



# Project Report

## Customer Retention Case Study Analysis

(E-retail factors for customer activation and retention: A case study from Indian e-commerce customers)

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## **ACKNOWLEDGMENT**

I would like to express my sincere thanks of gratitude to my mentors from Data Trained academy and Flip Robo company for giving me the opportunity to work on this project.

### **References:**

- Data Science and Machine Learning Course by Data Trained

- 
- [How to plot ROC is here](#)
  - [Colormap codes for heatmap here](#)
  - Here is another implementation of this problem by Susan Li in [Towards Data Science](#) blog

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## **INTRODUCTION**

With the rapid global growth in electronic commerce (e-commerce), businesses are attempting to gain a competitive advantage by using e-commerce to interact with customers. Retaining customers in highly competitive business environments is critical for any company's survival because a lost customer represents more than the loss of the next sale. The company might lose all future sales and profits from that customers' lifetime of purchases.

environment is critical for any company's survival

Nowadays, online shopping is a fast-growing phenomenon. Growing numbers of consumers shop online to purchase goods and services, gather product information or even browse for enjoyment. Online shopping

environments are therefore playing an increasing role in the overall relationship between marketers and their consumers. That is, consumer-purchases are mainly based on the cyberspace appearance such as pictures, images, quality information and video clips of the product, not on the actual experience. Due to this internet penetration, customers can just sit at their home, place their orders, pay via credit card, and wait until the goods are delivered to their home and they can easily shop their needy products via e-commerce rather than in physical stores.

## **Business Problem Framing:**

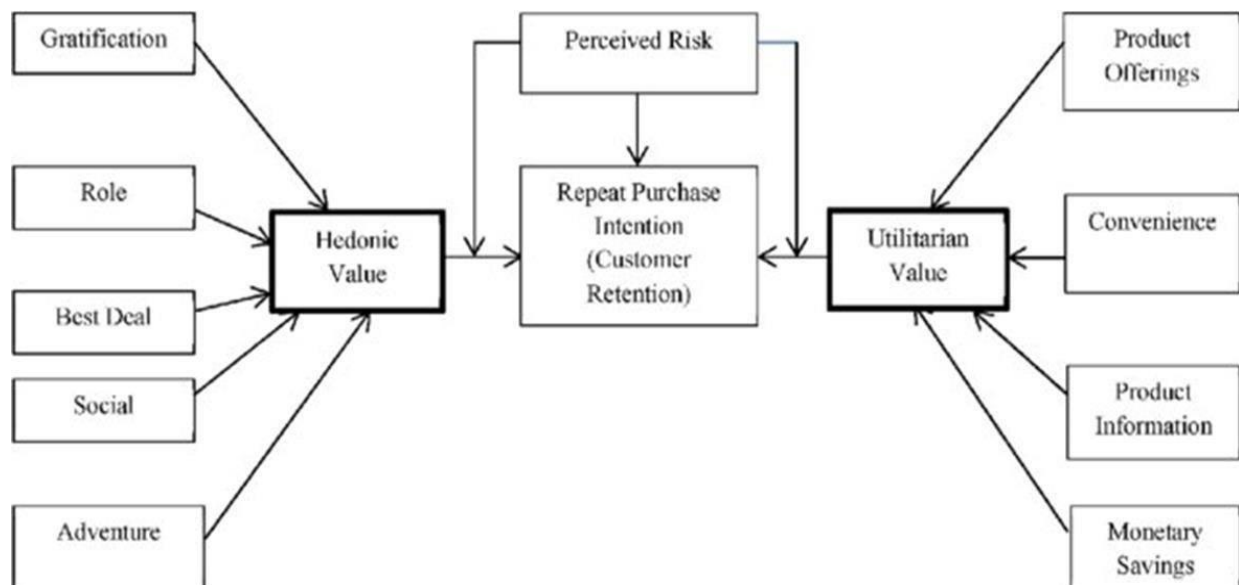
The online purchasing rate increasing day by day. Customers' satisfaction is most important for any business development. The first question that comes into our mind is "What individual factors motivate a buyer to purchase online as well as restrain to purchase online?". We will discuss about this in data analysis part. The main aim of this project is to explore consumer perceptions of internet-based e- retailing.

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

**Utilitarian value:** Utilitarian value is an objective value which provides some functional benefits to the consumers and helps consumers to accomplish practical tasks.

**Hedonistic value:** Hedonistic value is subjective (Psychological) value which provides an experiential satisfaction. In other words, the immediate

psychological gratification that comes from experiencing some activity or from consumption of a product.



## Conceptual Background of the Domain Problem:

The problem statement examined how customers form expectations on technology based self-service quality and suggested five main attributes of ecommerce store quality, that are service quality, system quality, information quality, trust and net benefit. The result of the study shows that, ease of use and enjoyment were also significant determinants of service quality, while speed of delivery and reliability had positive impact on service quality.

Many businesses focus on customer loyalty programs to remain competitive in today's marketplaces and explore innovative ways to keep their existing customers engaged. Customer retention is a simple concept. Yet, it often requires effort from every department to improve the customer experience and build lasting trust. So, what is customer retention and why it is so important. Let's know about it.

## What is Customer Retention?

The customer retention is the process of engaging existing customers to continue buying products or services from their business. The goal of

customer retention is retaining as many as customer as possible in the company.

One of the best ways to understand customer retention is to explore how to calculate customer retention rate for a given period.

### **How to Measure Customer Retention?**

The simplest way to measure a customer retention rate is to look at the number of new customers acquired, number of previous customers, and total number of customers at the end of any chosen period.

Retention rate =  $((\text{No of Total Customers} - \text{No of New Customers}) / \text{No of Previous Customers}) / 100$

The calculation provides a percentage that indicates how many customers have been retained over the period.

### **Why is Customer Retention Important?**

- Customer retention is an express route to a business' financial success. It allows the companies to build long term, meaningful relationships with customers.
- It empowers customers to share feedback with the company team.
- It helps you understand how loyal and satisfied your customers are, how strong your customer service is, and your products are really worth their money or not.
- It enhances the brand reputation and understands future needs of the customers.

### **Review of literature:**

This literature review is the integrated form of relationship marketing, customer loyalty, trust, reliability and privacy policy concept because all of these concepts are inter linked with each other.

