
',
      '16 How frequently do you abandon (selecting an items and leaving without making payment) your shopping cart?
',
      '17 Why did you abandon the "Bag", "Shopping Cart"?
'],
      dtype='object')
```

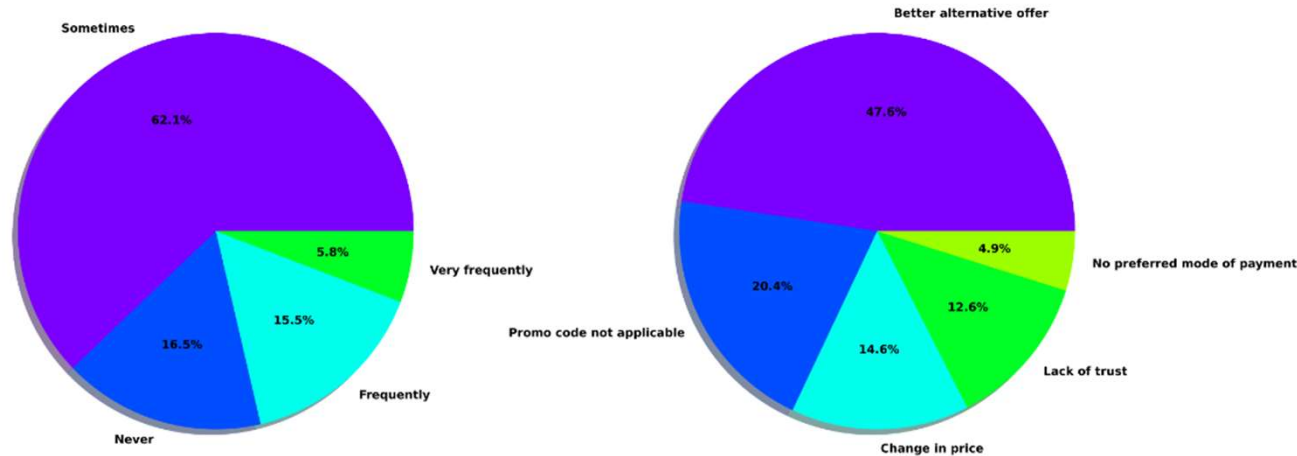**14 How much time do you explore the e- retail store before making a purchase decision?**

15 What is your preferred payment Option?

VISUALIZATIONS

3. Exploring features of shopping purchase decision & payment

16 How frequently do you abandon (selecting an items and leaving without making payment) your shopping cart?   17 Why did you abandon the "Bag", "Shopping Cart"?

Observations:

✔ 46.6% of the customers are spending more than 15 mins before making purchase decision, 30.1% customers spending 6-10 mins before making purchase decision,14.6% of the customers spending 11-15 mins before making purchase decision, 3.9% customers spending less than 1 minute

✔ 57.3% customers are using credit/debit cards, 24.3% customers are using cash on delivery, 18.4% customers are using E-wallets

✔ 62.8% of the customers who abandon the shopping cart without making payment

✔ The reason behind abandon the shopping cart, 47.6% of customers felt that they have best alternative offer, 20.4% of customers promo code not applicable on particular product, followed by next most common reason is change in price.
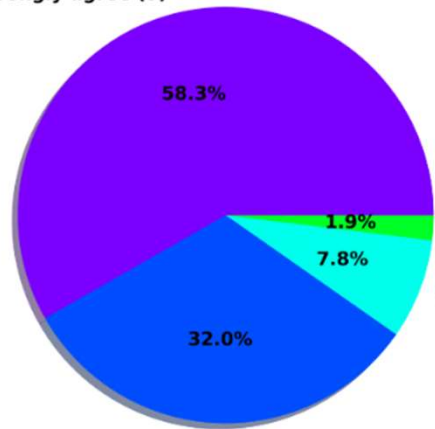
VISUALIZATIONS

4. Exploring features of Website options & performance related

```
# Exploring features of Website options & performance related
df.columns[17:25]
```

```
Index(['18 The content on the website must be easy to read and understand',
       '19 Information on similar product to the one highlighted  is important for product comparison',
       '20 Complete information on listed seller and product being offered is important for purchase decision.',
       '21 All relevant information on listed products must be stated clearly',
       '22 Ease of navigation in website', '23 Loading and processing speed',
       '24 User friendly Interface of the website',
       '25 Convenient Payment methods'],
      dtype='object')
```
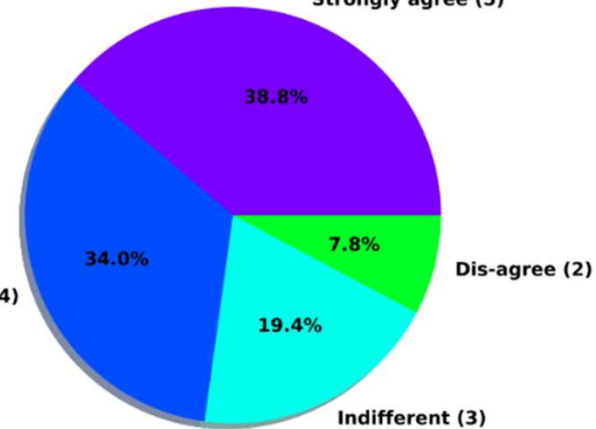

18 The content on the website must be easy to read and understand

19 Information on similar product to the one highlighted is important for product comparison

VISUALIZATIONS
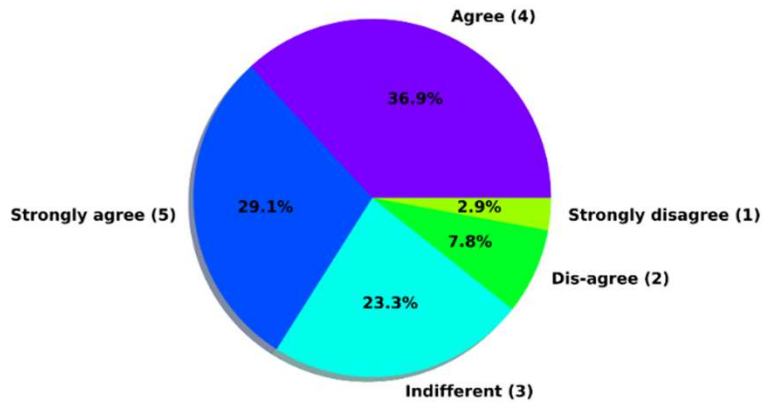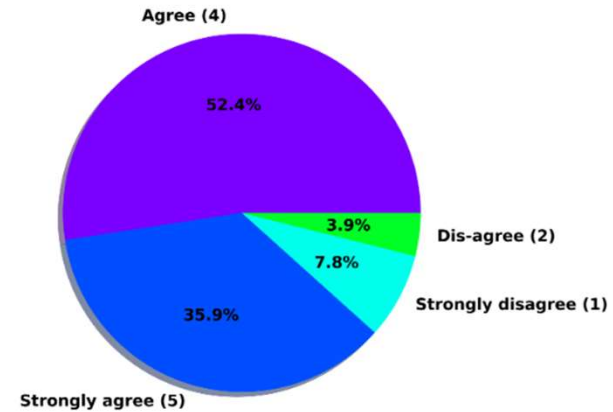
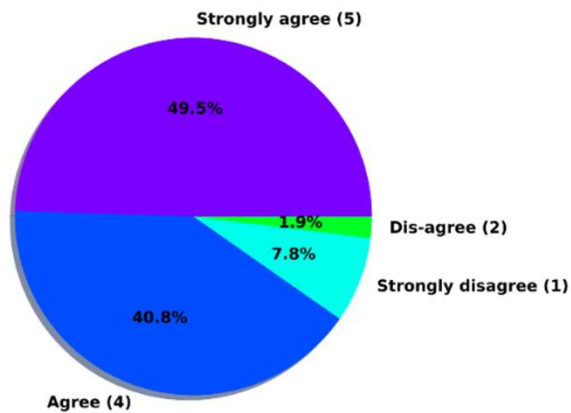4. Exploring features of Website options & performance related

20 Complete information on listed seller and product being offered is important for purchase decision.
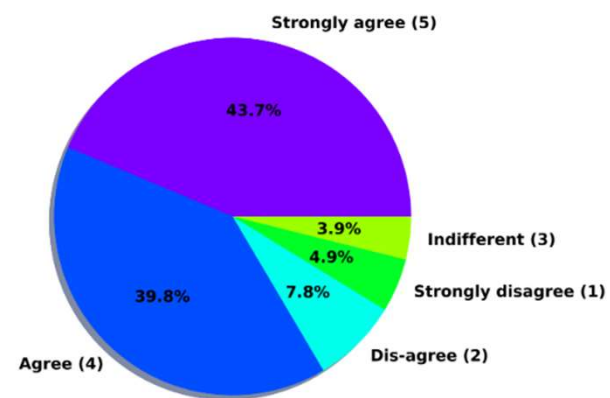

Agree (4) 36.9%
Strongly agree (5) 29.1%
Indifferent (3) 23.3%
Dis-agree (2) 7.8%
Strongly disagree (1) 2.9%

21 All relevant information on listed products must be stated clearly

Agree (4) 52.4%
Strongly agree (5) 35.9%
Strongly disagree (1) 7.8%
Dis-agree (2) 3.9%

22 Ease of navigation in website

Strongly agree (5) 49.5%
Agree (4) 40.8%
Strongly disagree (1) 7.8%
Dis-agree (2) 1.9%

23 Loading and processing speed

Strongly agree (5) 43.7%
Agree (4) 39.8%
Dis-agree (2) 7.8%
Strongly disagree (1) 4.9%
Indifferent (3) 3.9%

VISUALIZATIONS

4. Exploring features of Website options & performance related

24 User friendly Interface of the website

Strongly agree (5) — 69.9%
1.9% Indifferent (3)
4.9% Dis-agree (2)
7.8%
15.5%
Strongly disagree (1)
Agree (4)

25 Convenient Payment methods

Strongly agree (5) — 58.3%
12.6% Dis-agree (2)
29.1%
Agree (4)

Observations :
- ✓ 58.3 % customers strongly agree and 32.0% customers agree that content on website must be easy to read and understand.
- ✓ 38.8% customers strongly agree and 34.0% customers agree that information on similar product to the one highlighted on website for product comparison.
- ✓ More than 60% of customers agree or strongly agree that complete information on listed seller and product being offered is important for purchase decision.
- ✓ More than 90% of customers agree or strongly agree that all relevant information on listed products must be stated clearly.
- ✓ Around 90% of customers agree or strongly agree that website should be easy for navigation.
- ✓ 43.7 % customers strongly agree and 39.8 % customers agree over high loading & processing speed.
- ✓ 69.9 % customers strongly agree and 15.5 % customers agree that website should be user friendly.
