

Import Libraries

```
In [1]:  
import numpy as np  
import pandas as pd  
import matplotlib.pyplot as plt  
import seaborn as sns  
%matplotlib inline  
  
from warnings import filterwarnings  
filterwarnings('ignore')  
  
from IPython.core.interactiveshell import InteractiveShell  
InteractiveShell.ast_node_interactivity='all'
```

Load the Dataset

```
In [2]: data=pd.read_excel(r"C:\Users\User\Downloads\customer_retention_dataset.xlsx")
data.head(2)
```

Out[2]:

1Gender of respondent	2How old are you?	3Which city do you shop online from?	4What is the Pin Code of where you shop online from?	5Since How Long You are Shopping Online ?	6How many times you have made an online purchase in the past 1 year?	7How do you access the internet while shopping on-line?	8Which device do you use to access the online shopping?	9What is the screen size of your mobile device? \\t\\t\\t\\t\\t\\t\\t	10What is the operating system (OS) of your device? \\t\\t\\t\\t\\t	Longer time to get logged in (promotion, sales period)	Longer time in displaying graphics and photos (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
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	Mynta.com

2 rows × 71 columns

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

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

```
In [4]: pd.set_option('display.max_columns',None)
```

```
In [5]: data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 269 entries, 0 to 268
Data columns (total 71 columns):
 #   Column          Dtype  
 0   1Gender of respondent    object 
 1   2 How old are you?      object 
 2   3 Which city do you shop online from?  object 
 3   4 What is the Pin Code of where you shop online from?  int64  
 4   5 Since How Long You are Shopping Online ?  object 
 5   6 How many times you have made an online purchase in the past 1 year?  object 
 6   7 How do you access the internet while shopping on-line?  object 
 7   8 Which device do you use to access the online shopping?  object 
 8   9 What is the screen size of your mobile device?  object 
 9   10 What is the operating system (OS) of your device?  object 
 10  11 What browser do you run on your device to access the website?  object 
 11  12 Which channel did you follow to arrive at your favorite online store for the first time?  object 
 12  13 After first visit, how do you reach the online retail store?
```

269 non-null object
13 14 How much time do you explore the e- retail store before making a purchase decision?
269 non-null object
14 15 What is your preferred payment Option?
269 non-null object
15 16 How frequently do you abandon (selecting an items and leaving without making payment) your shopping cart?
269 non-null object
16 17 Why did you abandon the “Bag”, “Shopping Cart”?
269 non-null object
17 18 The content on the website must be easy to read and understand
269 non-null object
18 19 Information on similar product to the one highlighted is important for product comparison
269 non-null object
19 20 Complete information on listed seller and product being offered is important for purchase decision.
269 non-null object
20 21 All relevant information on listed products must be stated clearly
269 non-null object
21 22 Ease of navigation in website
269 non-null object
22 23 Loading and processing speed
269 non-null object
23 24 User friendly Interface of the website
269 non-null object
24 25 Convenient Payment methods
269 non-null object
25 26 Trust that the online retail store will fulfill its part of the transaction at the stipulated time
269 non-null object
26 27 Empathy (readiness to assist with queries) towards the customers
269 non-null object
27 28 Being able to guarantee the privacy of the customer
269 non-null object
28 29 Responsiveness, availability of several communication channels (email, online rep, twitter, phone etc.)
269 non-null object
29 30 Online shopping gives monetary benefit and discounts
269 non-null object
30 31 Enjoyment is derived from shopping online
269 non-null object
31 32 Shopping online is convenient and flexible
269 non-null object
32 33 Return and replacement policy of the e-tailer is important for purchase decision
269 non-null object
33 34 Gaining access to loyalty programs is a benefit of shopping online
269 non-null object
34 35 Displaying quality Information on the website improves satisfaction of customers
269 non-null object
35 36 User derive satisfaction while shopping on a good quality website or application
269 non-null object
36 37 Net Benefit derived from shopping online can lead to users satisfaction
269 non-null object

37 38 User satisfaction cannot exist without trust
269 non-null object
38 39 Offering a wide variety of listed product in several category
269 non-null object
39 40 Provision of complete and relevant product information
269 non-null object
40 41 Monetary savings
269 non-null object
41 42 The Convenience of patronizing the online retailer
269 non-null object
42 43 Shopping on the website gives you the sense of adventure
269 non-null object
43 44 Shopping on your preferred e-tailer enhances your social status
269 non-null object
44 45 You feel gratification shopping on your favorite e-tailer
269 non-null object
45 46 Shopping on the website helps you fulfill certain roles
269 non-null object
46 47 Getting value for money spent
269 non-null object
47 From the following, tick any (or all) of the online retailers you have shopped from;
269 non-null object
48 Easy to use website or application
269 non-null object
49 Visual appealing web-page layout
269 non-null object
50 Wild variety of product on offer
269 non-null object
51 Complete, relevant description information of products
269 non-null object
52 Fast loading website speed of website and application
269 non-null object
53 Reliability of the website or application
269 non-null object
54 Quickness to complete purchase
269 non-null object
55 Availability of several payment options
269 non-null object
56 Speedy order delivery
269 non-null object
57 Privacy of customers' information
269 non-null object
58 Security of customer financial information
269 non-null object
59 Perceived Trustworthiness
269 non-null object
60 Presence of online assistance through multi-channel
269 non-null object
61 Longer time to get logged in (promotion, sales period)

```
269 non-null    object
 62 Longer time in displaying graphics and photos (promotion, sales period)
269 non-null    object
 63 Late declaration of price (promotion, sales period)
269 non-null    object
 64 Longer page loading time (promotion, sales period)
269 non-null    object
 65 Limited mode of payment on most products (promotion, sales period)
269 non-null    object
 66 Longer delivery period
269 non-null    object
 67 Change in website/Application design
269 non-null    object
 68 Frequent disruption when moving from one page to another
269 non-null    object
 69 Website is as efficient as before
269 non-null    object
 70 Which of the Indian online retailer would you recommend to a friend?
269 non-null    object
dtypes: int64(1), object(70)
memory usage: 149.3+ KB
```

Checking null values

```
In [6]: data.isnull().sum()
```

```
Out[6]: 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 [7]: data_1=data.select_dtypes(exclude='object')
```

```
In [8]: data.head(5)
```

Out[8]:

	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 A first v how you re the on r st \t\l
0	Male	31-40 years	Delhi	110009	Above 4 years	31-40 times	Dial-up	Desktop	Others	Window/windows Mobile	Google chrome	Search Engine	Se En
1	Female	21-30 years	Delhi	110030	Above 4 years	41 times and above	Wi-Fi	Smartphone	4.7 inches	IOS/Mac	Google chrome	Search Engine	applica
2	Female	21-30 years	Greater Noida	201308	3-4 years	41 times and above	Mobile Internet	Smartphone	5.5 inches	Android	Google chrome	Search Engine	applica
3	Male	21-30 years	Karnal	132001	3-4 years	Less than 10 times	Mobile Internet	Smartphone	5.5 inches	IOS/Mac	Safari	Search Engine	Se En
4	Female	21-30 years	Bangalore	530068	2-3 years	11-20 times	Wi-Fi	Smartphone	4.7 inches	IOS/Mac	Safari	Content Marketing	applica



In [9]:

```
data.describe()
```

Out[9]:

4 What is the Pin Code of where you shop online from?

4 What is the Pin Code of where you shop online from?

count	269.000000
mean	220465.747212
std	140524.341051
min	110008.000000
25%	122018.000000
50%	201303.000000
75%	201310.000000
max	560037.000000

Correalation Matrix

In [10]:

```
data.corr()
```

Out[10]:

4 What is the Pin Code of where you shop online from?

4 What is the Pin Code of where you shop online from?

1.0

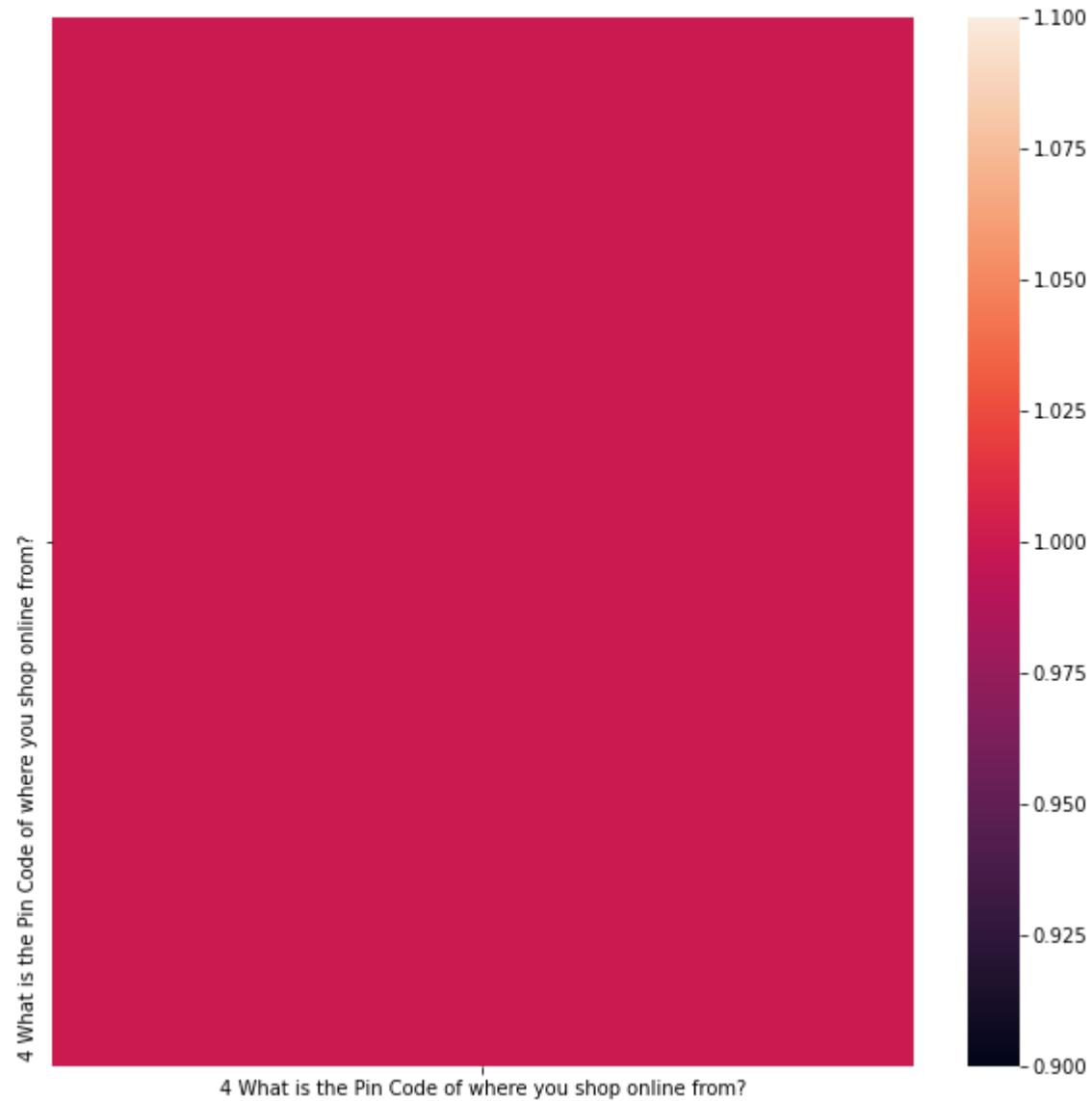
Correlation Matrix:

In [11]:

```
plt.figure(figsize=(10,10))
sns.heatmap(data.corr())
```

Out[11]: <Figure size 720x720 with 0 Axes>

Out[11]: <AxesSubplot:>



Exploratory Data Analysis:

In [12]:

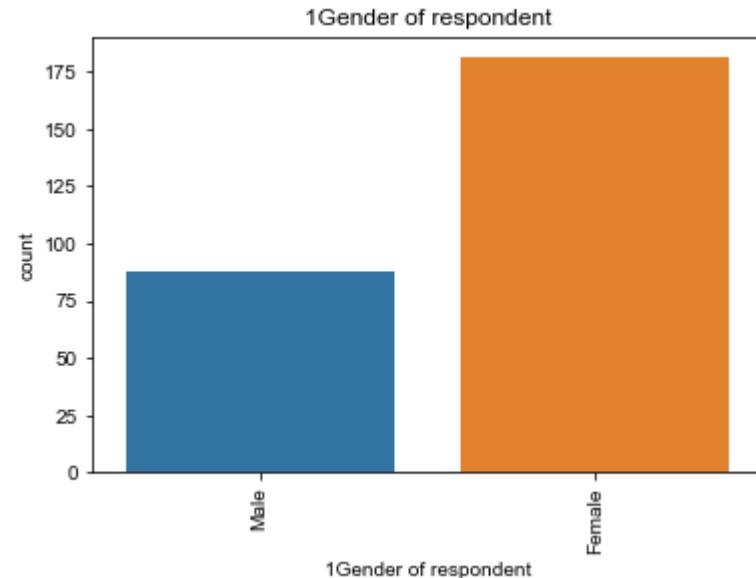
```
for i in data.columns[0:20]:  
    plt.title(i)  
    sns.countplot(x=data[i])  
    sns.set_theme(style='darkgrid', palette='deep',)
```

```
plt.xticks(rotation=90)
plt.show()
```

```
Out[12]: Text(0.5, 1.0, '1Gender of respondent')
```

```
Out[12]: <AxesSubplot:title={'center':'1Gender of respondent'}, xlabel='1Gender of respondent', ylabel='count'>
```

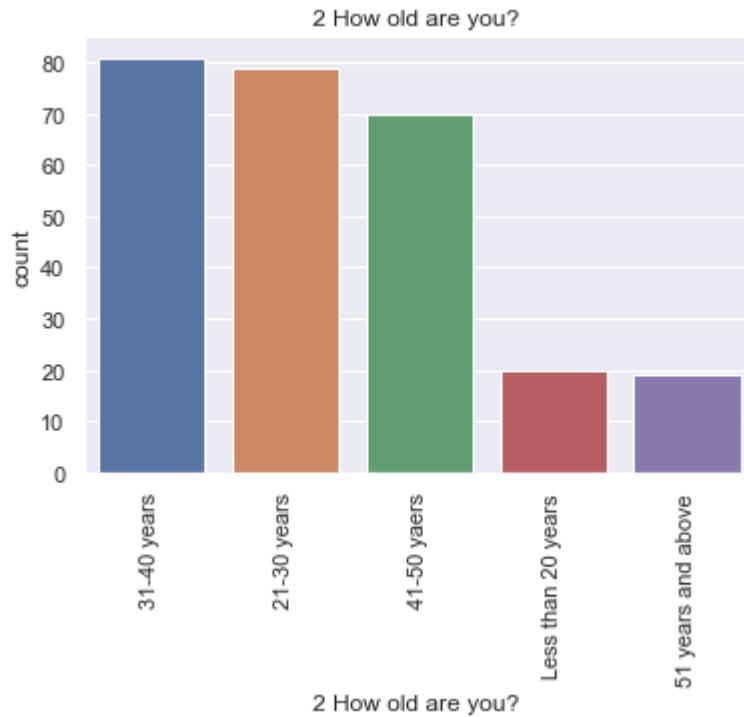
```
Out[12]: (array([0, 1]), [Text(0, 0, 'Male'), Text(1, 0, 'Female')])
```



```
Out[12]: Text(0.5, 1.0, '2 How old are you? ')
```

```
Out[12]: <AxesSubplot:title={'center':'2 How old are you? '}, xlabel='2 How old are you? ', ylabel='count'>
```

```
Out[12]: (array([0, 1, 2, 3, 4]),
 [Text(0, 0, '31-40 years'),
 Text(1, 0, '21-30 years'),
 Text(2, 0, '41-50 yaers'),
 Text(3, 0, 'Less than 20 years'),
 Text(4, 0, '51 years and above')])
```



```
Out[12]: Text(0.5, 1.0, '3 Which city do you shop online from?')
```

```
Out[12]: <AxesSubplot:title={'center':'3 Which city do you shop online from?'}, xlabel='3 Which city do you shop online from?', ylabel='count'>
```

```
Out[12]: (array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10]),
 [Text(0, 0, 'Delhi'),
 Text(1, 0, 'Greater Noida'),
 Text(2, 0, 'Karnal '),
 Text(3, 0, 'Bangalore '),
 Text(4, 0, 'Noida'),
 Text(5, 0, 'Solan'),
 Text(6, 0, 'Moradabad'),
 Text(7, 0, 'Gurgaon '),
 Text(8, 0, 'Merrut'),
 Text(9, 0, 'Ghaziabad'),
 Text(10, 0, 'Bulandshahr')])
```

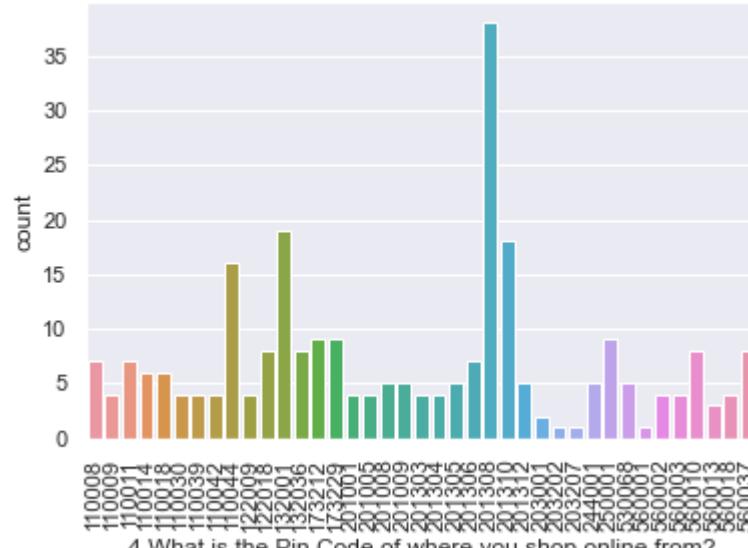


```
Out[12]: Text(0.5, 1.0, '4 What is the Pin Code of where you shop online from?')

Out[12]: <AxesSubplot:title={'center':'4 What is the Pin Code of where you shop online from?'}, xlabel='4 What is the Pin Code of where you shop online from?', ylabel='count'>
Out[12]: (array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15, 16,
       17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33,
       34, 35, 36, 37, 38]),
 [Text(0, 0, '110008'),
  Text(1, 0, '110009'),
  Text(2, 0, '110011'),
  Text(3, 0, '110014'),
  Text(4, 0, '110018'),
  Text(5, 0, '110030'),
  Text(6, 0, '110039'),
  Text(7, 0, '110042'),
  Text(8, 0, '110044'),
  Text(9, 0, '122009'),
  Text(10, 0, '122018'),
  Text(11, 0, '132001'),
  Text(12, 0, '132036'),
  Text(13, 0, '173212'),
  Text(14, 0, '173229'),
  Text(15, 0, '201001'),
  Text(16, 0, '201005'),
  Text(17, 0, '201008'),
```

```
Text(18, 0, '201009'),  
Text(19, 0, '201303'),  
Text(20, 0, '201304'),  
Text(21, 0, '201305'),  
Text(22, 0, '201306'),  
Text(23, 0, '201308'),  
Text(24, 0, '201310'),  
Text(25, 0, '201312'),  
Text(26, 0, '203001'),  
Text(27, 0, '203202'),  
Text(28, 0, '203207'),  
Text(29, 0, '244001'),  
Text(30, 0, '250001'),  
Text(31, 0, '530068'),  
Text(32, 0, '560001'),  
Text(33, 0, '560002'),  
Text(34, 0, '560003'),  
Text(35, 0, '560010'),  
Text(36, 0, '560013'),  
Text(37, 0, '560018'),  
Text(38, 0, '560037')]
```