The customer retention is possible only when the organization fulfil customers' needs and their expectations. A buyer goes through five stages while making a decision to purchase like problem recognition, information search, evaluation of alternatives, purchase decision, and purchase behavior. These stages are best explainable when a buyer goes for buying costly items on online stores, such as a diamond jewellery, home appliances etc. However, in day-to-day purchase, consumers may not go through all these



stages, since some commodities do not need information, and based on buyer's previous experience they will visit a store for the purchase.

In addition, companies are now using the Internet to build closer relationships with consumers and marketing partners. Besides competing in traditional marketplaces, they now have access to exciting new market spaces. Moreover, through the internet, consumers can learn about design, order, and pay for products and services, without ever leaving home and then, through the wonders of express delivery, they can receive their purchases in short time. From virtual reality displays that test new products to online virtual stores that sell them, the technology explosion is affecting every aspect of marketing. The internet has now become a truly global phenomenon.

Consumer's satisfaction and purchase decision on online shopping depends on few more issues. These are, e-store image, delivery and customers services, service quality and purchase behavior personalization, motivations for online purchase, trust, reliability, privacy, transaction and cost, incentive programs, web-site design, online interactivity, merchandise motivation, assurance, convenience, responsiveness etc. Following from the above consideration, this project will find out what individual factors motivate a buyer to purchase online and restrain to purchase online.

## **Motivation for the Problem Undertaken:**

The main objective behind this problem is to help the ecommerce websites to find the e-retail factors for customers activation and retention. The online shopping was considered by almost everyone to be convenient. The store is always open and it is easy, less stress and time saving to shop from home. Participants also seemed to agree that internet shopping gives access to a large range of stores and products from the entire world and offers best price to their consumers. So, in this project we will be analysing how these online stores attract the customers and whether the customers are satisfied by their products or not.

## **ANALYTICAL PROBLEM FRAMING**

**Mathematical/ Analytical Modelling of the Problem:**

The main thing that I found in problem statement is, the data given for us is unsupervised data. The problem statement contains both utilitarian value and hedonic value. I have performed both univariate and bivariate analysis to analyse these values using different plots like pie plot, count plot, distribution plot, factor plot etc. These plots give better pattern for analysing the data. In this project I have done various mathematical and statistical analysis such as describing the statistical summary of the columns in which I found that the count is same for all the columns which means no null values present. Since the dataset contains object data type, I used label encoding method to convert the object data into numerical data. Checked for correlation between the features and visualized it using heat map.

## **Data Sources and their formats:**

- ✓ The data is collected from the Indian online shoppers. Results indicate the e-retail success factors, which are very much critical for customer satisfaction. The dataset is provided by Flip Robo which is in the format xlsx.
- ✓ There are two excel sheets one is detailed datasheet and other one is encoded datasheet. I have used detailed datasheet for the processing.
- ✓ The dataset contains 269 rows and 71 columns which is comprised of categorical columns. All the features contain object data type except the feature Pin code (integer data type).
- ✓ While describing the data I found skewness and outliers present in the columns. Since all the columns are categorical so I haven't removed outliers and skewness.

## **Data Pre-processing Done:**

- Firstly, I have imported the necessary libraries and dataset.
- Checked the dimension of the dataset, data types of the features. Checked the information of the data frame using `info ()` and checked the number of unique values present in the dataset.
- Since the columns had no proper names, so I renamed them with new name as below.

```

1 # Checking the new column names after renaming them
2 CR.columns

Index(['Gender', 'Age', 'Shopping_City', 'Pincode', 'Shopping_Since',
      'Shopping_Frequency', 'Internet_Accessibility', 'Device_Used',
      'Screen_Size', 'OS', 'Browser_Used', 'Channel_First_Used', 'Login_Mode',
      'Time_Explored', 'Payment_Mode', 'Abandon_Frequency', 'Abandon_Reason',
      'Content_Readability', 'Similar_Product_Info', 'Seller_Product_Info',
      'Product_Info_Clarity', 'Navigation_Ease', 'Loading_Processing_Speed',
      'User_Friendly_Interface', 'Convenient_Payment_Mode',
      'Timely_Fulfilment_Trust', 'Customer_Support_Response',
      'Customer_Privacy_Guarantee', 'Various_Channel_Responses', 'Benefits',
      'Enjoy', 'Convenience', 'Return_Replacement_Policy',
      'Loyalty_Programs_Access', 'Info_Satisfaction',
      'Site_Quality_Satisfaction', 'Net_Benefit_Satisfaction', 'Trust',
      'Product_Seveal_Category', 'Relevant_Product_Info', 'Monetary_Savings',
      'Patronizing_Convenience', 'Adventure_Sense', 'Social_Status',
      'Gratification', 'Role_Fulfilment', 'Money_Worthy', 'Shopped_From',
      'Easy_Web_App', 'Visually_Appealing_WebApp', 'Product_Variety',
      'Complete_Product_Info', 'Fast_WebApp', 'Reliable_WebApp',
      'Quick_Purchase', 'Payment_Options_Availability', 'Fast_Delivery',
      'Customer_Privacy_Info', 'Financial_Security_Info',
      'Perceived_Trustworthiness', 'Multichannel_Assistance',
      'Long_Login_Time', 'Long_Display_Time', 'Late_Price_Declare',
      'Long>Loading_Time', 'Limited_Payment_Mode', 'Late_Delivery',
      'WebApp_Design_Change', 'Page_Disruption', 'WebApp_Efficiency',
      'Recommendation'],
      dtype='object')

```

- I have checked the null values and found no null values present in the dataset and visualized it using heat map.
- Checked the value count of each column. By checking valuecount function, I found some of the columns contains duplicate and unwanted entries, so I have replaced them using appropriate values.
- Visualized each feature using seaborn and matplotlib libraries by plotting count plot, pie plot, distribution plot, box plot and factor plot.
- Performed label encoding.
- Checked the skewness and outliers. Since all the columns are categorical, so I haven't removed skewness and outliers.
- Checked the correlation between the features and visualized it using heat map.
- Described the data using describe ().