- ✓ 58.3% customers strongly agree and 29.1% customers agree that the convenient payment methods are available
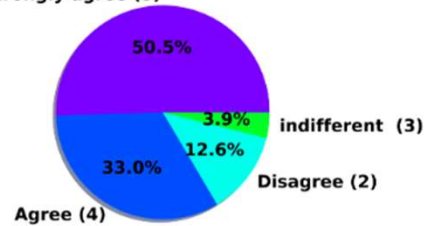
VISUALIZATIONS

5. Explorating features of Online shopping customer service requirement

```
# Explorating features of Online shopping customer service requirement
df.columns[25:38]
```
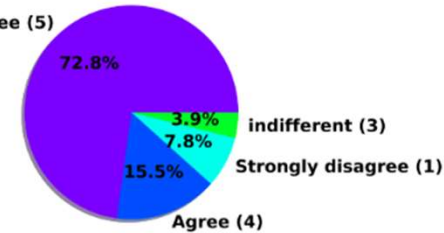
26 Trust that the online retail store will fulfill its part of the transaction at the stipulated time
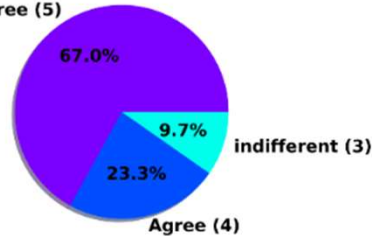

Strongly agree (5): 50.5%
indifferent (3): 3.9%
Disagree (2): 12.6%
Agree (4): 33.0%

27 Empathy (readiness to assist with queries) towards the customers

Strongly agree (5): 72.8%
indifferent (3): 3.9%
Strongly disagree (1): 7.8%
Agree (4): 15.5%

28 Being able to guarantee the privacy of the customer

Strongly agree (5): 67.0%
indifferent (3): 9.7%
Agree (4): 23.3%

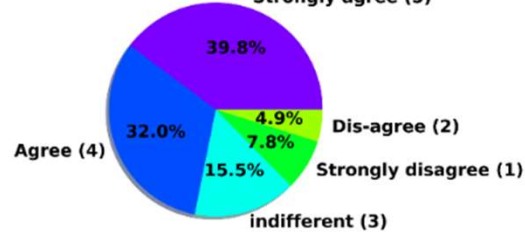**29 Responsiveness, availability of several communication channels (email, online rep, twitter, phone etc.)**
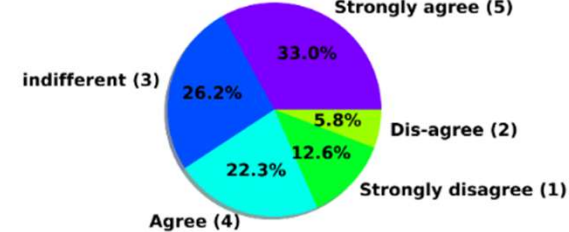

Strongly agree (5): 57.3%
Strongly disagree (1): 2.9%
indifferent (3): 4.9%
Agree (4): 35.0%
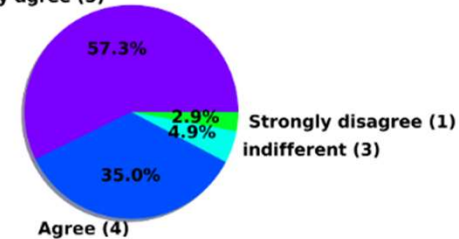
30 Online shopping gives monetary benefit and discounts

Strongly agree (5): 39.8%
Dis-agree (2): 4.9%
Strongly disagree (1): 7.8%
Agree (4): 32.0%
indifferent (3): 15.5%

31 Enjoyment is derived from shopping online

Strongly agree (5): 33.0%
indifferent (3): 26.2%
Dis-agree (2): 5.8%
Strongly disagree (1): 12.6%
Agree (4): 22.3%

VISUALIZATIONS

5. Exploring features of Online shopping customer service requirement

32 Shopping online is convenient and flexible

Strongly agree (5)
54.4%
4.9% Dis-agree (2)
12.6%
indifferent (3)
28.2%
Agree (4)

33 Return and replacement policy of the e-tailer is important for purchase decision

Strongly agree (5)
73.8%
6.8% Dis-agree (2)
19.4%
Agree (4)

34 Gaining access to loyalty programs is a benefit of shopping online

Strongly agree (5)
42.7%
4.9% Strongly disagree (1)
23.3%
Agree (4)
7.8%
Dis-agree (2)
21.4%
indifferent (3)

35 Displaying quality Information on the website improves satisfaction of customers

Strongly agree (5)
47.6%
30.1%
22.3%
Agree (4)
indifferent (3)

36 User derive satisfaction while shopping on a good quality website or application

Strongly agree (5)