4 What is the Pin Code of where you shop online from?

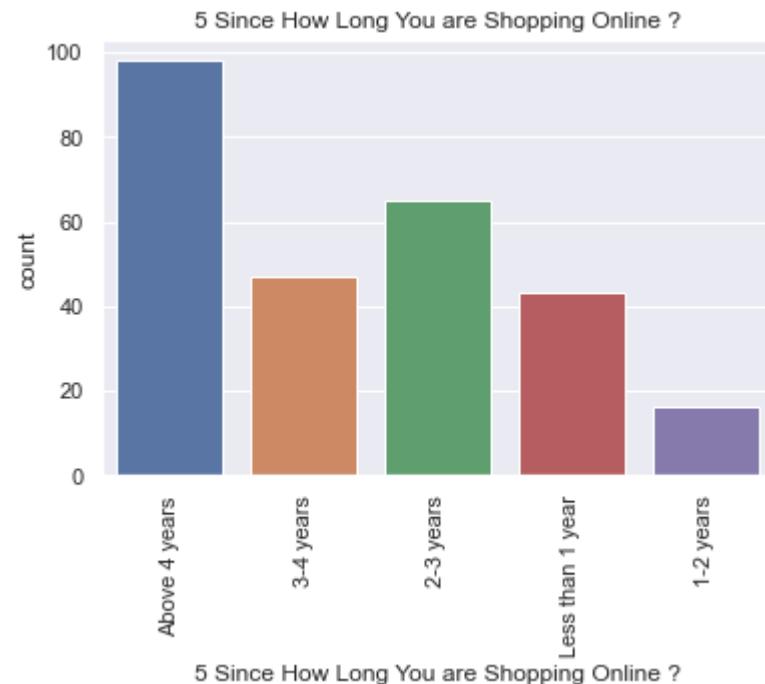


```
Out[12]: Text(0.5, 1.0, '5 Since How Long You are Shopping Online ?')
```

```
Out[12]: <AxesSubplot:title={'center':'5 Since How Long You are Shopping Online ?'}, xlabel='5 Since How Long You are Shopping Online ?', ylabel='count'>
```

```
Out[12]: (array([0, 1, 2, 3, 4]),  
          [Text(0, 0, 'Above 4 years'),  
           Text(1, 0, '3-4 years')],
```

```
Text(2, 0, '2-3 years'),  
Text(3, 0, 'Less than 1 year'),  
Text(4, 0, '1-2 years'))]
```

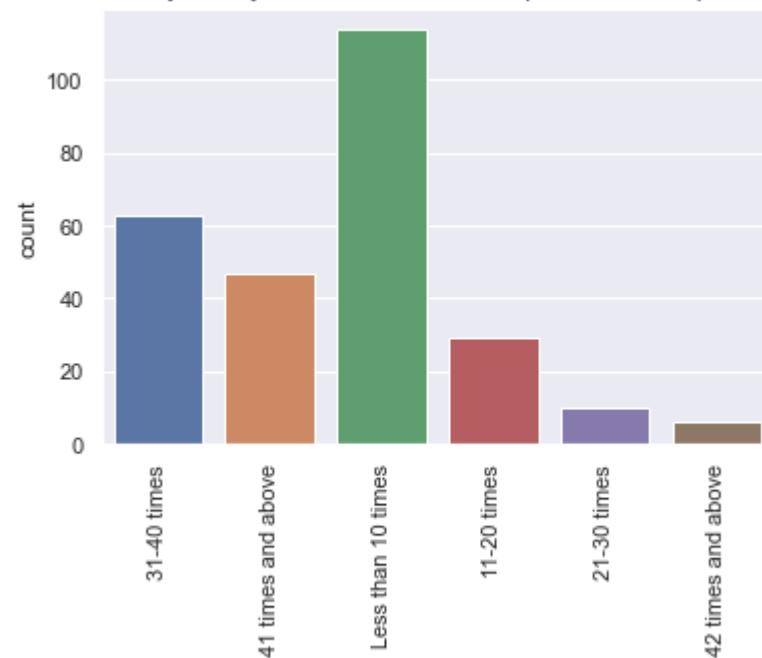


```
Out[12]: Text(0.5, 1.0, '6 How many times you have made an online purchase in the past 1 year?')
```

```
Out[12]: <AxesSubplot:title={'center':'6 How many times you have made an online purchase in the past 1 year?'}, xlabel='6 How many times you have made an online purchase in the past 1 year?', ylabel='count'>
```

```
Out[12]: (array([0, 1, 2, 3, 4, 5]),  
 [Text(0, 0, '31-40 times'),  
  Text(1, 0, '41 times and above'),  
  Text(2, 0, 'Less than 10 times'),  
  Text(3, 0, '11-20 times'),  
  Text(4, 0, '21-30 times'),  
  Text(5, 0, '42 times and above')])
```

6 How many times you have made an online purchase in the past 1 year?



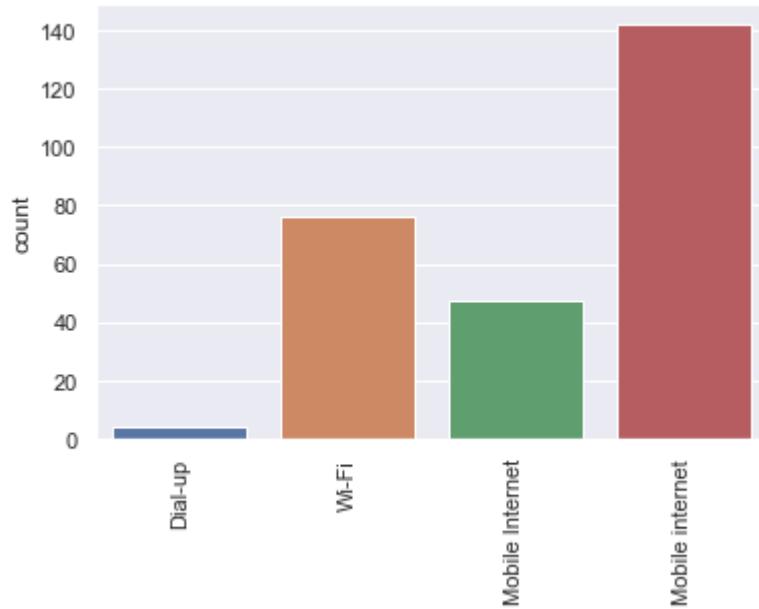
6 How many times you have made an online purchase in the past 1 year?

```
Out[12]: Text(0.5, 1.0, '7 How do you access the internet while shopping on-line?')
```

```
Out[12]: <AxesSubplot:title={'center':'7 How do you access the internet while shopping on-line?'}, xlabel='7 How do you access the internet while shopping on-line?', ylabel='count'>
```

```
Out[12]: (array([0, 1, 2, 3]),
 [Text(0, 0, 'Dial-up'),
 Text(1, 0, 'Wi-Fi'),
 Text(2, 0, 'Mobile Internet'),
 Text(3, 0, 'Mobile internet')])
```

7 How do you access the internet while shopping on-line?



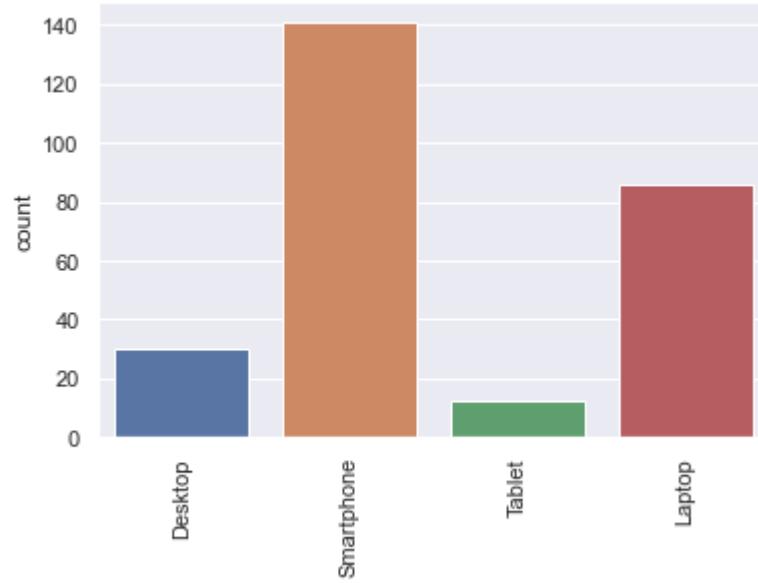
7 How do you access the internet while shopping on-line?

```
Out[12]: Text(0.5, 1.0, '8 Which device do you use to access the online shopping?')
```

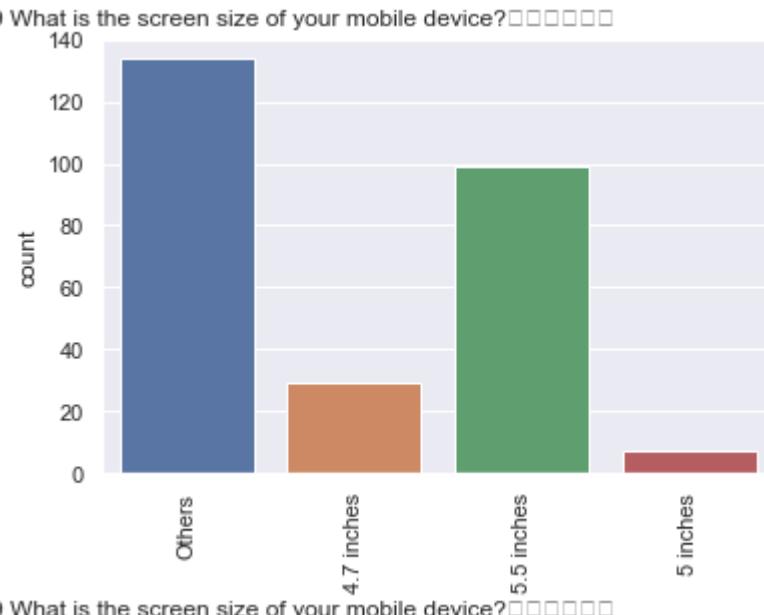
```
Out[12]: <AxesSubplot:title={'center':'8 Which device do you use to access the online shopping?'}, xlabel='8 Which device do you u  
se to access the online shopping?', ylabel='count'>
```

```
Out[12]: (array([0, 1, 2, 3]),  
 [Text(0, 0, 'Desktop'),  
  Text(1, 0, 'Smartphone'),  
  Text(2, 0, 'Tablet'),  
  Text(3, 0, 'Laptop')])
```

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

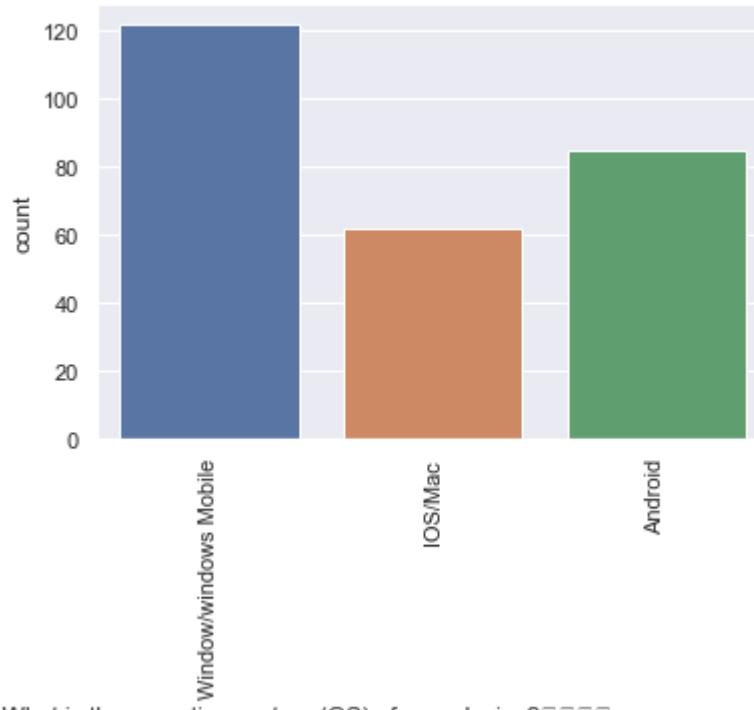


8 Which device do you use to access the online shopping?



9 What is the screen size of your mobile device?

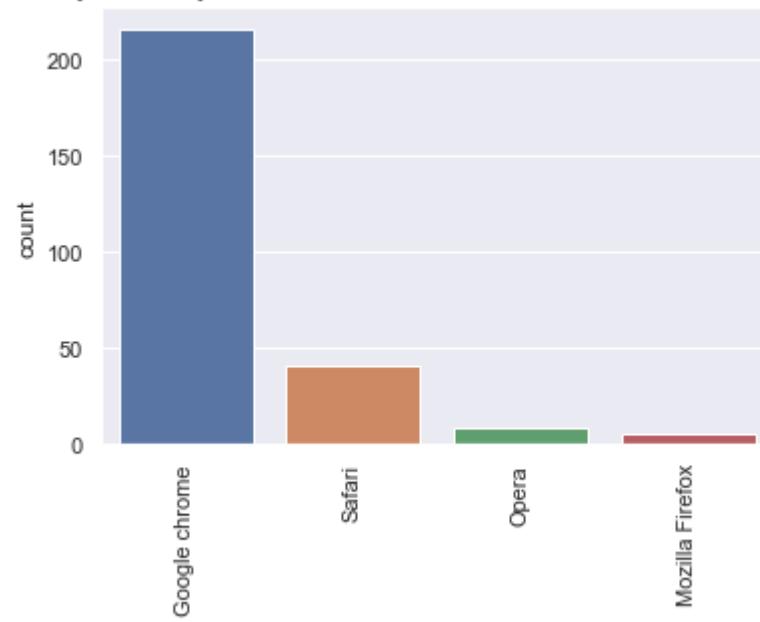
10 What is the operating system (OS) of your device?□□□□



10 What is the operating system (OS) of your device?□□□□

```
Out[12]: Text(0.5, 1.0, '11 What browser do you run on your device to access the website?\t\t\t')
')
Out[12]: <AxesSubplot:title={'center':'11 What browser do you run on your device to access the website?\t\t\t
'}, xlabel='11 What browser do you run on your device to access the website?\t\t\t
', ylabel='count'>
Out[12]: (array([0, 1, 2, 3]),
 [Text(0, 0, 'Google chrome'),
  Text(1, 0, 'Safari'),
  Text(2, 0, 'Opera'),
  Text(3, 0, 'Mozilla Firefox')])
```

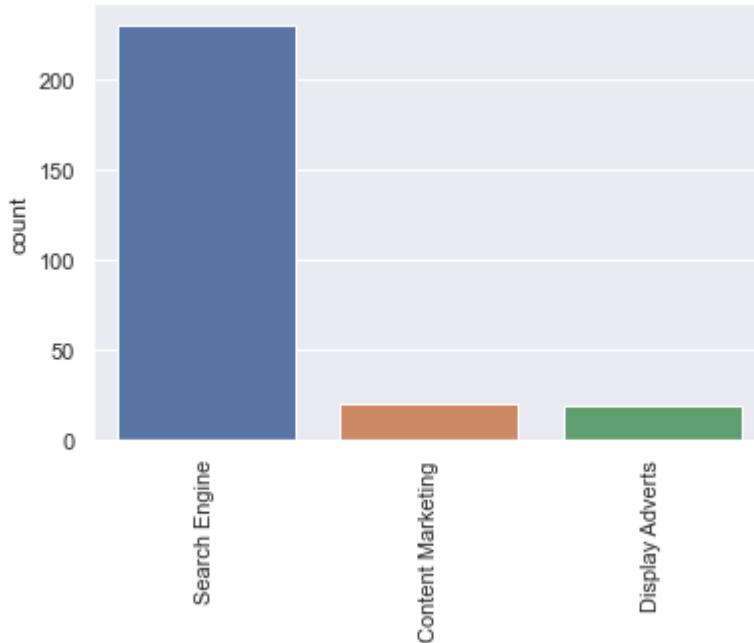
11 What browser do you run on your device to access the website?□□□



11 What browser do you run on your device to access the website?□□□

```
Out[12]: Text(0.5, 1.0, '12 Which channel did you follow to arrive at your favorite online store for the first time?  
)  
Out[12]: <AxesSubplot:title={'center':'12 Which channel did you follow to arrive at your favorite online store for the first time?  
'}, xlabel='12 Which channel did you follow to arrive at your favorite online store for the first time?  
' , ylabel='count'>  
Out[12]: (array([0, 1, 2]),  
 [Text(0, 0, 'Search Engine'),  
 Text(1, 0, 'Content Marketing'),  
 Text(2, 0, 'Display Adverts')])
```

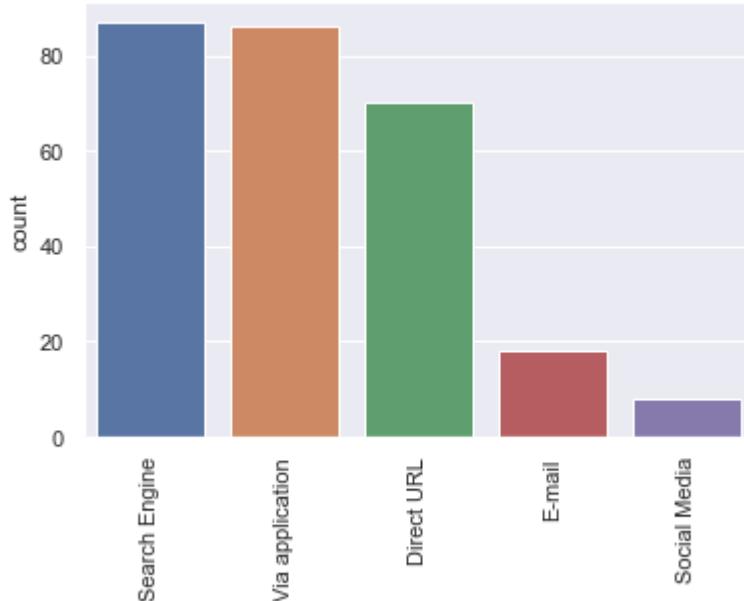
12 Which channel did you follow to arrive at your favorite online store for the first time?



