

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

Prepared by: Md Hafizur Rahman

Introduction

Customer satisfaction has emerged as one of the most important factors that guarantee the success of online stores; 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. The data is collected from the Indian online shoppers. Results indicate the e-retail success factors, which are very much critical for customer satisfaction.

Executive Summary:

In this project, a dataset was provided containing the details of the participants of a survey, along with their online shopping experiences, preferences, and opinions regarding various ecommerce websites.

The Dataset was first checked for null values, and then the various feature columns were analysed. Exploratory Data analysis was conducted to investigate the relationships that existed between the columns, using various visualization techniques.

The dataset was worked with to study and understand how various Hedonic values, Utilitarian values in combination with several perceived risks helped to understand Customer retention and loyalty to various ecommerce websites.

About the Dataset:

Loading the Dataset.

```
In [2]: Cdf = pd.read_excel('customer_retention_dataset.xlsx')
```

```
In [3]: Cdf.shape
```

```
Out[3]: (269, 71)
```

```
In [4]: Cdf.head()
```

```
Out[4]:
```

	1 Gender of respondent	2 How old are you?	3 Which city do you shop online from?	4 What is the Pin Code of where you shop online from?	5 Since How Long You are Shopping Online ?	6 How many times you have made an online purchase in the past 1 year?	7 How do you access the internet while shopping on-line?	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?	...	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)
0	Male	31-40 years	Delhi	110009	Above 4 years	31-40 times	Dial-up	Desktop	Others	Window/windows Mobile	...	Amazon.in	Amazon.in	Flipkart.com
1	Female	21-30 years	Delhi	110030	Above 4 years	41 times and above	Wi-Fi	Smartphone	4.7 inches	IOS/Mac	...	Amazon.in, Flipkart.com	Myntra.com	snapdeal.com
2	Female	21-30 years	Greater Noida	201308	3-4 years	41 times and above	Mobile Internet	Smartphone	5.5 inches	Android	...	Myntra.com	Myntra.com	Myntra.com
3	Male	21-30 years	Karnal	132001	3-4 years	Less than 10 times	Mobile Internet	Smartphone	5.5 inches	IOS/Mac	...	Snapdeal.com	Myntra.com, Snapdeal.com	Myntra.com
4	Female	21-30 years	Bangalore	530068	2-3 years	11-20 times	Wi-Fi	Smartphone	4.7 inches	IOS/Mac	...	Flipkart.com, Paytm.com	Paytm.com	Paytm.com

5 rows x 71 columns

The given dataset consists of 71 columns and 269 rows

The Featured columns are:

- '1 Gender of respondent',**
- '2 How old are you? ',**
- '3 Which city do you shop online from?',**
- '4 What is the Pin Code of where you shop online from?',**
- '5 Since How Long You are Shopping Online ?',**
- '6 How many times you have made an online purchase in the past 1 year?',**
- '7 How do you access the internet while shopping on-line?',**
- '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?',**
- '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”?',**

-
- '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',**
- '26 Trust that the online retail store will fulfill its part of the transaction at the stipulated time',**
- '27 Empathy (readiness to assist with queries) towards the customers',**
- '28 Being able to guarantee the privacy of the customer',**
- '29 Responsiveness, availability of several communication channels (email, online rep, twitter, phone etc.)',**
- '30 Online shopping gives monetary benefit and discounts',**
- '31 Enjoyment is derived from shopping online',**
- '32 Shopping online is convenient and flexible',**
- '33 Return and replacement policy of the e-tailer is important for purchase decision',**
- '34 Gaining access to loyalty programs is a benefit of shopping online',**
- '35 Displaying quality Information on the website improves satisfaction of customers',**
- '36 User derive satisfaction while shopping on a good quality website or application',**
-

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

'38 User satisfaction cannot exist without trust',

'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',

'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 ',

'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?'

Data Cleaning:

Upon inspecting all the columns in the dataframe, it is observed that none of the columns appear to have any NaN values.

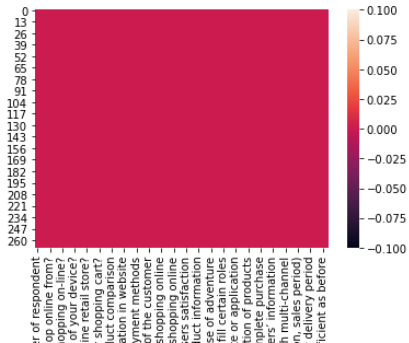
Checking for null / values missing

```
In [5]: Cdf.isnull().sum()
```

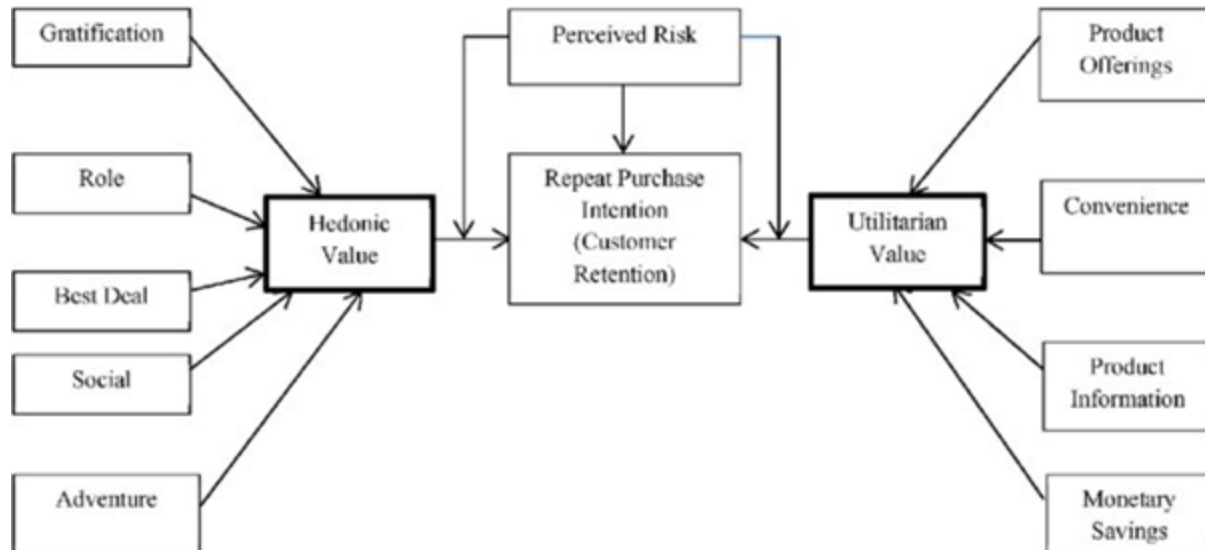
```
Out[5]: 1Gender of respondent      0
        2 How old are you?      0
        3 Which city do you shop online from?      0
        4 What is the Pin Code of where you shop online from?      0
        5 Since How Long You are Shopping Online ?      0
        ..
        Longer delivery period      0
        Change in website/Application design      0
        Frequent disruption when moving from one page to another      0
        Website is as efficient as before      0
        Which of the Indian online retailer would you recommend to a friend?      0
        Length: 71, dtype: int64
```

```
In [6]: sns.heatmap(Cdf.isnull())
```

```
Out[6]: <AxesSubplot>
```



Exploratory Data Analysis



The individual columns of the dataframe were first analysed to study their composition and then, with reference to the diagram above, the relationship between various columns was understood through data visualization using Countplots.

Univariate Analysis

Analyzing the Target Class

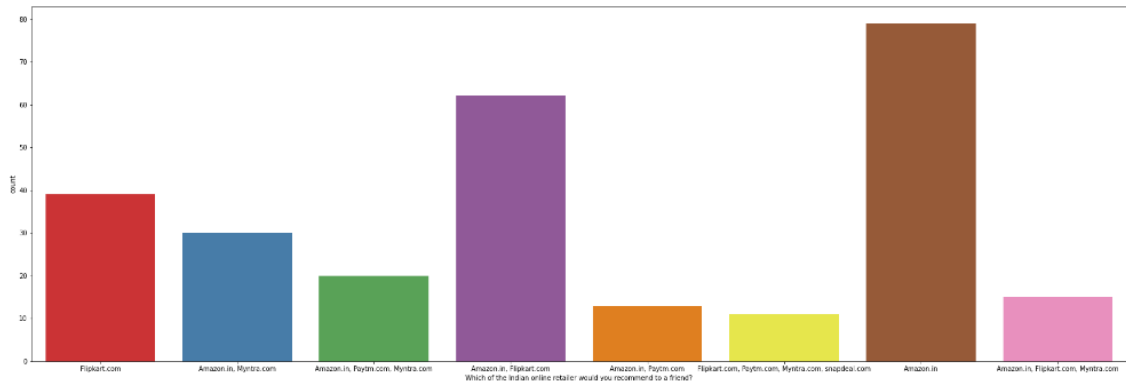
Column: 'Which of the Indian online retailer would you recommend to a friend?' can be regarded as a representation of customer Loyalty / Retention since customers who recommend the services of an ecommerce are very highly likely to buy from those websites again

```
In [155]: Cdf['Which of the Indian online retailer would you recommend to a friend?'].value_counts()
```

```
Out[155]: Amazon.in          79
Amazon.in, Flipkart.com     62
Flipkart.com                39
Amazon.in, Myntra.com       30
Amazon.in, Paytm.com, Myntra.com  20
Amazon.in, Flipkart.com, Myntra.com  15
Amazon.in, Paytm.com        13
Flipkart.com, Paytm.com, Myntra.com, snapdeal.com  11
Name: Which of the Indian online retailer would you recommend to a friend?, dtype: int64
```

```
In [156]: plt.figure(figsize=(30,10),facecolor='white')
sns.countplot(Cdf['Which of the Indian online retailer would you recommend to a friend?'], palette="Set1")
```

```
Out[156]: <AxesSubplot:xlabel='Which of the Indian online retailer would you recommend to a friend?', ylabel='count'>
```



It is observed that Amazon is the most popular E commerce website followed by Flipkart.

Consumer Demographics

Columns which contained details regarding the demographics of the participants (age, gender, location) were visualized and analyzed.

```
In [11]: Cdf['1Gender of respondent'].unique()
```

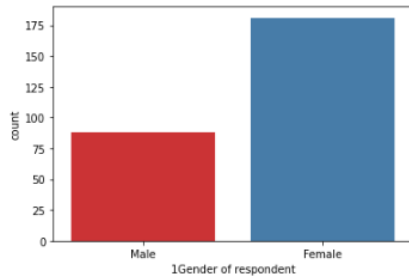
```
Out[11]: array(['Male', 'Female'], dtype=object)
```

```
In [12]: Cdf['1Gender of respondent'].value_counts()
```

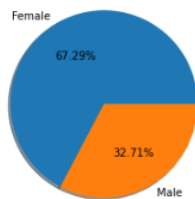
```
Out[12]: Female    181  
        Male      88  
        Name: 1Gender of respondent, dtype: int64
```

```
In [13]: sns.countplot(Cdf['1Gender of respondent'], palette="Set1")
```

```
Out[13]: <AxesSubplot:xlabel='1Gender of respondent', ylabel='count'>
```



```
In [14]: labels = 'Female','Male'  
fig, ax = plt.subplots()  
ax.pie(Cdf['1Gender of respondent'].value_counts(), labels = labels, radius = 1, autopct = '%1.2f%%', shadow=True,)  
plt.show()
```



```
In [15]: Cdf['3 Which city do you shop online from?'].unique()
```

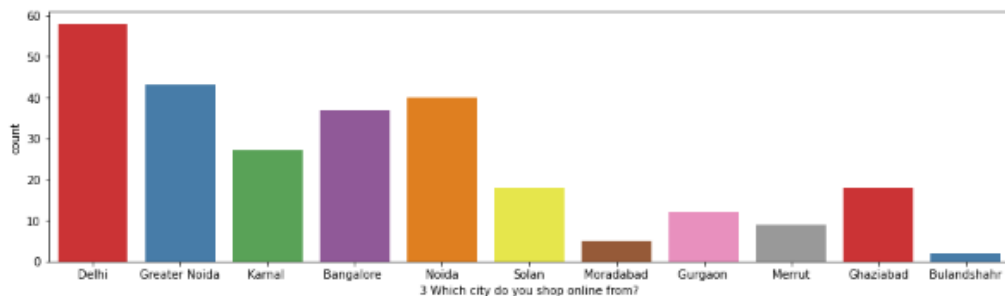
```
Out[15]: array(['Delhi', 'Greater Noida', 'Karnal ', 'Bangalore ', 'Noida',  
              'Solani', 'Moradabad', 'Gurgaon ', 'Merrut', 'Ghaziabad',  
              'Bulandshahr'], dtype=object)
```

```
In [16]: Cdf['3 Which city do you shop online from?'].value_counts()
```

```
Out[16]: Delhi          58  
Greater Noida         43  
Noida                 40  
Bangalore             37  
Karnal                27  
Solani                18  
Ghaziabad             18  
Gurgaon               12  
Merrut                9  
Moradabad              5  
Bulandshahr           2  
Name: 3 Which city do you shop online from?, dtype: int64
```

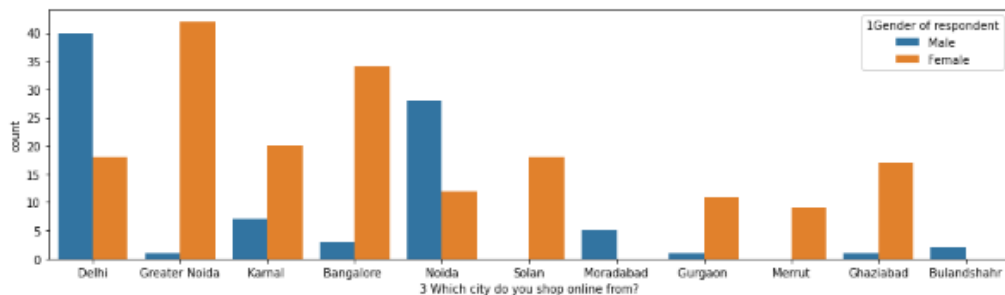
```
In [17]: plt.figure(figsize=(15,4),facecolor='white')  
sns.countplot(Cdf['3 Which city do you shop online from?'], palette="Set1")
```

```
Out[17]: <AxesSubplot:xlabel='3 Which city do you shop online from?', ylabel='count'>
```



```
In [18]: plt.figure(figsize=(15,4),facecolor='white')  
sns.countplot(Cdf['3 Which city do you shop online from?'], hue=Cdf['1Gender of respondent'])
```

```
Out[18]: <AxesSubplot:xlabel='3 Which city do you shop online from?', ylabel='count'>
```



```
In [19]: Cdf['2 How old are you? '].unique()
```

```
Out[19]: array(['31-40 years', '21-30 years', '41-50 yaers', 'Less than 20 years',  
              '51 years and above'], dtype=object)
```

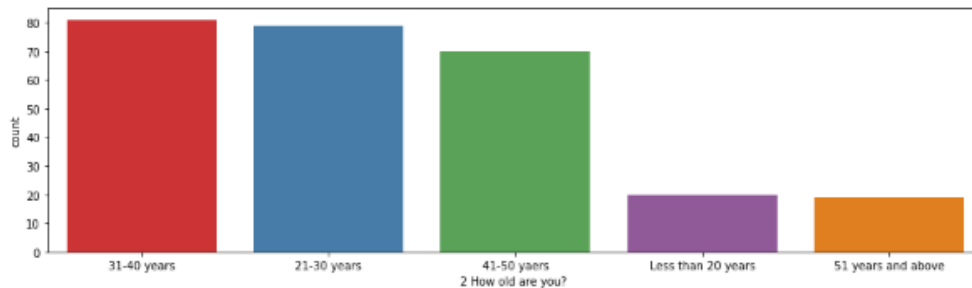
```
In [19]: Cdf['2 How old are you?'].unique()
Out[19]: array(['31-40 years', '21-30 years', '41-50 yaers', 'Less than 20 years',
               '51 years and above'], dtype=object)
```

```
In [20]: Cdf['2 How old are you?'].value_counts()
```

```
Out[20]: 31-40 years      81
         21-30 years     79
         41-50 yaers    70
         Less than 20 years  20
         51 years and above  19
         Name: 2 How old are you?, dtype: int64
```

```
In [21]: plt.figure(figsize=(15,4),facecolor='white')
         sns.countplot(Cdf['2 How old are you?'], palette="Set1")
```

```
Out[21]: <AxesSubplot:xlabel='2 How old are you?', ylabel='count'>
```



```
In [22]: labels = '31-40years','21-30 years','41-50 years','Less than 20 years','51 years and above'
         fig, ax = plt.subplots()
         ax.pie(Cdf['2 How old are you?'].value_counts(),labels = labels,radius =1,autopct = '%1.2f%%', shadow=True,)
         plt.show()
```



Based on the above graphs it is observed that:

- Majority of the participants are female, comprising 67.29% of the total participants of the survey.
- Most of the participants hail from Delhi, Greater Noida, Noida, and Bangalore.
- Of those who hailed from Delhi and Noida, the majority were Male. While of those who hailed from Greater Noida, Bangalore and Karnal, Ghaziabad and Solan the majority were Female

- The age distribution of the majority of the participants lies in the range of 21-40 years, with 59.48% of the total participants falling within that age range, while 26.02% of the participants belong to the age range of 41-50 years.