## Hardware & Software Requirements & Tools Used:

### Hardware required:

- Processor: core i5 or above☐
- RAM: 8 GB or above☐
- ROM/SSD: 250 GB or above☐

### Software required:

- Anaconda 3- language used Python 3☐
- Microsoft Excel☐

**Libraries:** The important libraries that I have used for this project are below.

```
1 import numpy as np
2 import pandas as pd
3 import seaborn as sns
4 import matplotlib.pyplot as plt
5 import warnings
6 import os
7 import scipy as stats
8 from sklearn.preprocessing import LabelEncoder
9 %matplotlib inline
10 warnings.filterwarnings('ignore')
```

### **import NumPy as np:**

It is defined as a Python package used for performing the various numerical computations and processing of the multidimensional and single dimensional array elements. The calculations using Numpy arrays are faster than the normal Python array.

### **import pandas as pd:**

Pandas is a Python library that is used for faster data analysis, data cleaning and data pre-processing. The data-frame term is coming from Pandas only.

### **import matplotlib. pyplot as plt and import seaborn as sns:**

Matplotlib and Seaborn acts as the backbone of data visualization through Python.

**Matplotlib:** It is a Python library used for plotting graphs with the help of other libraries like NumPy and Pandas. It is a powerful tool for visualizing data in Python. It is used for creating statical interferences and plotting 2D graphs of arrays.

**Seaborn:** It is also a Python library used for plotting graphs with the help of Matplotlib, Pandas, and NumPy. It is built on the roof of Matplotlib and is considered as a superset of the Matplotlib library. It helps in visualizing univariate and bivariate data.

### **From sklearn. preprocessing import LabelEncoder:**

There are several encoding techniques like Label Encoder, OneHotEncoder, Ordinal Encoder. In this project I have used Label Encoder technique to convert categorical data or object type data into numerical data.

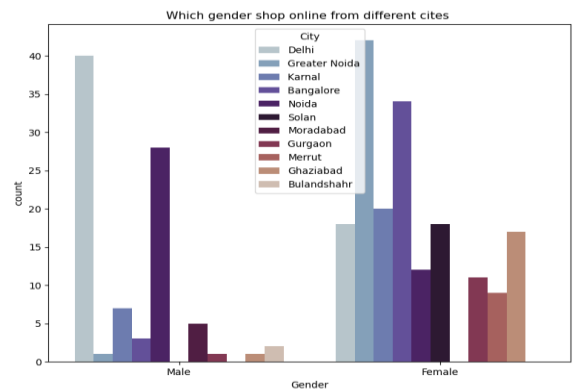
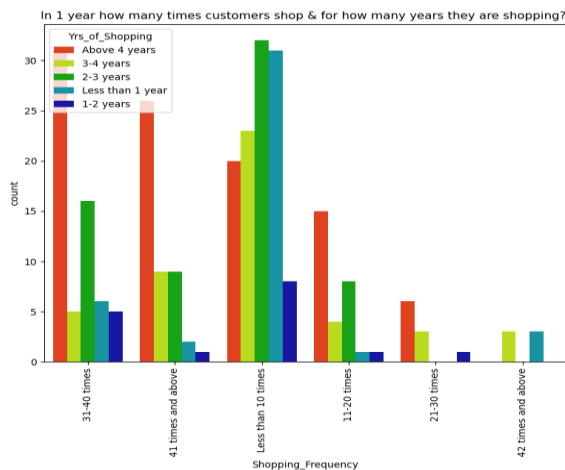
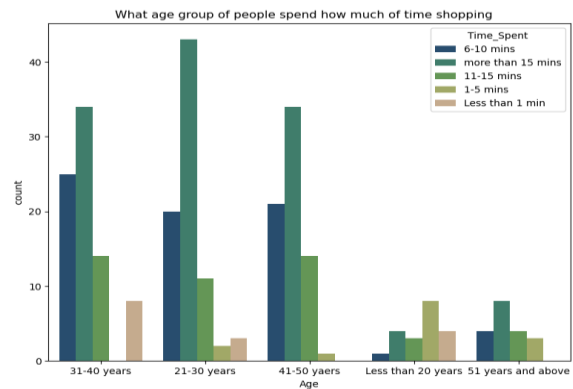
## **MODEL/S DEVELOPMENT AND EVALUATION**

### **Identification of possible problem-solving approaches (methods):**

- ✓ I have used “. replace()” function to replace unwanted entries in the columns.
- ✓ Used “Label Encoder” method to encode the categorical features into numerical.
- ✓ Described the statistical details of the features using “.describe()” method.
- ✓ Used “Pearson’s method” to check the correlation between the features.
- ✓ Performed both univariate and bivariate analysis using seaborn and matplotlib.