12 Which channel did you follow to arrive at your favorite online store for the first time?

```
Out[12]: Text(0.5, 1.0, '13 After first visit, how do you reach the online retail store?\t\t\t\t\t')  
Out[12]: <AxesSubplot:title={'center':'13 After first visit, how do you reach the online retail store?\t\t\t\t\t'}, xlabel='13 After first visit, how do you reach the online retail store?\t\t\t\t\t', ylabel='count'>  
Out[12]: (array([0, 1, 2, 3, 4]),  
 [Text(0, 0, 'Search Engine'),  
  Text(1, 0, 'Via application'),  
  Text(2, 0, 'Direct URL'),  
  Text(3, 0, 'E-mail'),  
  Text(4, 0, 'Social Media')])
```

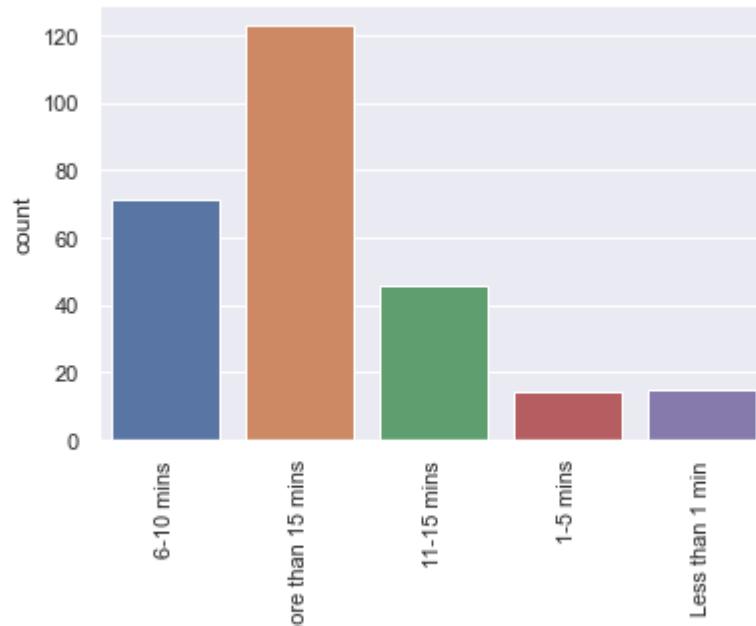
13 After first visit, how do you reach the online retail store?□□□□



13 After first visit, how do you reach the online retail store?□□□□

```
Out[12]: Text(0.5, 1.0, '14 How much time do you explore the e- retail store before making a purchase decision?  
)  
Out[12]: <AxesSubplot:title={'center':'14 How much time do you explore the e- retail store before making a purchase decision?  
'}, xlabel='14 How much time do you explore the e- retail store before making a purchase decision?  
' , ylabel='count'>  
Out[12]: (array([0, 1, 2, 3, 4]),  
 [Text(0, 0, '6-10 mins'),  
 Text(1, 0, 'more than 15 mins'),  
 Text(2, 0, '11-15 mins'),  
 Text(3, 0, '1-5 mins'),  
 Text(4, 0, 'Less than 1 min')])
```

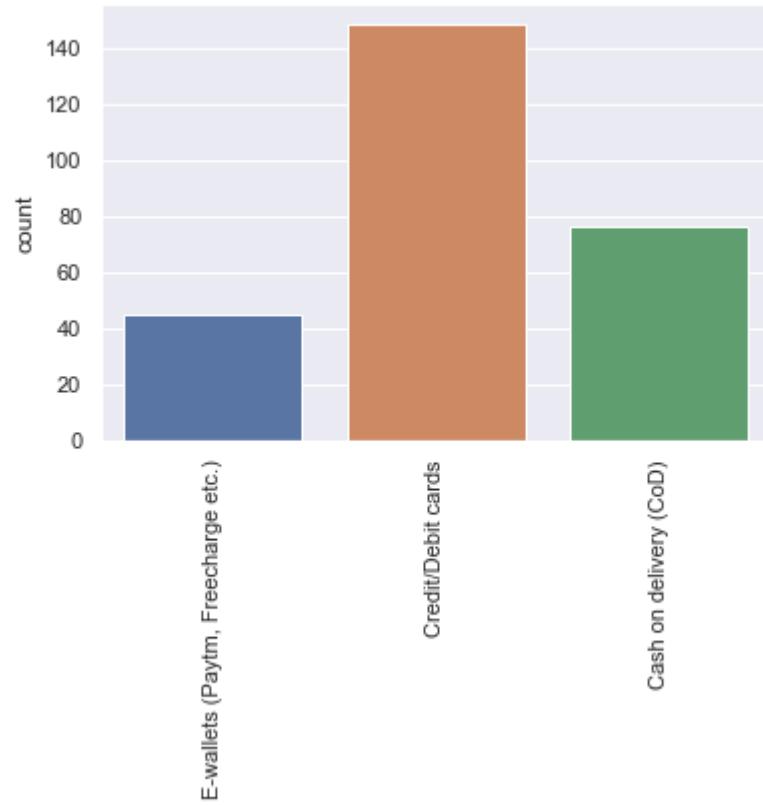
14 How much time do you explore the e- retail store before making a purchase decision?



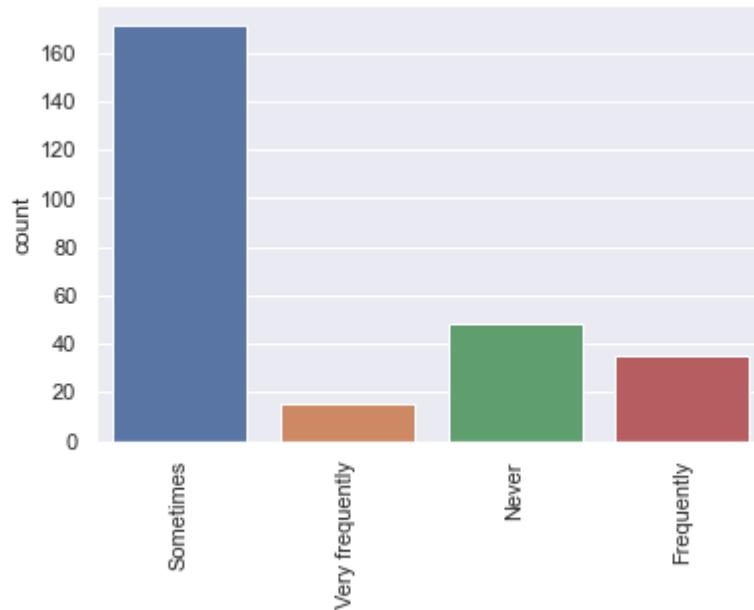
14 How much time do you explore the e- retail store before making a purchase decision?

```
Out[12]: (array([0, 1, 2]),  
          [Text(0, 0, 'E-wallets (Paytm, Freecharge etc.)'),  
           Text(1, 0, 'Credit/Debit cards'),  
           Text(2, 0, 'Cash on delivery (CoD)')])
```

15 What is your preferred payment Option?

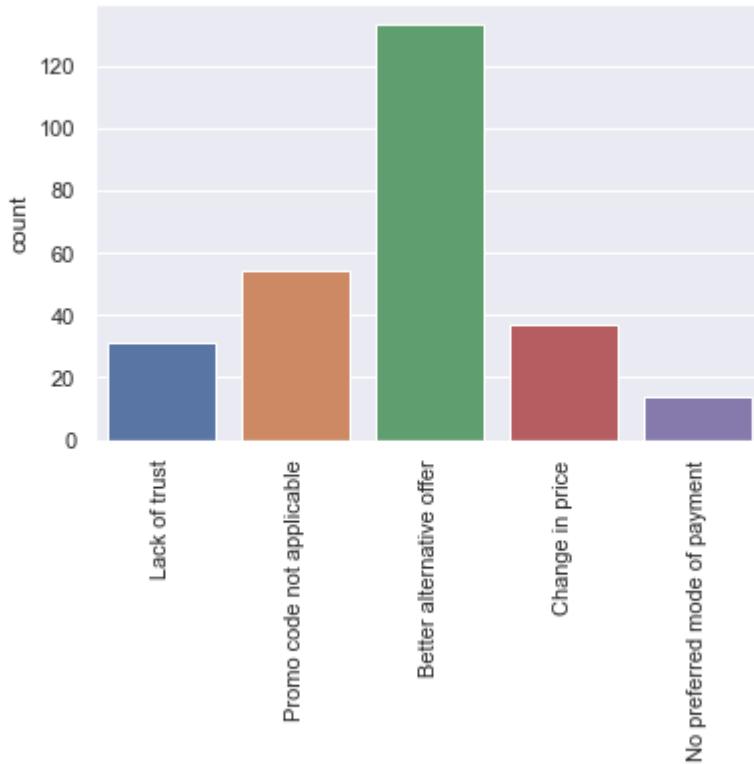


15 What is your preferred payment Option?



```
Out[12]: (array([0, 1, 2, 3, 4]),  
          [Text(0, 0, 'Lack of trust'),  
           Text(1, 0, 'Promo code not applicable'),  
           Text(2, 0, 'Better alternative offer'),  
           Text(3, 0, 'Change in price'),  
           Text(4, 0, 'No preferred mode of payment')])
```

17 Why did you abandon the "Bag", "Shopping Cart"?□□□□□



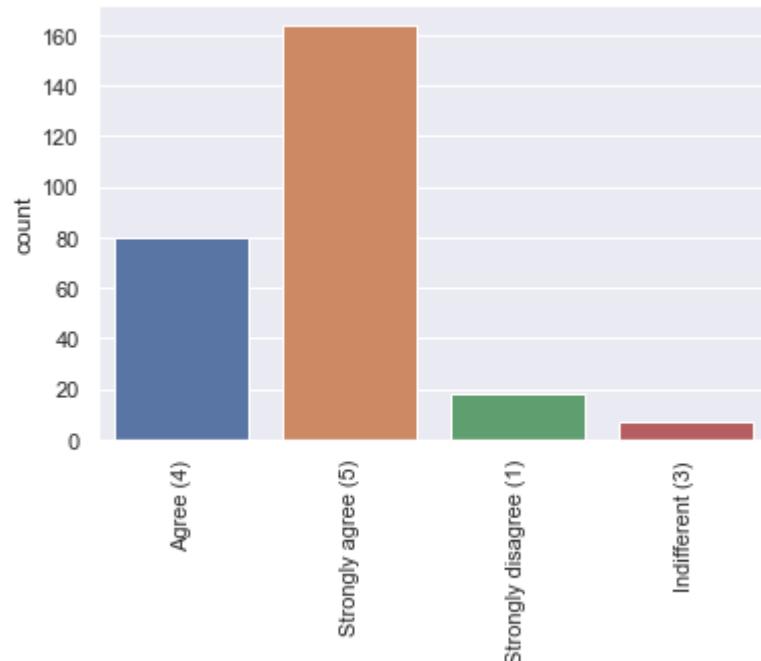
17 Why did you abandon the "Bag", "Shopping Cart"?□□□□□

```
Out[12]: Text(0.5, 1.0, '18 The content on the website must be easy to read and understand')
```

```
Out[12]: <AxesSubplot:title={'center':'18 The content on the website must be easy to read and understand'}, xlabel='18 The content on the website must be easy to read and understand', ylabel='count'>
```

```
Out[12]: (array([0, 1, 2, 3]),  
 [Text(0, 0, 'Agree (4)'),  
  Text(1, 0, 'Strongly agree (5)'),  
  Text(2, 0, 'Strongly disagree (1)'),  
  Text(3, 0, 'Indifferent (3)')])
```

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



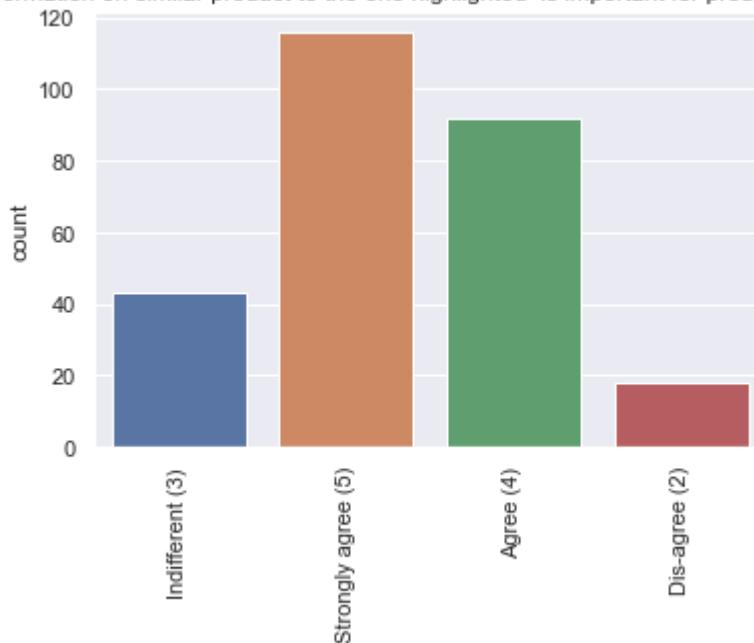
18 The content on the website must be easy to read and understand

```
Out[12]: Text(0.5, 1.0, '19 Information on similar product to the one highlighted is important for product comparison')
```

```
Out[12]: <AxesSubplot:title={'center':'19 Information on similar product to the one highlighted is important for product comparison'}, xlabel='19 Information on similar product to the one highlighted is important for product comparison', ylabel='count'>
```

```
Out[12]: (array([0, 1, 2, 3]),  
 [Text(0, 0, 'Indifferent (3)'),  
  Text(1, 0, 'Strongly agree (5)'),  
  Text(2, 0, 'Agree (4)'),  
  Text(3, 0, 'Dis-agree (2)')])
```

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



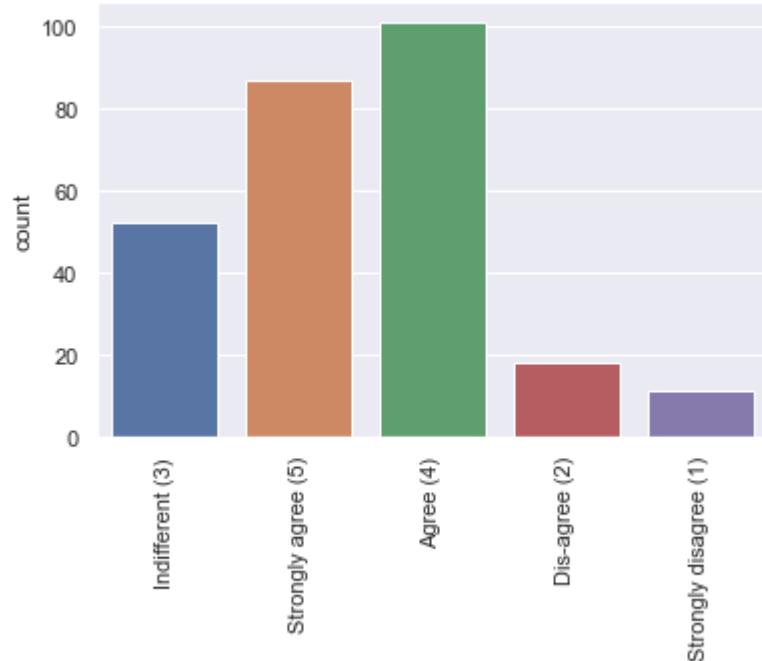
19 Information on similar product to the one highlighted is important for product comparison

Out[12]: Text(0.5, 1.0, '20 Complete information on listed seller and product being offered is important for purchase decision.')

Out[12]: <AxesSubplot:title={'center':'20 Complete information on listed seller and product being offered is important for purchase decision.'}, xlabel='20 Complete information on listed seller and product being offered is important for purchase decision.', ylabel='count'>

Out[12]: (array([0, 1, 2, 3, 4]),
 [Text(0, 0, 'Indifferent (3)'),
 Text(1, 0, 'Strongly agree (5)'),
 Text(2, 0, 'Agree (4)'),
 Text(3, 0, 'Dis-agree (2)'),
 Text(4, 0, 'Strongly disagree (1)')])

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



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

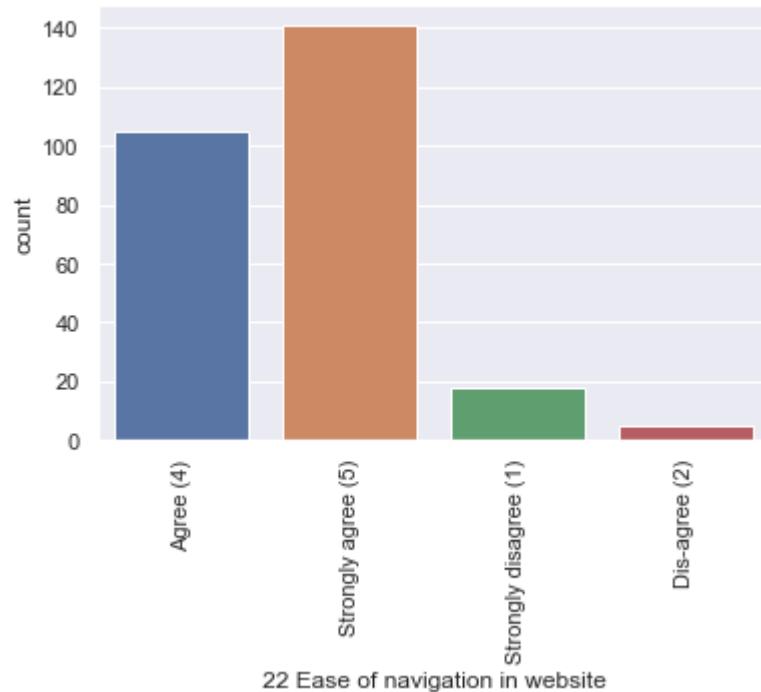
```
In [13]: for i in data.columns[21:40]:
    plt.title(i)
    sns.countplot(x=data[i])
    sns.set_theme(style='darkgrid', palette='deep')
    plt.xticks(rotation=90)
    plt.show()
```

```
Out[13]: Text(0.5, 1.0, '22 Ease of navigation in website')
```

```
Out[13]: <AxesSubplot:title={'center':'22 Ease of navigation in website'}, xlabel='22 Ease of navigation in website', ylabel='count'>
```

```
Out[13]: (array([0, 1, 2, 3]),
 [Text(0, 0, 'Agree (4)'),
 Text(1, 0, 'Strongly agree (5)'),
 Text(2, 0, 'Strongly disagree (1)'),
 Text(3, 0, 'Dis-agree (2)')])
```

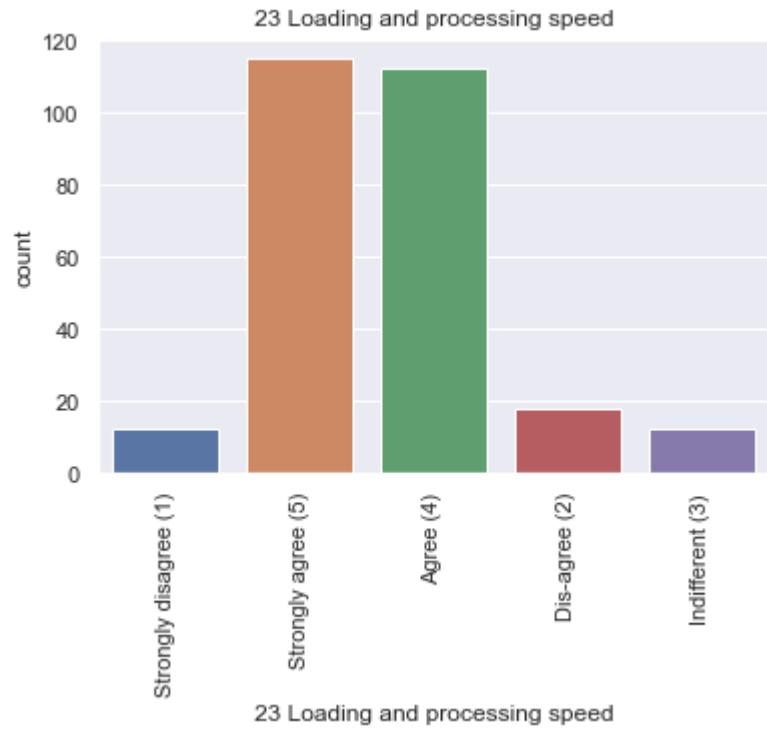
22 Ease of navigation in website



```
Out[13]: Text(0.5, 1.0, '23 Loading and processing speed')
```

```
Out[13]: <AxesSubplot:title={'center':'23 Loading and processing speed'}, xlabel='23 Loading and processing speed', ylabel='count'>
```

```
Out[13]: (array([0, 1, 2, 3, 4]),  
 [Text(0, 0, 'Strongly disagree (1)'),  
  Text(1, 0, 'Strongly agree (5)'),  
  Text(2, 0, 'Agree (4)'),  
  Text(3, 0, 'Dis-agree (2)'),  
  Text(4, 0, 'Indifferent (3)')])
```