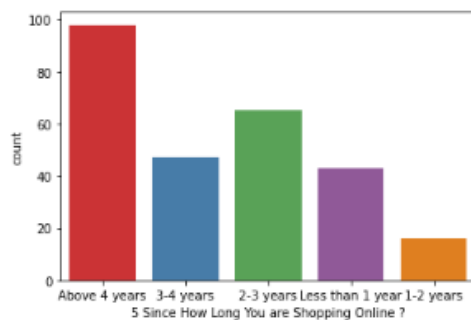
Consumer online shopping activities and preferences

```
In [23]: Cdf['5 Since How Long You are Shopping Online ?'].value_counts()
```

```
Out[23]: Above 4 years      98
2-3 years      65
3-4 years      47
Less than 1 year  43
1-2 years      16
Name: 5 Since How Long You are Shopping Online ?, dtype: int64
```

```
In [24]: sns.countplot(Cdf['5 Since How Long You are Shopping Online ?'], palette="Set1")
```

```
Out[24]: <AxesSubplot:xlabel='5 Since How Long You are Shopping Online ?', ylabel='count'>
```



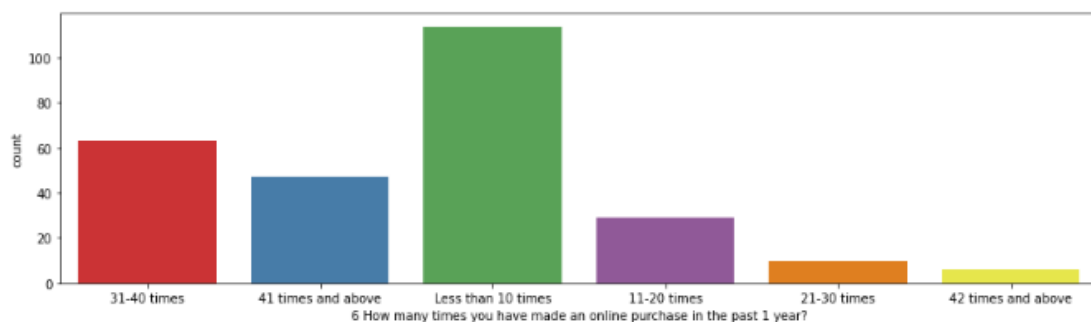
```
In [25]: Cdf['6 How many times you have made an online purchase in the past 1 year?'].value_counts()
```

```
Out[25]: Less than 10 times    114
31-40 times      63
41 times and above  47
11-20 times      29
21-30 times      10
42 times and above   6
Name: 6 How many times you have made an online purchase in the past 1 year?, dtype: int64
```

```
In [26]: plt.figure(figsize=(15,4),facecolor='white')
```

```
sns.countplot(Cdf['6 How many times you have made an online purchase in the past 1 year?'], palette="Set1")
```

```
Out[26]: <AxesSubplot:xlabel='6 How many times you have made an online purchase in the past 1 year?', ylabel='count'>
```

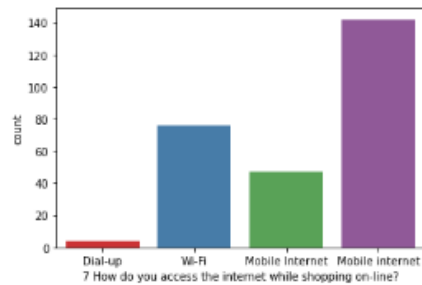


```
In [27]: Cdf['7 How do you access the internet while shopping on-line?'].value_counts()
```

```
Out[27]: Mobile internet    142  
Wi-Fi                      76  
Mobile Internet           47  
Dial-up                   4  
Name: 7 How do you access the internet while shopping on-line?, dtype: int64
```

```
In [28]: sns.countplot(Cdf['7 How do you access the internet while shopping on-line?'], palette="Set1")
```

```
Out[28]: <AxesSubplot:xlabel='7 How do you access the internet while shopping on-line?', ylabel='count'>
```

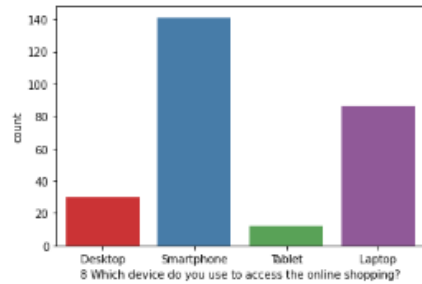


```
In [29]: Cdf['8 Which device do you use to access the online shopping?'].value_counts()
```

```
Out[29]: Smartphone    141  
Laptop                86  
Desktop               30  
Tablet                12  
Name: 8 Which device do you use to access the online shopping?, dtype: int64
```

```
In [30]: sns.countplot(Cdf['8 Which device do you use to access the online shopping?'], palette="Set1")
```

```
Out[30]: <AxesSubplot:xlabel='8 Which device do you use to access the online shopping?', ylabel='count'>
```

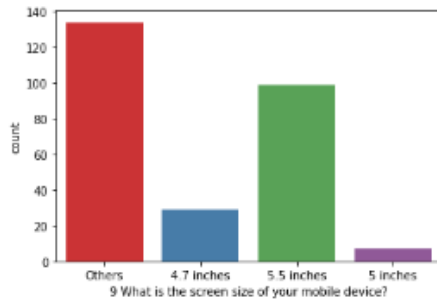


```
In [31]: Cdf['9 What is the screen size of your mobile device?'].value_counts()
```

```
Out[31]: Others      134
5.5 inches    99
4.7 inches    29
5 inches       7
Name: 9 What is the screen size of your mobile device?, dtype: int64
```

```
In [32]: sns.countplot(Cdf['9 What is the screen size of your mobile device?'], palette="Set1")
```

```
Out[32]: <AxesSubplot:xlabel='9 What is the screen size of your mobile device?', ylabel='count'>
```

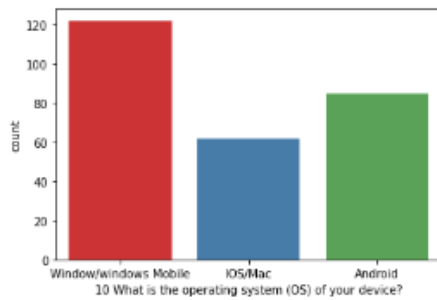


```
In [33]: Cdf['10 What is the operating system (OS) of your device?'].value_counts()
```

```
Out[33]: Window/windows Mobile  122
Android                        85
IOS/Mac                       62
Name: 10 What is the operating system (OS) of your device?, dtype: int64
```

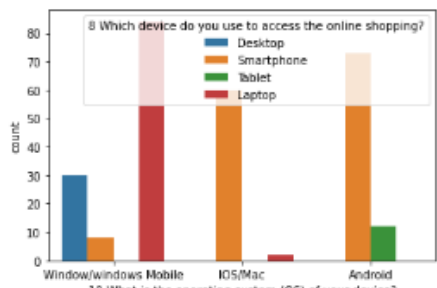
```
In [34]: sns.countplot(Cdf['10 What is the operating system (OS) of your device?'], palette="Set1")
```

```
Out[34]: <AxesSubplot:xlabel='10 What is the operating system (OS) of your device?', ylabel='count'>
```



```
In [35]: sns.countplot(Cdf['10 What is the operating system (OS) of your device?'], hue=Cdf['8 Which device do you use to access the online shopping?'])
```

```
Out[35]: <AxesSubplot:xlabel='10 What is the operating system (OS) of your device?', ylabel='count'>
```

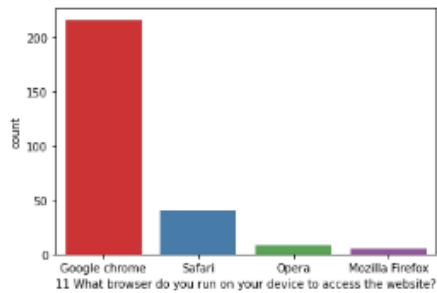


```
In [36]: Cdf['11 What browser do you run on your device to access the website?'].value_counts()
```

```
Out[36]: Google chrome    216  
Safari    40  
Opera    8  
Mozilla Firefox    5  
Name: 11 What browser do you run on your device to access the website?, dtype: int64
```

```
In [37]: sns.countplot(Cdf['11 What browser do you run on your device to access the website?'], palette="Set1")
```

```
Out[37]: <AxesSubplot:xlabel='11 What browser do you run on your device to access the website?', ylabel='count'>
```



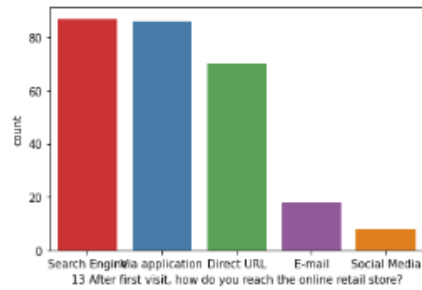
```
In [38]: sns.countplot(Cdf['11 What browser do you run on your device to access the website?'], hue=Cdf['8 Which device do you use to acc
```

```
Out[38]: <AxesSubplot:xlabel='11 What browser do you run on your device to access the website?', ylabel='count'>
```



```
In [39]: Cdf['12 Which channel did you follow to arrive at your favorite online store for the first time?'].value_counts()
```

```
Out[39]: Search Engine    230  
Content Marketing    20  
Display Adverts    19  
Name: 12 Which channel did you follow to arrive at your favorite online store for the first time?, dtype: int64
```

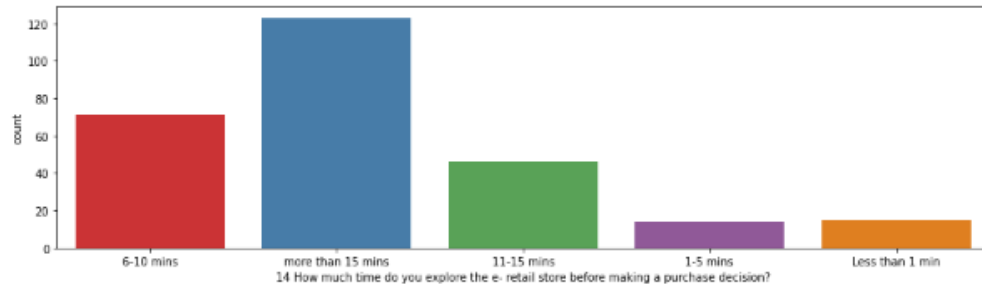



```
In [43]: Cdf['14 How much time do you explore the e- retail store before making a purchase decision?'].value_counts()
```

```
Out[43]: more than 15 mins    123
        6-10 mins          71
        11-15 mins         46
        Less than 1 min     15
        1-5 mins           14
        Name: 14 How much time do you explore the e- retail store before making a purchase decision?, dtype: int64
```

```
In [44]: plt.figure(figsize=(15,4),facecolor='white')
        sns.countplot(Cdf['14 How much time do you explore the e- retail store before making a purchase decision?'], palette="Set1")
```

```
Out[44]: <AxesSubplot:xlabel='14 How much time do you explore the e- retail store before making a purchase decision?', ylabel='count'>
```



```
In [45]: Cdf['15 What is your preferred payment Option?'].value_counts()
```

```
Out[45]: Credit/Debit cards    148
        Cash on delivery (CoD)  76
        E-wallets (Paytm, Freecharge etc.)  45
        Name: 15 What is your preferred payment Option?, dtype: int64
```

```
In [46]: plt.figure(figsize=(10,4),facecolor='white')
        sns.countplot(Cdf['15 What is your preferred payment Option?'], palette="Set1")
```

```
Out[46]: <AxesSubplot:xlabel='15 What is your preferred payment Option?', ylabel='count'>
```



Based on the above graphs it is observed that:

- Majority of the consumers have been shopping for over 4 years and have made less than 10 purchases in the last 1 year.
- Smartphone and mobile internet are the most popular means of accessing ecommerce websites, with most common screen size being 5.5 inches or greater.
- Windows operating system is the most popular on Laptop/Desktop devices while android is the most popular OS on smartphone devices followed by iOS.
- Google Chrome is the most popular web Browser, especially on portable devices, followed by Safari.
- Search Engine is the most common means of arriving at the E commerce websites, followed by Application and Direct URL.
- Most consumers spend over 15 mins browsing an e-commerce website before making a purchase decision.

Consumer Hesitation

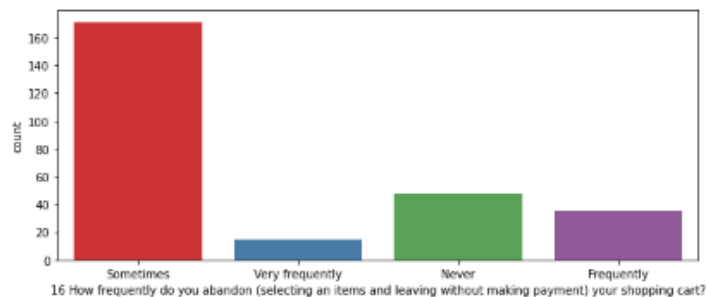
Various factors/reasons which contributed to consumers' hesitation to complete a purchase online were analysed from the data provided under the columns of the dataframe.

```
In [47]: Cdf['16 How frequently do you abandon (selecting an items and leaving without making payment) your shopping cart?'].value_counts
```

```
Out[47]: Sometimes      171  
Never          48  
Frequently      35  
Very frequently   15  
Name: 16 How frequently do you abandon (selecting an items and leaving without making payment) your shopping cart?, dtype: int64
```

```
In [48]: plt.figure(figsize=(10,4),facecolor='white')  
sns.countplot(Cdf['16 How frequently do you abandon (selecting an items and leaving without making payment) your shopping cart?'])
```

```
Out[48]: <AxesSubplot:xlabel='16 How frequently do you abandon (selecting an items and leaving without making payment) your shopping cart?', ylabel='count'>
```

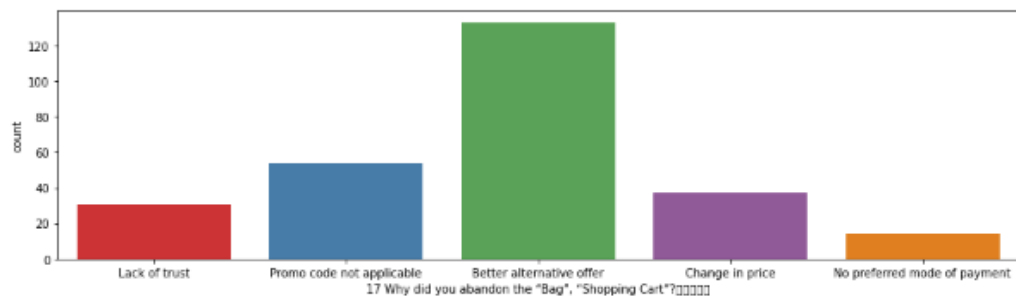


```
In [49]: Cdf['17 Why did you abandon the "Bag", "Shopping Cart"?\t\t\t\t\t'].value_counts()
```

```
Out[49]: Better alternative offer      133  
Promo code not applicable             54  
Change in price                      37  
Lack of trust                       31  
No preferred mode of payment         14  
Name: 17 Why did you abandon the "Bag", "Shopping Cart"?\t\t\t\t\t, dtype: int64
```

```
In [50]: plt.figure(figsize=(15,4),facecolor='white')  
sns.countplot(Cdf['17 Why did you abandon the "Bag", "Shopping Cart"?\t\t\t\t\t'], palette="Set1")
```

```
Out[50]: <AxesSubplot:xlabel='17 Why did you abandon the "Bag", "Shopping Cart"?\t\t\t\t\t', ylabel='count'>
```



Based on the above graphs it is observed that:

- Consumers sometimes abandon items in shopping cart.
- Finding a better alternative offer is the most common reason behind why consumers abandon items on a particular e-commerce website.

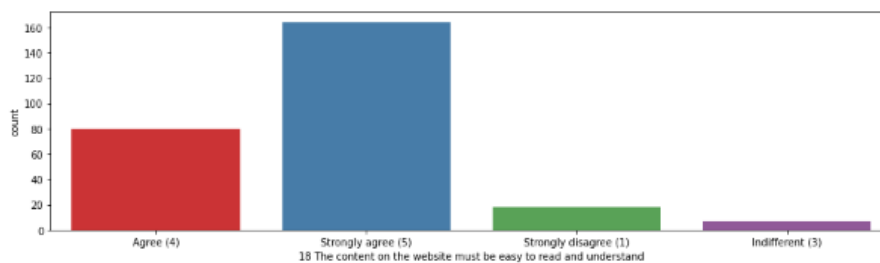
Consumer opinions on Website Features

Analyzing the opinions of the participants on the various features of the e-commerce websites.

```
In [51]: Cdf['18 The content on the website must be easy to read and understand'].value_counts()
```

```
Out[51]: Strongly agree (5)    164
         Agree (4)             80
         Strongly disagree (1)  18
         Indifferent (3)        7
         Name: 18 The content on the website must be easy to read and understand, dtype: int64
```

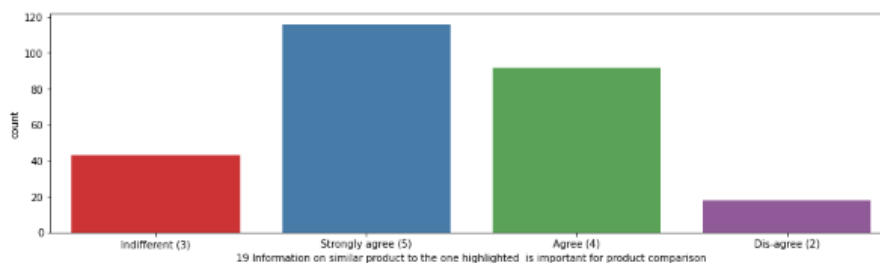
```
In [52]: plt.figure(figsize=(15,4),facecolor='white')
         sns.countplot(Cdf['18 The content on the website must be easy to read and understand'], palette="Set1")
Out[52]: <AxesSubplot: xlabel='18 The content on the website must be easy to read and understand', ylabel='count'>
```



```
In [53]: Cdf['19 Information on similar product to the one highlighted is important for product comparison'].value_counts()
```

```
Out[53]: Strongly agree (5)    116
         Agree (4)             92
         Indifferent (3)        43
         Dis-agree (2)         18
         Name: 19 Information on similar product to the one highlighted is important for product comparison, dtype: int64
```

```
In [54]: plt.figure(figsize=(15,4),facecolor='white')
         sns.countplot(Cdf['19 Information on similar product to the one highlighted is important for product comparison'], palette="Set1")
Out[54]: <AxesSubplot: xlabel='19 Information on similar product to the one highlighted is important for product comparison', ylabel='count'>
```

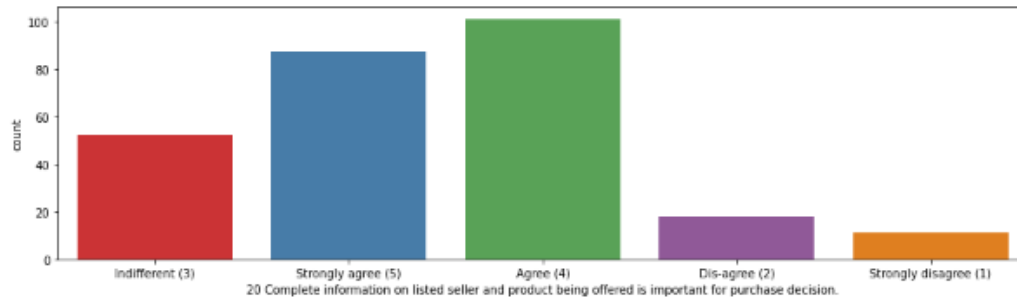


```
In [55]: Cdf['20 Complete information on listed seller and product being offered is important for purchase decision.'].value_counts()
```

```
Out[55]: Agree (4)             101
         Strongly agree (5)      87
         Indifferent (3)         52
         Dis-agree (2)          18
         Strongly disagree (1)   11
         Name: 20 Complete information on listed seller and product being offered is important for purchase decision., dtype: int64
```

```
In [56]: plt.figure(figsize=(15,4),facecolor='white')
sns.countplot(Cdf['20 Complete information on listed seller and product being offered is important for purchase decision.'], pal
```

```
Out[56]: <AxesSubplot:xlabel='20 Complete information on listed seller and product being offered is important for purchase decision.', y
label='count'>
```