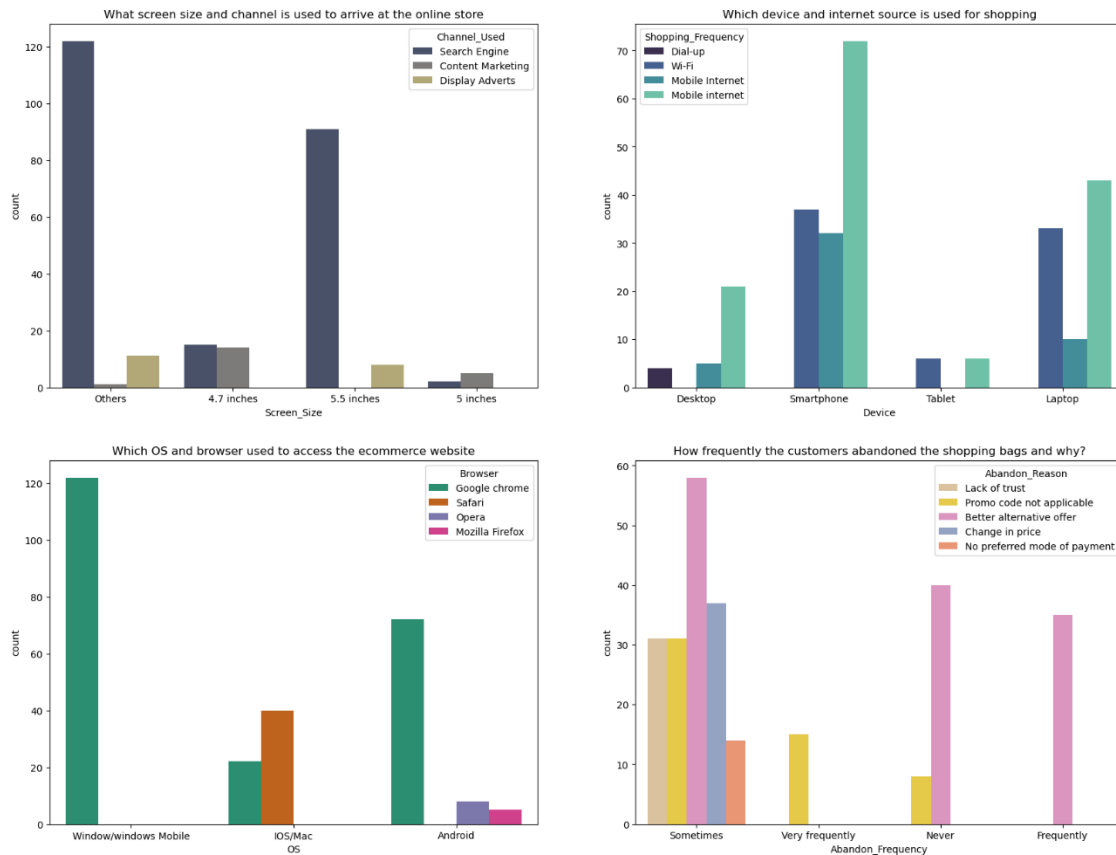
### **Visualizations:**

- The data visualization is divided into 2 parts. Mainly there are 2 categories in which visualization is divided for the convenience of understanding.
- Univariate Analysis (this the first category of data. It has mostly categorical and numerical data)
- Bivariate analysis(Experiences of customers) The experience of customers about the online shopping/product buying can be represented and in the dataset the questions are asked in the form of polls.
- Bivariate Analysis(different platforms) The different platforms used by the customers for online shopping or buying products, and their preferences with respect to websites/apps can be showcased. The visualization of data has to be divided into different parts. As there are 71 columns in the dataset it is not possible to showcase those in charts individually.



## Observations from the above graphs:

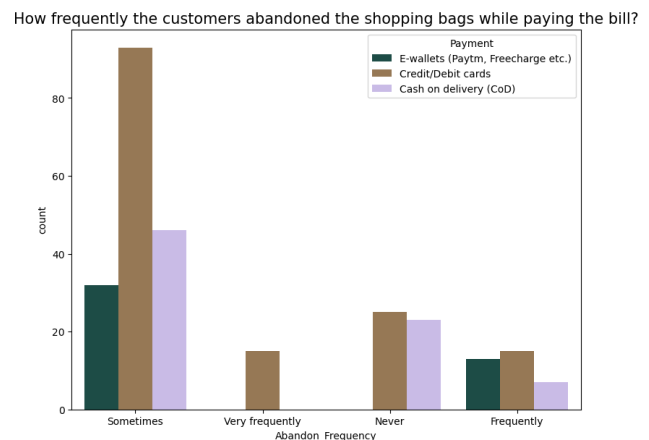
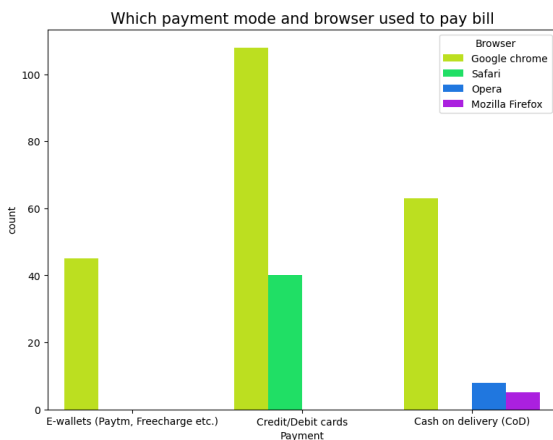
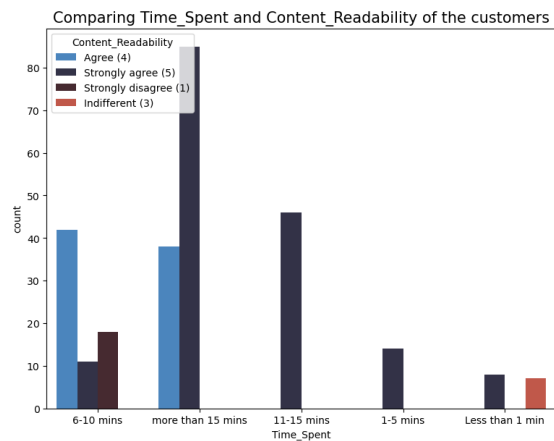
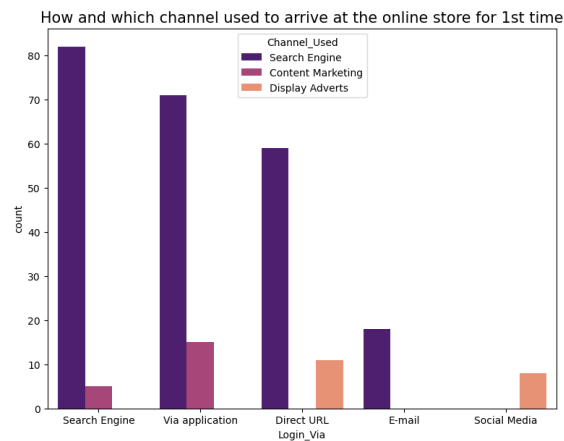
- Females from every age group tends to shop more than male. Female from the 21-30 yr age group has the highest rate of shopping where as less than 20yr and 51 yr above age group has least no. of customers.
- Age group of 31-40yrs,21-30yrs and 41-50 yrs all customers spend more than 15 mins to make a decision to shop products. And the age group less than 20yrs and 51 yrs above spend the least time for shopping.
- The customers who are shopping for more than 2,3 and 4 yrs shop atleast 31-40 and 41 times and above a year. There are also customers who shopped for a few months to 1,2 and 3 yrs and shop atleast 10 times a year. There are very less customers who shopped for 42 times and above a yr.
- Most of the female customers shopped online for more than 4 year and the count is also high for the females who shopped from 2-3 years. And only few male customers shop online more than 4 years.