64.1%
1.9% Dis-agree (2)
34.0%
Agree (4)

37 Net Benefit derived from shopping online can lead to users satisfaction

Strongly agree (5)
59.2%
4.9% Dis-agree (2)
14.6%
21.4%
indifferent (3)
Agree (4)

VISUALIZATIONS

5. Exploring features of Online shopping customer service requirement

38 User satisfaction cannot exist without trust

Observations :

✓ Around more than 80% customers strongly agree or agree that Trust that the online retail store will fulfill its part of the transaction at the stipulated time
✓ 72.8% of the customers strongly agree that companies readiness to assist customer queries related to product is important factor in purchase decision.
✓ Around more than 90% customers strongly agree or agree that being able to guarantee the privacy of the customer is important
✓ More than 90% customers strongly agree or agree that they like product companies is availability of communication channels.
✓ More than 70% customers strongly agree or agree that online shopping gives monetary benefit and discounts.
✓ More than 50% customers enjoyment is derived from online shopping.
✓ More than 80% customers strongly agree or agree that shopping online is convenient and flexible
✓ More than 90% customers strongly agree or agree that the return and replacement policy of the e-tailer is import factor for purchase decision
✓ Around 70% of customers strongly agree or agree that gaining access to loyalty program is a benefit of shopping online
✓ 47.6% customers strongly agree and 30.1% customers agree that displaying quality information on website helps in decision making in turn improves customer satisfaction.
✓ More than 95% of customers strongly agree or agree that user derive satisfaction while shopping on a good quality website or application
✓ More than 80% of customers strongly agree or agree that net benefit derived from shopping online can lead to their satisfaction
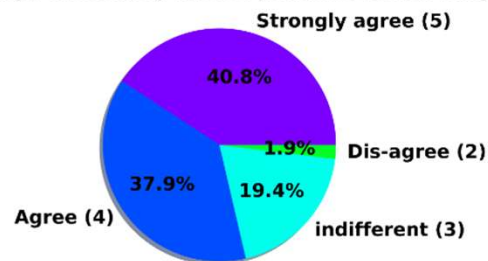✓ More than 85% of customers strongly agree or agree over fact that user satisfaction cannot exist without trust.
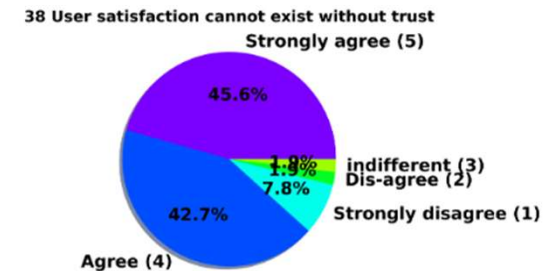
VISUALIZATIONS

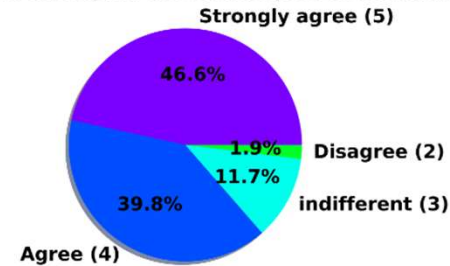6. Exploring features related to Customer online shopping experiences

```python
# Explorating features related to Customer online shopping experiences
df.columns[38:47]
```
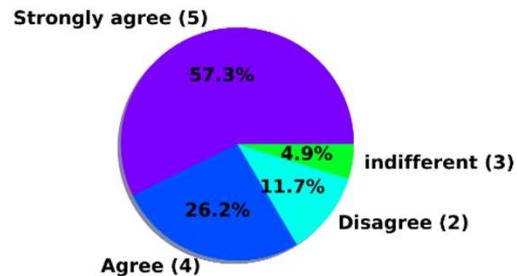