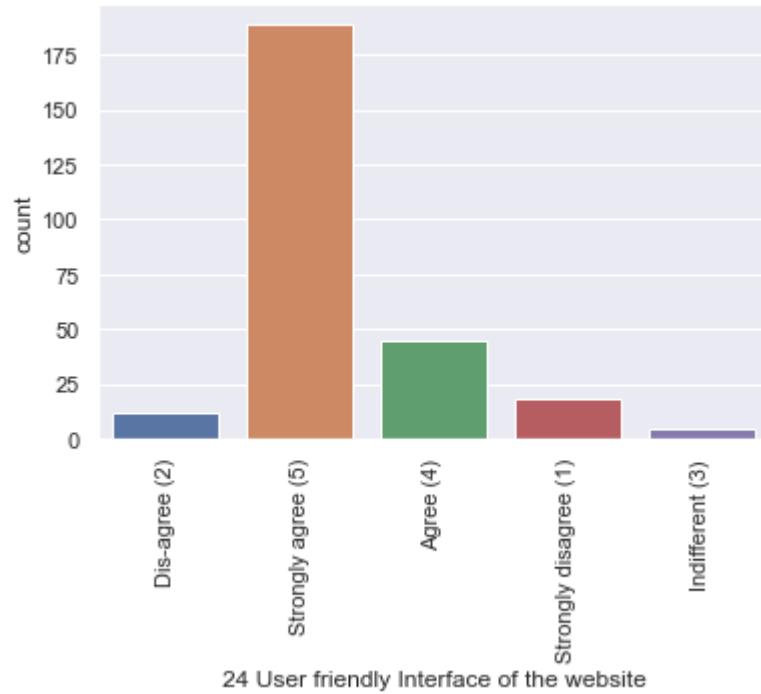


```
Out[13]: Text(0.5, 1.0, '24 User friendly Interface of the website')
```

```
Out[13]: <AxesSubplot:title={'center':'24 User friendly Interface of the website'}, xlabel='24 User friendly Interface of the website', ylabel='count'>
```

```
Out[13]: (array([0, 1, 2, 3, 4]),
 [Text(0, 0, 'Dis-agree (2)'),
 Text(1, 0, 'Strongly agree (5)'),
 Text(2, 0, 'Agree (4)'),
 Text(3, 0, 'Strongly disagree (1)'),
 Text(4, 0, 'Indifferent (3)')])
```

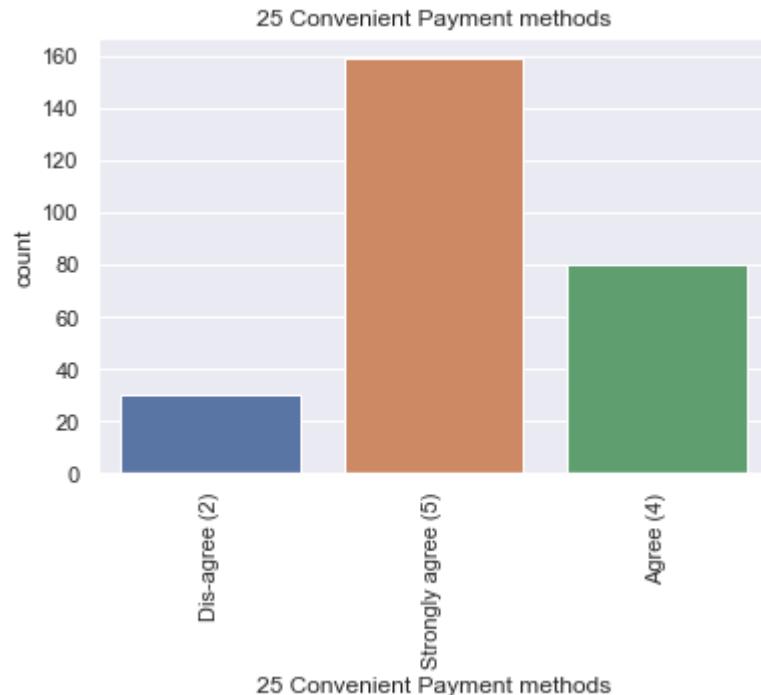
24 User friendly Interface of the website



```
Out[13]: Text(0.5, 1.0, '25 Convenient Payment methods')
```

```
Out[13]: <AxesSubplot:title={'center':'25 Convenient Payment methods'}, xlabel='25 Convenient Payment methods', ylabel='count'>
```

```
Out[13]: (array([0, 1, 2]),
 [Text(0, 0, 'Dis-agree (2)'),
 Text(1, 0, 'Strongly agree (5)'),
 Text(2, 0, 'Agree (4)')])
```

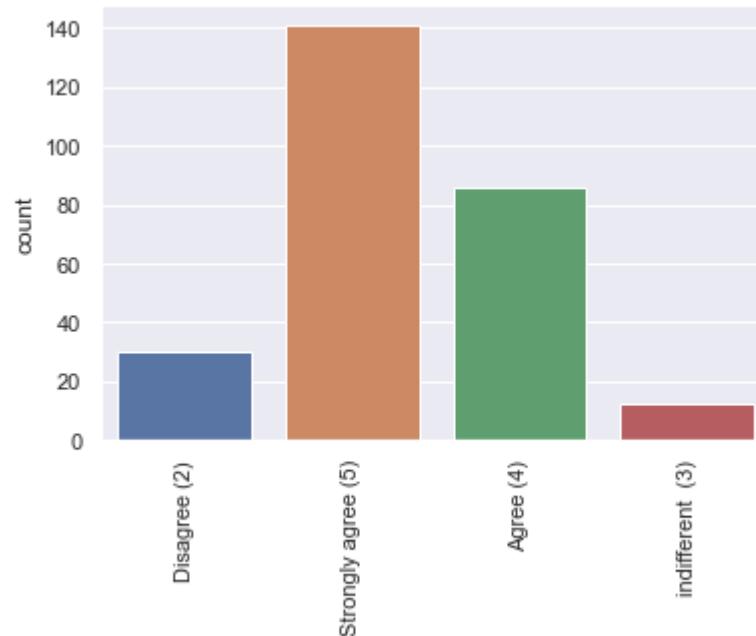


Out[13]: Text(0.5, 1.0, '26 Trust that the online retail store will fulfill its part of the transaction at the stipulated time')

Out[13]: <AxesSubplot:title={'center':'26 Trust that the online retail store will fulfill its part of the transaction at the stipulated time'}, xlabel='26 Trust that the online retail store will fulfill its part of the transaction at the stipulated time', ylabel='count'>

Out[13]: (array([0, 1, 2, 3]),
 [Text(0, 0, 'Disagree (2)'),
 Text(1, 0, 'Strongly agree (5)'),
 Text(2, 0, 'Agree (4)'),
 Text(3, 0, 'indifferent (3)')])

26 Trust that the online retail store will fulfill its part of the transaction at the stipulated time

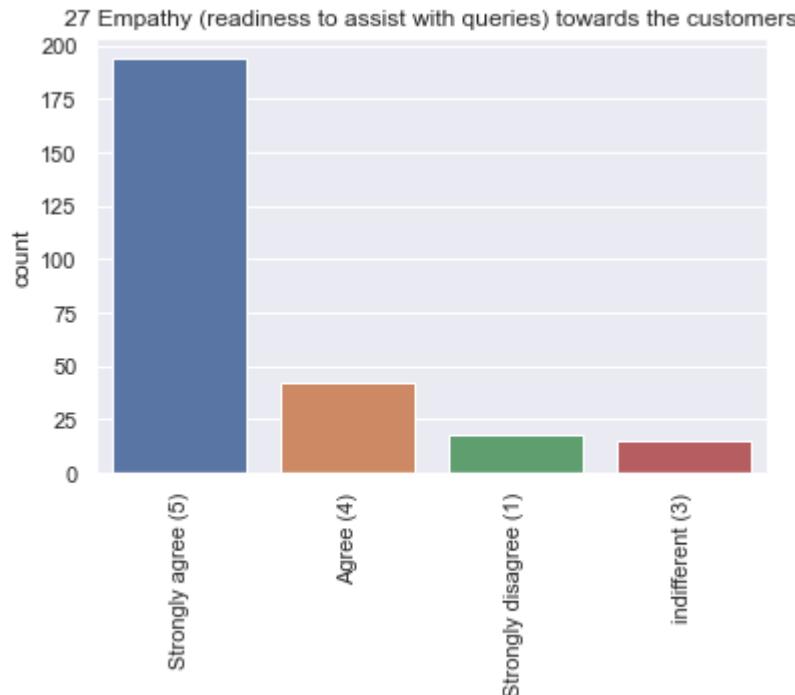


26 Trust that the online retail store will fulfill its part of the transaction at the stipulated time

```
Out[13]: Text(0.5, 1.0, '27 Empathy (readiness to assist with queries) towards the customers')
```

```
Out[13]: <AxesSubplot:title={'center':'27 Empathy (readiness to assist with queries) towards the customers'}, xlabel='27 Empathy (readiness to assist with queries) towards the customers', ylabel='count'>
```

```
Out[13]: (array([0, 1, 2, 3]),
 [Text(0, 0, 'Strongly agree (5)'),
  Text(1, 0, 'Agree (4)'),
  Text(2, 0, 'Strongly disagree (1)'),
  Text(3, 0, 'indifferent (3)')])
```



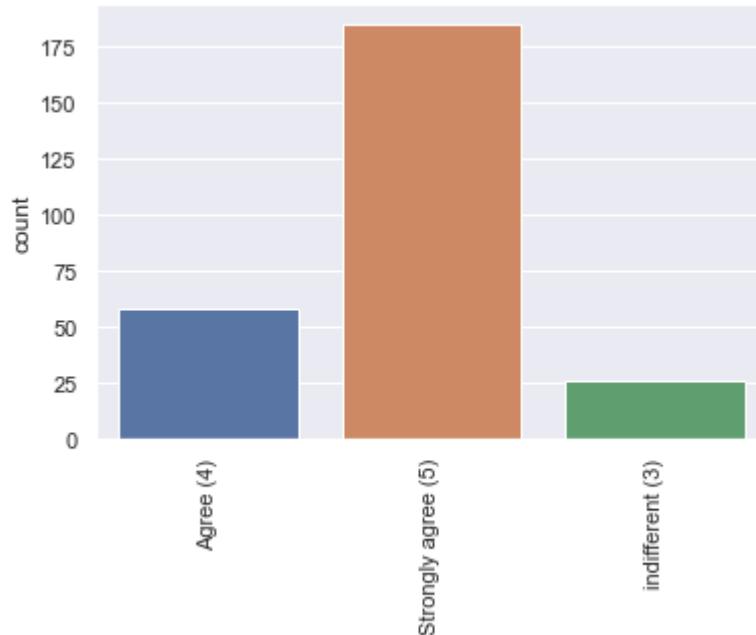
27 Empathy (readiness to assist with queries) towards the customers

```
Out[13]: Text(0.5, 1.0, '28 Being able to guarantee the privacy of the customer')
```

```
Out[13]: <AxesSubplot:title={'center':'28 Being able to guarantee the privacy of the customer'}, xlabel='28 Being able to guarantee the privacy of the customer', ylabel='count'>
```

```
Out[13]: (array([0, 1, 2]),
 [Text(0, 0, 'Agree (4)'),
 Text(1, 0, 'Strongly agree (5)'),
 Text(2, 0, 'indifferent (3)')])
```

28 Being able to guarantee the privacy of the customer



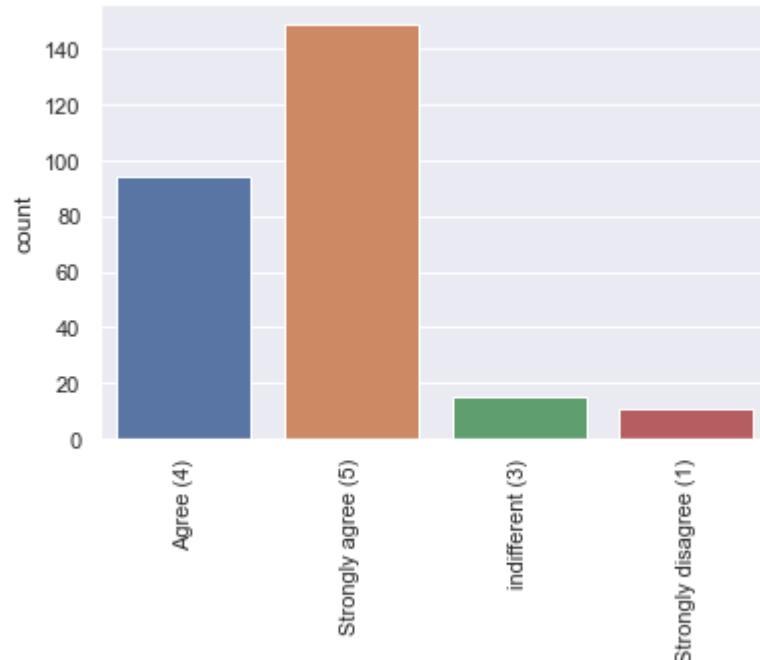
28 Being able to guarantee the privacy of the customer

```
Out[13]: Text(0.5, 1.0, '29 Responsiveness, availability of several communication channels (email, online rep, twitter, phone etc.)')

Out[13]: <AxesSubplot:title={'center':'29 Responsiveness, availability of several communication channels (email, online rep, twitter, phone etc.)'}, xlabel='29 Responsiveness, availability of several communication channels (email, online rep, twitter, phone etc.)', ylabel='count'>

Out[13]: (array([0, 1, 2, 3]),
 [Text(0, 0, 'Agree (4)'),
  Text(1, 0, 'Strongly agree (5)'),
  Text(2, 0, 'indifferent (3)'),
  Text(3, 0, 'Strongly disagree (1)')])
```

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



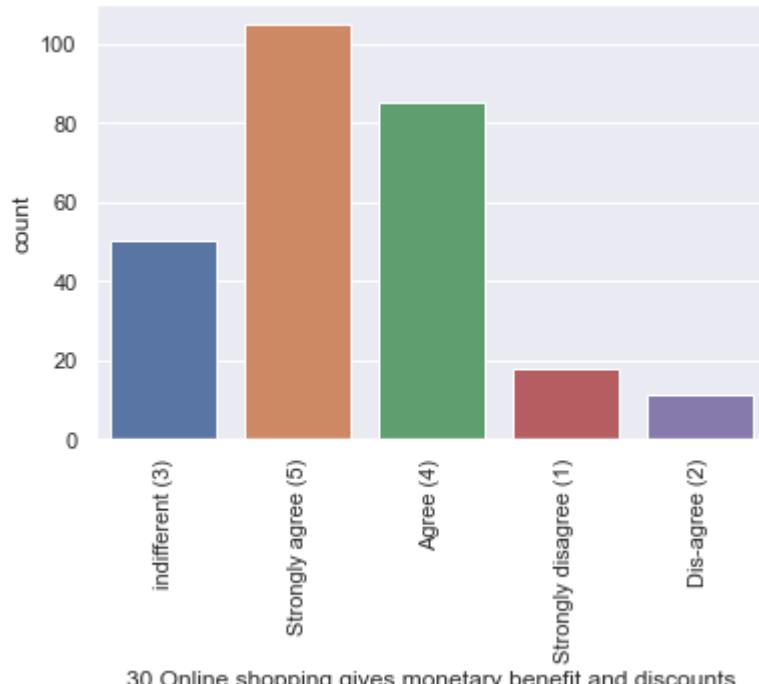
29 Responsiveness, availability of several communication channels (email, online rep, twitter, phone etc.)

```
Out[13]: Text(0.5, 1.0, '30 Online shopping gives monetary benefit and discounts')
```

```
Out[13]: <AxesSubplot:title={'center':'30 Online shopping gives monetary benefit and discounts'}, xlabel='30 Online shopping gives monetary benefit and discounts', ylabel='count'>
```

```
Out[13]: (array([0, 1, 2, 3, 4]),
 [Text(0, 0, 'indifferent (3)'),
  Text(1, 0, 'Strongly agree (5)'),
  Text(2, 0, 'Agree (4)'),
  Text(3, 0, 'Strongly disagree (1)'),
  Text(4, 0, 'Dis-agree (2)')])
```

30 Online shopping gives monetary benefit and discounts



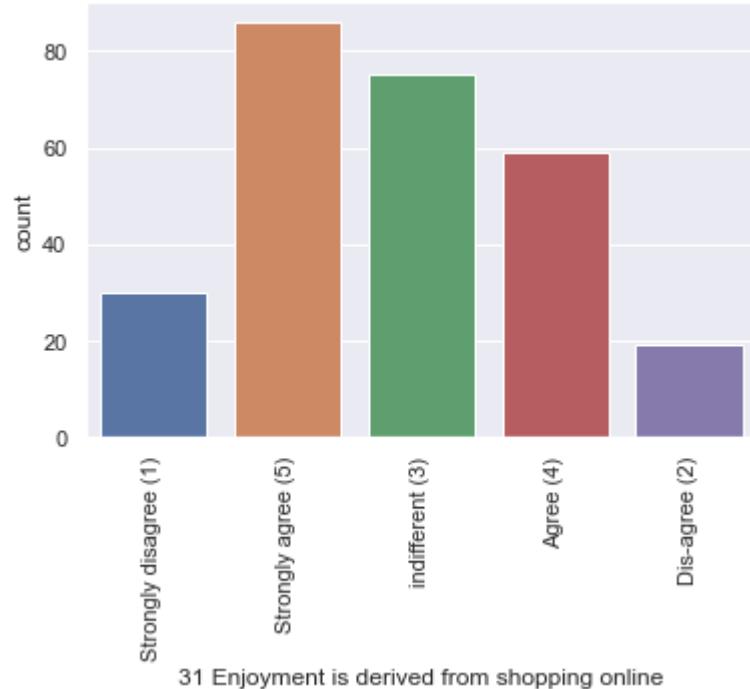
30 Online shopping gives monetary benefit and discounts

```
Out[13]: Text(0.5, 1.0, '31 Enjoyment is derived from shopping online')
```

```
Out[13]: <AxesSubplot:title={'center':'31 Enjoyment is derived from shopping online'}, xlabel='31 Enjoyment is derived from shopping online', ylabel='count'>
```

```
Out[13]: (array([0, 1, 2, 3, 4]),  
 [Text(0, 0, 'Strongly disagree (1)'),  
  Text(1, 0, 'Strongly agree (5)'),  
  Text(2, 0, 'indifferent (3)'),  
  Text(3, 0, 'Agree (4)'),  
  Text(4, 0, 'Dis-agree (2)')])
```

31 Enjoyment is derived from shopping online



31 Enjoyment is derived from shopping online

```
Out[13]: Text(0.5, 1.0, '32 Shopping online is convenient and flexible')
```

```
Out[13]: <AxesSubplot:title={'center':'32 Shopping online is convenient and flexible'}, xlabel='32 Shopping online is convenient and flexible', ylabel='count'>
```

```
Out[13]: (array([0, 1, 2, 3]),
 [Text(0, 0, 'Dis-agree (2)'),
 Text(1, 0, 'Strongly agree (5)'),
 Text(2, 0, 'indifferent (3)'),
 Text(3, 0, 'Agree (4)')])
```