## Observations from the above plots:

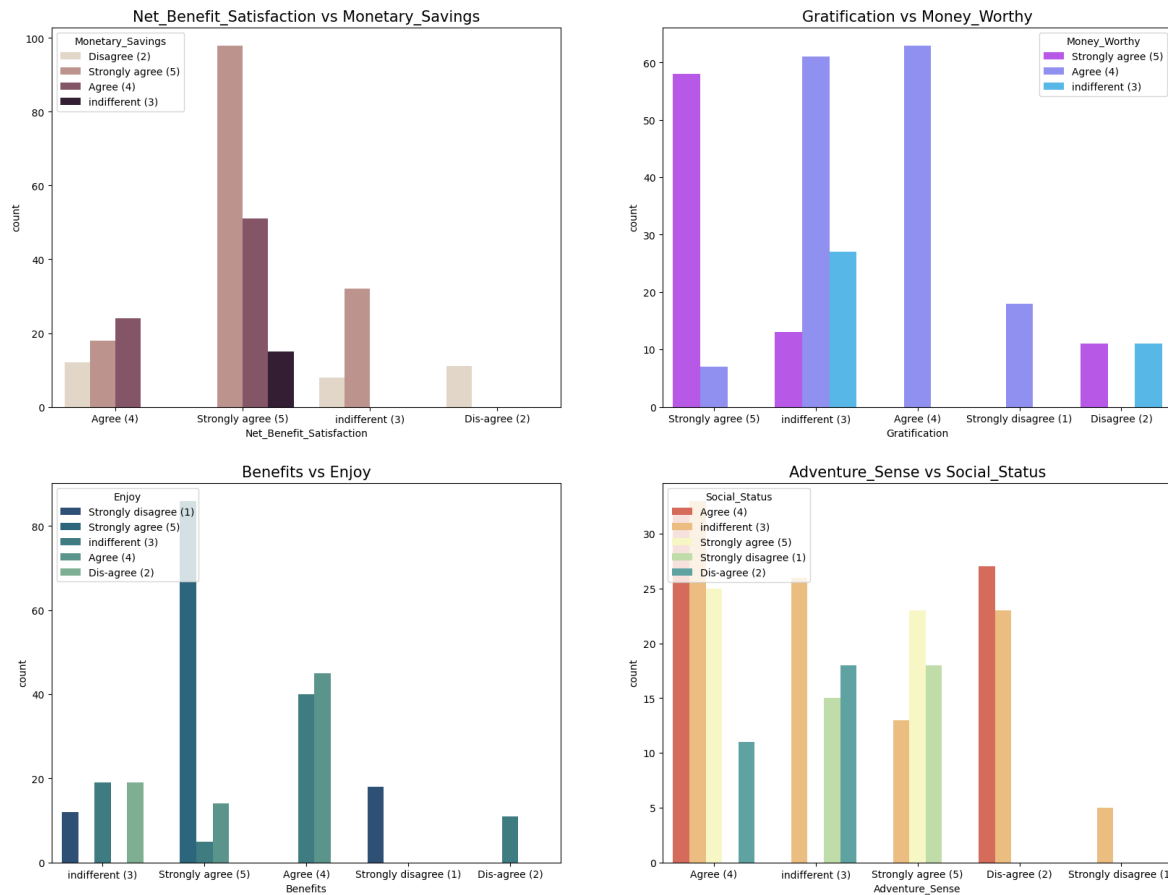
- Most of the female customers tend to be from Delhi, Greater Noida and Bangalore.
- The channel mostly used by the customers is Search engine and tend to use screen size of 5.5 inches. Content marketing and Display Adverts are the least used channels.
- Shoppers uses their smartphones the most for the most for online shopping and so it can be related that most of the customers uses mobile internet as their source for browsing.
- Windows and Android are used the most to search online products and the most used browser is Google chrome by the customers.





## Observations from the above plots:

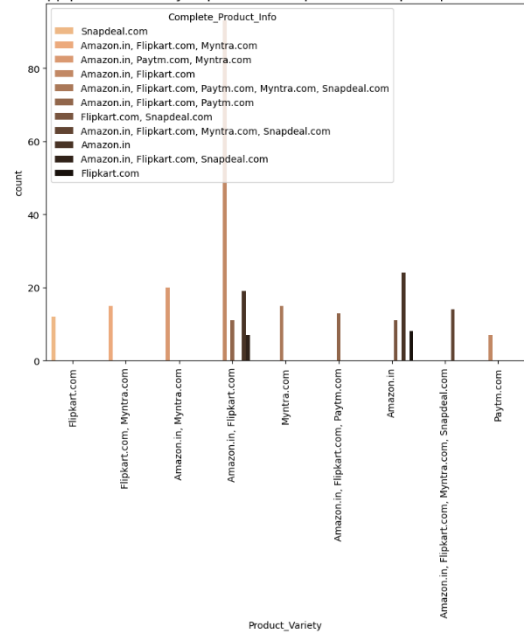
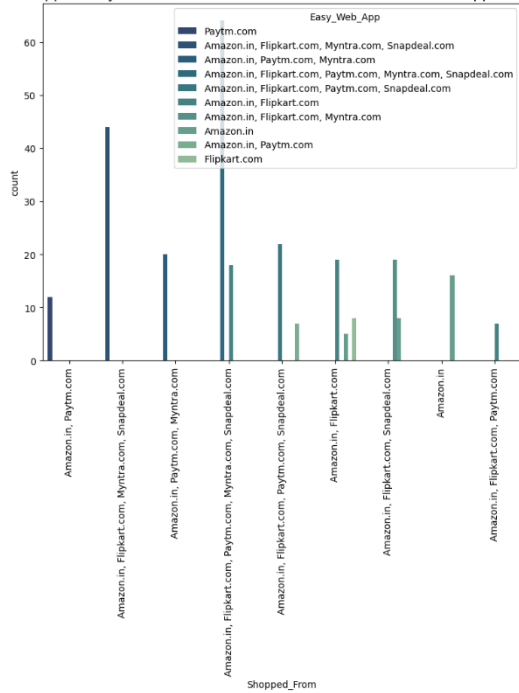
- There are sometimes when the customer abandons the shopping bags due to better alternative offers, change in price, lack of trust and Promo code not applicable. Whereas there are also some customers who never or frequently abandon the shopping bag due to better alternative offers.
- Every first time of the customer, they preferred to use Search Engine and Applications.
- As the content readability is good, customers spend more than 10 and 15 mins to shop products online.
- As most of the customers use Google Chrome for e-stores, it can be observed that more than 50% of the customers make choices to make the payments by Credit/Debit cards followed by Cash on Delivery and the least by E-wallets. There may be a sense of lack of security while doing the transaction by E-wallets that is why most customers avoid doing transactions through it. Customers using Mozilla Firefox and Opera browsers tend to opt for Cash on Deliveries.