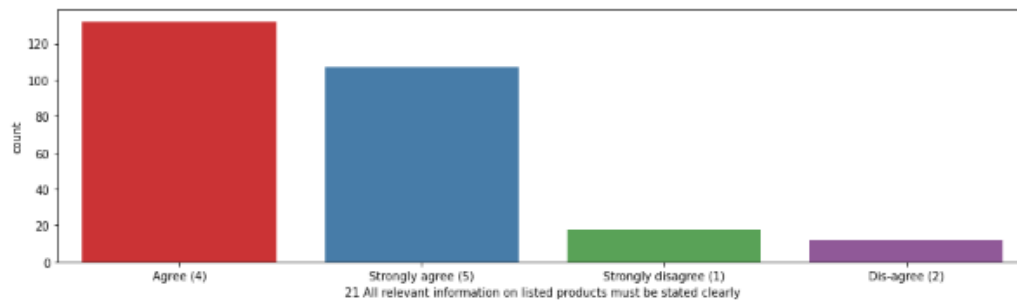


```
In [57]: Cdf['21 All relevant information on listed products must be stated clearly'].value_counts()
```

```
Out[57]: Agree (4)          132
Strongly agree (5)        107
Strongly disagree (1)      18
Dis-agree (2)             12
Name: 21 All relevant information on listed products must be stated clearly, dtype: int64
```

```
In [58]: plt.figure(figsize=(15,4),facecolor='white')
sns.countplot(Cdf['21 All relevant information on listed products must be stated clearly'], palette="Set1")
```

```
Out[58]: <AxesSubplot:xlabel='21 All relevant information on listed products must be stated clearly', ylabel='count'>
```

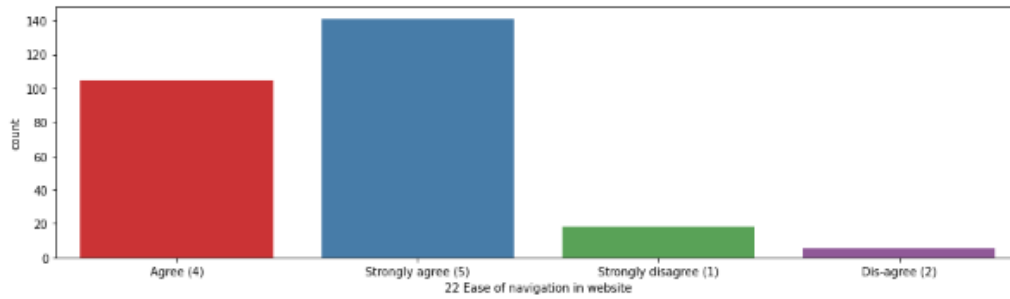


```
In [59]: Cdf['22 Ease of navigation in website'].value_counts()
```

```
Out[59]: Strongly agree (5)      141
Agree (4)          105
Strongly disagree (1)  18
Dis-agree (2)         5
Name: 22 Ease of navigation in website, dtype: int64
```

```
In [60]: plt.figure(figsize=(15,4),facecolor='white')
sns.countplot(Cdf['22 Ease of navigation in website'], palette="Set1")

Out[60]: <AxesSubplot:xlabel='22 Ease of navigation in website', ylabel='count'>
```

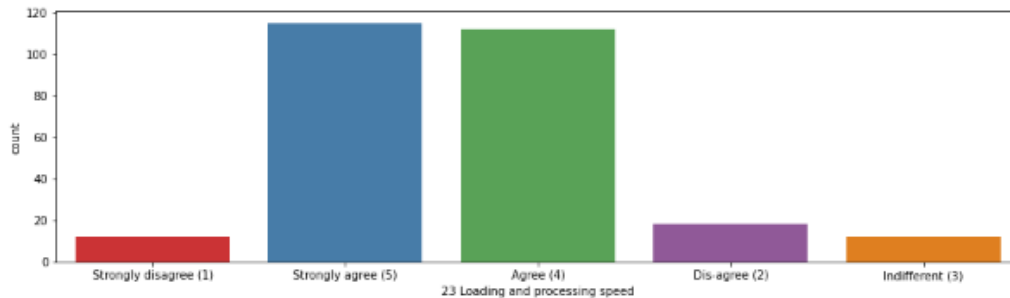


```
In [61]: Cdf['23 Loading and processing speed'].value_counts()
```

```
Out[61]: Strongly agree (5)      115
Agree (4)      112
Dis-agree (2)   18
Indifferent (3) 12
Strongly disagree (1) 12
Name: 23 Loading and processing speed, dtype: int64
```

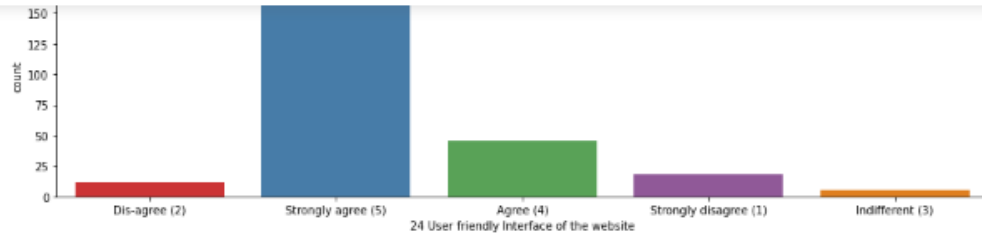
```
In [62]: plt.figure(figsize=(15,4),facecolor='white')
sns.countplot(Cdf['23 Loading and processing speed'], palette="Set1")
```

```
Out[62]: <AxesSubplot:xlabel='23 Loading and processing speed', ylabel='count'>
```



```
In [63]: Cdf['24 User friendly Interface of the website'].value_counts()
```

```
Out[63]: Strongly agree (5)      189
Agree (4)      45
Strongly disagree (1)   18
Dis-agree (2)      12
Indifferent (3)        5
Name: 24 User friendly Interface of the website, dtype: int64
```

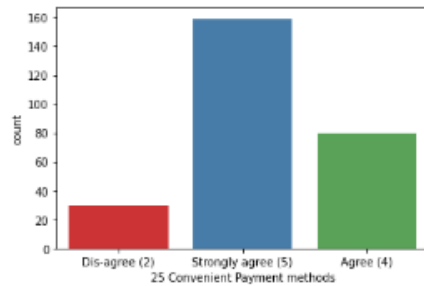


```
In [65]: Cdf['25 Convenient Payment methods'].value_counts()
```

```
Out[65]: Strongly agree (5)    159
         Agree (4)           88
         Dis-agree (2)        30
         Name: 25 Convenient Payment methods, dtype: int64
```

```
In [66]: sns.countplot(Cdf['25 Convenient Payment methods'], palette="Set1") |
```

```
Out[66]: <AxesSubplot:xlabel='25 Convenient Payment methods', ylabel='count'>
```

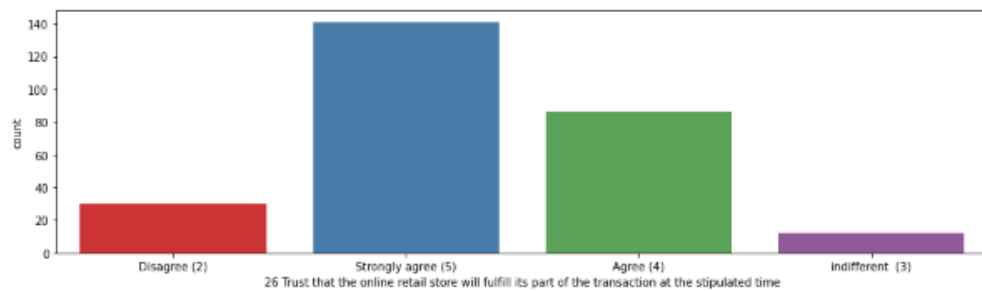


```
In [67]: Cdf['26 Trust that the online retail store will fulfill its part of the transaction at the stipulated time'].value_counts()
```

```
Out[67]: Strongly agree (5)    141
         Agree (4)           86
         Disagree (2)        30
         Indifferent (3)      12
         Name: 26 Trust that the online retail store will fulfill its part of the transaction at the stipulated time, dtype: int64
```

```
In [68]: plt.figure(figsize=(15,4),facecolor='white')
         sns.countplot(Cdf['26 Trust that the online retail store will fulfill its part of the transaction at the stipulated time'], palette="Set1")
```

```
Out[68]: <AxesSubplot:xlabel='26 Trust that the online retail store will fulfill its part of the transaction at the stipulated time', ylabel='count'>
```

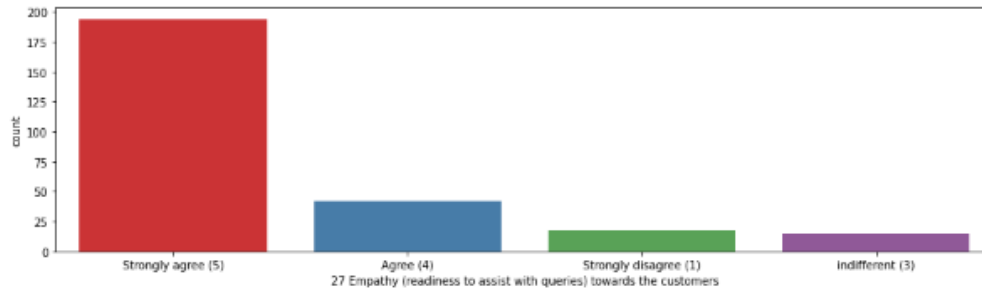


```
In [69]: Cdf['27 Empathy (readiness to assist with queries) towards the customers'].value_counts()
```

```
Out[69]: Strongly agree (5)    194  
         Agree (4)           42  
         Strongly disagree (1) 18  
         Indifferent (3)      15  
         Name: 27 Empathy (readiness to assist with queries) towards the customers, dtype: int64
```

```
In [70]: plt.figure(figsize=(15,4),facecolor='white')  
         sns.countplot(Cdf['27 Empathy (readiness to assist with queries) towards the customers'], palette="Set1")
```

```
Out[70]: <AxesSubplot:xlabel='27 Empathy (readiness to assist with queries) towards the customers', ylabel='count'>
```

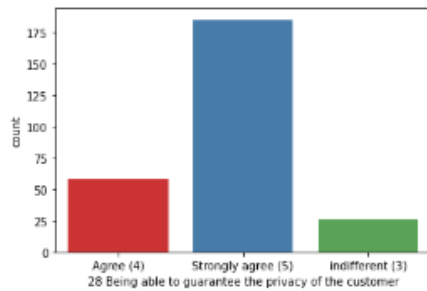


```
In [71]: Cdf['28 Being able to guarantee the privacy of the customer'].value_counts()
```

```
Out[71]: Strongly agree (5)    185  
         Agree (4)           58  
         Indifferent (3)      26  
         Name: 28 Being able to guarantee the privacy of the customer, dtype: int64
```

```
In [72]: sns.countplot(Cdf['28 Being able to guarantee the privacy of the customer'], palette="Set1")
```

```
Out[72]: <AxesSubplot:xlabel='28 Being able to guarantee the privacy of the customer', ylabel='count'>
```

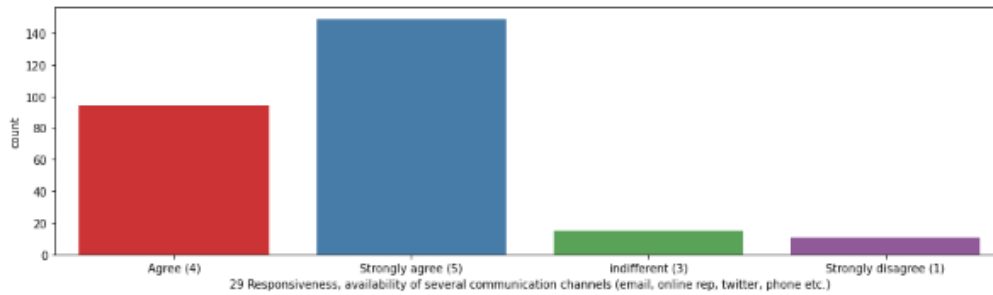


```
In [73]: Cdf['29 Responsiveness, availability of several communication channels (email, online rep, twitter, phone etc.)'].value_counts()
```

```
Out[73]: Strongly agree (5)    149  
         Agree (4)           94  
         Indifferent (3)      15  
         Strongly disagree (1) 11  
         Name: 29 Responsiveness, availability of several communication channels (email, online rep, twitter, phone etc.), dtype: int64
```



```
In [74]: plt.figure(figsize=(15,4),facecolor='white')
sns.countplot(Cdf['29 Responsiveness, availability of several communication channels (email, online rep, twitter, phone etc.)'],
Out[74]: <AxesSubplot:xlabel='29 Responsiveness, availability of several communication channels (email, online rep, twitter, phone et
c.)', ylabel='count'>
```

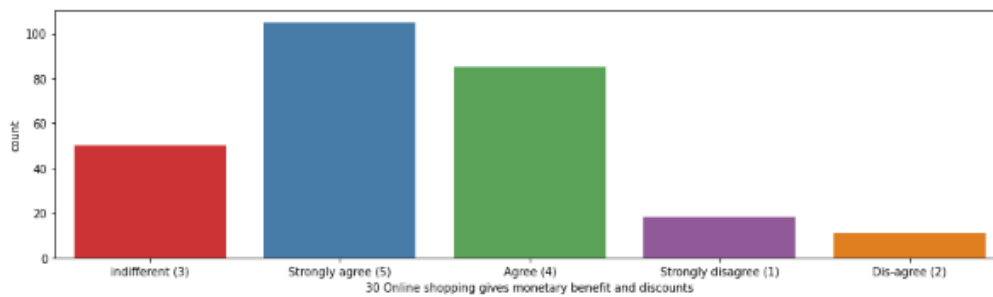


```
In [75]: Cdf['30 Online shopping gives monetary benefit and discounts'].value_counts()
```

```
Out[75]: Strongly agree (5)    105
Agree (4)    85
Indifferent (3)    50
Strongly disagree (1)    18
Dis-agree (2)    11
Name: 30 Online shopping gives monetary benefit and discounts, dtype: int64
```

```
In [76]: plt.figure(figsize=(15,4),facecolor='white')
sns.countplot(Cdf['30 Online shopping gives monetary benefit and discounts'], palette="Set1")
```

```
Out[76]: <AxesSubplot:xlabel='30 Online shopping gives monetary benefit and discounts', ylabel='count'>
```

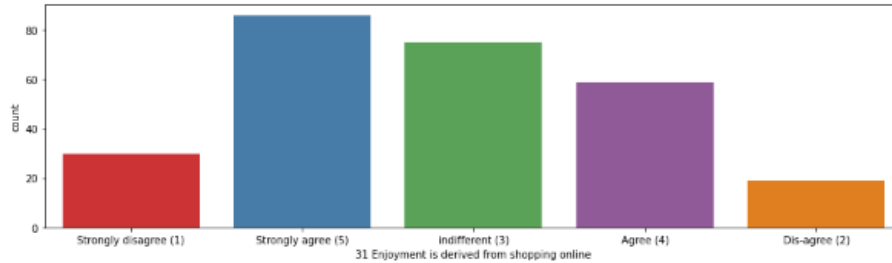


```
In [77]: Cdf['31 Enjoyment is derived from shopping online'].value_counts()
```

```
Out[77]: Strongly agree (5)      86  
Indifferent (3)      75  
Agree (4)      59  
Strongly disagree (1)  30  
Dis-agree (2)      19  
Name: 31 Enjoyment is derived from shopping online, dtype: int64
```

```
In [78]: plt.figure(figsize=(15,4),facecolor='white')  
sns.countplot(Cdf['31 Enjoyment is derived from shopping online'], palette="Set1")
```

```
Out[78]: <AxesSubplot:xlabel='31 Enjoyment is derived from shopping online', ylabel='count'>
```

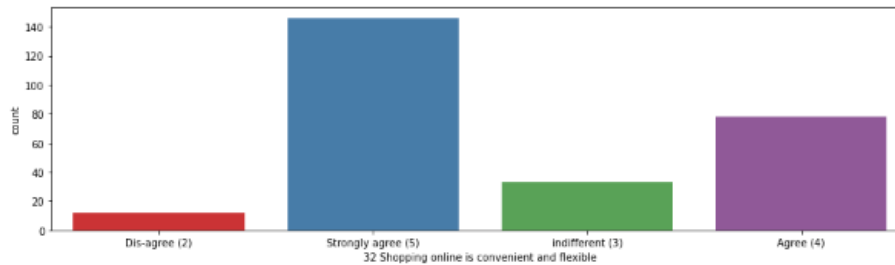


```
In [79]: Cdf['32 Shopping online is convenient and flexible'].value_counts()
```

```
Out[79]: Strongly agree (5)      146  
Agree (4)      78  
Indifferent (3)      33  
Dis-agree (2)      12  
Name: 32 Shopping online is convenient and flexible, dtype: int64
```

```
In [80]: plt.figure(figsize=(15,4),facecolor='white')  
sns.countplot(Cdf['32 Shopping online is convenient and flexible'], palette="Set1")
```

```
Out[80]: <AxesSubplot:xlabel='32 Shopping online is convenient and flexible', ylabel='count'>
```

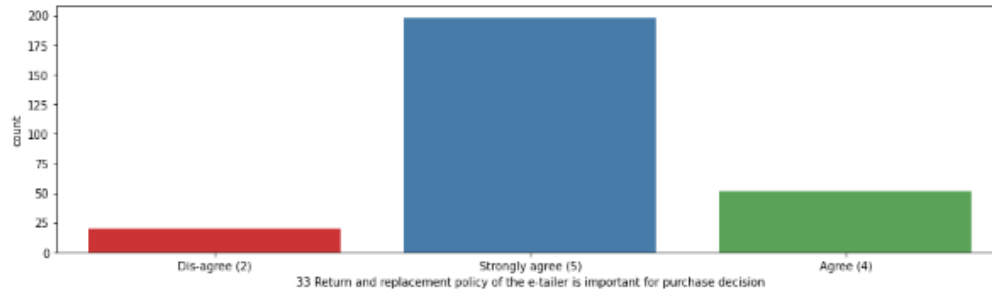


```
In [81]: Cdf['33 Return and replacement policy of the e-tailer is important for purchase decision'].value_counts()
```

```
Out[81]: Strongly agree (5)    198  
        Agree (4)            51  
        Dis-agree (2)        20  
        Name: 33 Return and replacement policy of the e-tailer is important for purchase decision, dtype: int64
```

```
In [82]: plt.figure(figsize=(15,4),facecolor='white')  
        sns.countplot(Cdf['33 Return and replacement policy of the e-tailer is important for purchase decision'], palette="Set1")
```

```
Out[82]: <AxesSubplot:xlabel='33 Return and replacement policy of the e-tailer is important for purchase decision', ylabel='count'>
```