```
Index(['39 Offering a wide variety of listed product in several category',
       '40 Provision of complete and relevant product information',
       '41 Monetary savings',
       '42 The Convenience of patronizing the online retailer',
       '43 Shopping on the website gives you the sense of adventure',
       '44 Shopping on your preferred e-tailer enhances your social status',
       '45 You feel gratification shopping on your favorite e-tailer',
       '46 Shopping on the website helps you fulfill certain roles',
       '47 Getting value for money spent'],
      dtype='object')
```
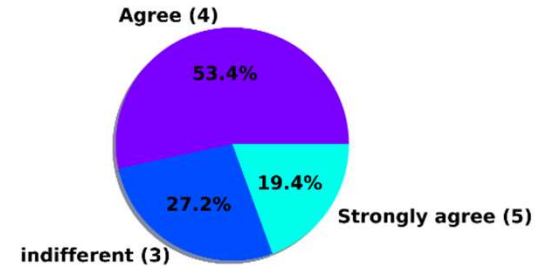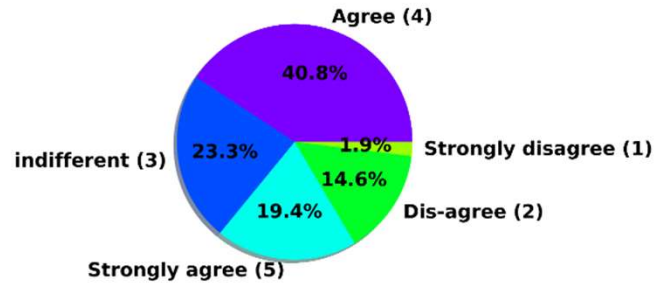
39 Offering a wide variety of listed product in several category

- Strongly agree (5): 40.8%
- Dis-agree (2): 1.9%
- indifferent (3): 19.4%
- Agree (4): 37.9%

40 Provision of complete and relevant product information

- Strongly agree (5): 46.6%
- Disagree (2): 1.9%
- indifferent (3): 11.7%
- Agree (4): 39.8%

41 Monetary savings

- Strongly agree (5): 57.3%
- indifferent (3): 4.9%
- Disagree (2): 11.7%
- Agree (4): 26.2%

42 The Convenience of patronizing the online retailer

- Agree (4): 53.4%
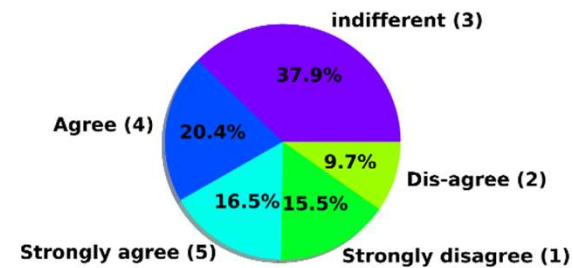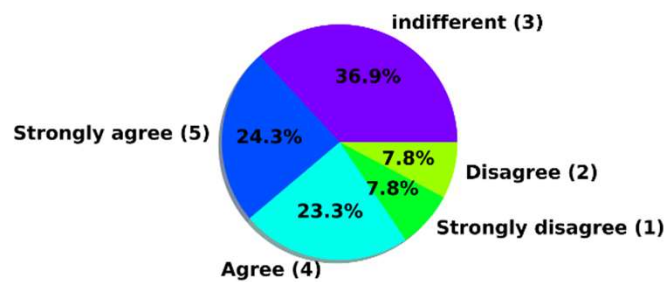- Strongly agree (5): 19.4%
- indifferent (3): 27.2%

VISUALIZATIONS

6. Exploring features related to Customer online shopping experiences

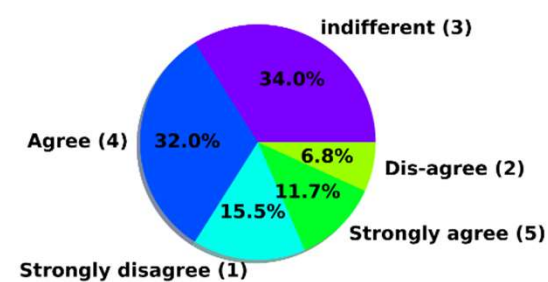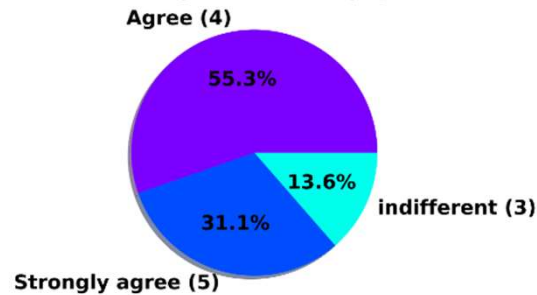**43 Shopping on the website gives you the sense of adventure**
- Agree (4): 40.8%
- Strongly disagree (1): 1.9%
- Dis-agree (2): 14.6%
- Strongly agree (5): 19.4%
- indifferent (3): 23.3%

44 Shopping on your preferred e-tailer enhances your social status
- indifferent (3): 37.9%
- Dis-agree (2): 9.7%
- Strongly disagree (1): 15.5%
- Strongly agree (5): 16.5%
- Agree (4): 20.4%

45 You feel gratification shopping on your favorite e-tailer
- indifferent (3): 36.9%
- Disagree (2): 7.8%
- Strongly disagree (1): 7.8%
- Agree (4): 23.3%
- Strongly agree (5): 24.3%

46 Shopping on the website helps you fulfill certain roles
- indifferent (3): 34.0%
- Dis-agree (2): 6.8%
- Strongly agree (5): 11.7%
- Strongly disagree (1): 15.5%
- Agree (4): 32.0%

47 Getting value for money spent
- Agree (4): 55.3%
- indifferent (3): 13.6%
- Strongly agree (5): 31.1%