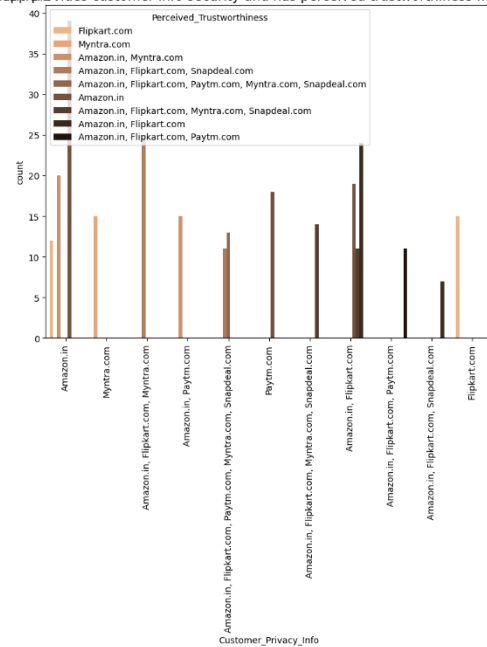
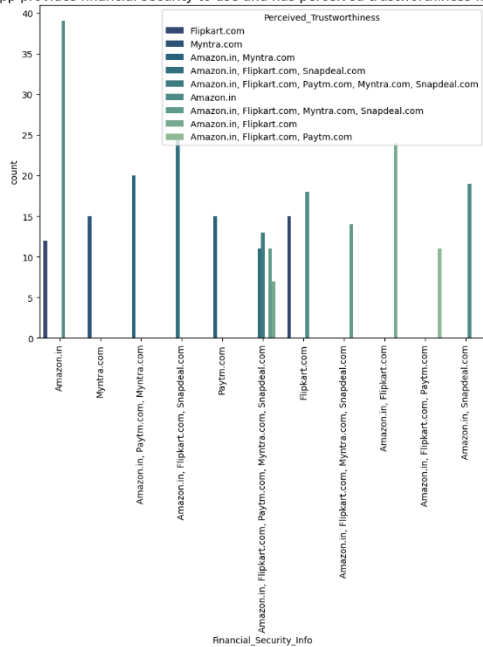
### Observations from the above plots:

- There seem to be issues while doing the transaction via Credit /Debit cards to the customers as there is a high rate of abandoning the shopping bag sometimes.
- Almost all the customers Strongly Agree that the ecommerce websites should provide a clearer search for the similar product information and there should be a Product information clarity provided.
- Most of the customers Strongly agrees that appropriate User-friendly interface can give them a great satisfaction while browsing for products which also can ease navigation on the ecommerce websites. If websites are easy for the navigation customers cannot feel ambiguous while making choices. There are not many customers who disagrees with the easy navigation and User-friendly interfaces of websites.
- Most of the customers agreed that return and replacement policy of the e-tailer is important for purchase decision also helping in the convenience and ease for shopping. Return and Replacement policies tend to give a sense of security to the customers about their money and products they are buying. Maximum of customers find it convenient to shop from ecommerce sited that provide return and replacement policies .

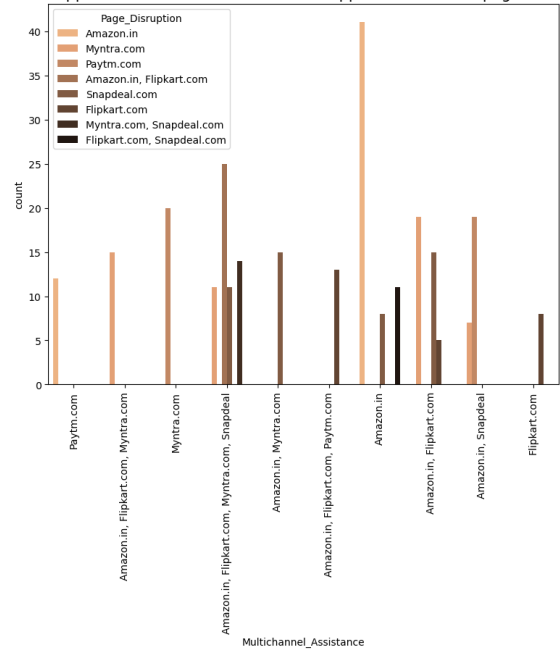
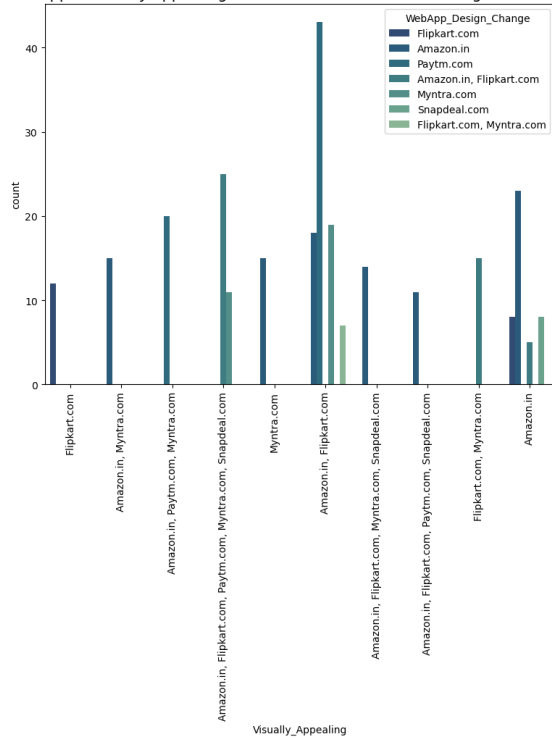
Which app is easy to use and from which website the customers shopped the most? Which app provides variety of products and provides complete product information?