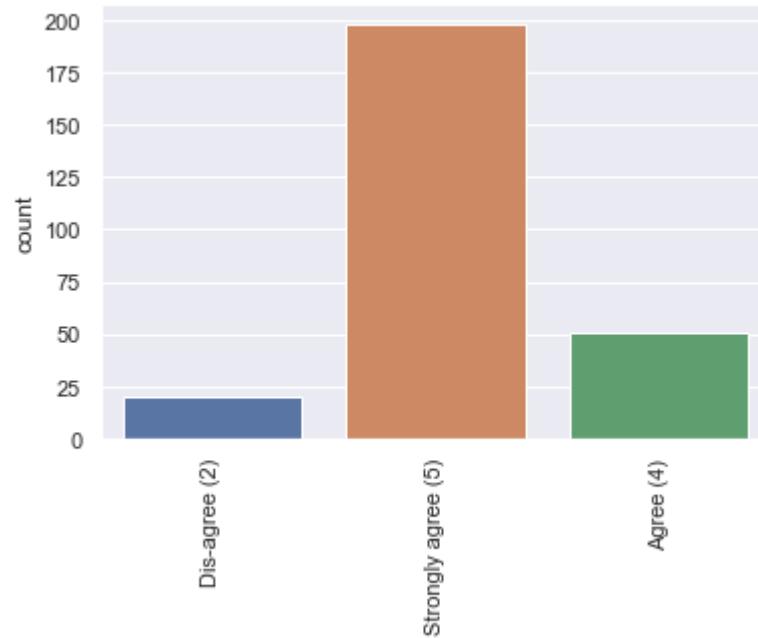


```
Out[13]: Text(0.5, 1.0, '33 Return and replacement policy of the e-tailer is important for purchase decision')
```

```
Out[13]: <AxesSubplot:title={'center':'33 Return and replacement policy of the e-tailer is important for purchase decision'}, xlabel='33 Return and replacement policy of the e-tailer is important for purchase decision', ylabel='count'>
```

```
Out[13]: (array([0, 1, 2]),
 [Text(0, 0, 'Dis-agree (2)'),
  Text(1, 0, 'Strongly agree (5)'),
  Text(2, 0, 'Agree (4)')])
```

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

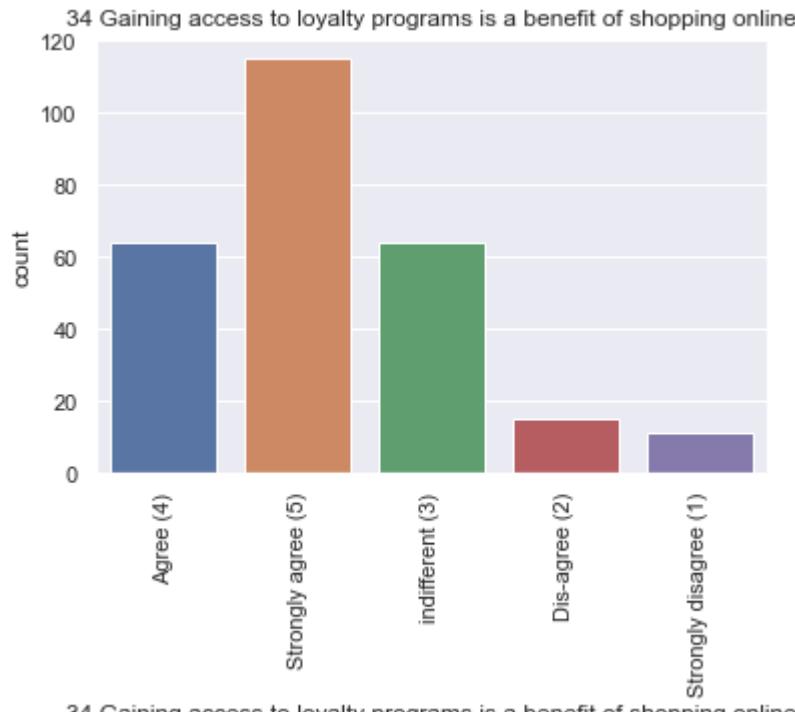


33 Return and replacement policy of the e-tailer is important for purchase decision

```
Out[13]: Text(0.5, 1.0, '34 Gaining access to loyalty programs is a benefit of shopping online')
```

```
Out[13]: <AxesSubplot:title={'center':'34 Gaining access to loyalty programs is a benefit of shopping online'}, xlabel='34 Gaining access to loyalty programs is a benefit of shopping online', ylabel='count'>
```

```
Out[13]: (array([0, 1, 2, 3, 4]),
 [Text(0, 0, 'Agree (4)'),
 Text(1, 0, 'Strongly agree (5)'),
 Text(2, 0, 'indifferent (3)'),
 Text(3, 0, 'Dis-agree (2)'),
 Text(4, 0, 'Strongly disagree (1)')])
```



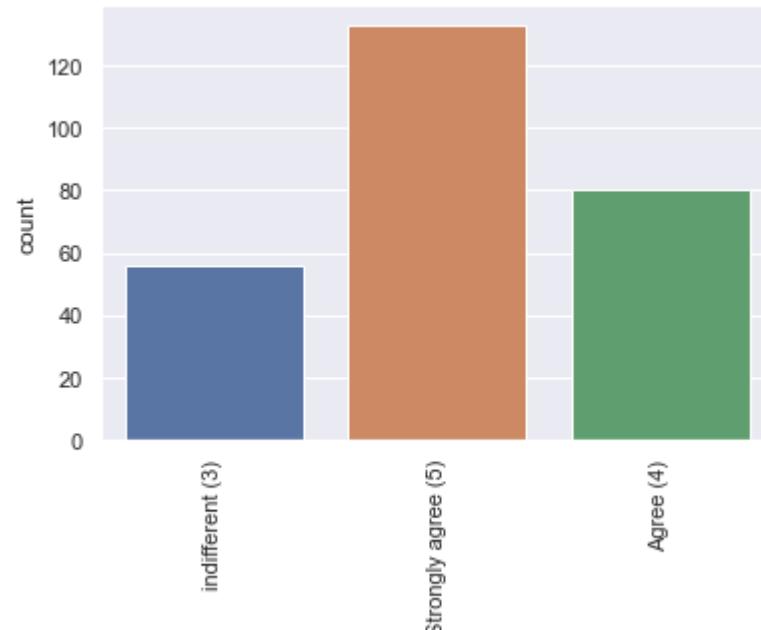
34 Gaining access to loyalty programs is a benefit of shopping online

```
Out[13]: Text(0.5, 1.0, '35 Displaying quality Information on the website improves satisfaction of customers')
```

```
Out[13]: <AxesSubplot:title={'center':'35 Displaying quality Information on the website improves satisfaction of customers'}, xlabel='35 Displaying quality Information on the website improves satisfaction of customers', ylabel='count'>
```

```
Out[13]: (array([0, 1, 2]),
 [Text(0, 0, 'indifferent (3)'),
 Text(1, 0, 'Strongly agree (5)'),
 Text(2, 0, 'Agree (4)')])
```

35 Displaying quality Information on the website improves satisfaction of customers



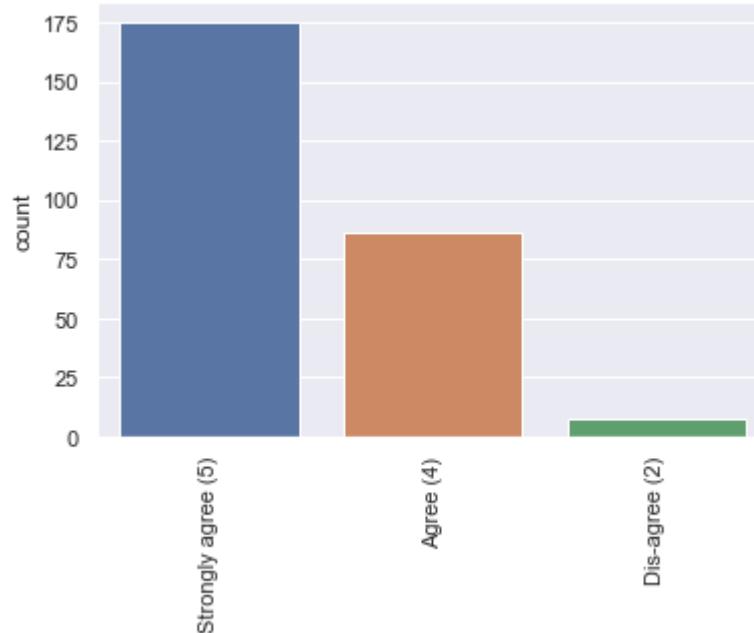
35 Displaying quality Information on the website improves satisfaction of customers

```
Out[13]: Text(0.5, 1.0, '36 User derive satisfaction while shopping on a good quality website or application')
```

```
Out[13]: <AxesSubplot:title={'center':'36 User derive satisfaction while shopping on a good quality website or application'}, xlabel='36 User derive satisfaction while shopping on a good quality website or application', ylabel='count'>
```

```
Out[13]: (array([0, 1, 2]),
 [Text(0, 0, 'Strongly agree (5)'),
  Text(1, 0, 'Agree (4)'),
  Text(2, 0, 'Dis-agree (2)')])
```

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



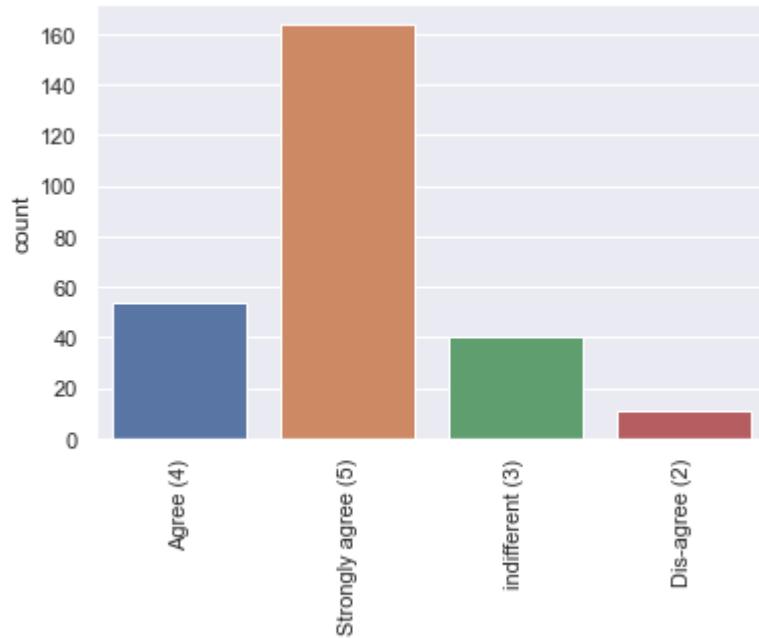
36 User derive satisfaction while shopping on a good quality website or application

Out[13]: Text(0.5, 1.0, '37 Net Benefit derived from shopping online can lead to users satisfaction')

Out[13]: <AxesSubplot:title={'center':'37 Net Benefit derived from shopping online can lead to users satisfaction'}, xlabel='37 Ne t Benefit derived from shopping online can lead to users satisfaction', ylabel='count'>

Out[13]: (array([0, 1, 2, 3]),
 [Text(0, 0, 'Agree (4)'),
 Text(1, 0, 'Strongly agree (5)'),
 Text(2, 0, 'indifferent (3)'),
 Text(3, 0, 'Dis-agree (2)')])

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



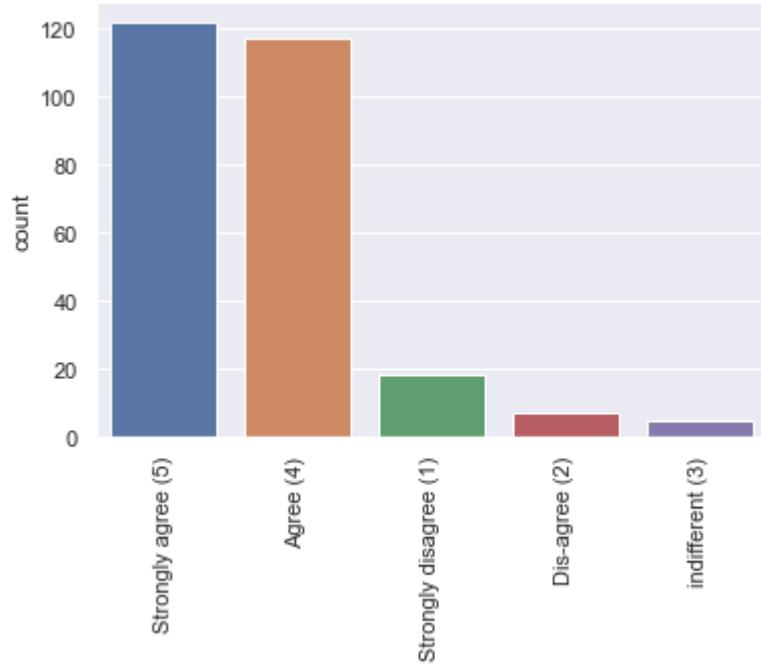
37 Net Benefit derived from shopping online can lead to users satisfaction

```
Out[13]: Text(0.5, 1.0, '38 User satisfaction cannot exist without trust')
```

```
Out[13]: <AxesSubplot:title={'center':'38 User satisfaction cannot exist without trust'}, xlabel='38 User satisfaction cannot exist without trust', ylabel='count'>
```

```
Out[13]: (array([0, 1, 2, 3, 4]),  
 [Text(0, 0, 'Strongly agree (5)'),  
  Text(1, 0, 'Agree (4)'),  
  Text(2, 0, 'Strongly disagree (1)'),  
  Text(3, 0, 'Dis-agree (2)'),  
  Text(4, 0, 'indifferent (3)')])
```

38 User satisfaction cannot exist without trust



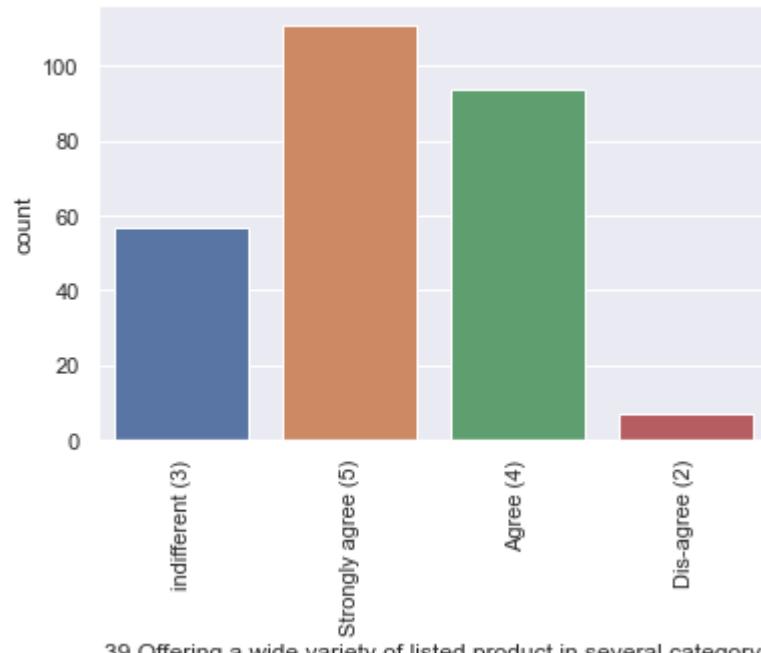
38 User satisfaction cannot exist without trust

```
Out[13]: Text(0.5, 1.0, '39 Offering a wide variety of listed product in several category')
```

```
Out[13]: <AxesSubplot:title={'center':'39 Offering a wide variety of listed product in several category'}, xlabel='39 Offering a wide variety of listed product in several category', ylabel='count'>
```

```
Out[13]: (array([0, 1, 2, 3]),
 [Text(0, 0, 'indifferent (3)'),
  Text(1, 0, 'Strongly agree (5)'),
  Text(2, 0, 'Agree (4)'),
  Text(3, 0, 'Dis-agree (2)')])
```

39 Offering a wide variety of listed product in several category

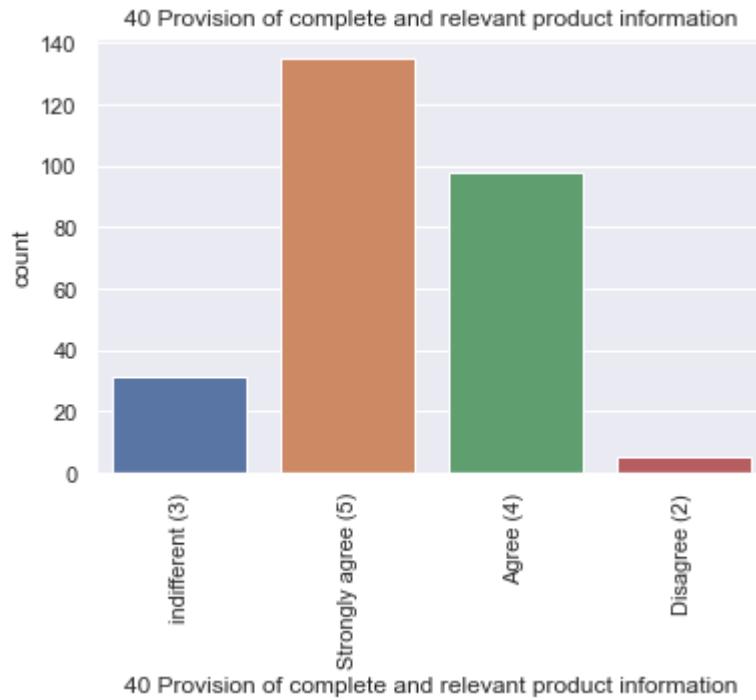


39 Offering a wide variety of listed product in several category

```
Out[13]: Text(0.5, 1.0, '40 Provision of complete and relevant product information')
```

```
Out[13]: <AxesSubplot:title={'center':'40 Provision of complete and relevant product information'}, xlabel='40 Provision of complete and relevant product information', ylabel='count'>
```

```
Out[13]: (array([0, 1, 2, 3]),
 [Text(0, 0, 'indifferent (3)'),
 Text(1, 0, 'Strongly agree (5)'),
 Text(2, 0, 'Agree (4)'),
 Text(3, 0, 'Disagree (2)')])
```



In [14]:

```
for i in data.columns[41:60]:
    plt.title(i)
    sns.countplot(x=data[i])
    plt.xticks(rotation=90)
    plt.show()
```

Out[14]: Text(0.5, 1.0, '42 The Convenience of patronizing the online retailer')

Out[14]: <AxesSubplot:title={'center':'42 The Convenience of patronizing the online retailer'}, xlabel='42 The Convenience of patronizing the online retailer', ylabel='count'>

Out[14]: (array([0, 1, 2]),
 [Text(0, 0, 'indifferent (3)'),
 Text(1, 0, 'Agree (4)'),
 Text(2, 0, 'Strongly agree (5)')])



```
Out[14]: Text(0.5, 1.0, '43 Shopping on the website gives you the sense of adventure')
```

```
Out[14]: <AxesSubplot:title={'center':'43 Shopping on the website gives you the sense of adventure'}, xlabel='43 Shopping on the website gives you the sense of adventure', ylabel='count'>
```

```
Out[14]: (array([0, 1, 2, 3, 4]),
 [Text(0, 0, 'Agree (4)'),
 Text(1, 0, 'indifferent (3)'),
 Text(2, 0, 'Strongly agree (5)'),
 Text(3, 0, 'Dis-agree (2)'),
 Text(4, 0, 'Strongly disagree (1)')])
```