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VISUALIZATIONS

6. Exploring features related to Customer online shopping experiences

Observations :

✓ 46.6% customers strongly agree & 39.8% customer agree that for online shopping, there is a provision of complete and relevant product information.

✓ Around 83% customer strong agree or agree that they pursue online shopping for Monetary Savings.

✓ For 40.8 % customers Online shopping on website strongly gives the sense of adventure.

✓ We can see different peoples have different opinions about connection between e-tailer & social status. Same with gratification on favorite e-tailer.

✓ More than 85% customers strongly agree or agree that they prefer online shopping because they get value of money spent

VISUALIZATIONS

7. Exploring features of Opinion on Online Shopping Platform Websites by Customers

```
# Exploring features of Opinion on Online Shopping Platform Websites by Customers
df.columns[47:57]

Index(['From the following, tick any (or all) of the online retailers you have shopped from;
',
       'Easy to use website or application',
       'Visual appealing web-page layout', 'Wild variety of product on offer',
       'Complete, relevant description information of products',
       'Fast loading website speed of website and application',
       'Reliability of the website or application',
       'Quickness to complete purchase',
       'Availability of several payment options', 'Speedy order delivery '],
      dtype='object')
```
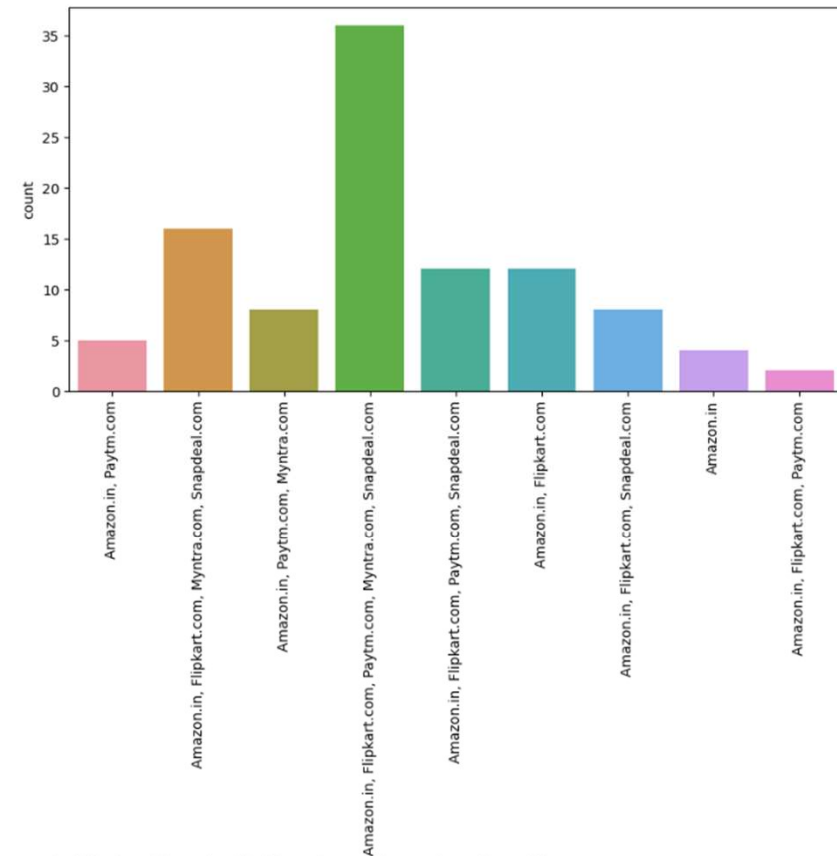

From the following, tick any (or all) of the online retailers you have shopped from;

VISUALIZATIONS

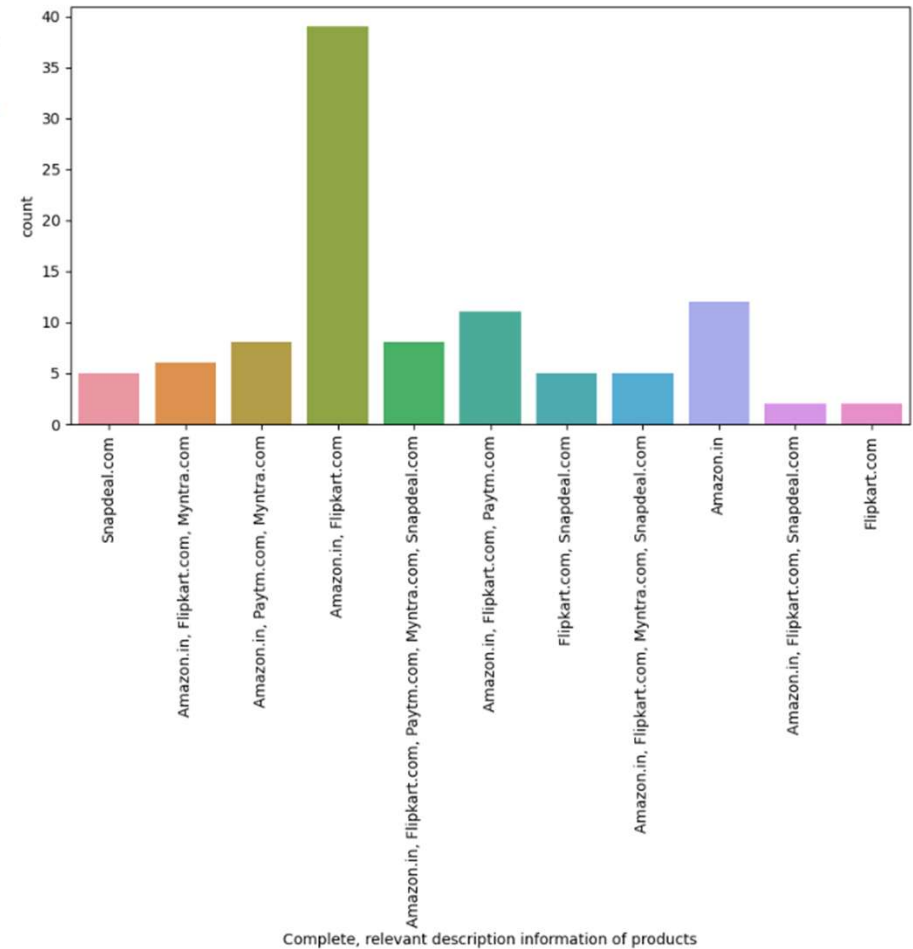7. Exploring features of Opinion on Online Shopping Platform Websites by Customers
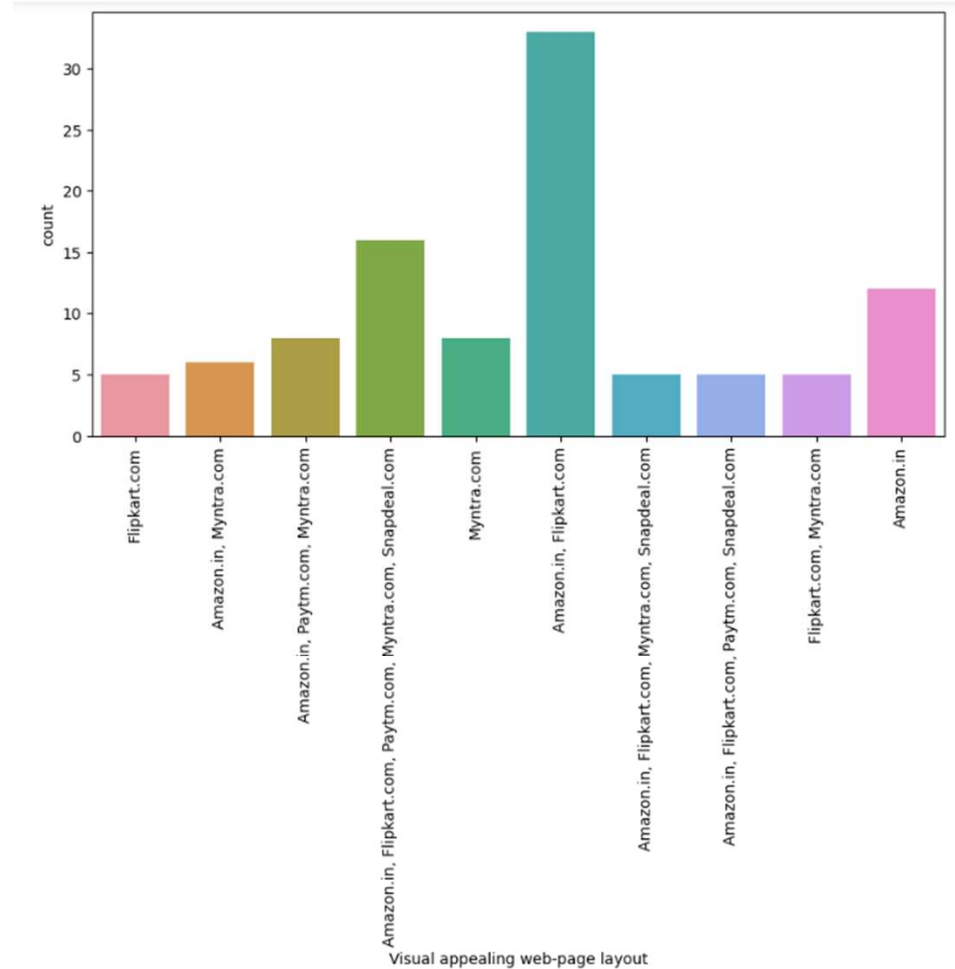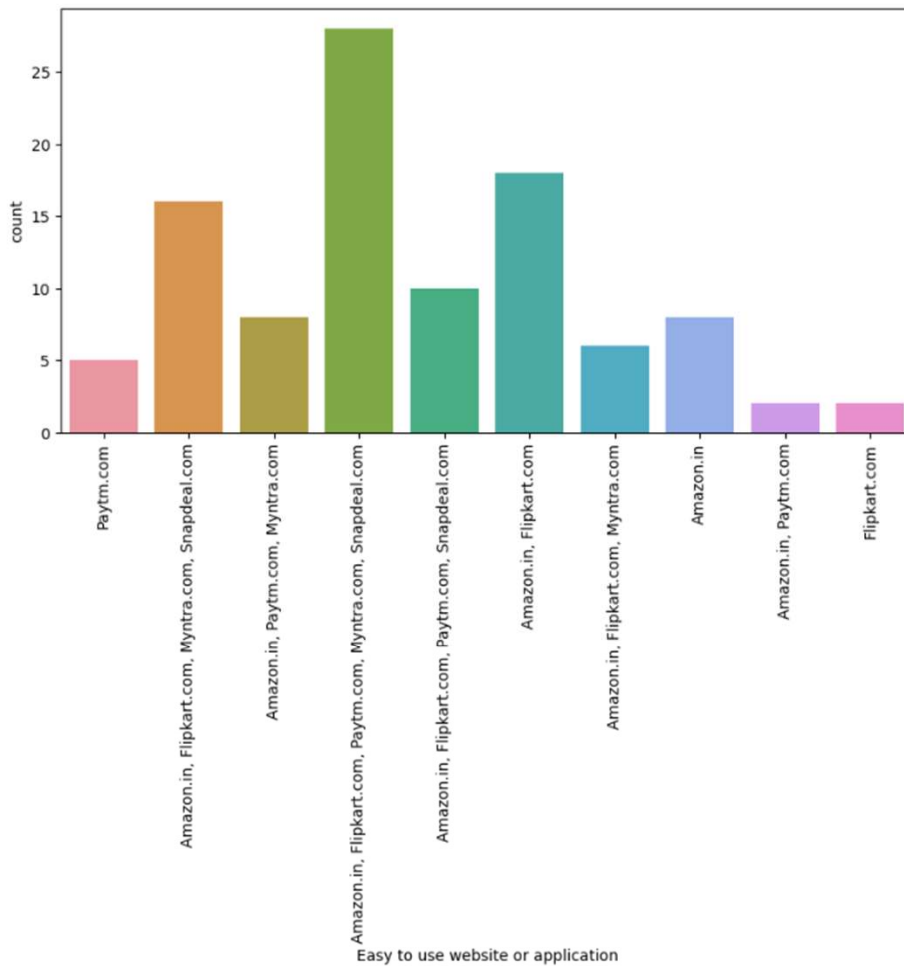
VISUALIZATIONS

7. Exploring features of Opinion on Online Shopping Platform Websites by Customers
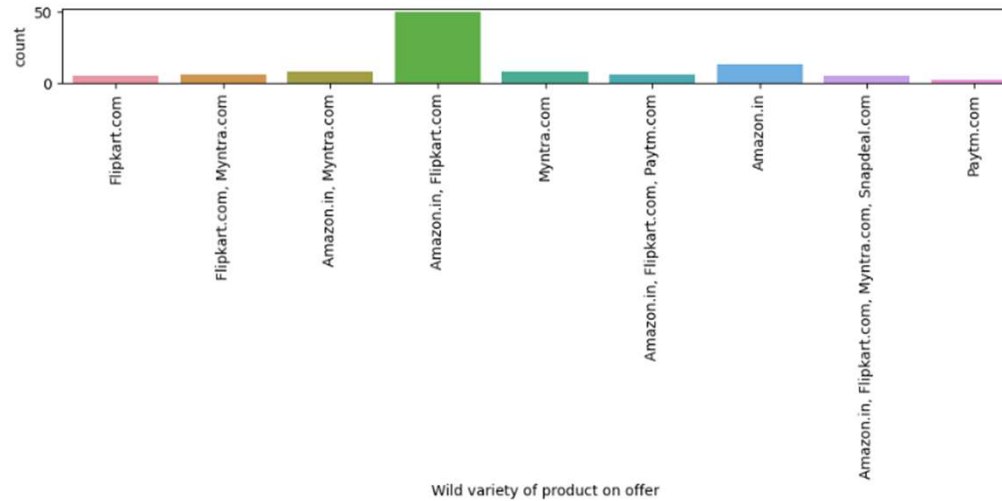

Wild variety of product on offer

Complete, relevant description information of products

VISUALIZATIONS

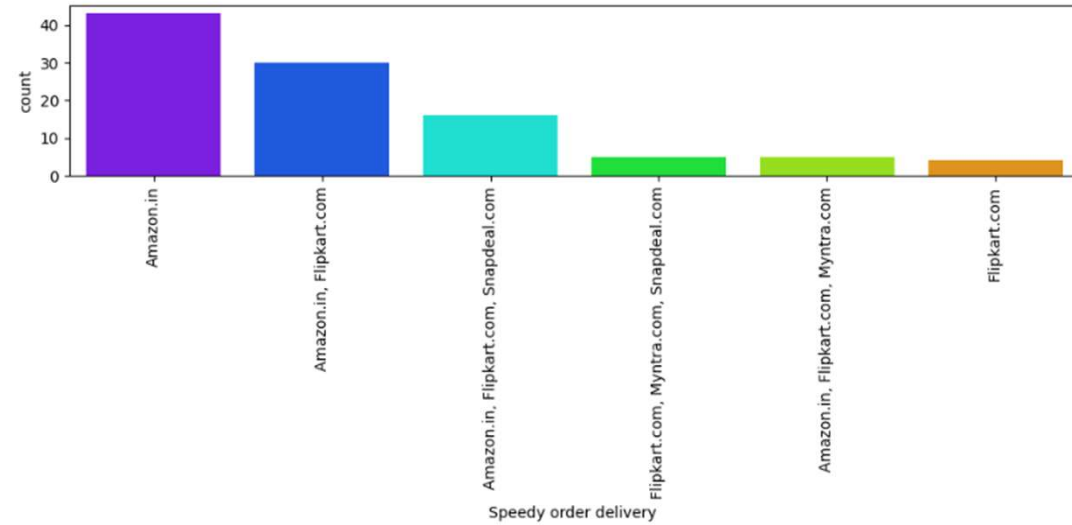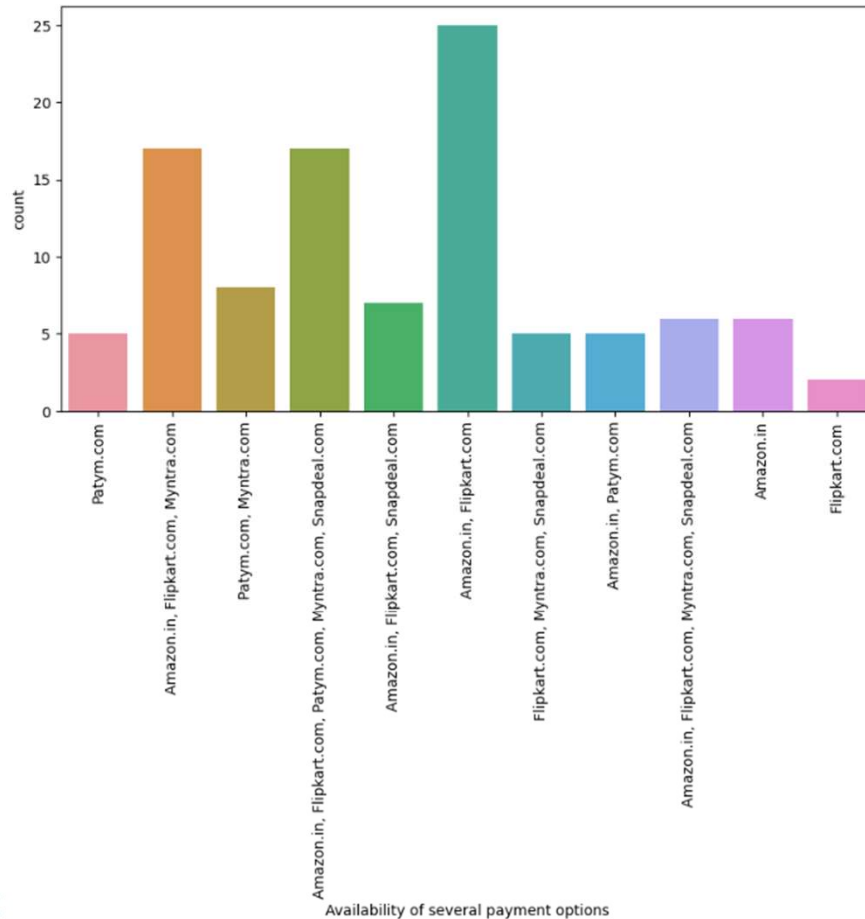7. Exploring features of Opinion on Online Shopping Platform Websites by Customers

Fast loading website speed of website and application

Reliability of the website or application