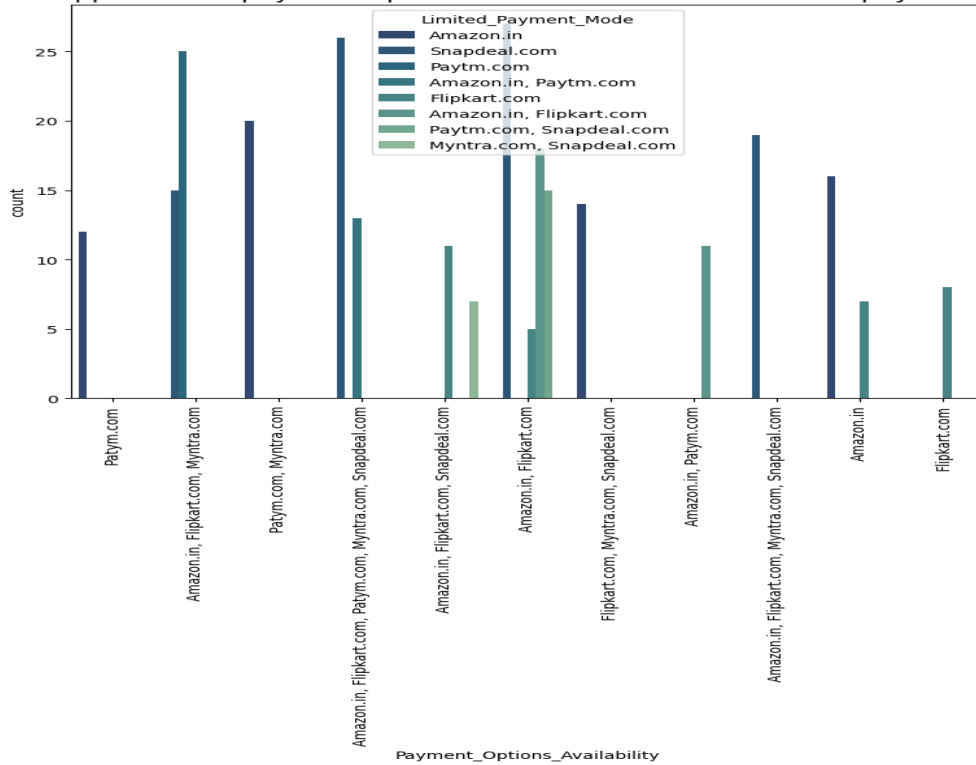
Which app provides financial security to use and has perceived trustworthiness from customers? Which app provides customer info security and has perceived trustworthiness from customers?

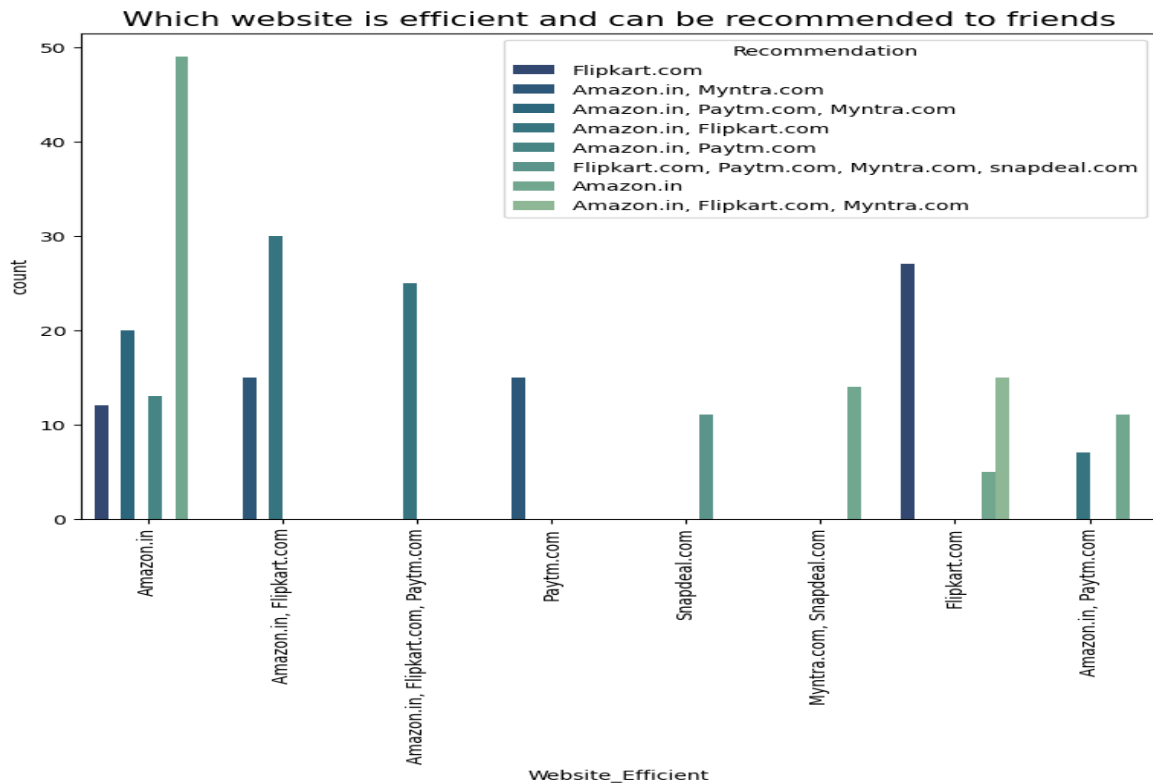


Which app is visually appealing vs which website needs to change the web design Which app has multichannel assistance vs app has issues with page disruption



Which app has max payment option vs which website has limited payment options





### Observations from the above plots:

- Above 50% of the customers uses Amazon.in Flipkart.com Paytm.com, Myntra.com and Snapdeal.com as the shopping platforms which are also easy to use. The reason of using these websites for shopping must be a good user interface.
- Amazon.in Flipkart.com provides the highest rate of product variety which can also be a reason to gain popularity among the customers. These websites provide a complete product information which helps customers to make purchase decision easier and wiser.
- The customers financial information security and the privacy of the customers personal information is the highest priority of the websites to keep it safely and not leak the information. Amazon. In tends to be the most trustworthy sites in the sense of Financial Information security of a customer followed by Flipkart.com Paytm.com, Myntra.com and Snapdeal.com. These sites gain the highest rates for perceived trustworthiness.
- There are a lot no. of customers who purchase products from amazon.in and it can be observed that all of them agrees that the website is visually appealing but still thinks that there should be a web design change in it which is same in the case of Flipcart.com. Users have a opinion of changing the web designs of

almost all the sites though they use the same for shopping.