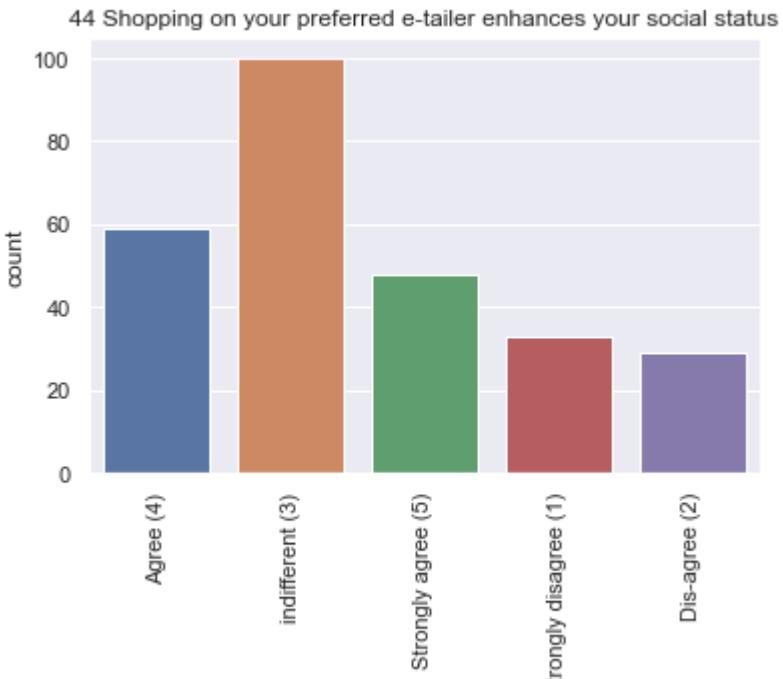


43 Shopping on the website gives you the sense of adventure

```
Out[14]: Text(0.5, 1.0, '44 Shopping on your preferred e-tailer enhances your social status')
```

```
Out[14]: <AxesSubplot:title={'center':'44 Shopping on your preferred e-tailer enhances your social status'}, xlabel='44 Shopping o  
n your preferred e-tailer enhances your social status', ylabel='count'>
```

```
Out[14]: (array([0, 1, 2, 3, 4]),  
 [Text(0, 0, 'Agree (4)'),  
  Text(1, 0, 'indifferent (3)'),  
  Text(2, 0, 'Strongly agree (5)'),  
  Text(3, 0, 'Strongly disagree (1)'),  
  Text(4, 0, 'Dis-agree (2)')])
```

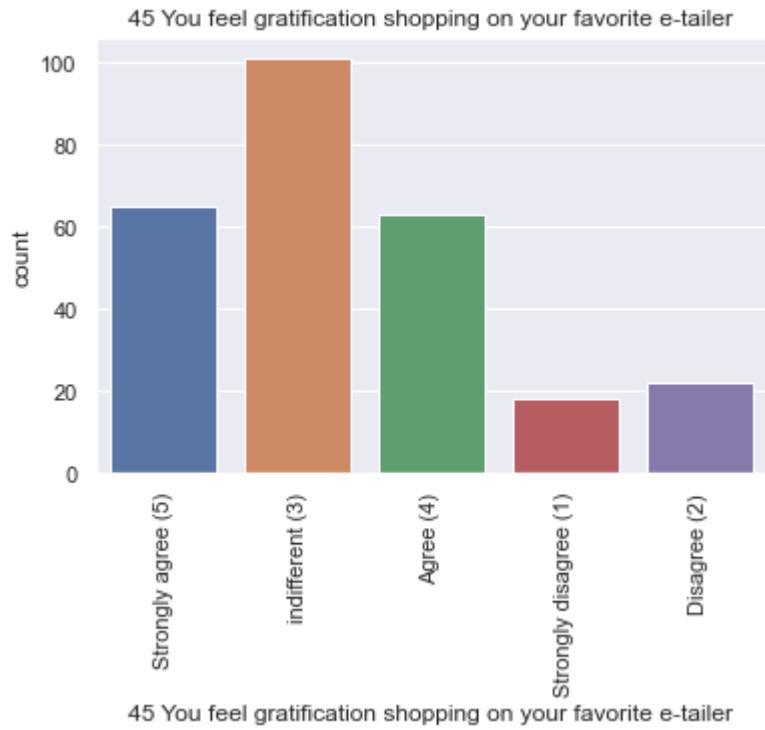


44 Shopping on your preferred e-tailer enhances your social status

```
Out[14]: Text(0.5, 1.0, '45 You feel gratification shopping on your favorite e-tailer')
```

```
Out[14]: <AxesSubplot:title={'center':'45 You feel gratification shopping on your favorite e-tailer'}, xlabel='45 You feel gratification shopping on your favorite e-tailer', ylabel='count'>
```

```
Out[14]: (array([0, 1, 2, 3, 4]),
 [Text(0, 0, 'Strongly agree (5)'),
  Text(1, 0, 'indifferent (3)'),
  Text(2, 0, 'Agree (4)'),
  Text(3, 0, 'Strongly disagree (1)'),
  Text(4, 0, 'Disagree (2)')])
```

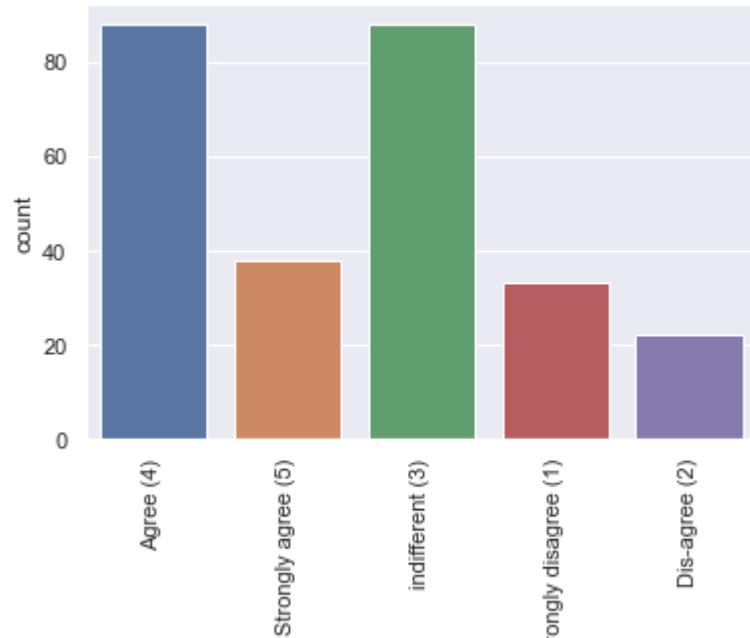


```
Out[14]: Text(0.5, 1.0, '46 Shopping on the website helps you fulfill certain roles')
```

```
Out[14]: <AxesSubplot:title={'center':'46 Shopping on the website helps you fulfill certain roles'}, xlabel='46 Shopping on the website helps you fulfill certain roles', ylabel='count'>
```

```
Out[14]: (array([0, 1, 2, 3, 4]),  
 [Text(0, 0, 'Agree (4)'),  
  Text(1, 0, 'Strongly agree (5)'),  
  Text(2, 0, 'indifferent (3)'),  
  Text(3, 0, 'Strongly disagree (1)'),  
  Text(4, 0, 'Dis-agree (2)')])
```

46 Shopping on the website helps you fulfill certain roles



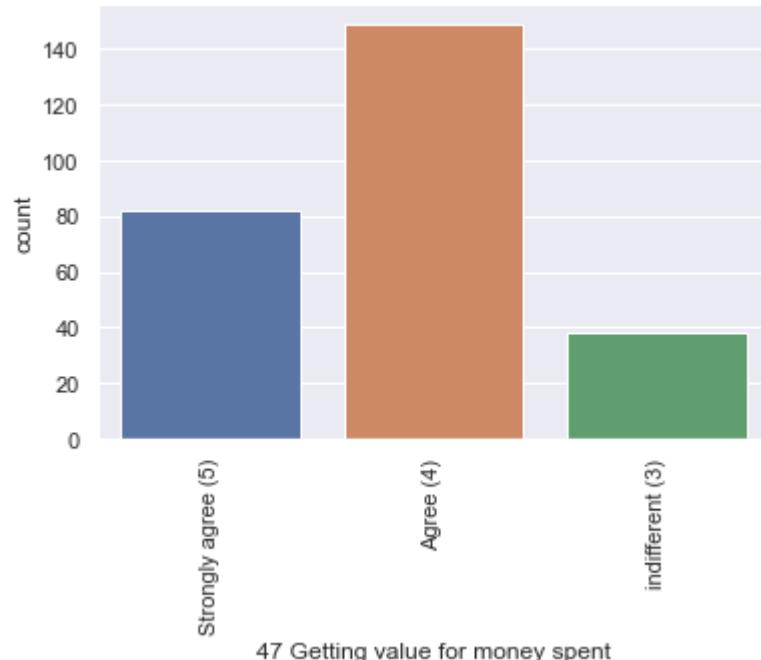
46 Shopping on the website helps you fulfill certain roles

```
Out[14]: Text(0.5, 1.0, '47 Getting value for money spent')
```

```
Out[14]: <AxesSubplot:title={'center':'47 Getting value for money spent'}, xlabel='47 Getting value for money spent', ylabel='count'>
```

```
Out[14]: (array([0, 1, 2]),
 [Text(0, 0, 'Strongly agree (5)'),
  Text(1, 0, 'Agree (4)'),
  Text(2, 0, 'indifferent (3)')])
```

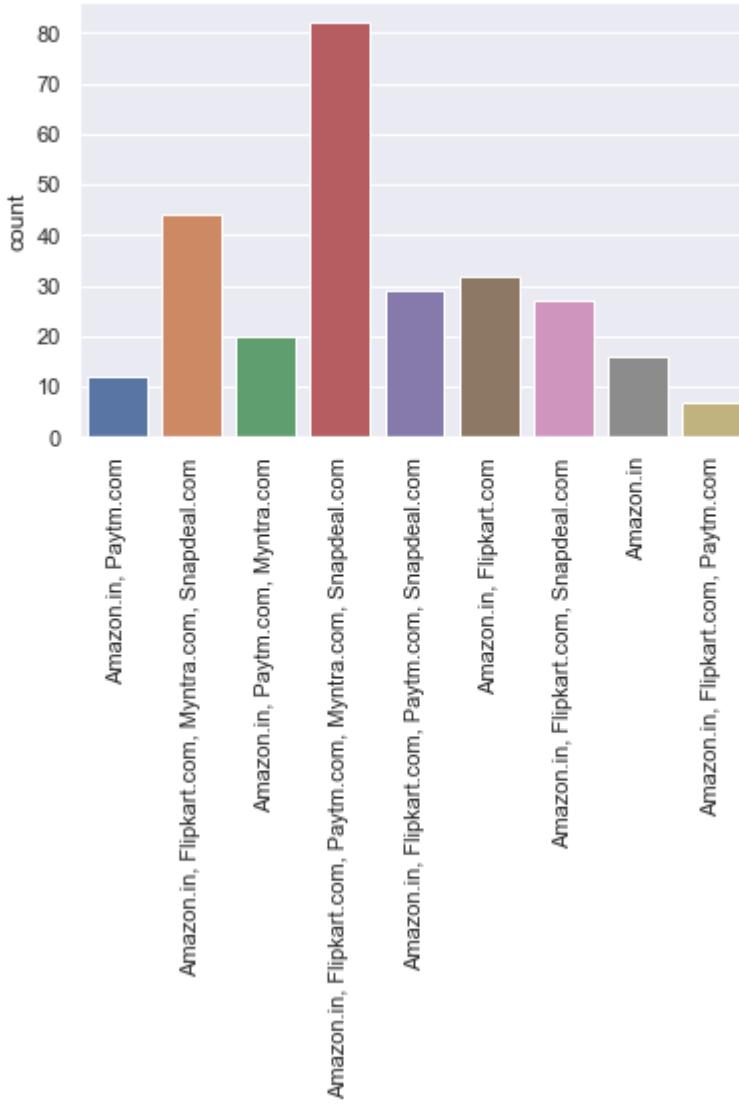
47 Getting value for money spent



47 Getting value for money spent

```
Out[14]: Text(0.5, 1.0, 'From the following, tick any (or all) of the online retailers you have shopped from;  
)  
Out[14]: <AxesSubplot:title={'center':'From the following, tick any (or all) of the online retailers you have shopped from;  
, xlabel='From the following, tick any (or all) of the online retailers you have shopped from;  
, ylabel='count'>  
Out[14]: (array([0, 1, 2, 3, 4, 5, 6, 7, 8]),  
 [Text(0, 0, 'Amazon.in, Paytm.com'),  
  Text(1, 0, 'Amazon.in, Flipkart.com, Myntra.com, Snapdeal.com'),  
  Text(2, 0, 'Amazon.in, Paytm.com, Myntra.com'),  
  Text(3, 0, 'Amazon.in, Flipkart.com, Paytm.com, Myntra.com, Snapdeal.com'),  
  Text(4, 0, 'Amazon.in, Flipkart.com, Paytm.com, Snapdeal.com'),  
  Text(5, 0, 'Amazon.in, Flipkart.com'),  
  Text(6, 0, 'Amazon.in, Flipkart.com, Snapdeal.com'),  
  Text(7, 0, 'Amazon.in'),  
  Text(8, 0, 'Amazon.in, Flipkart.com, Paytm.com')])
```

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



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

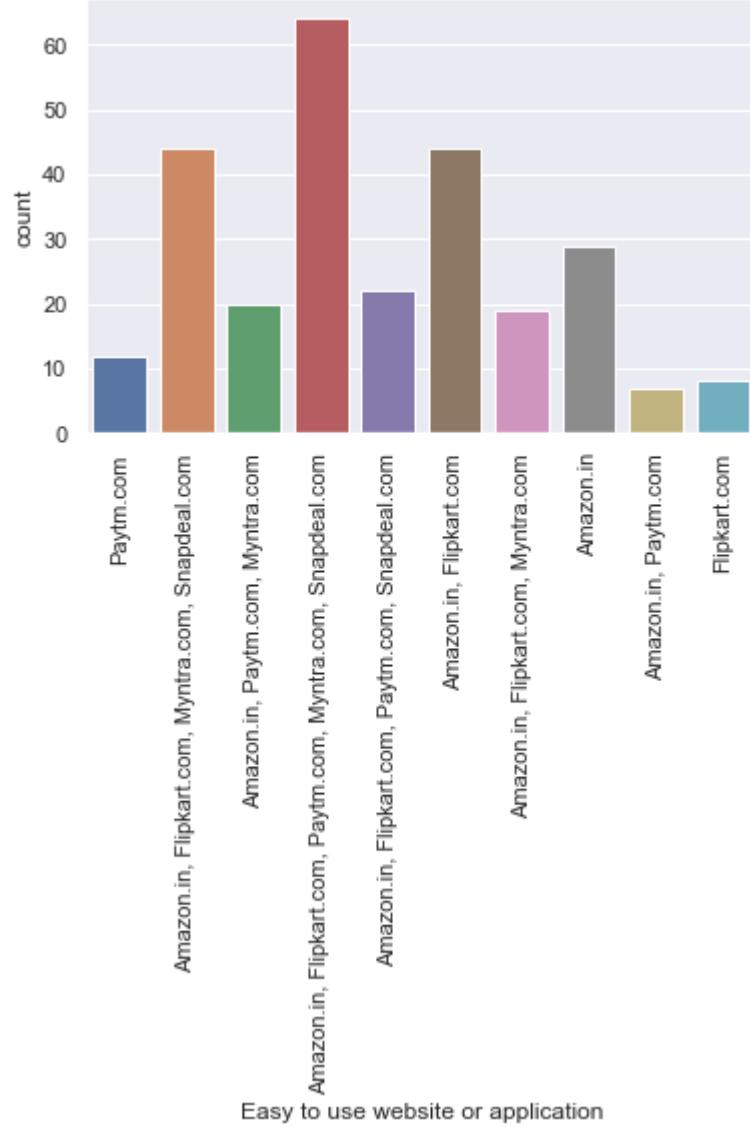
```
Out[14]: Text(0.5, 1.0, 'Easy to use website or application')
```

```
Out[14]: <AxesSubplot:title={'center':'Easy to use website or application'}, xlabel='Easy to use website or application', ylabel='count'>
```

```
Out[14]: (array([0, 1, 2, 3, 4, 5, 6, 7, 8, 9]),  
 [Text(0, 0, 'Paytm.com'),  
  Text(1, 0, 'Amazon.in, Flipkart.com, Myntra.com, Snapdeal.com'),  
  Text(2, 0, 'Amazon.in, Paytm.com, Myntra.com'),  
  Text(3, 0, 'Amazon.in, Flipkart.com, Paytm.com, Myntra.com, Snapdeal.com'),
```

```
Text(4, 0, 'Amazon.in, Flipkart.com, Paytm.com, Snapdeal.com'),
Text(5, 0, 'Amazon.in, Flipkart.com'),
Text(6, 0, 'Amazon.in, Flipkart.com, Myntra.com'),
Text(7, 0, 'Amazon.in'),
Text(8, 0, 'Amazon.in, Paytm.com'),
Text(9, 0, 'Flipkart.com'))
```

Easy to use website or application

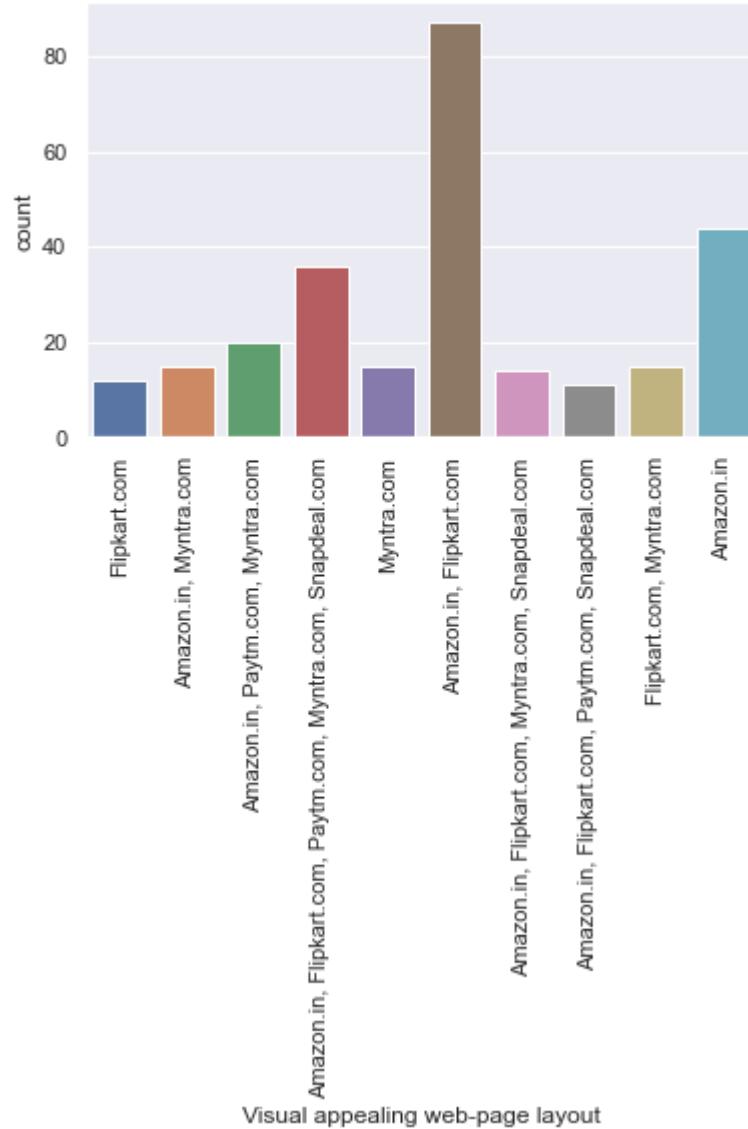


Out[14]: Text(0.5, 1.0, 'Visual appealing web-page layout')