VISUALIZATIONS

7. Exploring features of Opinion on Online Shopping Platform Websites by Customers

Availability of several payment options

Speedy order delivery
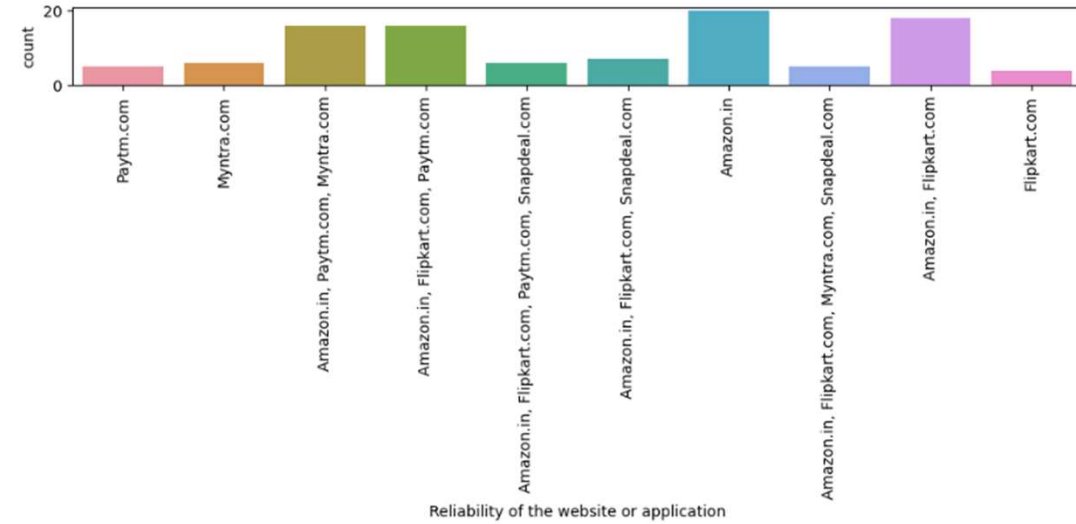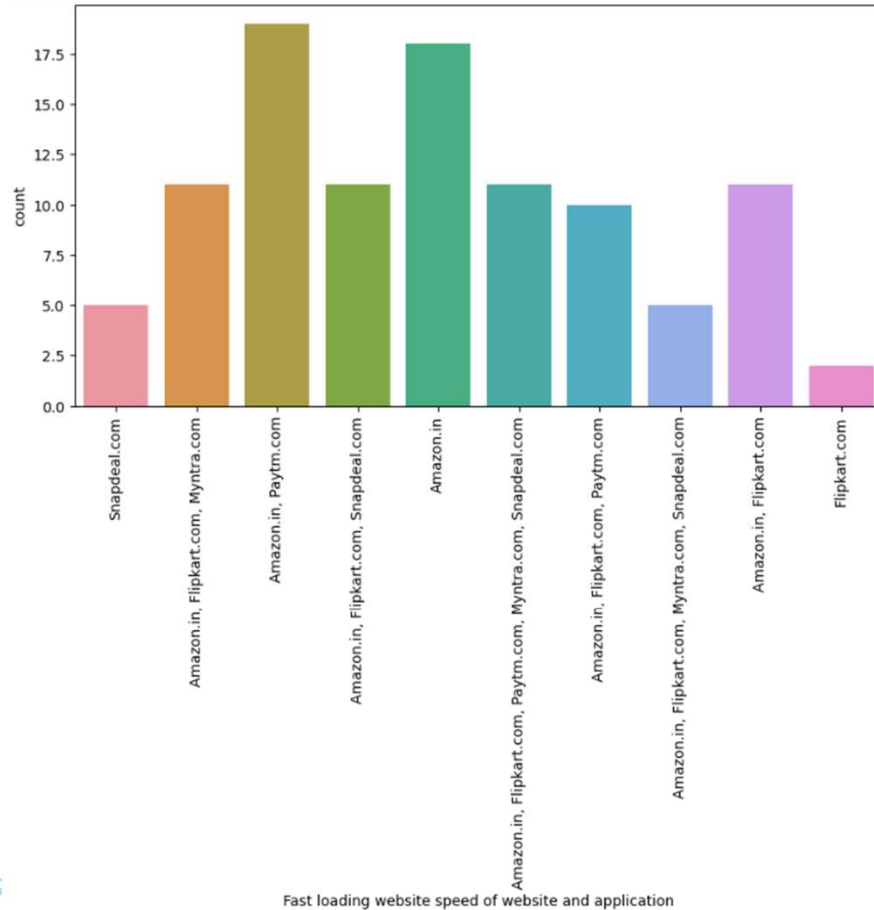
VISUALIZATIONS

7. Exploring features of Opinion on Online Shopping Platform Websites by Customers

Observations :
- ✓ Majority, 28 customers agree that Amazon.in, Flipkart.com, Paytm.com, Myntra.com, Snapdeal.com are Easy to use website or application. But Overall, Amazon.in got individually 1st Rank in easy to use application & website
- ✓ 33 customers agree that Amazon.in, Flipkart.com have Visual appealing web-page layout than most of other market players.
- ✓ 50 customers agree that Amazon.in, Flipkart.com provides wide variety of offer on product.
- ✓ 39 customers agree that Amazon.in, Flipkart.com provides complete information compare to others.
- ✓ Majority of customers think that loading speed of Amazon.in is fastest while Flipkart.com slowest website to load
- ✓ In terms of Reliability of website or application again Amazon top list.
- ✓ Majority of people also think that Amazon.in tops the chart in terms of quickness purchase process compare to others.
- ✓ Majority of customers think that Amazon.in, Flipkart.com provides several payment options compare to others
- ✓ In terms of speed of delivery Amazon.in is much better than other online shopping platforms and Flipkart.com worst among all in terms of speed delivery of product.

VISUALIZATIONS

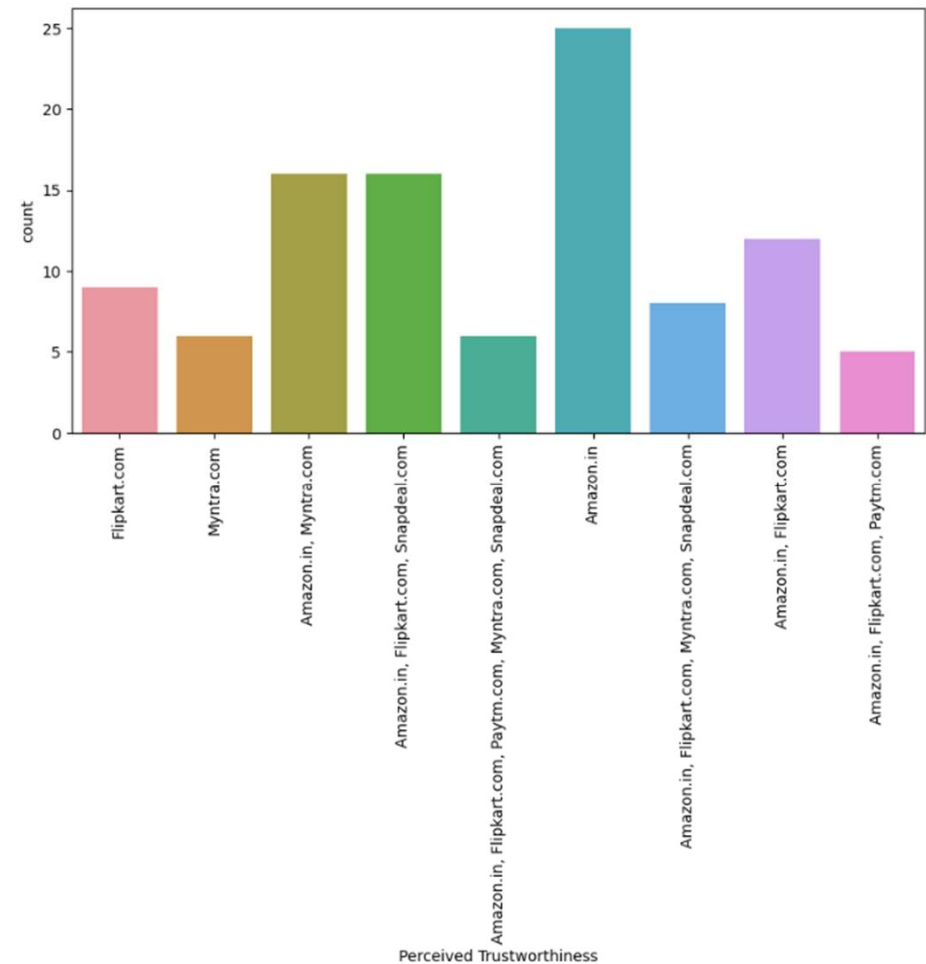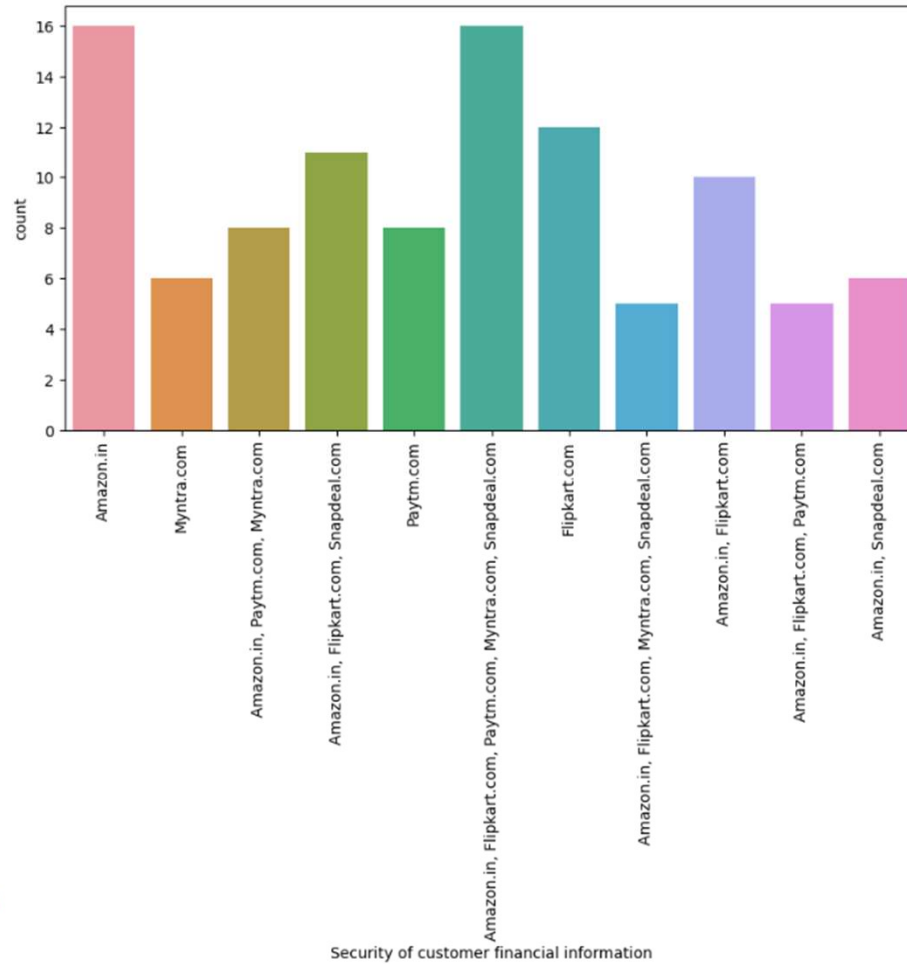7. Exploring features of Opinion on Online Shopping Platform Websites by Customers

```
# Exploring features of Opinion on Online Shopping Platform Websites by Customers
df.columns[57:71]
```

```
Index(['Privacy of customers' information',
       'Security of customer financial information',
       'Perceived Trustworthiness',
       'Presence of online assistance through multi-channel',
       'Longer time to get logged in (promotion, sales period)',
       'Longer time in displaying graphics and photos (promotion, sales period)',
       'Late declaration of price (promotion, sales period)',
       'Longer page loading time (promotion, sales period)',
       'Limited mode of payment on most products (promotion, sales period)',