- Amazon.in gives a higher rate of multichannel assistance and at the same time has issues with the page disruption followed by the sites Flipcart.com and Myntra.com. Snapdeal has limited mode of payment on most of the products followed by Amazon. Having different types of payment methods will helps the customers to pay the invoice easily using their choice of payment and if the websites have speedy delivery methods without delivery charge, then the customers like to buy the products in those websites.
- Amazon is the website which is more efficient as Amazon.com. Also Amazon.in, Flipkart and Myntra are the highly recommended online retailer sites for purchasing all types of products, as they provide enormous amounts of benefits.

## **Interpretation of the Results:**

The results that were interpreted from the visualization are as follows:

From the survey we found that the customers agreed with certain things like ecommerce websites have empathy towards them, content must be easy to read and understand, similar products should be highlighted for product comparison, payment convenience, trustworthy and they felt gratified while shopping etc.

The respondents were asked to give ratings and feedback regarding certain statements that may be used to describe their ideal online store. We have found answers from customers like which websites among listed sites they are familiar with, they find easy to use, reliable, secured, about their delivery, change in web design, etc.

From the visualization we have found Amazon.in was the most used and favourite websites for the customers and Flipkart was the second favourite webapp while snapdeal.com and Paytm.com were the least used websites by the customers.

## **CONCLUSION**

### **Key Findings and Conclusions of the Study:**

#### **Findings:**

- In this project we have investigated ecommerce quality in online businesses and develop new knowledge to understand the most important dimensions of E-retail factor for customer activation and retention.□
- This project aimed to enhance prior understanding of how ecommerce websites affected customer satisfaction, customer trust, and customer behavior, i.e., repurchase intention, customer loyalty, and site revisit.□
- The dimensions like information about the products, convenient payment mode, Trust, Fulfilment, website design change, security/privacy and many others had a positive impact on the ecommerce websites for customers. Also, some of the dimensions□ like ease of navigation, loading and speed, late delivery etc did not have impact on the ecommerce websites.

- Thus, a company needs to pay attention to these dimensions more specifically and seek breakthroughs that can improve its performance and e-service quality.□

### **Conclusion of the Study:**

- The endeavour of this study is to identify the motivating factors towards online shopping and in which e-tailer the customers likely to shop more.□
- In this project, I have done some feature engineering by replacing the unwanted entries by suitable values, found no null values, and renamed the columns by giving new names. Visualized the data using count plot, factor plot, pie plot and distribution plot, also encoded the object data into numerical using label encoding method. Checked the statistical summary of the dataset and checked for skewness, outliers and correlation between the features.□
- From the analysis it was found that consumers purchasing decisions were dependent on various factors. All these motives motivate consumers to purchase products through online. According to consumers' opinions, "time saving" is the most important motivating factor for online shopping.□
- Again "information availability", "open 24/7", "huge range of products/ brands", "reasonable prices", "various offers for online products", "easy ordering system", and "shopping fun" are other motivating factors for online shopping respectively. Also, "online payment system", "personal privacy or security issues", "delaying of delivery" and "lacks of personal customer service" are the main inhibitions of online shopping to the respondents.□
- After visualizing the data, I found Amazon is the best online store where the customers trust on buying products and it has positive impact on the customers. Also, amazon and flip kart have increased customers' expectations. So, they are the best online retailer who makes the loyal customers and satisfies the customers.□
- It was also observed that online shopping is not trustworthy and reliable to some consumers due to only online payment system and personal privacy. In addition, online security is a major concern for the consumer particularly in terms of fraud, privacy□and hacking. So, the organizers should make up their organization for better sales.



## **Learning outcomes of the study in respect of data science:**

- Customer satisfaction and customer trust appeared as the outcomes of overall e-retail factor. The results of the analysis showed that e-retail factor had a positive impact on customer satisfaction. The majority of research done about e-retail factor states that customer satisfaction is the main determinant impacting on e-retail factor. It supports the idea that there is a significant relationship between e-retail factor and customer satisfaction. E-retail factor also had a positive impact on customer trust. The better the e-retail factor of a company, the higher the customer trust. Providing good service quality enhances customer satisfaction and customer trust.□
- From the above analysis we found that the mains reasons □ factors which attract consumers to do shopping online and then main reasons or obstacles which discourage consumers from shopping online. Therefore, from the analysis, it is found that most of the respondents use internet daily but most of the respondents do not use internet daily to buy products. Nearly half of the total respondents' opinions were that they would only use the internet to buy products when the need arises to do so.

## **Limitations of this work and Scope for Future Work:**

### **Limitations:**

- The limitation to the analysis is that there are more female customers who shop more on e-tailer websites compared to male customers, this is due to the minimum data. Since the data is very less so it's bit difficult to come to the conclusion on the retention rate.□
- There was no dependent variable in the dataset. If the dataset contains target variable, then it gives good visualization and relation between the feature and target and the model prediction is also possible of the target variable present.□

### **Recommendation to the online sellers (Scope for future work)**

Based upon the findings and analysis, the following assumptions (recommendations to the online seller) are presented for the online sellers to make online shopping more popular, convenient, reliable and trustworthy.

- Transaction security and consumers data safety are principal concerns of online customers purchasing products or services online. Therefore, online vendors can assure their consumers' by offering personal information privacy, protection policy and guarantee for transaction security by improving their technological systems.□
- Retailers should be careful about the annoying factors of online shopping such as being unable to access the website, long delays in completing online orders, inconsistencies in the items available online, mistakes in filling orders, and the hassle of returning goods.□
- Online sellers can be more concerned about delivery times, delivery charge and product return policies. They can make it easier, quicker and reliable, so that consumers can enjoy the online shopping experience and they like to shop in the particular websites regularly.□
- The respondents thought that products' mixing up or they find different product at delivery time which is the main inhibition of online shopping, so that the sellers must be very cautious when it comes to delivery.□
- Getting feedbacks from the customers is also one of the important things to improve the sales of the company. The e-tailer wants to keep the customer happy in order to build the successful business, but they easily fall into a trap of assuming that the customers will give feedback without being prompted. If the e- tailers are doing something wrong, most of the customers won't complain, they will just go elsewhere. So, it is important to ask customers how they really feel about their services.□