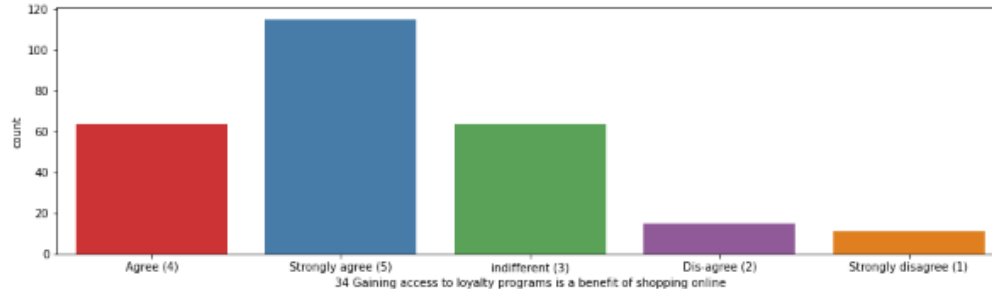


```
In [83]: Cdf['34 Gaining access to loyalty programs is a benefit of shopping online'].value_counts()
```

```
Out[83]: Strongly agree (5)    115  
        Agree (4)            64  
        Indifferent (3)       64  
        Dis-agree (2)        15  
        Strongly disagree (1)  11  
        Name: 34 Gaining access to loyalty programs is a benefit of shopping online, dtype: int64
```

```
In [84]: plt.figure(figsize=(15,4),facecolor='white')  
        sns.countplot(Cdf['34 Gaining access to loyalty programs is a benefit of shopping online'], palette="Set1")
```

```
Out[84]: <AxesSubplot:xlabel='34 Gaining access to loyalty programs is a benefit of shopping online', ylabel='count'>
```

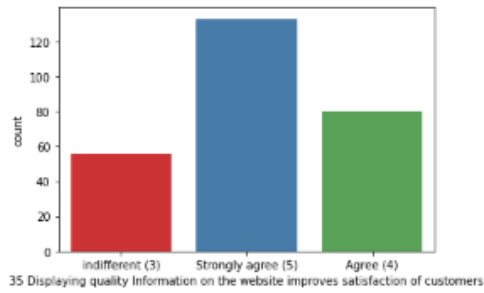


```
In [85]: Cdf['35 Displaying quality Information on the website improves satisfaction of customers'].value_counts()
```

```
Out[85]: Strongly agree (5)    133  
        Agree (4)            80  
        Indifferent (3)       56  
        Name: 35 Displaying quality Information on the website improves satisfaction of customers, dtype: int64
```

```
In [86]: sns.countplot(Cdf['35 Displaying quality Information on the website improves satisfaction of customers'], palette="Set1")
```

```
Out[86]: <AxesSubplot:xlabel='35 Displaying quality Information on the website improves satisfaction of customers', ylabel='count'>
```

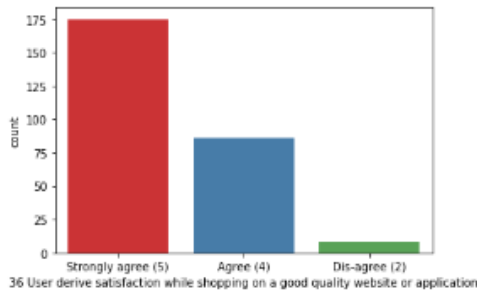


```
In [87]: Cdf['36 User derive satisfaction while shopping on a good quality website or application'].value_counts()
```

```
Out[87]: Strongly agree (5)    175  
Agree (4)                    86  
Dis-agree (2)                 8  
Name: 36 User derive satisfaction while shopping on a good quality website or application, dtype: int64
```

```
In [88]: sns.countplot(Cdf['36 User derive satisfaction while shopping on a good quality website or application'], palette="Set1")
```

```
Out[88]: <AxesSubplot:xlabel='36 User derive satisfaction while shopping on a good quality website or application', ylabel='count'>
```



```
In [89]: Cdf['37 Net Benefit derived from shopping online can lead to users satisfaction'].value_counts()
```

```
Out[89]: Strongly agree (5)    164  
Agree (4)                    54  
Indifferent (3)              48  
Dis-agree (2)                11  
Name: 37 Net Benefit derived from shopping online can lead to users satisfaction, dtype: int64
```

```
In [90]: sns.countplot(Cdf['37 Net Benefit derived from shopping online can lead to users satisfaction'], palette="Set1")
```

```
Out[90]: <AxesSubplot:xlabel='37 Net Benefit derived from shopping online can lead to users satisfaction', ylabel='count'>
```

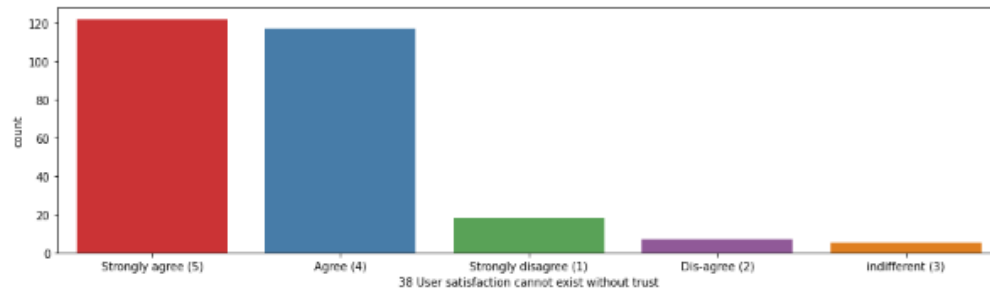


```
In [91]: Cdf['38 User satisfaction cannot exist without trust'].value_counts()
```

```
Out[91]: Strongly agree (5)    122  
Agree (4)    117  
Strongly disagree (1)    18  
Dis-agree (2)    7  
Indifferent (3)    5  
Name: 38 User satisfaction cannot exist without trust, dtype: int64
```

```
In [92]: plt.figure(figsize=(15,4),facecolor='white')  
sns.countplot(Cdf['38 User satisfaction cannot exist without trust'], palette="Set1")
```

```
Out[92]: <AxesSubplot:xlabel='38 User satisfaction cannot exist without trust', ylabel='count'>
```

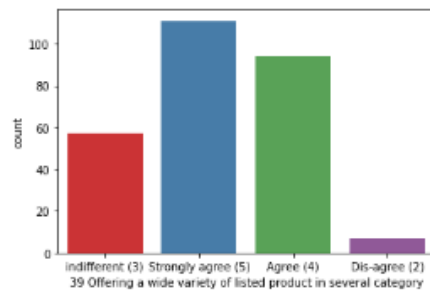


```
In [93]: Cdf['39 Offering a wide variety of listed product in several category'].value_counts()
```

```
Out[93]: Strongly agree (5)    111  
Agree (4)    94  
Indifferent (3)    57  
Dis-agree (2)    7  
Name: 39 Offering a wide variety of listed product in several category, dtype: int64
```

```
In [94]: sns.countplot(Cdf['39 Offering a wide variety of listed product in several category'], palette="Set1")
```

```
Out[94]: <AxesSubplot:xlabel='39 Offering a wide variety of listed product in several category', ylabel='count'>
```

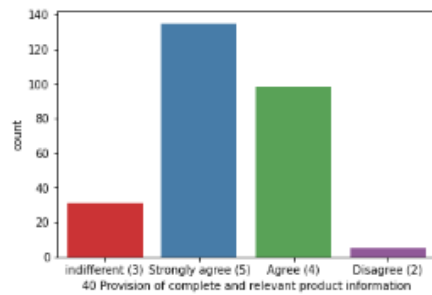


```
In [95]: Cdf['40 Provision of complete and relevant product information'].value_counts()
```

```
Out[95]: Strongly agree (5)    135  
Agree (4)    98  
Indifferent (3)    31  
Disagree (2)    5  
Name: 40 Provision of complete and relevant product information, dtype: int64
```

```
In [96]: sns.countplot(Cdf['40 Provision of complete and relevant product information'], palette="Set1")
```

```
Out[96]: <AxesSubplot:xlabel='40 Provision of complete and relevant product information', ylabel='count'>
```

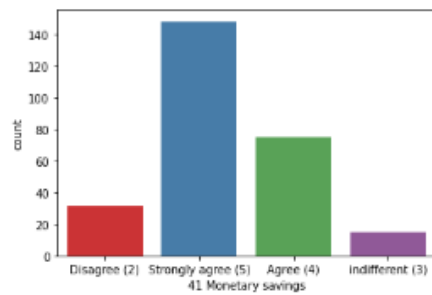


```
In [97]: Cdf['41 Monetary savings'].value_counts()
```

```
Out[97]: Strongly agree (5)    148  
Agree (4)                    75  
Disagree (2)                  31  
indifferent (3)               15  
Name: 41 Monetary savings, dtype: int64
```

```
In [98]: sns.countplot(Cdf['41 Monetary savings'], palette="Set1")
```

```
Out[98]: <AxesSubplot:xlabel='41 Monetary savings', ylabel='count'>
```

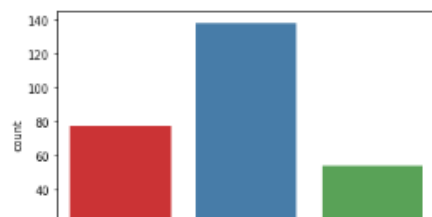


```
In [99]: Cdf['42 The Convenience of patronizing the online retailer'].value_counts()
```

```
Out[99]: Agree (4)            138  
indifferent (3)              77  
Strongly agree (5)          54  
Name: 42 The Convenience of patronizing the online retailer, dtype: int64
```

```
In [100]: sns.countplot(Cdf['42 The Convenience of patronizing the online retailer'], palette="Set1")
```

```
Out[100]: <AxesSubplot:xlabel='42 The Convenience of patronizing the online retailer', ylabel='count'>
```

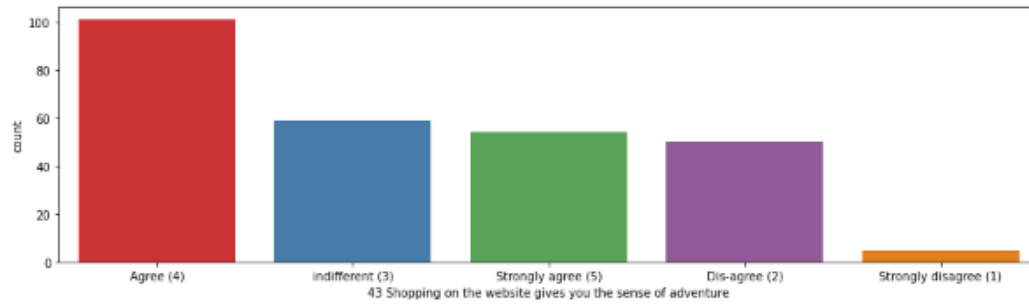


```
In [101]: Cdf['43 Shopping on the website gives you the sense of adventure'].value_counts()
```

```
Out[101]: Agree (4)          101  
Indifferent (3)           59  
Strongly agree (5)        54  
Dis-agree (2)            50  
Strongly disagree (1)      5  
Name: 43 Shopping on the website gives you the sense of adventure, dtype: int64
```

```
In [102]: plt.figure(figsize=(15,4),facecolor='white')  
sns.countplot(Cdf['43 Shopping on the website gives you the sense of adventure'], palette="Set1")
```

```
Out[102]: <AxesSubplot:xlabel='43 Shopping on the website gives you the sense of adventure', ylabel='count'>
```

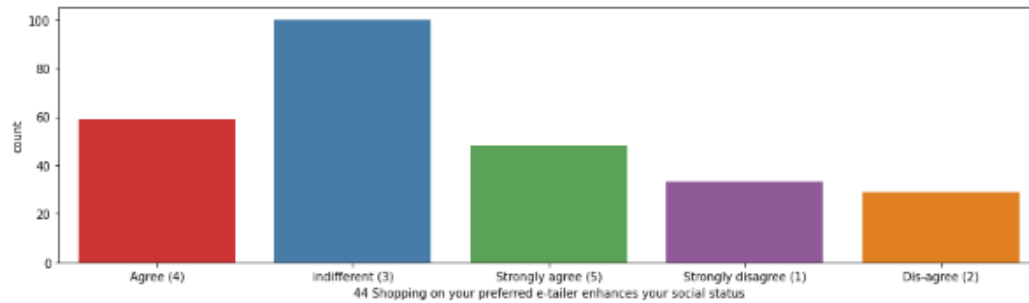


```
In [103]: Cdf['44 Shopping on your preferred e-tailer enhances your social status'].value_counts()
```

```
Out[103]: Indifferent (3)      100  
Agree (4)          59  
Strongly agree (5)  48  
Strongly disagree (1) 33  
Dis-agree (2)       29  
Name: 44 Shopping on your preferred e-tailer enhances your social status, dtype: int64
```

```
In [104]: plt.figure(figsize=(15,4),facecolor='white')  
sns.countplot(Cdf['44 Shopping on your preferred e-tailer enhances your social status'], palette="Set1")
```

```
Out[104]: <AxesSubplot:xlabel='44 Shopping on your preferred e-tailer enhances your social status', ylabel='count'>
```

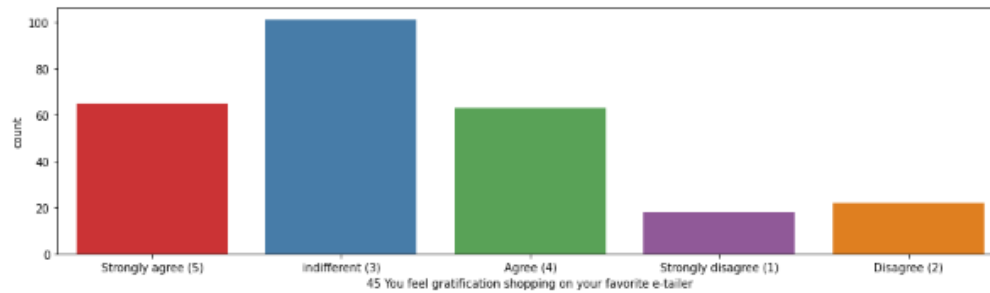


```
In [105]: Cdf['45 You feel gratification shopping on your favorite e-tailer'].value_counts()
```

```
Out[105]: Indifferent (3)      101  
Strongly agree (5)          65  
Agree (4)                   63  
Disagree (2)                22  
Strongly disagree (1)       18  
Name: 45 You feel gratification shopping on your favorite e-tailer, dtype: int64
```

```
In [106]: plt.figure(figsize=(15,4),facecolor='white')
sns.countplot(Cdf['45 You feel gratification shopping on your favorite e-tailer'], palette="Set1")

Out[106]: <AxesSubplot:xlabel='45 You feel gratification shopping on your favorite e-tailer', ylabel='count'>
```

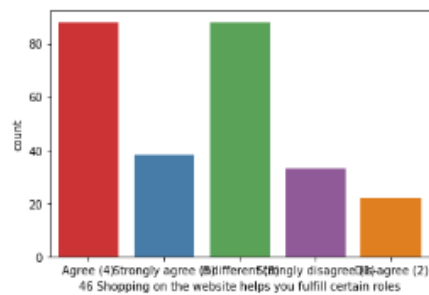


```
In [107]: Cdf['46 Shopping on the website helps you fulfill certain roles'].value_counts()

Out[107]: Agree (4)          88
Indifferent (3)          88
Strongly agree (5)       38
Strongly disagree (1)    33
Dis-agree (2)           22
Name: 46 Shopping on the website helps you fulfill certain roles, dtype: int64
```

```
In [108]: sns.countplot(Cdf['46 Shopping on the website helps you fulfill certain roles'], palette="Set1")

Out[108]: <AxesSubplot:xlabel='46 Shopping on the website helps you fulfill certain roles', ylabel='count'>
```

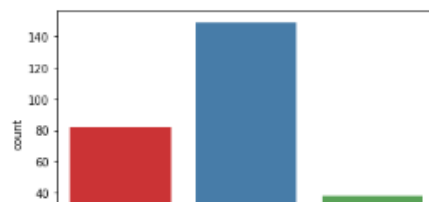


```
In [109]: Cdf['47 Getting value for money spent'].value_counts()

Out[109]: Agree (4)          149
Strongly agree (5)       82
Indifferent (3)          38
Name: 47 Getting value for money spent, dtype: int64
```

```
In [110]: sns.countplot(Cdf['47 Getting value for money spent'], palette="Set1")

Out[110]: <AxesSubplot:xlabel='47 Getting value for money spent', ylabel='count'>
```



From the graphs above the following observations are made:

- Majority of the consumers strongly agree that:
 - The content on the website must be easy to read and understand
 - Information on similar product to the one highlighted is important for product comparison
 - Complete information on listed seller and product being offered is important for purchase decision
 - All relevant information on listed products must be stated clearly
 - Navigation in website should be easy
 - Loading and processing should be quick
 - Interface of the website must be user friendly
 - Convenient Payment methods should be available
 - There is trust in the online retail store fulfilling its part of the transaction at the stipulated time
 - There should be Empathy (readiness to assist with queries) towards the customers
 - Online retail store should be able to guarantee the privacy of the customer
 - There should be Responsiveness, availability of several communication channels (email, online rep, twitter, phone etc.)
 - Online shopping gives monetary benefit and discounts
 - Enjoyment is derived from shopping online
 - Shopping online is convenient and flexible
 - Return and replacement policy of the e-tailer is important for purchase decision
 - Gaining access to loyalty programs is a benefit of shopping online
 - Displaying quality Information on the website improves satisfaction of customers
 - User derive satisfaction while shopping on a good quality website or application
 - Net Benefit is derived from shopping online can lead to users satisfaction
 - User satisfaction cannot exist without trust
 - E commerce websites must Offer a wide variety of listed product in several category
 - There should be Provision of complete and relevant product information
 - Monetary savings must be considerable

-
- The Convenience of patronizing the online retailer
 - Shopping on the website gives you the sense of adventure
 - Shopping on your preferred e-tailer enhances your social status
 - You feel gratification shopping on your favorite e-tailer
 - Shopping on the website helps you fulfill certain roles
 - Getting value for money spent is important