Out[14]: <AxesSubplot:title={'center':'Visual appealing web-page layout'}, xlabel='Visual appealing web-page layout', ylabel='coun

```
t'>
Out[14]: (array([0, 1, 2, 3, 4, 5, 6, 7, 8, 9]),
 [Text(0, 0, 'Flipkart.com'),
  Text(1, 0, 'Amazon.in, Myntra.com'),
  Text(2, 0, 'Amazon.in, Paytm.com, Myntra.com'),
  Text(3, 0, 'Amazon.in, Flipkart.com, Paytm.com, Myntra.com, Snapdeal.com'),
  Text(4, 0, 'Myntra.com'),
  Text(5, 0, 'Amazon.in, Flipkart.com'),
  Text(6, 0, 'Amazon.in, Flipkart.com, Myntra.com, Snapdeal.com'),
  Text(7, 0, 'Amazon.in, Flipkart.com, Paytm.com, Snapdeal.com'),
  Text(8, 0, 'Flipkart.com, Myntra.com'),
  Text(9, 0, 'Amazon.in')])
```

Visual appealing web-page layout



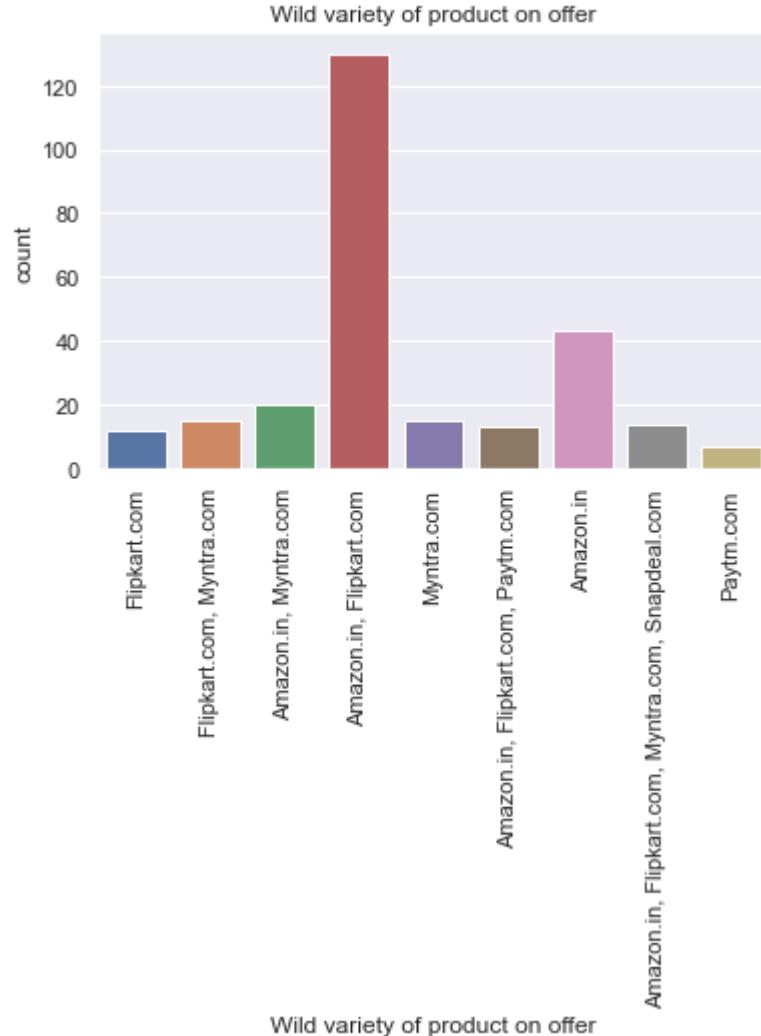
Visual appealing web-page layout

```
Out[14]: Text(0.5, 1.0, 'Wild variety of product on offer')
```

```
Out[14]: <AxesSubplot:title={'center':'Wild variety of product on offer'}, xlabel='Wild variety of product on offer', ylabel='count'>
```

```
Out[14]: (array([0, 1, 2, 3, 4, 5, 6, 7, 8]),  
 [Text(0, 0, 'Flipkart.com'),  
  Text(1, 0, 'Flipkart.com, Myntra.com'),  
  Text(2, 0, 'Amazon.in, Myntra.com'),  
  Text(3, 0, 'Amazon.in, Flipkart.com'),
```

```
Text(4, 0, 'Myntra.com'),
Text(5, 0, 'Amazon.in, Flipkart.com, Paytm.com'),
Text(6, 0, 'Amazon.in'),
Text(7, 0, 'Amazon.in, Flipkart.com, Myntra.com, Snapdeal.com'),
Text(8, 0, 'Paytm.com'))]
```



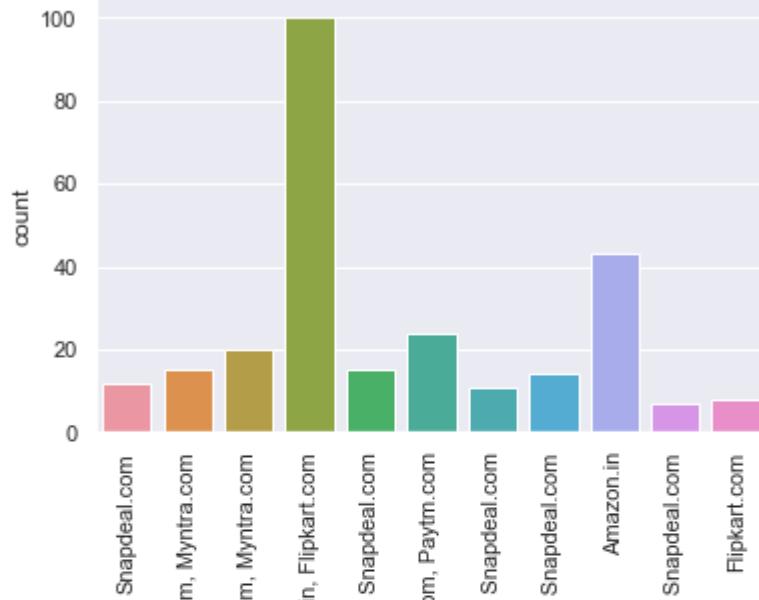
```
Out[14]: Text(0.5, 1.0, 'Complete, relevant description information of products')
```

```
Out[14]: <AxesSubplot:title={'center':'Complete, relevant description information of products'}, xlabel='Complete, relevant description information of products', ylabel='count'>
```

```
Out[14]: (array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10]),
 [Text(0, 0, 'Snapdeal.com'),
  Text(1, 0, 'Amazon.in, Flipkart.com, Myntra.com'),
  Text(2, 0, 'Amazon.in, Paytm.com, Myntra.com'),
```

```
Text(3, 0, 'Amazon.in, Flipkart.com'),
Text(4, 0, 'Amazon.in, Flipkart.com, Paytm.com, Myntra.com, Snapdeal.com'),
Text(5, 0, 'Amazon.in, Flipkart.com, Paytm.com'),
Text(6, 0, 'Flipkart.com, Snapdeal.com'),
Text(7, 0, 'Amazon.in, Flipkart.com, Myntra.com, Snapdeal.com'),
Text(8, 0, 'Amazon.in'),
Text(9, 0, 'Amazon.in, Flipkart.com, Snapdeal.com'),
Text(10, 0, 'Flipkart.com'))]
```

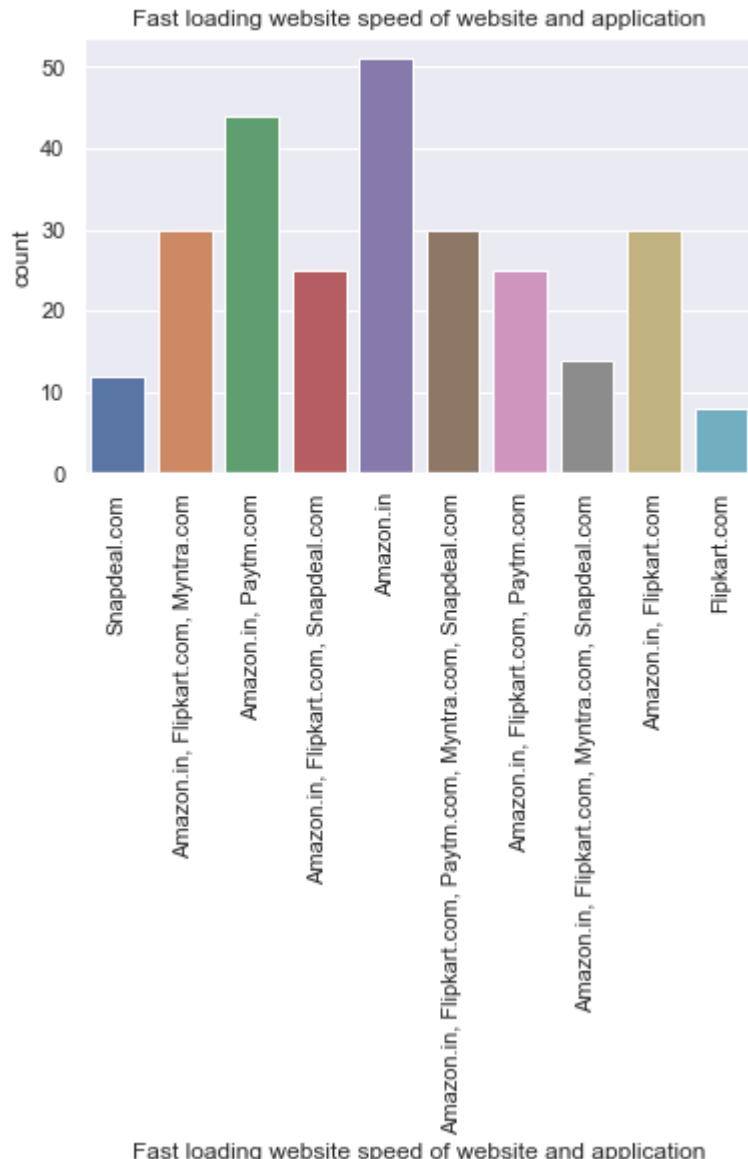
Complete, relevant description information of products



Complete, relevant description information of products

```
Out[14]: Text(0.5, 1.0, 'Fast loading website speed of website and application')
```

```
Out[14]: <AxesSubplot:title={'center':'Fast loading website speed of website and application'}, xlabel='Fast loading website speed of website and application', ylabel='count'>
Out[14]: (array([0, 1, 2, 3, 4, 5, 6, 7, 8, 9]),
 [Text(0, 0, 'Snapdeal.com'),
 Text(1, 0, 'Amazon.in, Flipkart.com, Myntra.com'),
 Text(2, 0, 'Amazon.in, Paytm.com'),
 Text(3, 0, 'Amazon.in, Flipkart.com, Snapdeal.com'),
 Text(4, 0, 'Amazon.in'),
 Text(5, 0, 'Amazon.in, Flipkart.com, Paytm.com, Myntra.com, Snapdeal.com'),
 Text(6, 0, 'Amazon.in, Flipkart.com, Paytm.com'),
 Text(7, 0, 'Amazon.in, Flipkart.com, Myntra.com, Snapdeal.com'),
 Text(8, 0, 'Amazon.in, Flipkart.com'),
 Text(9, 0, 'Flipkart.com')])
```

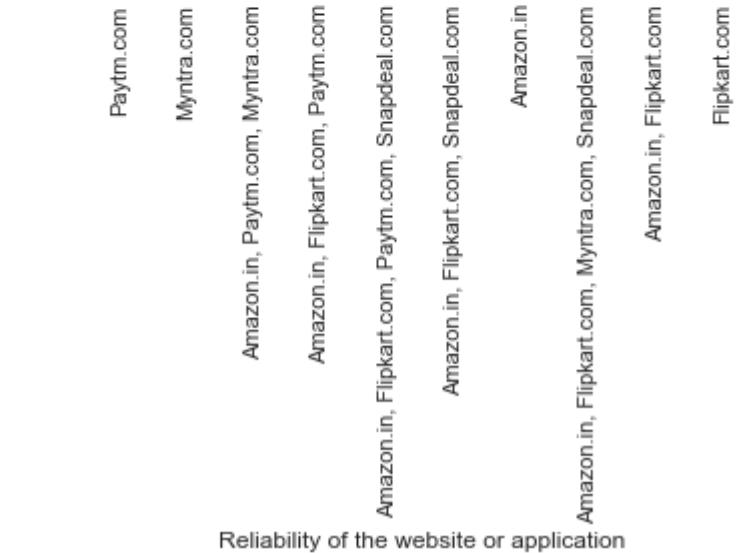
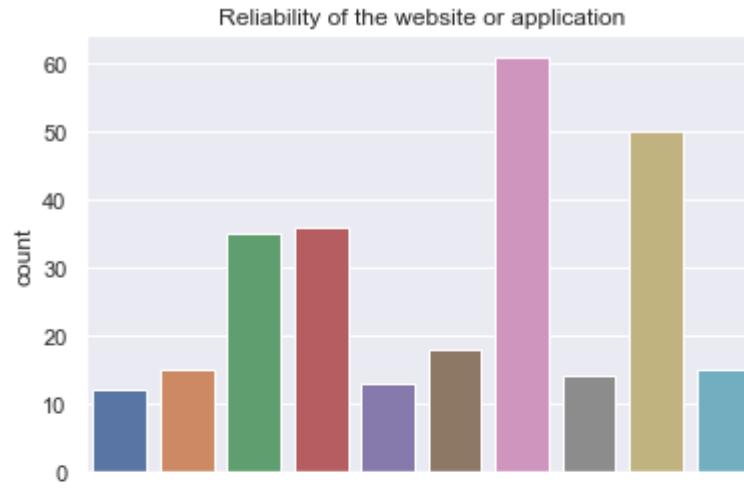


```
Out[14]: Text(0.5, 1.0, 'Reliability of the website or application')

Out[14]: <AxesSubplot:title={'center':'Reliability of the website or application'}, xlabel='Reliability of the website or application', ylabel='count'>

Out[14]: (array([0, 1, 2, 3, 4, 5, 6, 7, 8, 9]),
 [Text(0, 0, 'Paytm.com'),
 Text(1, 0, 'Myntra.com'),
 Text(2, 0, 'Amazon.in, Paytm.com, Myntra.com'),
 Text(3, 0, 'Amazon.in, Flipkart.com, Paytm.com'),
```

```
Text(4, 0, 'Amazon.in, Flipkart.com, Paytm.com, Snapdeal.com'),
Text(5, 0, 'Amazon.in, Flipkart.com, Snapdeal.com'),
Text(6, 0, 'Amazon.in'),
Text(7, 0, 'Amazon.in, Flipkart.com, Myntra.com, Snapdeal.com'),
Text(8, 0, 'Amazon.in, Flipkart.com'),
Text(9, 0, 'Flipkart.com'))]
```

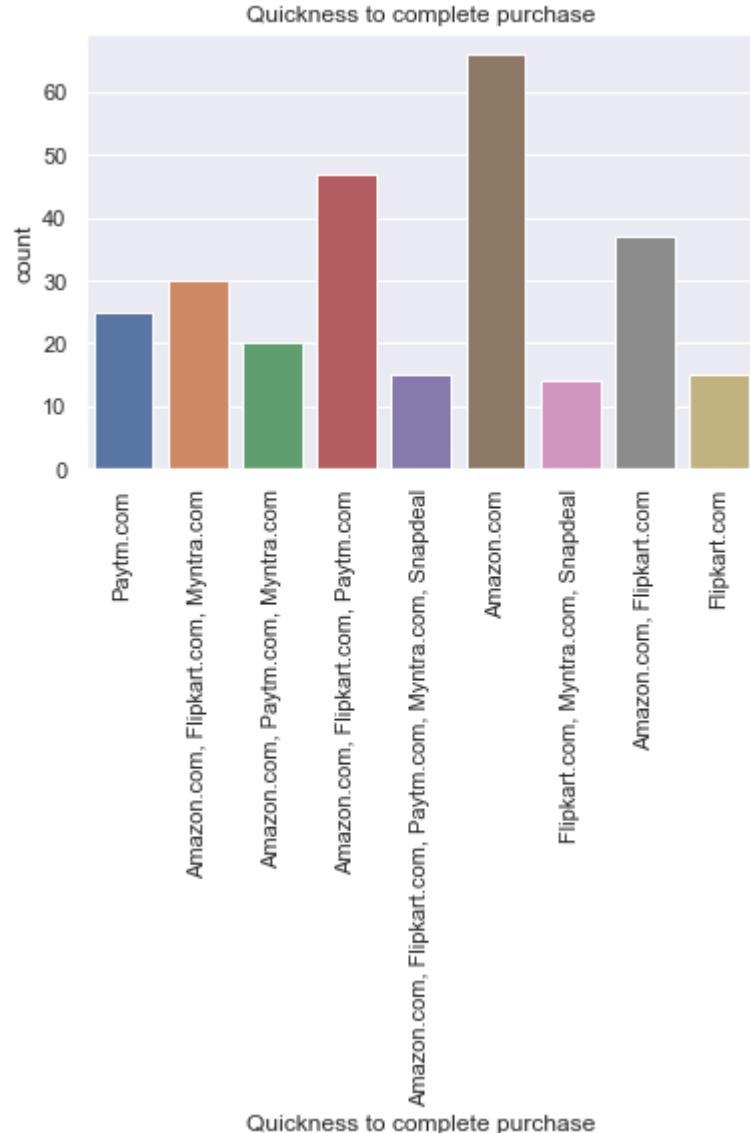


```
Out[14]: Text(0.5, 1.0, 'Quickness to complete purchase')
```

```
Out[14]: <AxesSubplot:title={'center':'Quickness to complete purchase'}, xlabel='Quickness to complete purchase', ylabel='count'>
```

```
Out[14]: (array([0, 1, 2, 3, 4, 5, 6, 7, 8]),
 [Text(0, 0, 'Paytm.com'),
 Text(1, 0, 'Amazon.com, Flipkart.com, Myntra.com'),
```