       'Longer delivery period', 'Change in website/Application design',
       'Frequent disruption when moving from one page to another',
       'Website is as efficient as before',
       'Which of the Indian online retailer would you recommend to a friend?'],
      dtype='object')
```
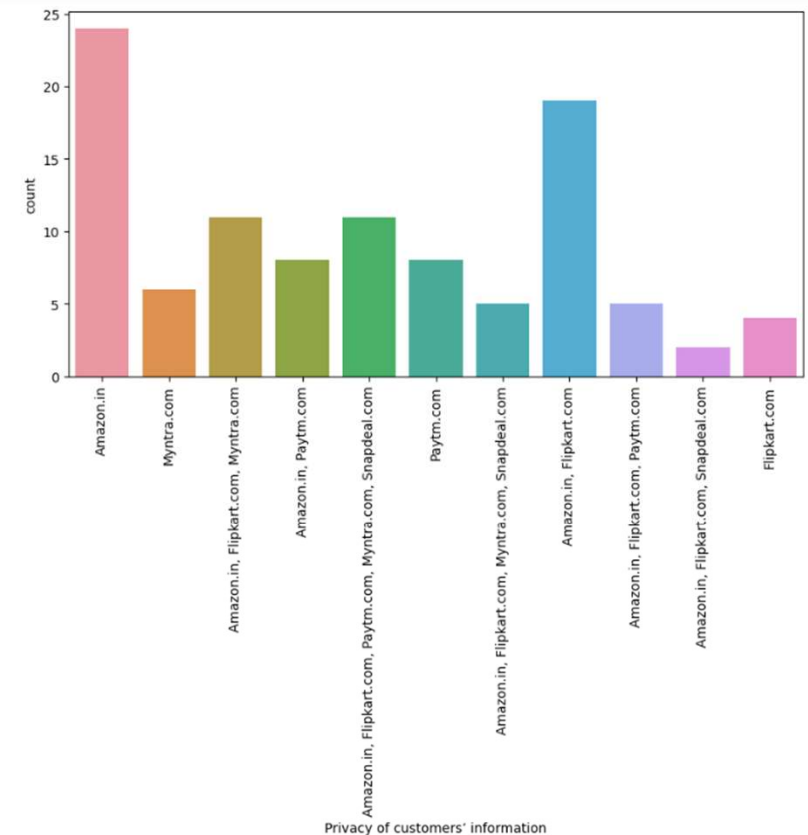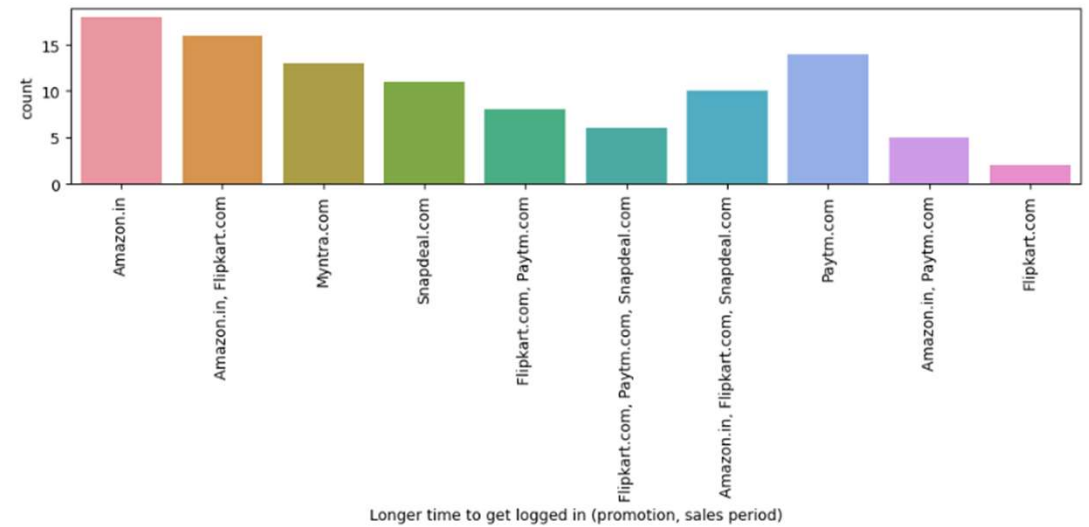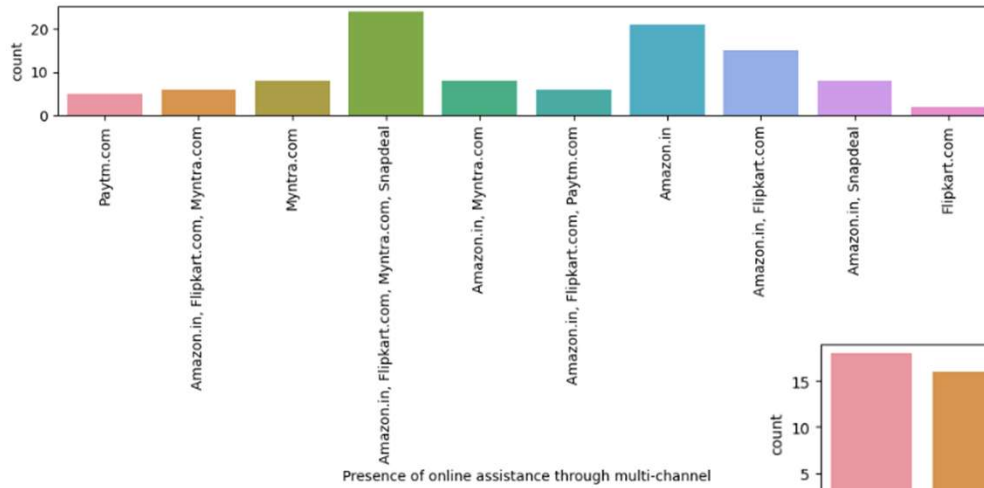
42

VISUALIZATIONS

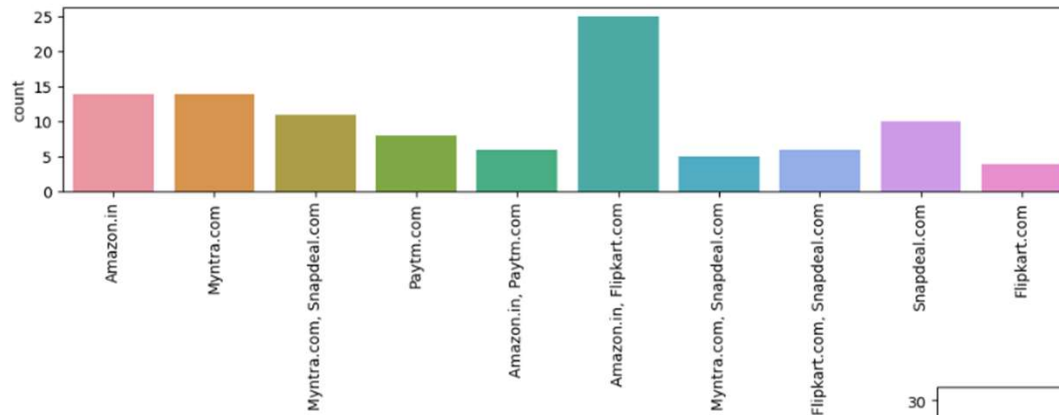7. Exploring features of Opinion on Online Shopping Platform Websites by Customers

CUSTOMER RETENTION

VISUALIZATIONS

7. Exploring features of Opinion on Online Shopping Platform Websites by Customers

Presence of online assistance through multi-channel
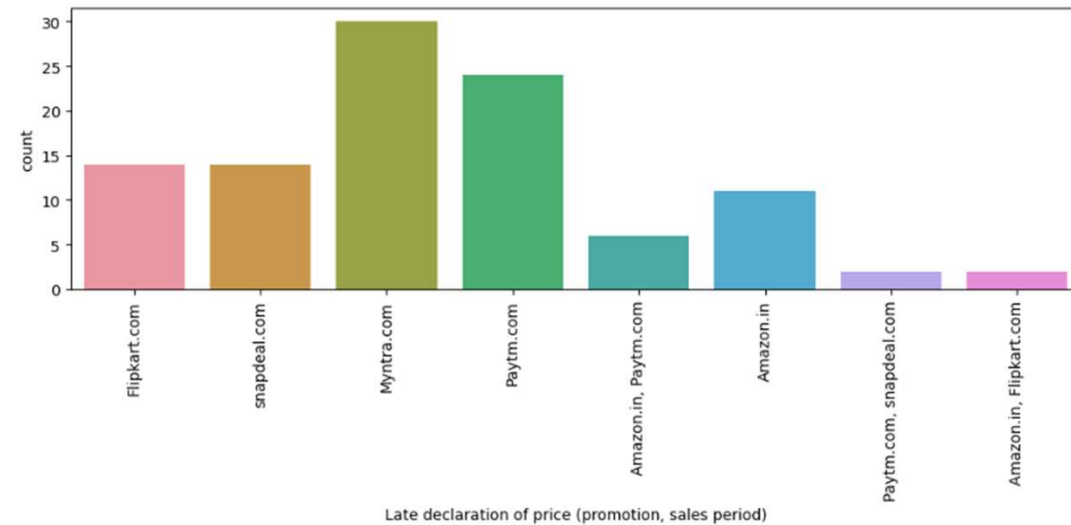

Longer time to get logged in (promotion, sales period)

VISUALIZATIONS

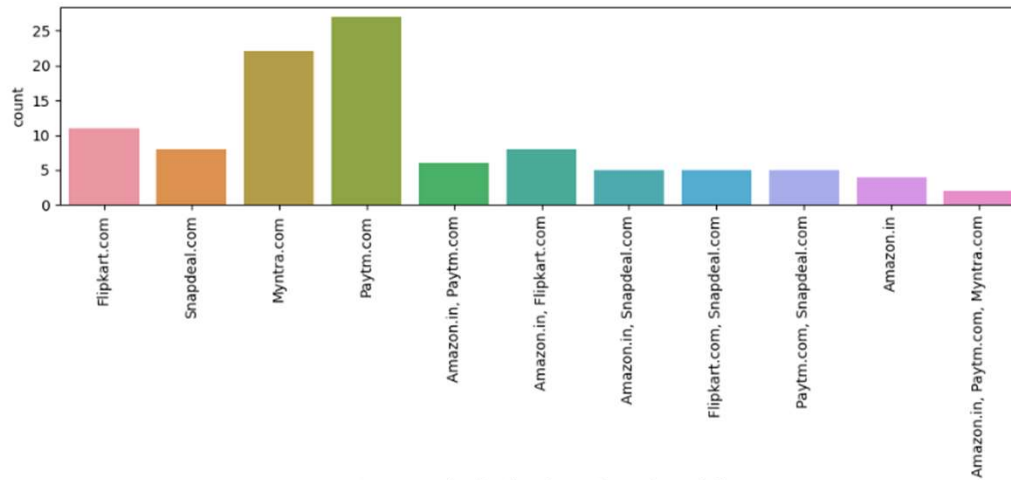7. Exploring features of Opinion on Online Shopping Platform Websites by Customers

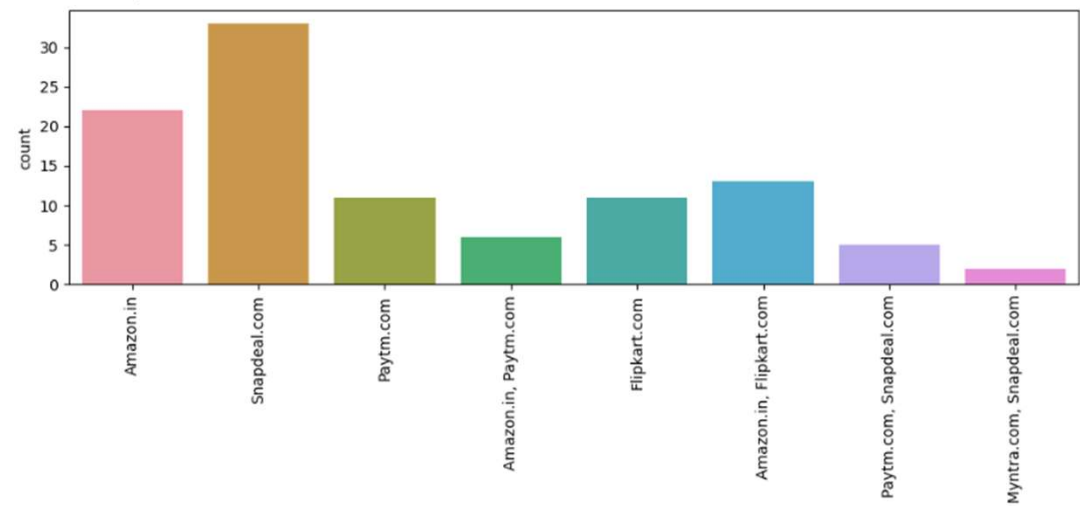Longer time in displaying graphics and photos (promotion, sales period)

Late declaration of price (promotion, sales period)

VISUALIZATIONS

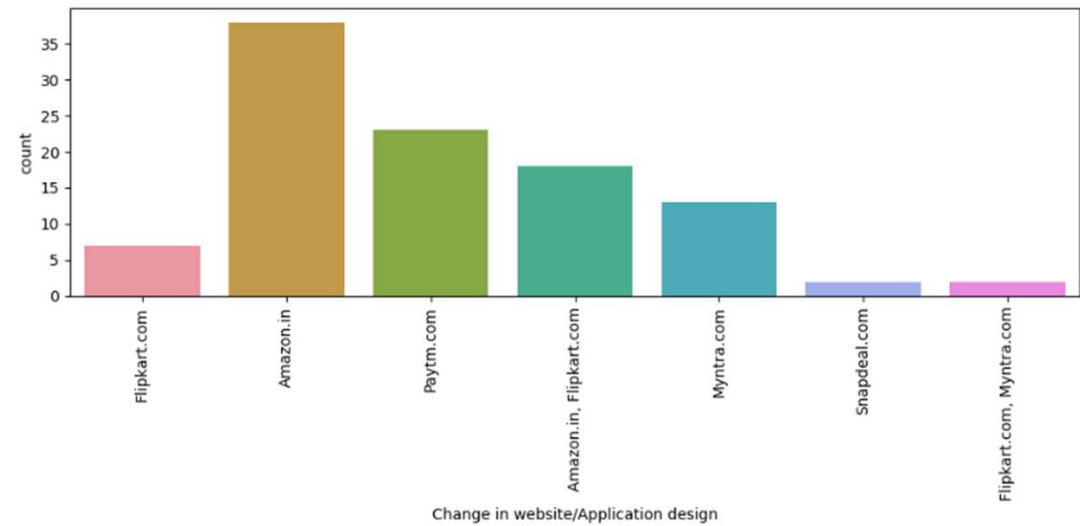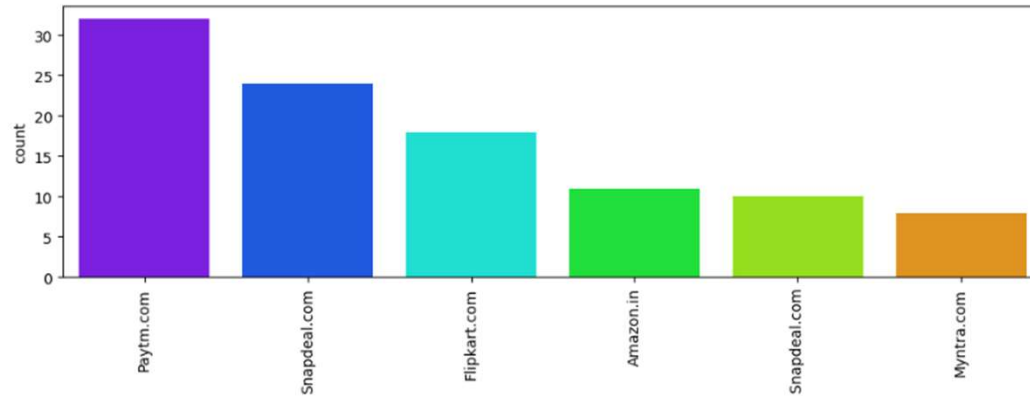7. Exploring features of Opinion on Online Shopping Platform Websites by Customers

Longer page loading time (promotion, sales period)

Limited mode of payment on most products (promotion, sales period)

46

VISUALIZATIONS

7. Exploring features of Opinion on Online Shopping Platform Websites by Customers

Longer delivery period

Change in website/Application design

VISUALIZATIONS

7. Exploring features of Opinion on Online Shopping Platform Websites by Customers

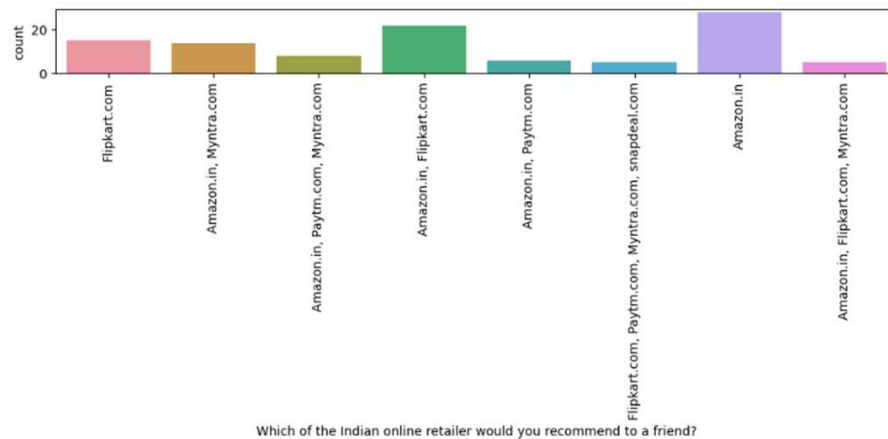Frequent disruption when moving from one page to another

Website is as efficient as before

VISUALIZATIONS

7. Exploring features of Opinion on Online Shopping Platform Websites by Customers

Which of the Indian online retailer would you recommend to a friend?
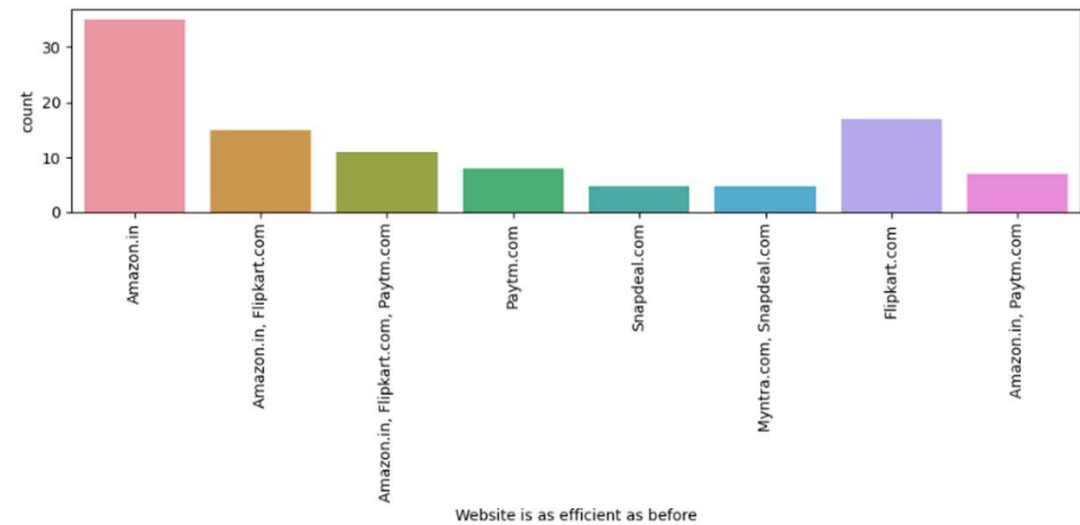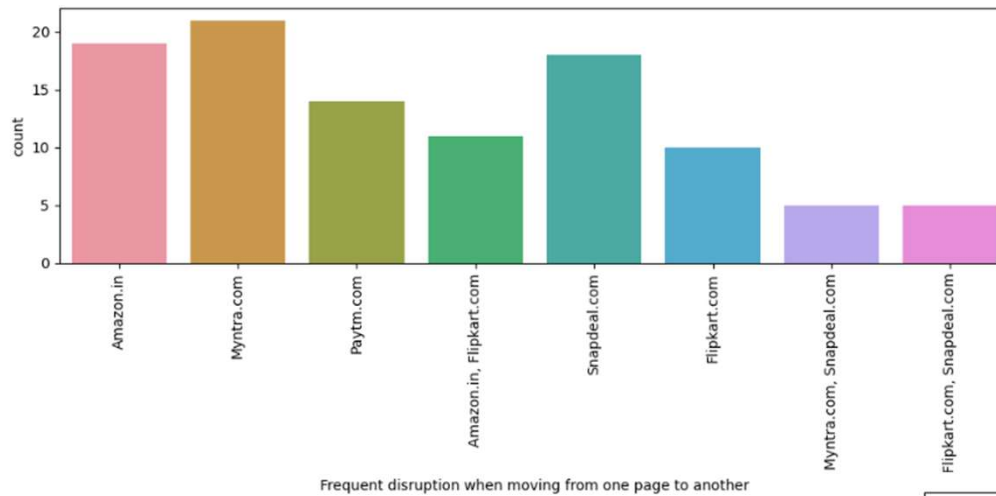
Observations :

✓ Majority of customers trust Amazon.in compared to other online platforms for Privacy of customers' information
✓ Majority of customers trust Amazon.in followed by Flipkart.com over Security of their financial information. Only few customers trust paytm.