Consumer Ecommerce Website preferences and opinions

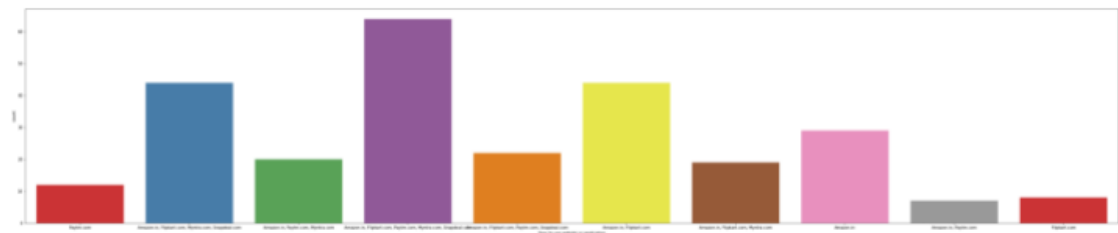
Analyzing the Preferences and opinions of the participants regarding the e-commerce websites.

```
In [113]: Cdf['Easy to use website or application'].value_counts()
```

```
Out[113]: Amazon.in, Flipkart.com, Paytm.com, Myntra.com, Snapdeal.com    64
Amazon.in, Flipkart.com, Myntra.com, Snapdeal.com                      44
Amazon.in, Flipkart.com                                                44
Amazon.in                                                            29
Amazon.in, Flipkart.com, Paytm.com, Snapdeal.com                      22
Amazon.in, Paytm.com, Myntra.com                                       20
Amazon.in, Flipkart.com, Myntra.com                                    19
Paytm.com                                                            12
Flipkart.com                                                         8
Amazon.in, Paytm.com                                                  7
Name: Easy to use website or application, dtype: int64
```

```
In [114]: plt.figure(figsize=(50,10),facecolor='white')
sns.countplot(Cdf['Easy to use website or application'], palette="Set1")
```

```
Out[114]: <AxesSubplot:xlabel='Easy to use website or application', ylabel='count'>
```

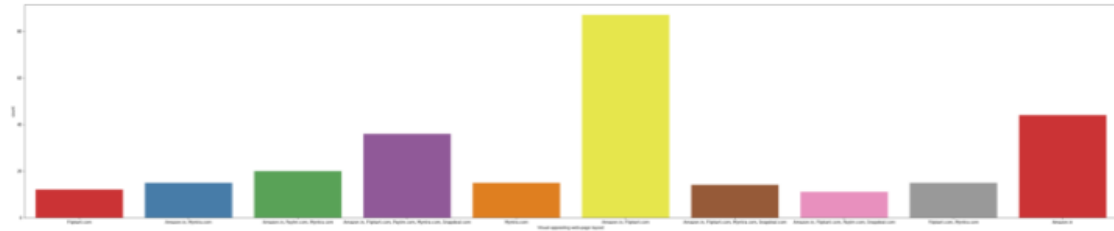


```
In [115]: Cdf['Visual appealing web-page layout'].value_counts()
```

```
Out[115]: Amazon.in, Flipkart.com    87
Amazon.in                            44
Amazon.in, Flipkart.com, Paytm.com, Myntra.com, Snapdeal.com    36
Amazon.in, Paytm.com, Myntra.com    20
Myntra.com                        15
Flipkart.com, Myntra.com            15
Amazon.in, Myntra.com                15
Amazon.in, Flipkart.com, Myntra.com, Snapdeal.com                14
Flipkart.com                    12
Amazon.in, Flipkart.com, Paytm.com, Snapdeal.com                11
Name: Visual appealing web-page layout, dtype: int64
```

```
In [116]: plt.figure(figsize=(50,10),facecolor='white')
sns.countplot(Cdf['Visual appealing web-page layout'], palette="Set1")
```

```
Out[116]: <AxesSubplot:xlabel='Visual appealing web-page layout', ylabel='count'>
```

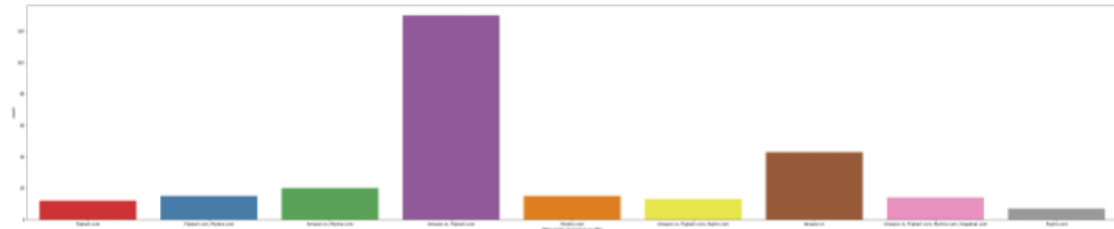


```
In [117]: Cdf['Wild variety of product on offer'].value_counts()
```

```
Out[117]: Amazon.in, Flipkart.com      130
Amazon.in      43
Amazon.in, Myntna.com      20
Myntna.com      15
Flipkart.com, Myntna.com      15
Amazon.in, Flipkart.com, Myntna.com, Snapdeal.com      14
Amazon.in, Flipkart.com, Paytm.com      13
Flipkart.com      12
Paytm.com      7
Name: Wild variety of product on offer, dtype: int64
```

```
In [118]: plt.figure(figsize=(50,10),facecolor='white')
sns.countplot(Cdf['Wild variety of product on offer'], palette="Set1")
```

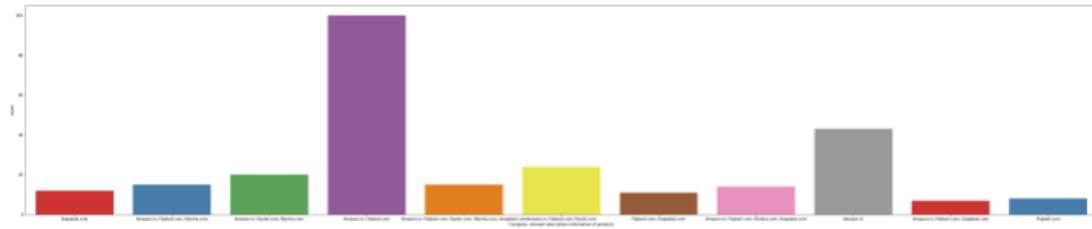
```
Out[118]: <AxesSubplot:xlabel='Wild variety of product on offer', ylabel='count'>
```



```
In [119]: Cdf['Complete, relevant description information of products'].value_counts()
```

```
Out[119]: Amazon.in, Flipkart.com      100
Amazon.in      43
Amazon.in, Flipkart.com, Paytm.com      24
Amazon.in, Paytm.com, Myntna.com      20
Amazon.in, Flipkart.com, Myntna.com      15
Amazon.in, Flipkart.com, Paytm.com, Myntna.com, Snapdeal.com      15
Amazon.in, Flipkart.com, Myntna.com, Snapdeal.com      14
Snapdeal.com      12
Flipkart.com, Snapdeal.com      11
Flipkart.com      8
Amazon.in, Flipkart.com, Snapdeal.com      7
Name: Complete, relevant description information of products, dtype: int64
```

Out[120]: <AxesSubplot:xlabel='Complete, relevant description information of products', ylabel='count'>

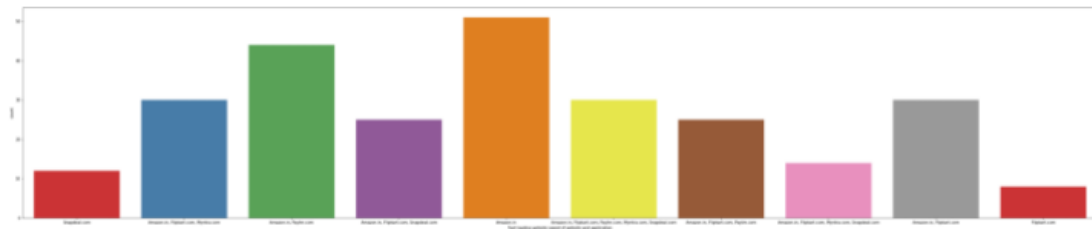


In [121]: Cdf['Fast loading website speed of website and application'].value_counts()

```
Out[121]: Amazon.in                    51
Amazon.in, Paytm.com                 44
Amazon.in, Flipkart.com               30
Amazon.in, Flipkart.com, Myntra.com   30
Amazon.in, Flipkart.com, Paytm.com, Myntra.com, Snapdeal.com 30
Amazon.in, Flipkart.com, Paytm.com    25
Amazon.in, Flipkart.com, Snapdeal.com 25
Amazon.in, Flipkart.com, Myntra.com, Snapdeal.com 14
Snapdeal.com                         12
Flipkart.com                         8
Name: Fast loading website speed of website and application, dtype: int64
```

In [122]: plt.figure(figsize=(50,10),facecolor='white')
sns.countplot(Cdf['Fast loading website speed of website and application'], palette="Set1")

Out[122]: <AxesSubplot:xlabel='Fast loading website speed of website and application', ylabel='count'>

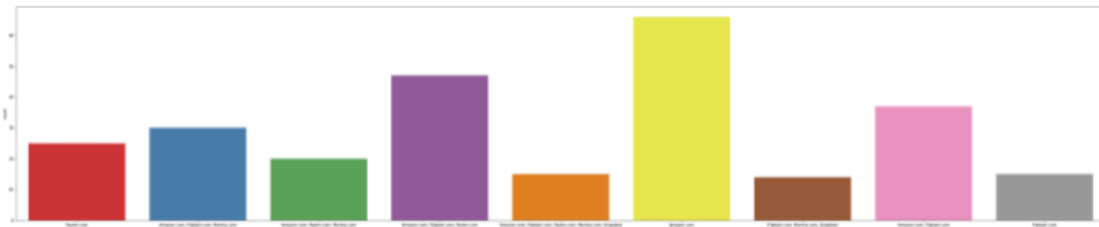


In [123]: Cdf['Quickness to complete purchase'].value_counts()

```
Out[123]: Amazon.com                    66
Amazon.com, Flipkart.com, Paytm.com   47
Amazon.com, Flipkart.com              37
Amazon.com, Flipkart.com, Myntra.com  30
Paytm.com                             25
Amazon.com, Paytm.com, Myntra.com     20
Flipkart.com                          15
Amazon.com, Flipkart.com, Paytm.com, Myntra.com, Snapdeal 15
Flipkart.com, Myntra.com, Snapdeal    14
Name: Quickness to complete purchase, dtype: int64
```

```
In [124]: plt.figure(figsize=(50,10),facecolor='white')
sns.countplot(Cdf['Quickness to complete purchase'], palette="Set1")
```

```
Out[124]: <AxesSubplot:xlabel='Quickness to complete purchase', ylabel='count'>
```

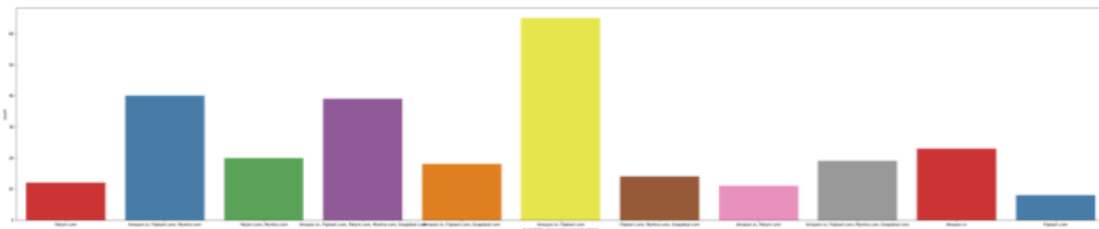


```
In [125]: Cdf['Availability of several payment options'].value_counts()
```

```
Out[125]: Amazon.in, Flipkart.com          65
Amazon.in, Flipkart.com, Myntara.com      40
Amazon.in, Flipkart.com, Patym.com, Myntara.com, Snapdeal.com  39
Amazon.in                               23
Patym.com, Myntara.com                    20
Amazon.in, Flipkart.com, Myntara.com, Snapdeal.com  19
Amazon.in, Flipkart.com, Snapdeal.com     18
Flipkart.com, Myntara.com, Snapdeal.com    14
Patym.com                                 12
Amazon.in, Patym.com                      11
Flipkart.com                             8
Name: Availability of several payment options, dtype: int64
```

```
In [126]: plt.figure(figsize=(50,10),facecolor='white')
sns.countplot(Cdf['Availability of several payment options'], palette="Set1")
```

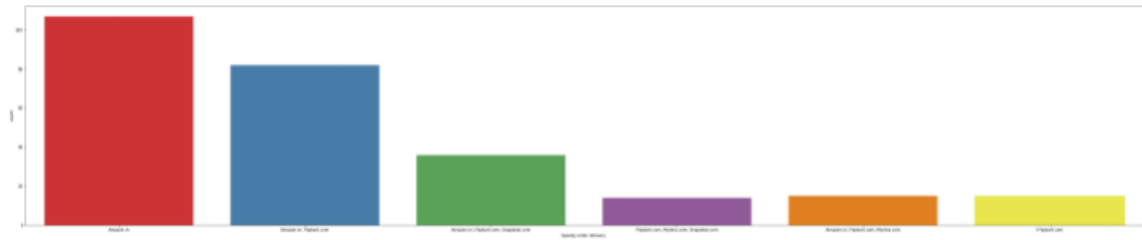
```
Out[126]: <AxesSubplot:xlabel='Availability of several payment options', ylabel='count'>
```



```
In [127]: Cdf['Speedy order delivery '].value_counts()
```

```
Out[127]: Amazon.in          107
Amazon.in, Flipkart.com      82
Amazon.in, Flipkart.com, Snapdeal.com  36
Flipkart.com                 15
Amazon.in, Flipkart.com, Myntara.com  15
Flipkart.com, Myntara.com, Snapdeal.com  14
Name: Speedy order delivery , dtype: int64
```

Out[128]: <AxesSubplot:xlabel='Speedy order delivery ', ylabel='count'>

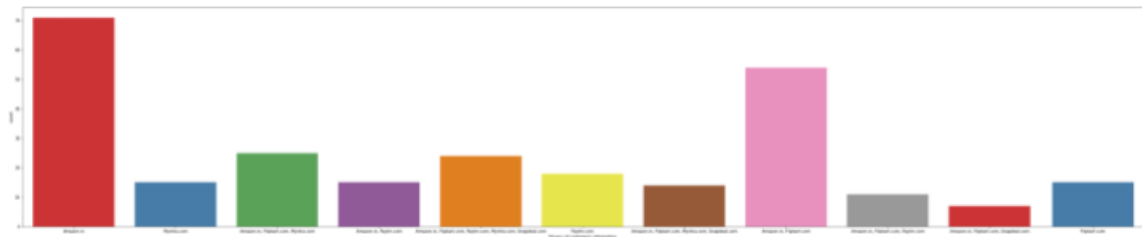


In [129]: Cdf['Privacy of customers' information'].value_counts()

Out[129]: Amazon.in 71
 Amazon.in, Flipkart.com 54
 Amazon.in, Flipkart.com, Myntra.com 25
 Amazon.in, Flipkart.com, Paytm.com, Myntra.com, Snapdeal.com 24
 Paytm.com 18
 Myntra.com 15
 Amazon.in, Paytm.com 15
 Flipkart.com 15
 Amazon.in, Flipkart.com, Myntra.com, Snapdeal.com 14
 Amazon.in, Flipkart.com, Paytm.com 11
 Amazon.in, Flipkart.com, Snapdeal.com 7
 Name: Privacy of customers' information, dtype: int64

In [130]: plt.figure(figsize=(50,10),facecolor='white')
 sns.countplot(Cdf['Privacy of customers' information'], palette="Set1")

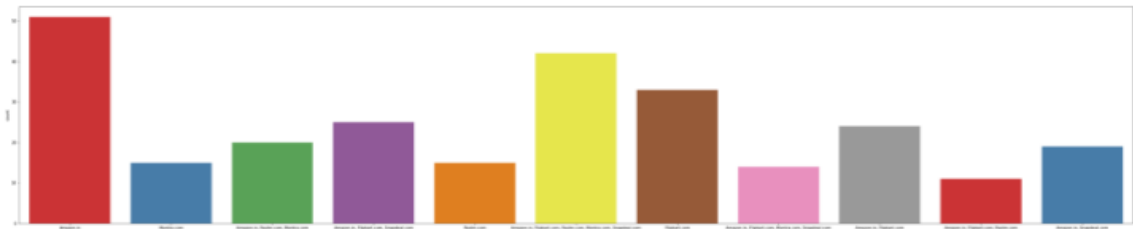
Out[130]: <AxesSubplot:xlabel='Privacy of customers' information', ylabel='count'>



In [131]: Cdf['Security of customer financial information'].value_counts()

Out[131]: Amazon.in 51
 Amazon.in, Flipkart.com, Paytm.com, Myntra.com, Snapdeal.com 42
 Flipkart.com 33
 Amazon.in, Flipkart.com, Snapdeal.com 25
 Amazon.in, Flipkart.com 24
 Amazon.in, Paytm.com, Myntra.com 20
 Amazon.in, Snapdeal.com 19
 Myntra.com 15
 Paytm.com 15
 Amazon.in, Flipkart.com, Myntra.com, Snapdeal.com 14
 Amazon.in, Flipkart.com, Paytm.com 11
 Name: Security of customer financial information, dtype: int64

```
Out[132]: <AxesSubplot:xlabel='Security of customer financial information', ylabel='count'>
```



```
In [133]: Cdf['Perceived Trustworthiness'].value_counts()
```

```
Out[133]: Amazon.in 76
Amazon.in, Flipkart.com, Snapdeal.com 36
Amazon.in, Mynta.com 35
Amazon.in, Flipkart.com 31
Flipkart.com 27
Amazon.in, Flipkart.com, Mynta.com, Snapdeal.com 25
Mynta.com 15
Amazon.in, Flipkart.com, Paytm.com, Mynta.com, Snapdeal.com 13
Amazon.in, Flipkart.com, Paytm.com 11
Name: Perceived Trustworthiness, dtype: int64
```

```
In [134]: plt.figure(figsize=(50,10),facecolor='white')
sns.countplot(Cdf['Perceived Trustworthiness'], palette="Set1")
```

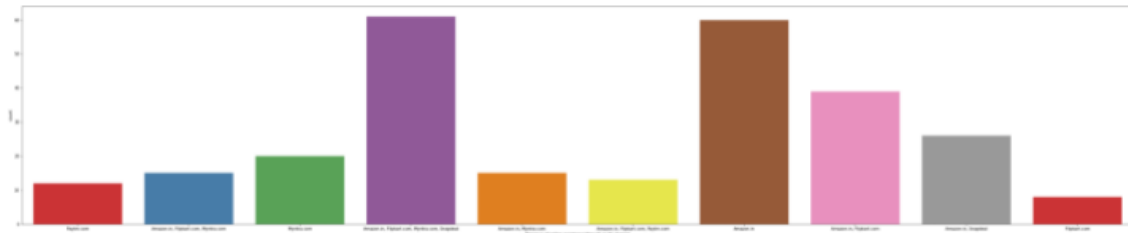
```
Out[134]: <AxesSubplot:xlabel='Perceived Trustworthiness', ylabel='count'>
```



```
In [135]: Cdf['Presence of online assistance through multi-channel'].value_counts()
```

```
Out[135]: Amazon.in, Flipkart.com, Mynta.com, Snapdeal 61
Amazon.in 60
Amazon.in, Flipkart.com 39
Amazon.in, Snapdeal 26
Mynta.com 20
Amazon.in, Flipkart.com, Mynta.com 15
Amazon.in, Mynta.com 15
Amazon.in, Flipkart.com, Paytm.com 13
Paytm.com 12
Flipkart.com 8
Name: Presence of online assistance through multi-channel, dtype: int64
```


Out[136]: <AxesSubplot:xlabel='Presence of online assistance through multi-channel', ylabel='count'>

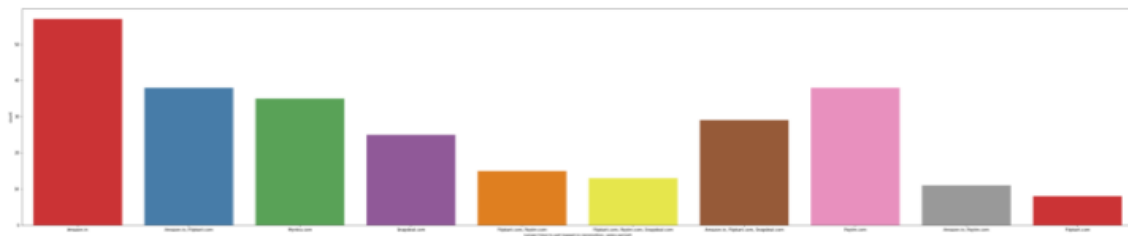


In [137]: Cdf['Longer time to get logged in (promotion, sales period)'].value_counts()

Out[137]: Amazon.in 57
 Amazon.in, Flipkart.com 38
 Paytm.com 38
 Myntra.com 35
 Amazon.in, Flipkart.com, Snapdeal.com 29
 Snapdeal.com 25
 Flipkart.com, Paytm.com 15
 Flipkart.com, Paytm.com, Snapdeal.com 13
 Amazon.in, Paytm.com 11
 Flipkart.com 8
 Name: Longer time to get logged in (promotion, sales period), dtype: int64

In [138]: plt.figure(figsize=(50,10),facecolor='white')
 sns.countplot(Cdf['Longer time to get logged in (promotion, sales period)'], palette="Set1")

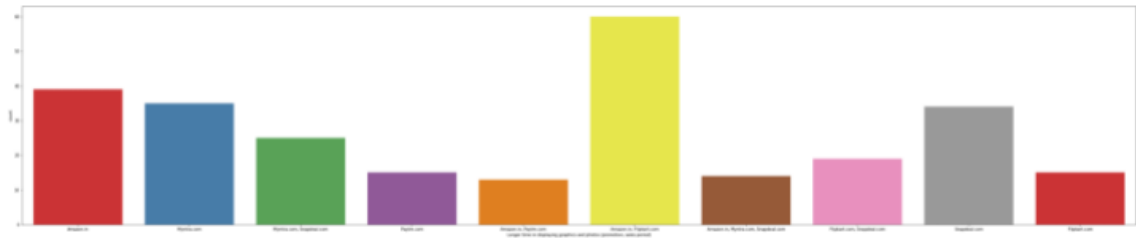
Out[138]: <AxesSubplot:xlabel='Longer time to get logged in (promotion, sales period)', ylabel='count'>



In [139]: Cdf['Longer time in displaying graphics and photos (promotion, sales period)'].value_counts()

Out[139]: Amazon.in, Flipkart.com 60
 Amazon.in 39
 Myntra.com 35
 Snapdeal.com 34
 Myntra.com, Snapdeal.com 25
 Flipkart.com, Snapdeal.com 19
 Flipkart.com 15
 Paytm.com 15
 Amazon.in, Myntra.com, Snapdeal.com 14
 Amazon.in, Paytm.com 13
 Name: Longer time in displaying graphics and photos (promotion, sales period), dtype: int64

```
Out[140]: <AxesSubplot:xlabel='Longer time in displaying graphics and photos (promotion, sales period)', ylabel='count'>
```

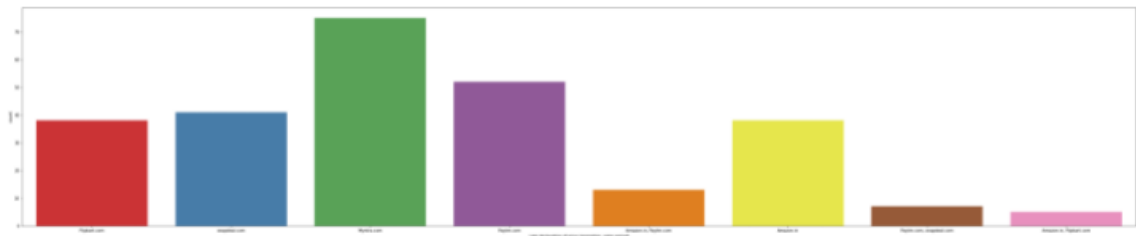


```
In [141]: Cdf['Late declaration of price (promotion, sales period)'].value_counts()
```

```
Out[141]: Myntra.com          75
Paytm.com          52
snapdeal.com       41
Flipkart.com       38
Amazon.in          38
Amazon.in, Paytm.com  13
Paytm.com, snapdeal.com  7
Amazon.in, Flipkart.com  5
Name: Late declaration of price (promotion, sales period), dtype: int64
```

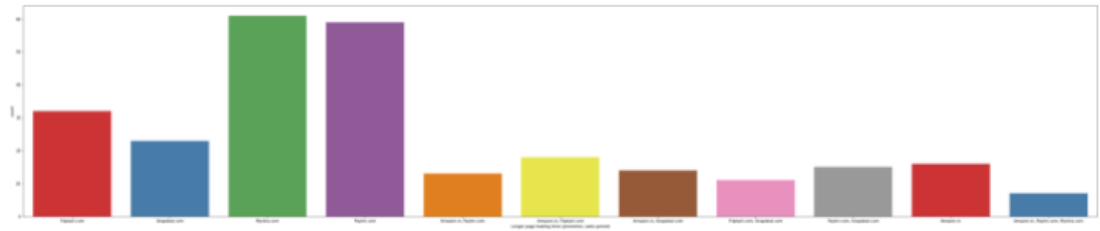
```
In [142]: plt.figure(figsize=(50,10),facecolor='white')
sns.countplot(Cdf['Late declaration of price (promotion, sales period)'], palette="Set1")
```

```
Out[142]: <AxesSubplot:xlabel='Late declaration of price (promotion, sales period)', ylabel='count'>
```



```
In [143]: Cdf['Longer page loading time (promotion, sales period)'].value_counts()
```

```
Out[143]: Myntra.com          61
Paytm.com          59
Flipkart.com       32
Snapdeal.com       23
Amazon.in, Flipkart.com  18
Amazon.in          16
Paytm.com, Snapdeal.com  15
Amazon.in, Snapdeal.com  14
Amazon.in, Paytm.com    13
Flipkart.com, Snapdeal.com  11
Amazon.in, Paytm.com, Myntra.com  7
Name: Longer page loading time (promotion, sales period), dtype: int64
```

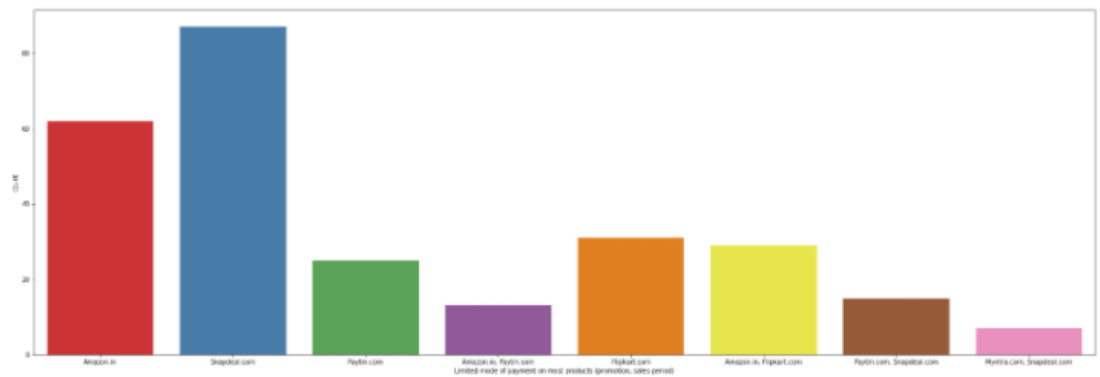


```
In [145]: Cdf['Limited mode of payment on most products (promotion, sales period)'].value_counts()
```

```
Out[145]: Snapdeal.com      31
Amazon.in      29
Flipkart.com   25
Amazon.in, Flipkart.com  15
Paytm.com      13
Paytm.com, Snapdeal.com  7
Amazon.in, Paytm.com    13
Myntra.com, Snapdeal.com 7
Name: Limited mode of payment on most products (promotion, sales period), dtype: int64
```

```
In [146]: plt.figure(figsize=(30,10),facecolor='white')
sns.countplot(Cdf['Limited mode of payment on most products (promotion, sales period)'], palette="Set1")
```

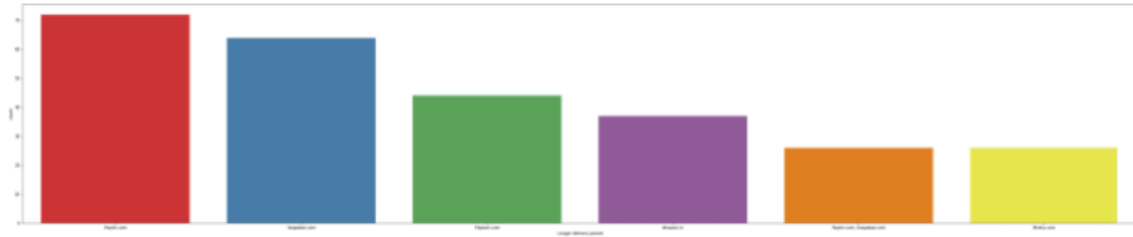
```
Out[146]: <AxesSubplot:xlabel='Limited mode of payment on most products (promotion, sales period)', ylabel='count'>
```



```
In [147]: Cdf['Longer delivery period'].value_counts()
```

```
Out[147]: Paytm.com      72
Snapdeal.com    64
Flipkart.com    44
Amazon.in      37
Myntra.com     26
Paytm.com, Snapdeal.com 26
Name: Longer delivery period, dtype: int64
```

```
Out[148]: <AxesSubplot:xlabel='Longer delivery period', ylabel='count'>
```

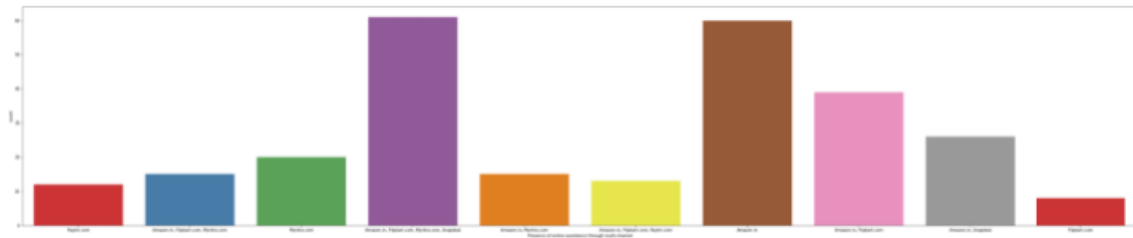


```
In [149]: Cdf['Change in website/Application design'].value_counts()
```

```
Out[149]: Amazon.in          96
Paytm.com          63
Amazon.in, Flipkart.com  45
Myntra.com         30
Flipkart.com       20
Snapdeal.com       8
Flipkart.com, Myntra.com  7
Name: Change in website/Application design, dtype: int64
```

```
In [150]: plt.figure(figsize=(50,10),facecolor='white')
sns.countplot(Cdf['Presence of online assistance through multi-channel'], palette="Set1")
```

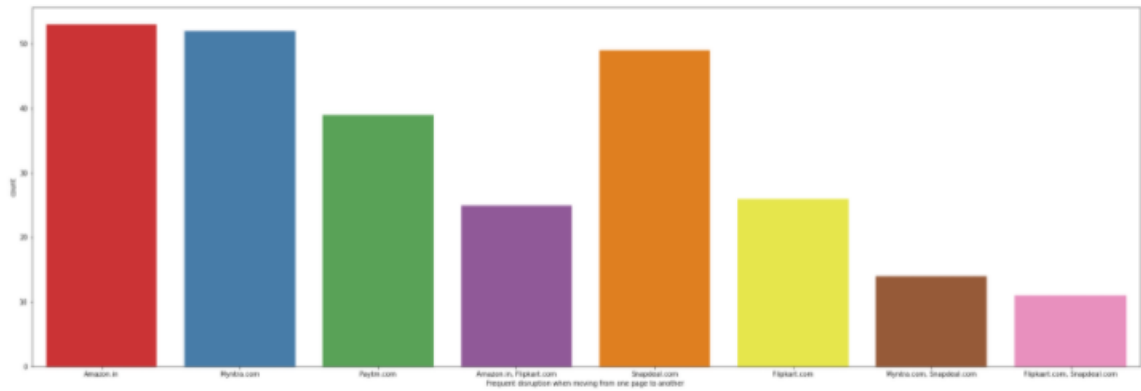
```
Out[150]: <AxesSubplot:xlabel='Presence of online assistance through multi-channel', ylabel='count'>
```



```
In [151]: Cdf['Frequent disruption when moving from one page to another'].value_counts()
```

```
Out[151]: Amazon.in          53
Myntra.com          52
Snapdeal.com        49
Paytm.com           39
Flipkart.com        26
Amazon.in, Flipkart.com  25
Myntra.com, Snapdeal.com  14
Flipkart.com, Snapdeal.com  11
Name: Frequent disruption when moving from one page to another, dtype: int64
```

```
Out[152]: <AxesSubplot:xlabel='Frequent disruption when moving from one page to another', ylabel='count'>
```

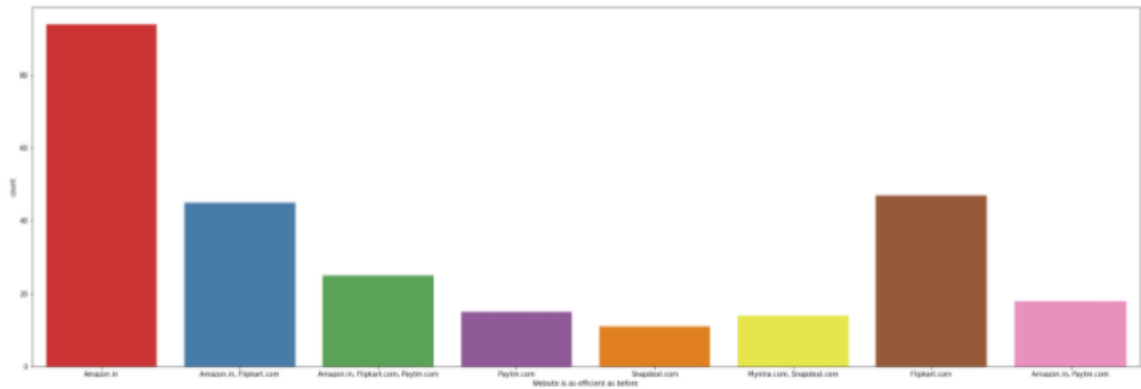


```
In [153]: Cdf['Website is as efficient as before'].value_counts()
```

```
Out[153]: Amazon.in          94
Flipkart.com          47
Amazon.in, Flipkart.com    45
Amazon.in, Flipkart.com, Paytm.com    25
Amazon.in, Paytm.com      18
Paytm.com              15
Myntra.com, Snapdeal.com  14
Snapdeal.com           11
Name: Website is as efficient as before, dtype: int64
```

```
In [154]: plt.figure(figsize=(30,10),facecolor='white')
sns.countplot(Cdf['Website is as efficient as before'], palette="Set1")
```

```
Out[154]: <AxesSubplot:xlabel='Website is as efficient as before', ylabel='count'>
```

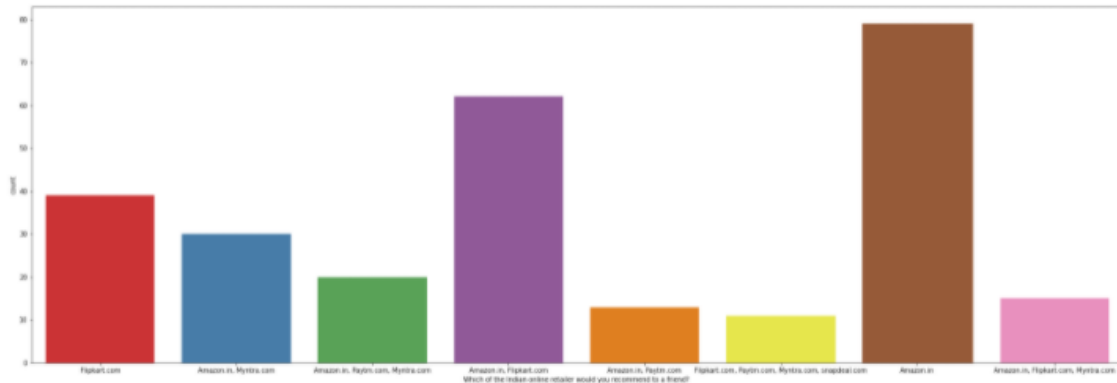


```
In [155]: Cdf['Which of the Indian online retailer would you recommend to a friend?'].value_counts()
```

```
Out[155]: Amazon.in                79
Amazon.in, Flipkart.com          62
Flipkart.com                     39
Amazon.in, Myntra.com            38
Amazon.in, Paytm.com, Myntra.com 28
Amazon.in, Flipkart.com, Myntra.com 15
Amazon.in, Paytm.com            13
Flipkart.com, Paytm.com, Myntra.com, snapdeal.com 11
Name: Which of the Indian online retailer would you recommend to a friend?, dtype: int64
```

```
In [156]: plt.figure(figsize=(30,10),facecolor='white')
sns.countplot(Cdf['Which of the Indian online retailer would you recommend to a friend?'], palette="Set1")
```

```
Out[156]: <AxesSubplot:xlabel='Which of the Indian online retailer would you recommend to a friend?', ylabel='count'>
```



From the graphs above the following observations are made:

- Amazon.in, Flipkart.com, Paytm.com, Myntra.com, Snapdeal.com are the most popular e-commerce websites.
- Amazon.in, Flipkart.com, Paytm.com, Myntra.com, Snapdeal.com are the easiest to use websites and applications
- Amazon.in and Flipkart.com have the most visually appealing web-page layout.
- Amazon.in and Flipkart.com have the widest variety of products on offer
- Amazon.in and Flipkart.com have the most complete, relevant description information of products.
- Amazon.in, and Paytm.com have the fastest loading speed while Flipkart is regarded by very few as being quick to load
- Amazon.com, Flipkart.com, Paytm.com are considered quick to complete purchases.
- Amazon.in, Flipkart.com are regarded by most to have several payment options available
- Amazon.in is regarded to offer speedy order delivery by most.
- Amazon.in offers the most Privacy for customers' information.
- Amazon.in, followed by Flipkart.com, Paytm.com, Myntra.com, Snapdeal.com provide the best security for customer financial information.