✓ Amazon.in, Flipkart.com, Myntra.com, Snapdeal.com provide assistance through different multi channel.
✓ Amazon.in take longer time to logged in while Flipkart.com take least time among all
✓ Majority of people agree that Amazon.in, Flipkart.com takes longer time in displaying graphics and photos.
✓ Paytm.com followed by Myntra.com take longer page loading time.
✓ Majority customers agree that Myntra.com takes longer time for delivery* compared to others.
✓ Majority of customers agree that Amazon.in website is as efficient as before
✓ Majority customers recommended Amazon.in to their friends followed by Flipkart.com

ENCODING OF CATEGORICAL DATA

```python
from sklearn.preprocessing import OrdinalEncoder
enc=OrdinalEncoder()   # creating instance for OrdinalEncoder
```

```python
df_encode=df.copy()
for i in df_encode.columns:
    df_encode[i]=enc.fit_transform(df_encode[i].values.reshape(-1,1))   # Transforming the data using OrdingalEncoder
df_encode.head(10)
```

There are 71 columns including target variable. Out of which, 70 columns have object data type and 1 column has int data type. In this case, column of Pincode with integers is considered as object datatype as it is a number which will be given to particular location and it will be unique. Pincode column also considered in encoding.
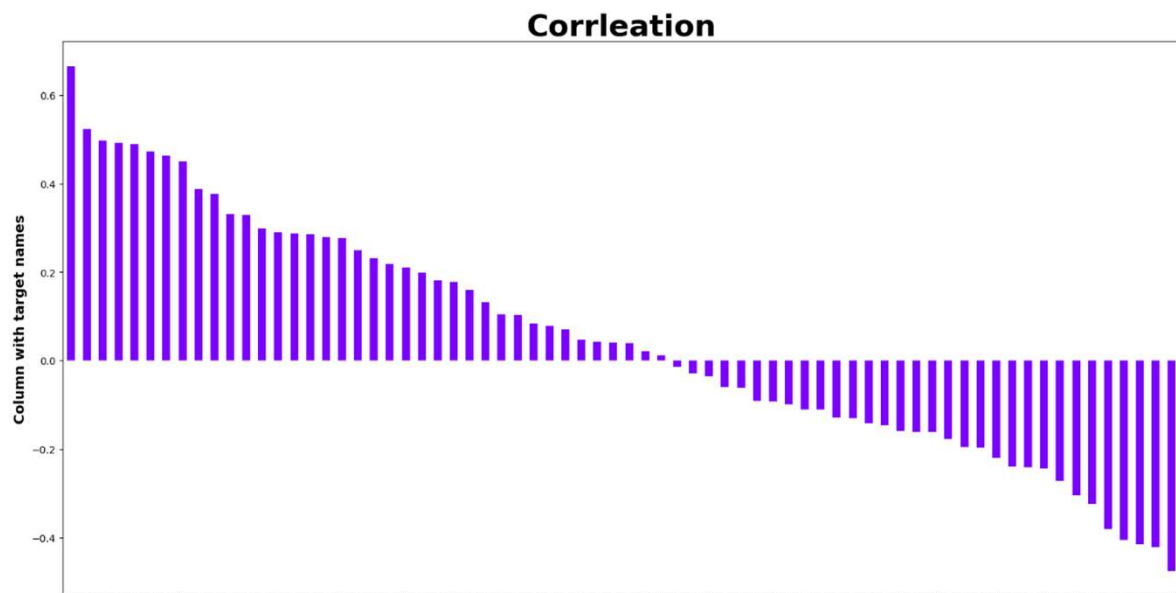
Used Ordinal Encoder to convert the object data into numerical data.

COEFFICIENT OF CORRELATION

In this project, considered the below column as target variable.

"Which of the Indian online retailer would you recommend to a friend?

Below plot shows the relationship of all features with target variable.

Observations:
- ✓ There are multiple features that have very weak correlations with target variable
- ✓ Typically the correlations in the range of -0.3 to 0.3 considered as weak correlations
- ✓ In this case, considering the range of -0.1 to 0.1 as very weak correlations as they are close to zero
- ✓ Identified the columns in the very weak correlation range

FEATURE SELECTION USING SELECTKBEST METHOD

✓ Used SelectKBest method to get the feature scores of all features with target variable

✓ Used Chi Square test in this method as output column is having categorical data

✓ Dataset has 70 features. The max selectKBest score is 186 and min score is 33

✓ Considered the threshold score of 40 to drop the columns in this case as top 50 features have score more than 40

✓ Again, checking the score values of all very weak correlated columns in the previous step and dropping the columns with very weak correlations and the score with less than 40

✓ By applying this method, no. of features reduced from 70 to 60

FEATURE SCALING

```python
# Applying MinMaxScaler to scale the x data
from sklearn.preprocessing import MinMaxScaler

x=df.drop("Which of the Indian online retailer would you recommend to a friend?",axis=1)  # #independent columns
y=df["Which of the Indian online retailer would you recommend to a friend?"]  # Output variable

MMS=MinMaxScaler()
x_scaled=MMS.fit_transform(x)
x=pd.DataFrame(data=x_scaled,columns=x.columns)
x.head(5)
```

✓ Applied MinMaxScaler to scale the entire X data to the range of values between 0 and 1.

PCA – PRINCIPAL COMPONENT ANALYSIS

✓Applied PCA (Principal Component Analysis) to reduce the size of the dataset as dataset is having 60 features

✓There are 60 columns in the dataset; no. of columns will be reduced without loosing their information using PCA technique

✓Initially calculated the number of components needed to explain the variance

✓Based on that, no. of columns required be used in PCA is identified

✓ From the plot, it is clear that 25 features are good enough to capture all the information

✓ Hence 25 features used as no. of components in PCA to reduce the dimensions

```
pca=PCA(n_components=25)
x=pca.fit_transform(x)
x=pd.DataFrame(x)
x.head()
```

The number of components needed to explain variance

100% cut-off threshold

Cumulative variance (%)

Number of Components
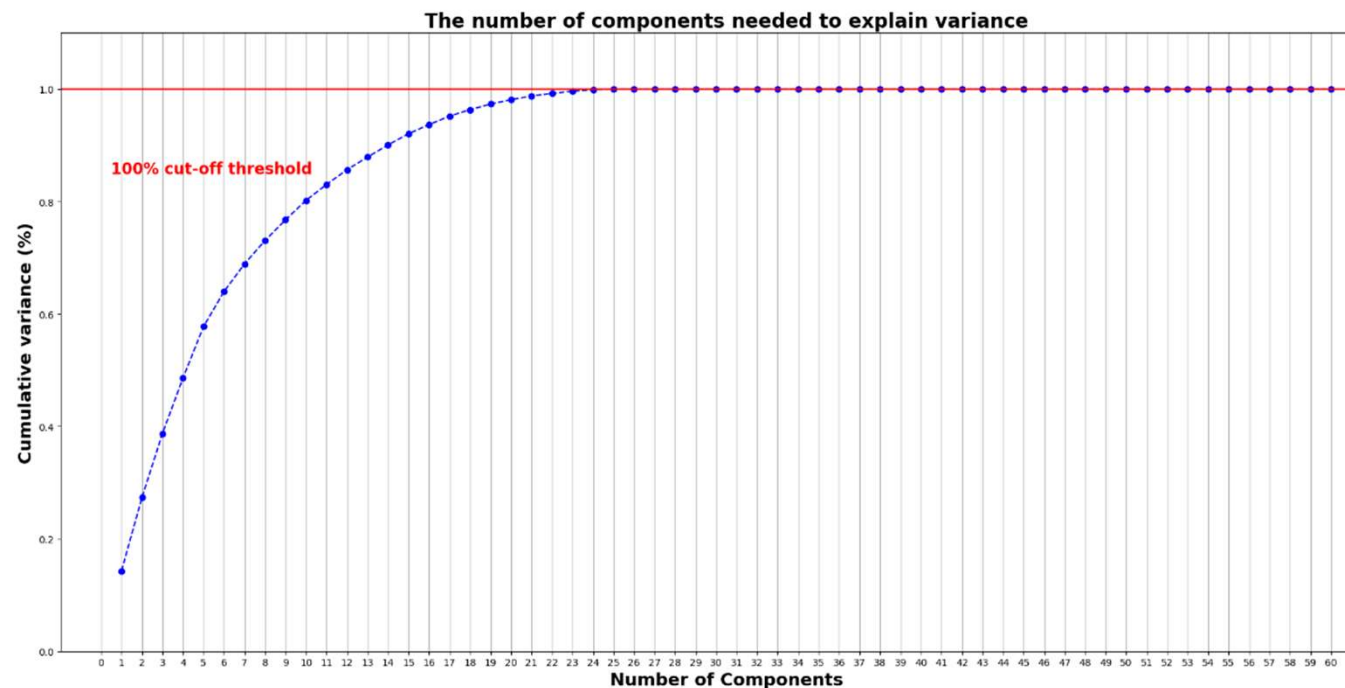
CHAPTER 4
CONCLUSIONS

CONCLUSIONS

Key findings of the study:

✓ Amazon and Flipkart are standing best online retailers out in the market with competent business strategies and lot advantages over other competitors.

✓ Paytm, Snapdeal and Myntra have poor customer services and there is lot of scope for further improvement.

✓ Amazon and Flipkart have got more positive feedbacks than other websites with relevant to Complete, relevant description information of products, Fast loading of websites, Reliability of website, quickness to complete purchase, availability of several payment options, speedy order delivery, privacy of customers information, security of customer financial information, etc.

✓ The customers with age < 20 years and with age> 51 years old have less tendency of shopping.

✓ Complete description product on website or app is essential from making purchase decision.

✓ Around 50% customers abandon cart due to better alternative offer which is obvious reason. Another most common reason is promo code not applicable on particular product.

✓ People who have been shopping for more then 3-4 years are the ones who frequently shops.

✓ Improve the experience of shopping for customers, as there is a lot of scope in enhancing the shopping experience to the customers. Then customers will find their way back and continue buying stuff from the best company.

THANK YOU