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- Amazon.in is perceived to be the most trustworthy website by the majority of participants.
 - Amazon.in, Flipkart.com, Myntra.com, Snapdeal have the highest presence of online assistance through multi-channel.
 - Most people face longer time to get logged in during promotion, sales period on Amazon.in and Flipkart followed by Paytm and Myntra.
 - Amazon.in, Flipkart.com take the longest time displaying graphics and photos during promotion, sales period.
 - Most people face Late declaration of price on Myntra and Paytm during promotion, sales period.
 - Myntra and Paytm take the longest page loading time during promotion, sales period.
 - Snapdeal.com and Amazon.in have the most limited modes of payment on most products during promotion, sales period.
 - Paytm.com and Snapdeal.com have Longer delivery periods compared to others.
 - Amazon.in and Paytm.com have had recent changes in website/Application design, as observed by the consumers.
 - Most consumers face frequent disruption when moving from one page to another on Amazon.in, Myntra.com and Snapdeal.com.
 - Most consumers are of the opinion that Amazon.in website is as efficient as before followed by Flipkart.com.
 - Most Consumers would recommend Amazon.in to a friend, followed by Flipkart.

Analysing Relationship between Customer retention and Perceived Risks

The Columns titled: '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"?'', 'Longer delivery period', 'Frequent disruption when moving from one page to another', 'Longer page loading time (promotion. sales period)', 'Perceived Trustworthiness', 'Security of customer financial information', 'Privacy of customers' information', '38 User satisfaction cannot exist without trust', '26 Trust that the online retail store will fulfill its part of the transaction at the stipulated time', 'Longer time to get logged in (promotion. sales period)', 'Longer time in displaying graphics and photos (promotion. sales



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- It is observed that those who prefer Flipkart.com, Paytm.com, Myntra.com and Snapdeal.com to Amazon.in do so because they face frequent disruption when moving from page to page on Amazon.in
 - Those who prefer Amazon.in and Flipkart.com face longer page loading time during promotion and sales period on snapdeal.com and myntra.com
 - Amazon.in has the highest trustworthiness as perceived by most consumers.
 - Amazon.in, Flipkart.com, Paytm.com have the highest security for customer financial information.
 - Amazon.in, Flipkart.com, Paytm.com maintain the greatest privacy for customer information.
 - Customers who believe that user satisfaction can't exist without trust recommend Amazon.in and Flipkart.com
 - Those customers who recommend Amazon.in and Flipkart.com the most trust that online retail stores will fulfill their part of the transaction at the stipulated time.
 - Customers face the longest time to get logged in on Amazon.in and Flipkart.com the most and yet, recommend those 2 websites the most.
 - Customers prefer Amazon.in and Flipkart.com To Myntra.com and Snapdeal.com because Myntra and Snapdeal take longer to display graphics and photos during promotion and sales period.
 - Customers prefer Amazon.in and Flipkart.com To Myntra.com and Snapdeal.com because Myntra and Snapdeal take too long to declare prices during promotion and sales period.

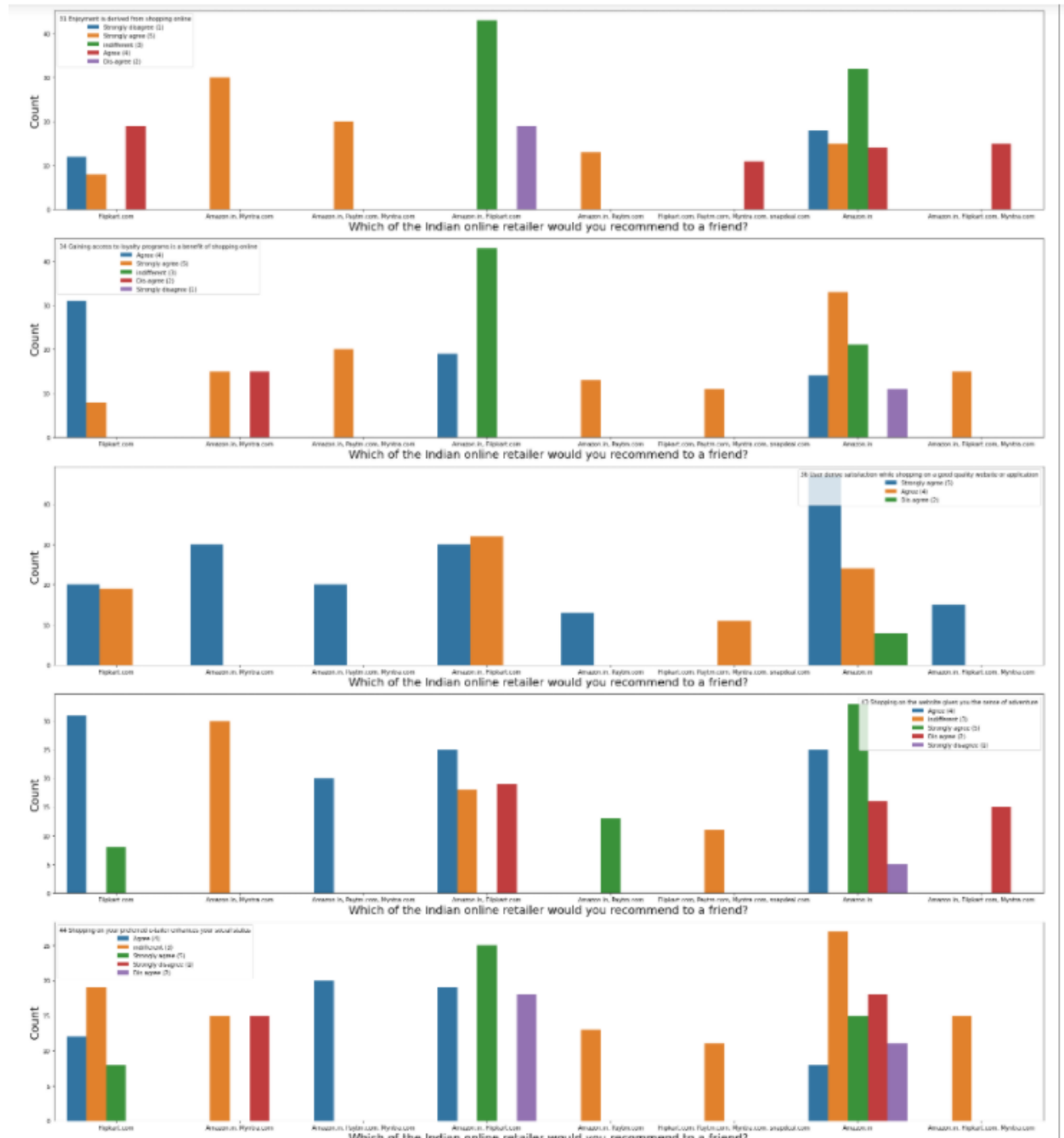
Analysing Relationship between Customer retention and Hedonic Value

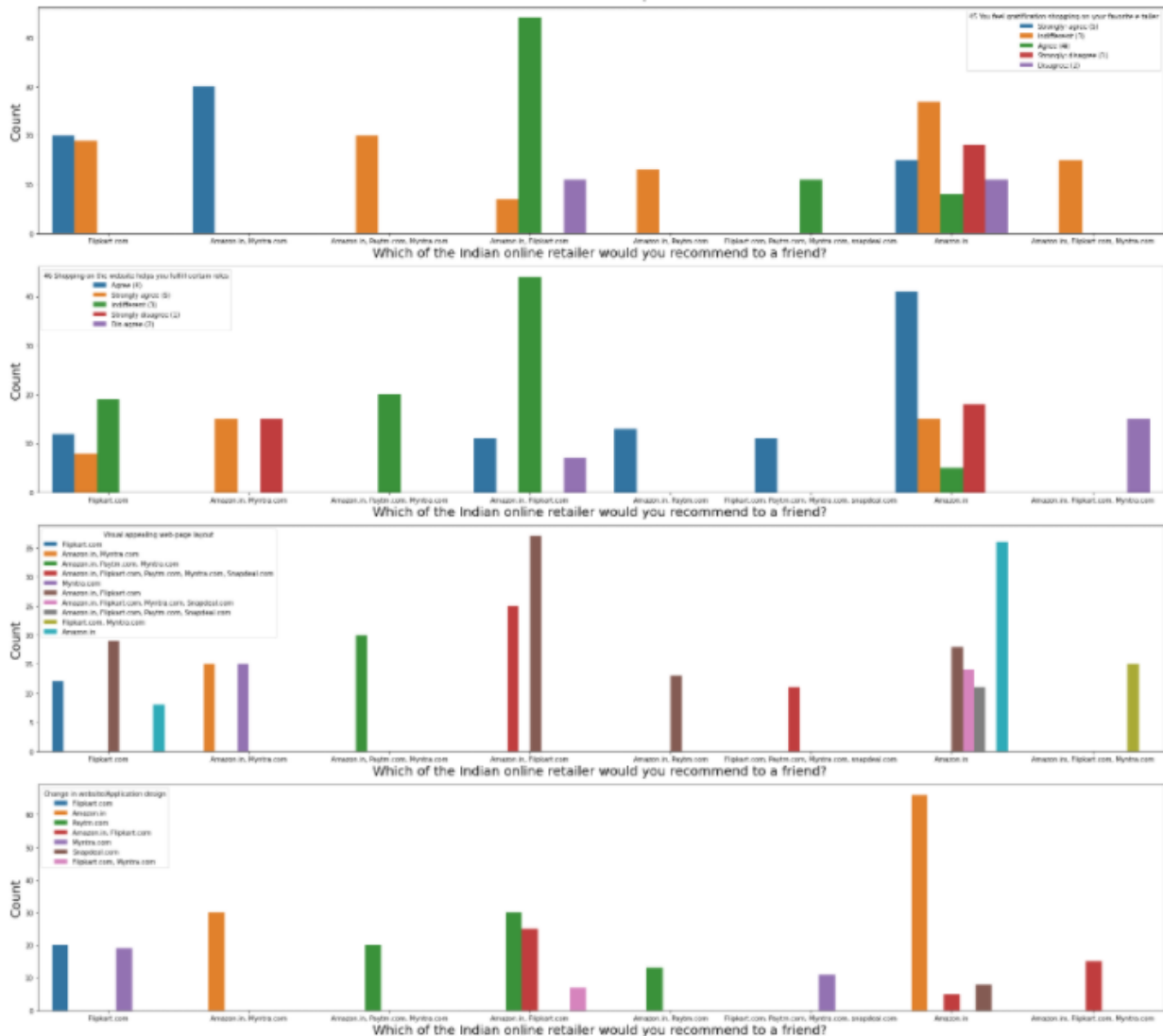
Hedonic Values serve the purpose of giving emotional / multisensory gratification and a sense of fulfillment of a role to Consumers.

Columns titled: *'31 Enjoyment is derived from shopping online', '34 Gaining access to loyalty programs is a benefit of shopping online', '36 User derive satisfaction while shopping on a good quality website or application', '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', 'Visual appealing web-page layout' and 'Change in website/Application design'* Represent hedonic values.

The relationships between the columns representing the Hedonic Values and the column representing Customer retention were visualized using the code below and observations were made.

```
plt.figure(figsize=(25,55),facecolor='white')
plotnum=1
y = Cdf[['31 Enjoyment is derived from shopping online','34 Gaining access to loyalty programs is a benefit of shopping online','36 User derive satisfaction while shopping on a good quality website or application','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','Visual appealing web-page layout' and 'Change in website/Application design']]
X = Cdf['Which of the Indian online retailer would you recommend to a friend?']
for col in y:
    if plotnum<=10:
        plt.subplot(10,1,plotnum)
        sns.countplot(X,hue =y[col])
        plt.xlabel('Which of the Indian online retailer would you recommend to a friend?',fontsize=20)
        plt.ylabel('Count',fontsize=20)
        plotnum+=1
plt.tight_layout()
```





From the graphs above the following observations are made:

- Customers who recommend Myntra.com, paytm.com and Amazon.in Strongly agree that enjoyment is derived from shopping online, while those who recommend Flipkart and Amazon.in are indifferent about it.
- Gaining Access to loyalty programs is a benefit of shopping online for those who recommend Amazon.in and Flipkart.com
- Those who Recommend Amazon.in, flipkart.com and Myntra.com strongly derive satisfaction while shopping on a good quality website / application.
- Those who Recommend Amazon.in, flipkart.com, paytm.com and Myntra.com strongly agree that they get a sense of adventure from shopping online.

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- Although most consumers are indifferent to whether or not shopping on e-commerce websites enhances their social status, Those who recommend Amazon.in, Flipkart.com, paytm.com and myntra.com agree that shopping on those websites enhances their social status.
 - Most consumers agree that shopping on Amazon.in and Flipkart.com get a sense of gratification from shopping on their favourite e-tailer.
 - Most consumers agree that shopping on Amazon.in, Flipkart.com, Myntra.com, snapdeal.com and Paytm.com agree that shopping on the websites fulfills certain roles.
 - Most consumers consider Amazon.in and Flipkart.com to have the most visually appealing web-page layout.
 - Most consumers who recommend Amazon.in appreciate change in website/application design.

Analysing Relationship between Customer retention and Utilitarian Value

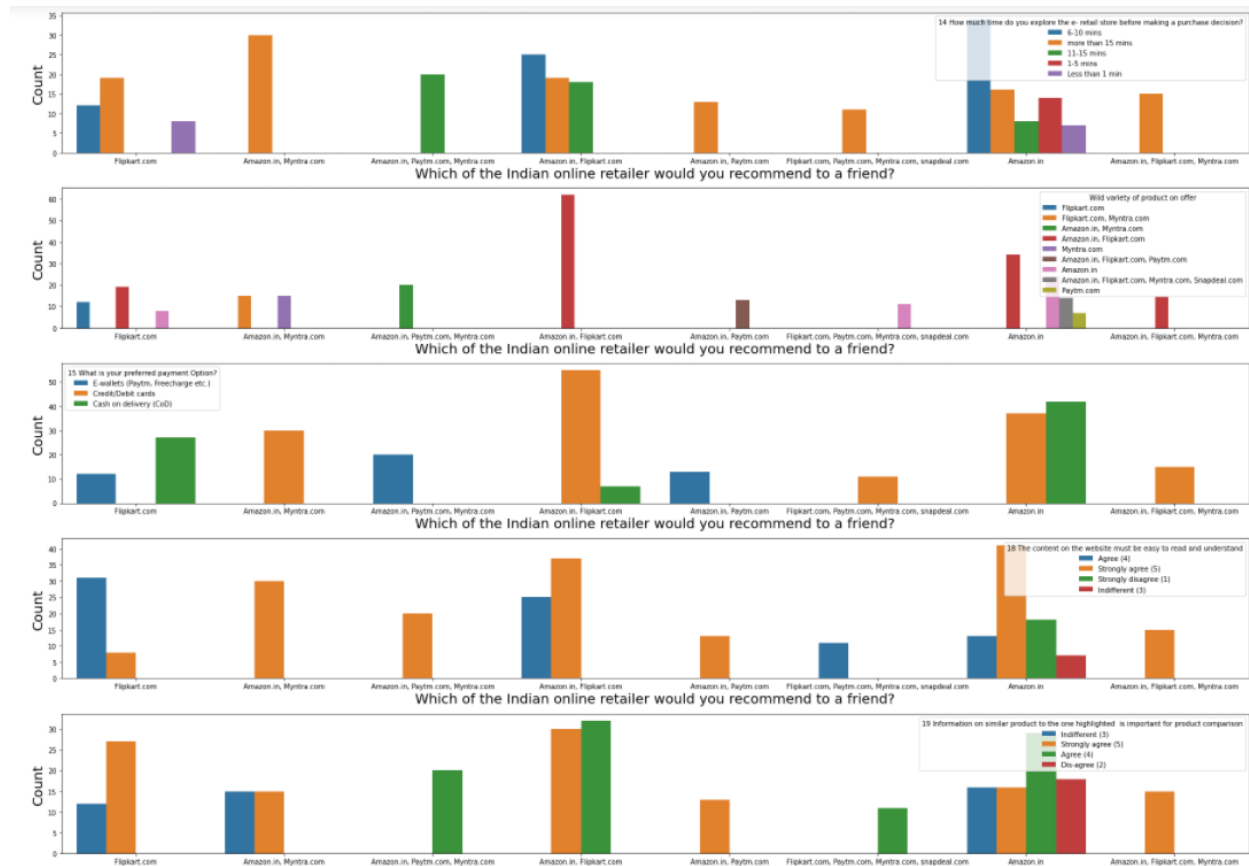
Utilitarian values are based on rational decisions, are goal related and give importance to functional values of products / transactions on websites that are aimed at enhancing customer satisfaction through meaningful online transactions.

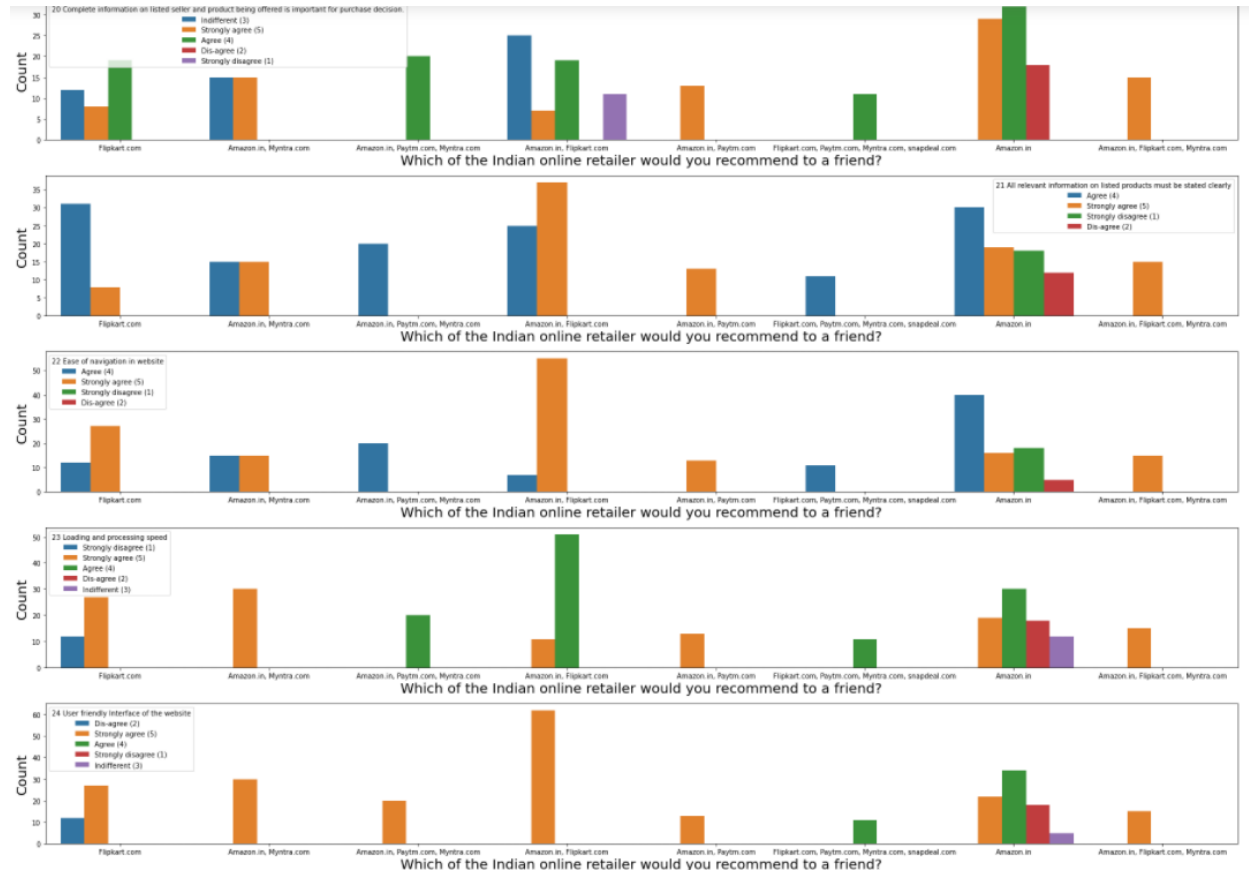
Columns titled: *'14 How much time do you explore the e- retail store before making a purchase decision?'. 'Wild variety of product on offer'. '15 What is your preferred payment Option?'. '18 The content on the website must be easy to read and understand', '19 Information on similar product to the one 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'. '27 Empathy (readiness to assist with queries) towards the customers'. '29 Responsiveness, availability of several communication channels (email, online rep, twitter, phone etc.)'. '30 Online shopping gives monetary benefit and discounts'. '32 Shopping online is convenient and flexible'. '33 Return and replacement policy of the e-tailer is important for purchase decision'. '35 Displaying quality Information on the website improves satisfaction of*

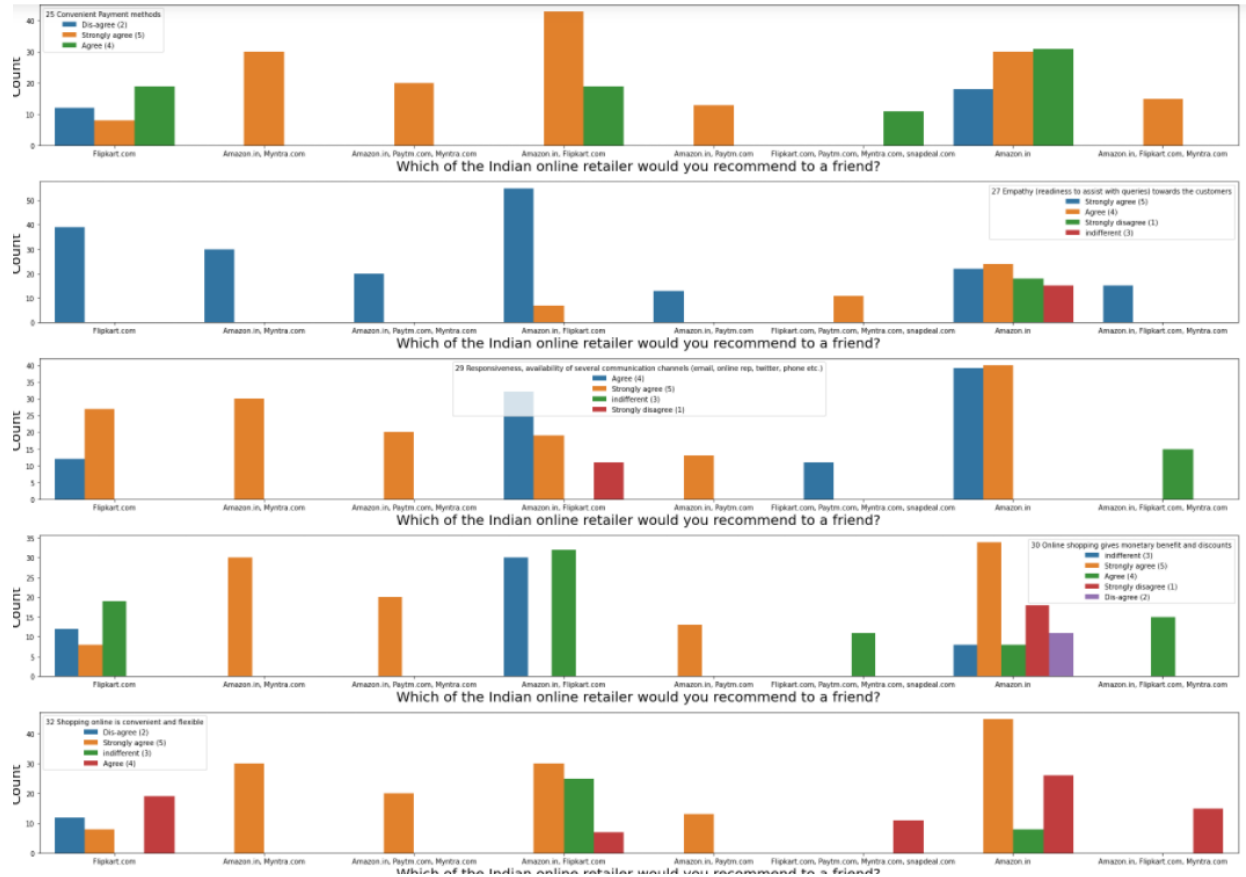
customers', '37 Net Benefit derived from shopping online can lead to users satisfaction', '39 Offering a wide variety of listed product in several category', '40 Provision of complete and relevant product information', '41 Monetary savings', '42 The Convenience of patronizing the online retailer', '47 Getting value for money spent', 'Easy to use website or application', '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', 'Website is as efficient as before', 'Presence of online assistance through multi-channel', 'Limited mode of payment on most products (promotion, sales period)' represent Utilitarian values.

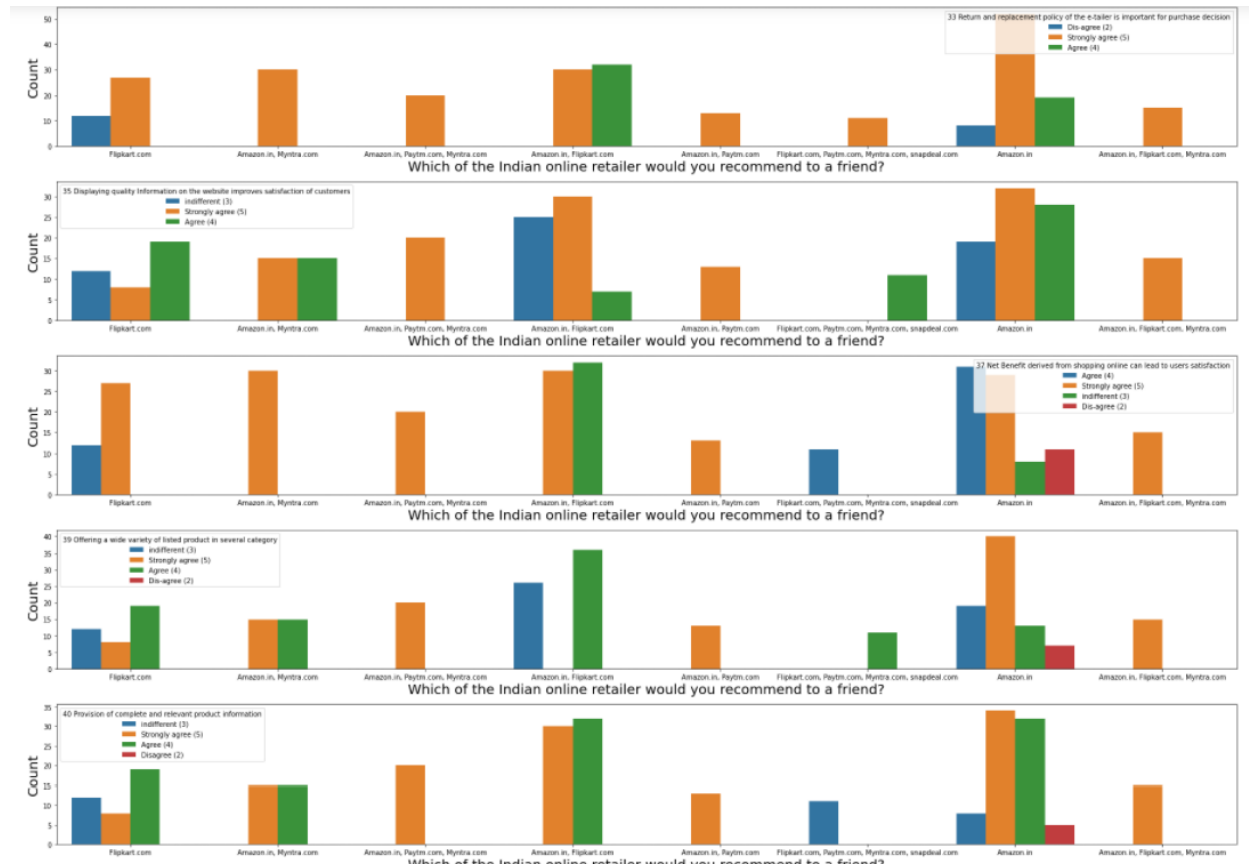
The relationships between the columns representing the Utilitarian Values and the column representing Customer retention were visualized using the code below and observations were made.

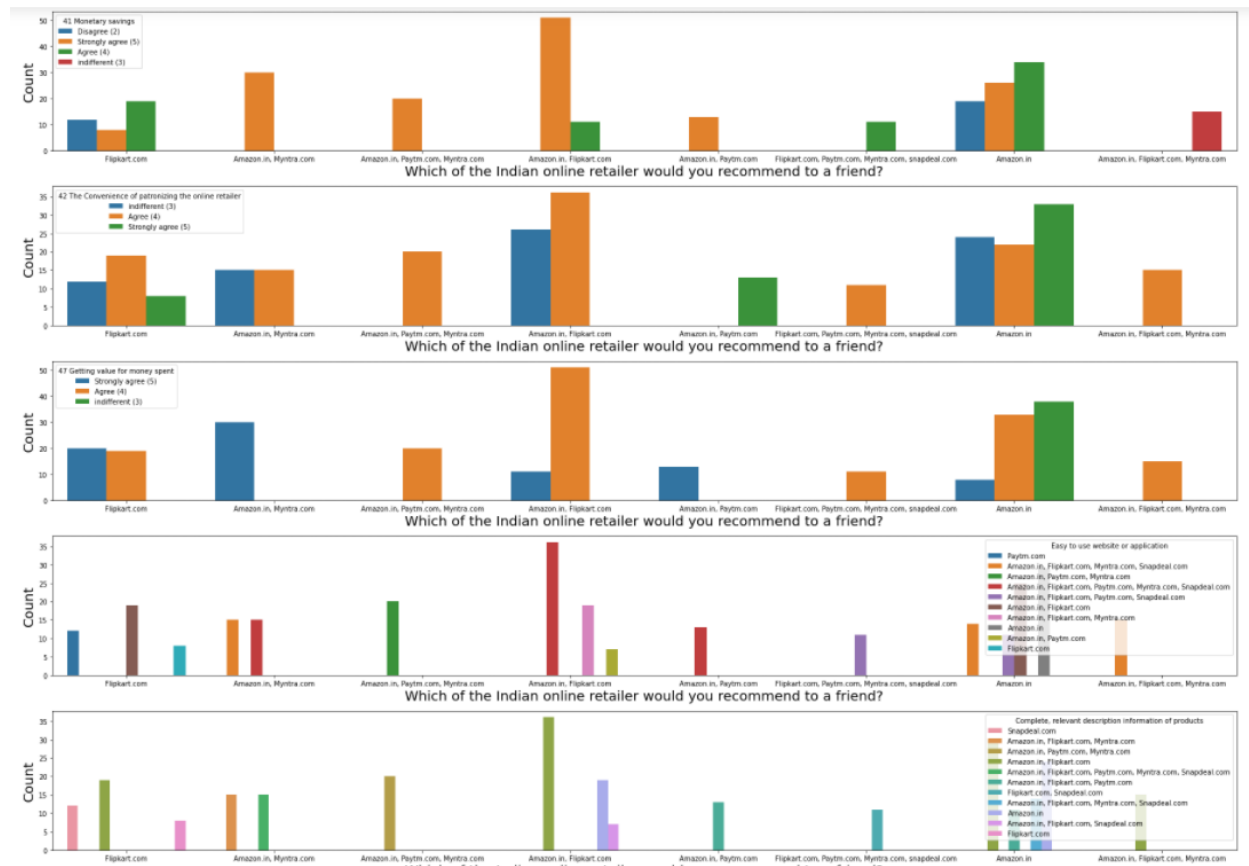
```
plt.figure(figsize=(25,120),facecolor='white')
plotnum=1
y = Cdf[['14 How much time do you explore the e- retail store before making a purchase decision?','Wild variety of product on off
x = Cdf['Which of the Indian online retailer would you recommend to a friend?']
for col in y:
    if plotnum<=34:
        plt.subplot(34,1,plotnum)
        sns.countplot(X,hue =y[col])
        plt.xlabel('Which of the Indian online retailer would you recommend to a friend?',fontsize=20)
        plt.ylabel('Count',fontsize=20)
        plotnum+=1
plt.tight_layout()
```











From the graphs above, the following observations can be made:

- Most Consumers who recommend amazon and myntra spend more than 15 minutes on Amazon and Myntra.
- Amazon and Flipkart offer the widest varieties of products
- Most Consumers who recommend amazon and flipkart Prefer payments via Credit/Debit cards and Cash on Delivery
- Most Consumers who recommend amazon and flipkart appreciate the ease of understanding and reading content on the respective websites.
- Most Consumers who recommend amazon and flipkart find it important for information on similar product to be available for comparison
- Most Consumers who recommend amazon and flipkart find complete product information important.
- Most Consumers who recommend amazon and flipkart clarity on product information to be important.
- Most Consumers who recommend amazon and flipkart find ease of website navigation important.
- Most Consumers who recommend amazon and flipkart want the website to load and process quickly.
- Most Consumers who recommend amazon and flipkart find the interface of the websites user friendly.
- Most Consumers who recommend amazon and flipkart find the payment methods most convenient.
- Most Consumers who recommend amazon and flipkart find it important for customer support representatives to be empathetic.
- Most Consumers who prefer Amazon and flipkart find it important for there to exist Responsiveness and availability of many communication channels.
- Most Consumers who recommend Amazon and flipkart find that shopping on there gives them monetary benefits and discounts.
- Most Consumers who recommend Amazon find shopping on there convenient and flexible.
- Most Consumers recommend Amazon because return and replacement policy is important for purchase decisions.

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- Most Consumers recommend Amazon and flipkart because they display quality information on websites.
 - Most Consumers recommend Amazon and flipkart because they believe net benefit is derived from shopping online leads to user satisfaction.
 - Most Consumers recommend Amazon and flipkart because they offer a wide variety of products in several categories.
 - Most Consumers recommend Amazon and flipkart because they provide complete and relevant product information.
 - Most Consumers recommend Amazon,mynta,paytm and flipkart because they offer monetary savings
 - Most Consumers recommend Amazon and flipkart because they consider convenience of patronizing the online retailer important
 - Most Consumers recommend Amazon and flipkart because they get value for money spent.
 - Most Consumers recommend Amazon,paytm,mynta and flipkart because of the ease of using them.
 - Most Consumers recommend Amazon and flipkart because they are quick to load,reliable, many payment options are available,purchasing is quick.
 - Most Consumers recommend Amazon because the website is as efficient as before.
 - Most Consumers recommend Amazon because of presence of online assistance through multiple channels
 - Most Consumers recommend Amazon and flipkart because snapdeal,mynta,paytm have limited modes of payment during promotion or sale periods.

Perceived Risk on E Commerce Websites

The relations between perceived risks and online e-commerce websites were visualized and observations were made.

Concluding Remarks.

From the above Exploratory Data Analysis, it is determined that for any website to retain customers, for the growth of its customer-base and to build and maintain a successful business, it is important that the E-tailers focus on enhancing customer experience in shopping on their websites, while ensuring that all of their particular hedonic and utilitarian needs are satisfied, while taking steps to minimise the perceived risks. Offering a huge variety of products, impeccable website design, user friendly interface, a huge variety of safe and convenient payment options, offering strong data security and privacy, helpful, empathetic support staff and impeccable customer service, optimised website processes that universally load in optimal time on all types of platforms and systems, faster delivery etc are vital to ensure customer loyalty to the brand of the e-tailer. Experienced customers, give great importance to their experiences of previous purchases, which in turn speeds up the process of attaining their shopping goals. In this way customers would purchase repeatedly on the basis of the judgment of value, which is necessary to help consumers to accomplish their goal of shopping. The major reason why Amazon.in and Flipkart.com dominate the E-commerce market in terms of customer retention and brand loyalty is that they have dedicated all their resources to studying and understanding the various requirements of individual customers that play as important factors in fulfilling their hedonic and utilitarian needs while giving them a sense of trust in making purchases on their respective websites while at the same time giving them incentives in various forms (discounts, cashbacks, loyalty programs etc) that keep them returning to make recurring purchases.