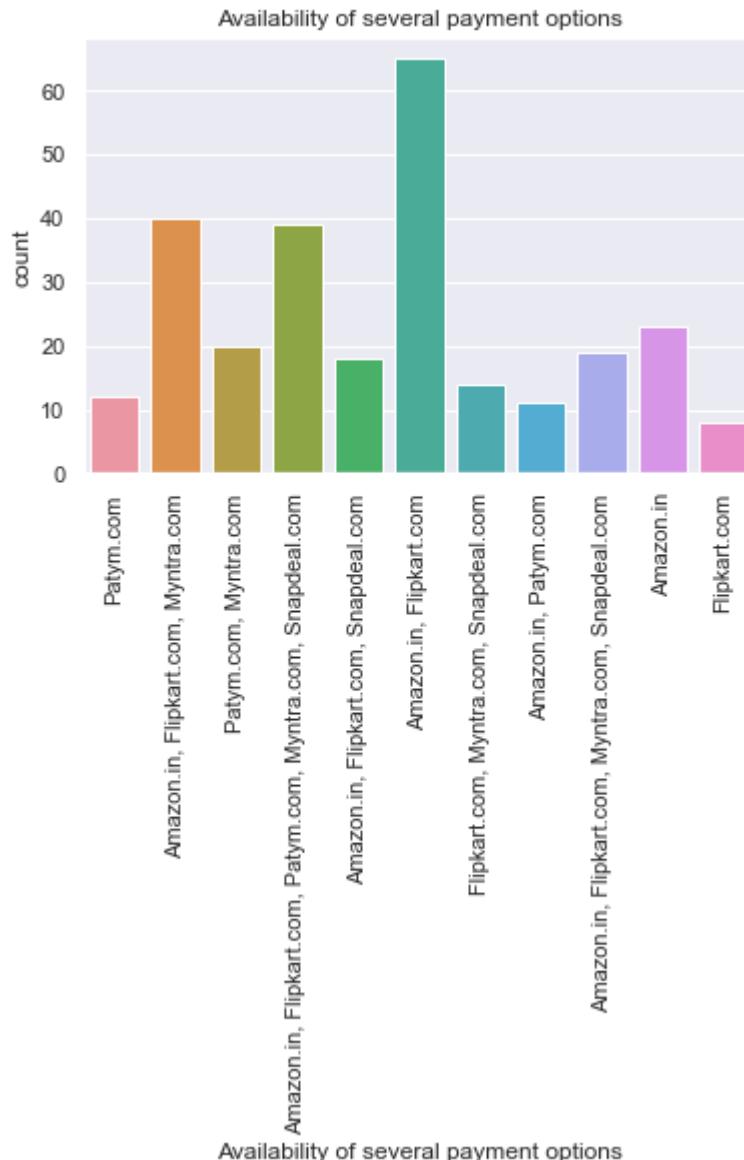
```
Text(2, 0, 'Amazon.com, Paytm.com, Myntra.com'),
Text(3, 0, 'Amazon.com, Flipkart.com, Paytm.com'),
Text(4, 0, 'Amazon.com, Flipkart.com, Paytm.com, Myntra.com, Snapdeal'),
Text(5, 0, 'Amazon.com'),
Text(6, 0, 'Flipkart.com, Myntra.com, Snapdeal'),
Text(7, 0, 'Amazon.com, Flipkart.com'),
Text(8, 0, 'Flipkart.com'))]
```



```
Out[14]: Text(0.5, 1.0, 'Availability of several payment options')
```

```
Out[14]: <AxesSubplot:title={'center':'Availability of several payment options'}, xlabel='Availability of several payment option'
```

```
s', ylabel='count')  
Out[14]: (array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10]),  
 [Text(0, 0, 'Patym.com'),  
  Text(1, 0, 'Amazon.in, Flipkart.com, Myntra.com'),  
  Text(2, 0, 'Patym.com, Myntra.com'),  
  Text(3, 0, 'Amazon.in, Flipkart.com, Patym.com, Myntra.com, Snapdeal.com'),  
  Text(4, 0, 'Amazon.in, Flipkart.com, Snapdeal.com'),  
  Text(5, 0, 'Amazon.in, Flipkart.com'),  
  Text(6, 0, 'Flipkart.com, Myntra.com, Snapdeal.com'),  
  Text(7, 0, 'Amazon.in, Patym.com'),  
  Text(8, 0, 'Amazon.in, Flipkart.com, Myntra.com, Snapdeal.com'),  
  Text(9, 0, 'Amazon.in'),  
  Text(10, 0, 'Flipkart.com')])
```

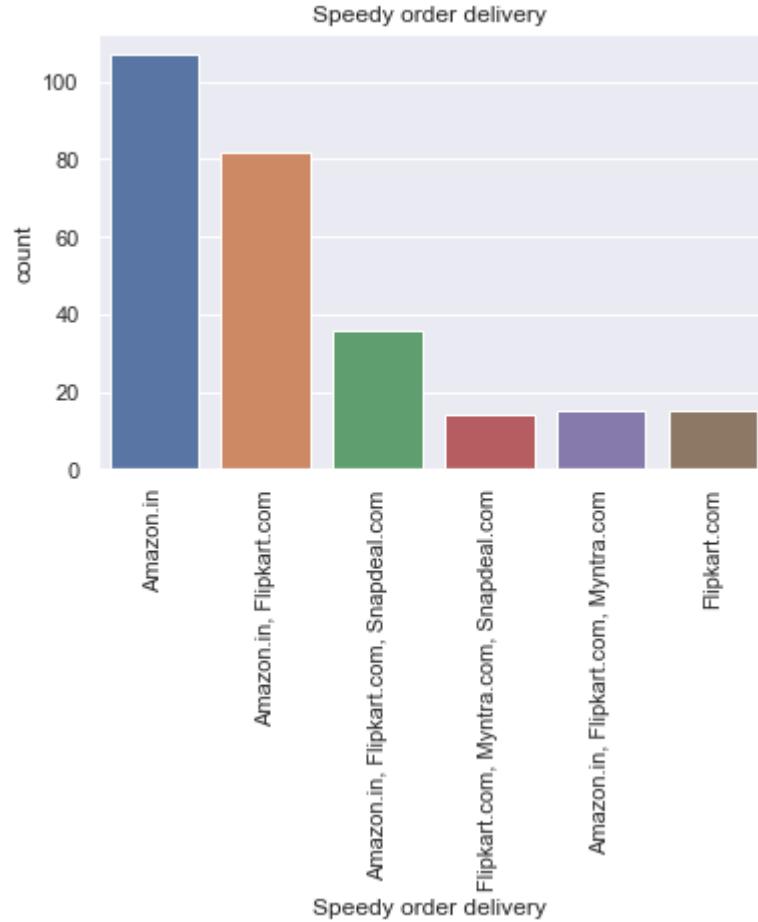


```
Out[14]: Text(0.5, 1.0, 'Speedy order delivery ')
```

```
Out[14]: <AxesSubplot:title={'center':'Speedy order delivery '}, xlabel='Speedy order delivery ', ylabel='count'>
```

```
Out[14]: (array([0, 1, 2, 3, 4, 5]),
 [Text(0, 0, 'Amazon.in'),
 Text(1, 0, 'Amazon.in, Flipkart.com'),
 Text(2, 0, 'Amazon.in, Flipkart.com, Snapdeal.com'),
 Text(3, 0, 'Flipkart.com, Myntra.com, Snapdeal.com'),
```

```
Text(4, 0, 'Amazon.in, Flipkart.com, Myntra.com'),  
Text(5, 0, 'Flipkart.com'))]
```

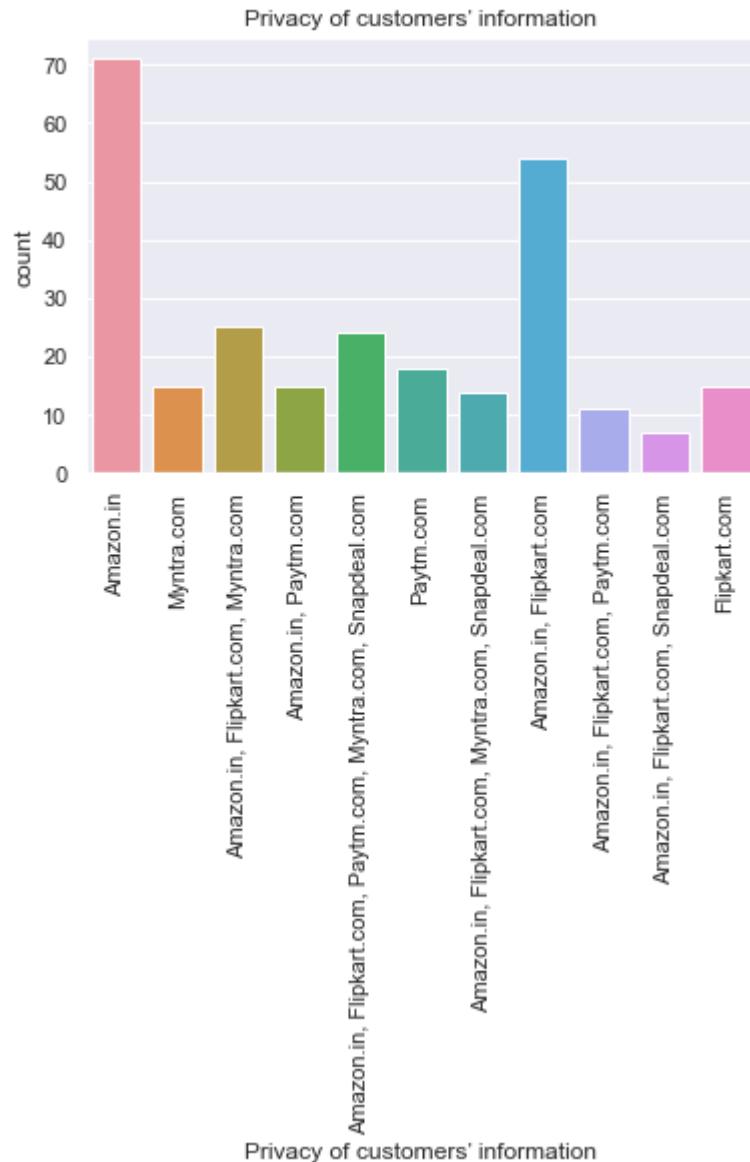


```
Out[14]: Text(0.5, 1.0, 'Privacy of customers' information')
```

```
Out[14]: <AxesSubplot:title={'center':'Privacy of customers' information'}, xlabel='Privacy of customers' information', ylabel='co  
unt'>
```

```
Out[14]: (array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10]),  
 [Text(0, 0, 'Amazon.in'),  
  Text(1, 0, 'Myntra.com'),  
  Text(2, 0, 'Amazon.in, Flipkart.com, Myntra.com'),  
  Text(3, 0, 'Amazon.in, Paytm.com'),  
  Text(4, 0, 'Amazon.in, Flipkart.com, Paytm.com, Myntra.com, Snapdeal.com'),  
  Text(5, 0, 'Paytm.com'),  
  Text(6, 0, 'Amazon.in, Flipkart.com, Myntra.com, Snapdeal.com'),  
  Text(7, 0, 'Amazon.in, Flipkart.com'),  
  Text(8, 0, 'Amazon.in, Flipkart.com, Paytm.com'),  
  Text(9, 0, 'Amazon.in, Myntra.com'),  
  Text(10, 0, 'Flipkart.com')])
```

```
Text(9, 0, 'Amazon.in, Flipkart.com, Snapdeal.com'),
Text(10, 0, 'Flipkart.com'))]
```

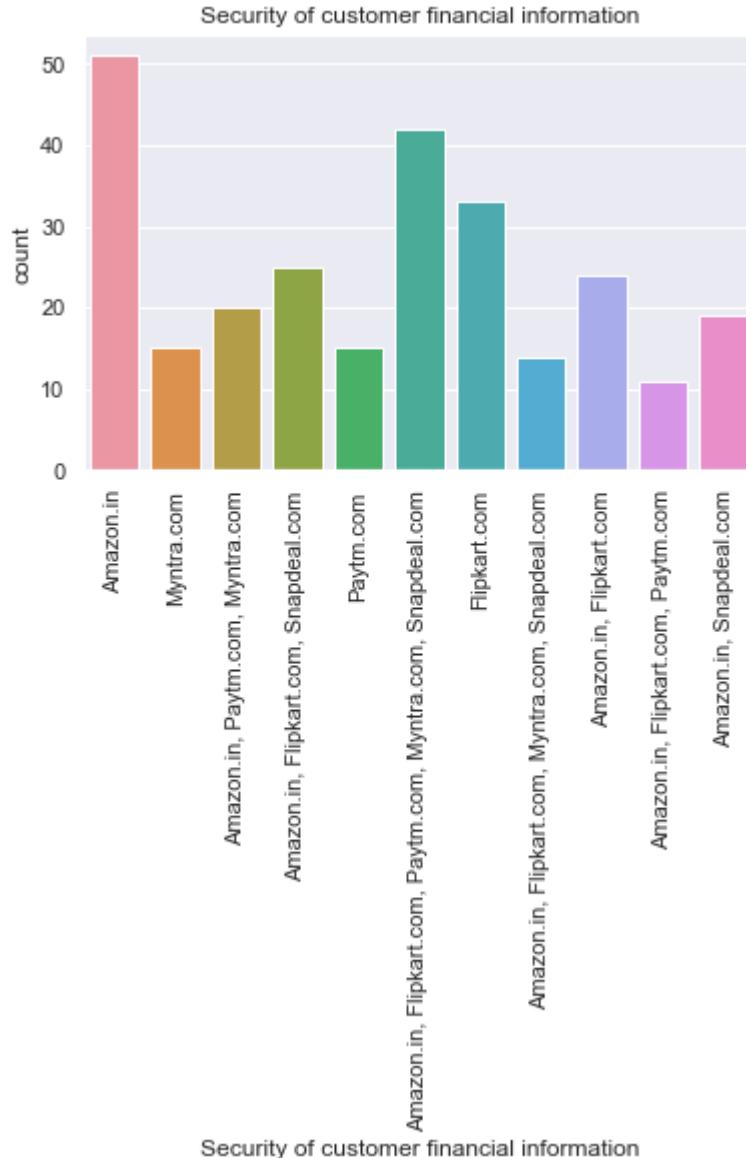


```
Out[14]: Text(0.5, 1.0, 'Security of customer financial information')
```

```
Out[14]: <AxesSubplot:title={'center':'Security of customer financial information'}, xlabel='Security of customer financial information', ylabel='count'>
```

```
Out[14]: (array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10]),
 [Text(0, 0, 'Amazon.in'),
  Text(1, 0, 'Myntra.com'),
```

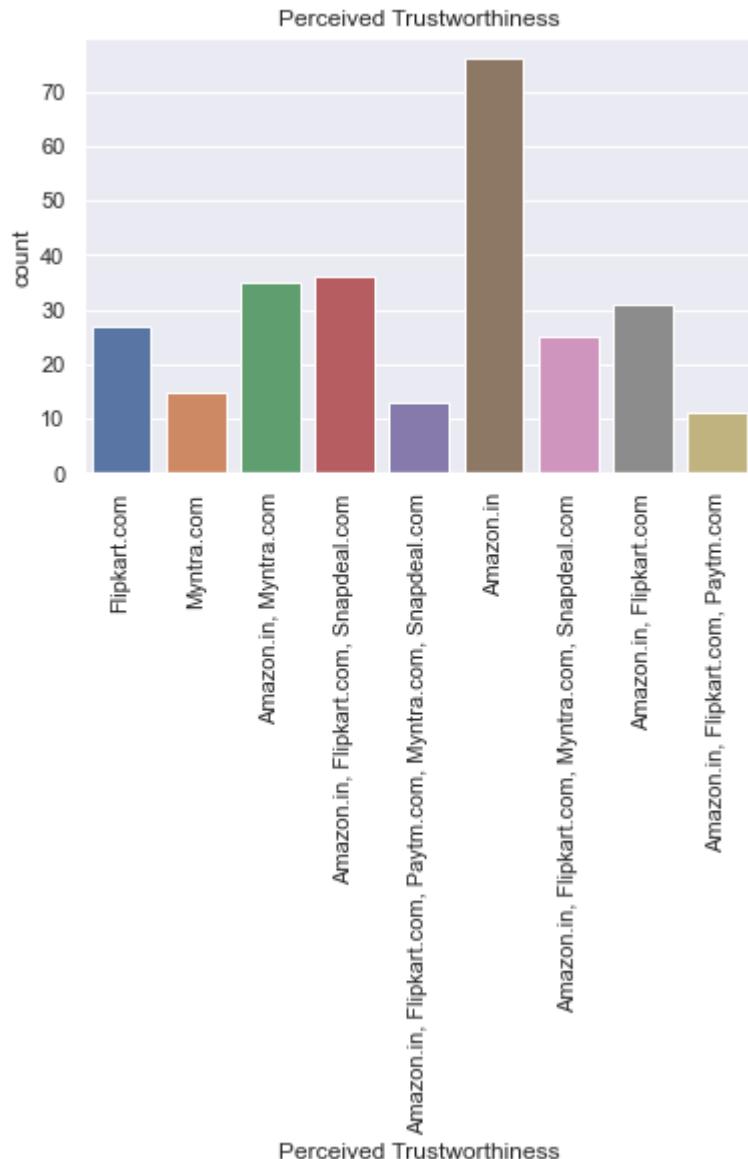
```
Text(2, 0, 'Amazon.in, Paytm.com, Myntra.com'),
Text(3, 0, 'Amazon.in, Flipkart.com, Snapdeal.com'),
Text(4, 0, 'Paytm.com'),
Text(5, 0, 'Amazon.in, Flipkart.com, Paytm.com, Myntra.com, Snapdeal.com'),
Text(6, 0, 'Flipkart.com'),
Text(7, 0, 'Amazon.in, Flipkart.com, Myntra.com, Snapdeal.com'),
Text(8, 0, 'Amazon.in, Flipkart.com'),
Text(9, 0, 'Amazon.in, Flipkart.com, Paytm.com'),
Text(10, 0, 'Amazon.in, Snapdeal.com'))]
```



```
Out[14]: Text(0.5, 1.0, 'Perceived Trustworthiness')

Out[14]: <AxesSubplot:title={'center':'Perceived Trustworthiness'}, xlabel='Perceived Trustworthiness', ylabel='count'>

Out[14]: (array([0, 1, 2, 3, 4, 5, 6, 7, 8]),
 [Text(0, 0, 'Flipkart.com'),
  Text(1, 0, 'Myntra.com'),
  Text(2, 0, 'Amazon.in, Myntra.com'),
  Text(3, 0, 'Amazon.in, Flipkart.com, Snapdeal.com'),
  Text(4, 0, 'Amazon.in, Flipkart.com, Paytm.com, Myntra.com, Snapdeal.com'),
  Text(5, 0, 'Amazon.in'),
  Text(6, 0, 'Amazon.in, Flipkart.com, Myntra.com, Snapdeal.com'),
  Text(7, 0, 'Amazon.in, Flipkart.com'),
  Text(8, 0, 'Amazon.in, Flipkart.com, Paytm.com')])
```



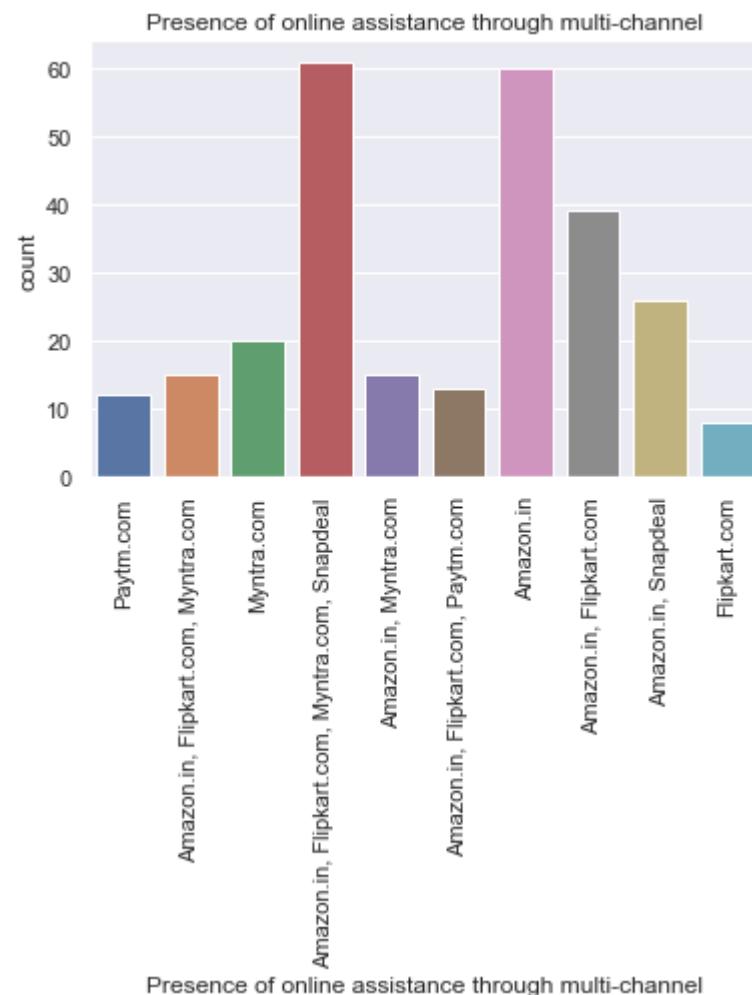
In [15]:

```
for i in data.columns[60:]:  
    plt.title(i)  
    sns.countplot(x=data[i])  
    sns.set_theme(style='darkgrid', palette='deep',)  
    plt.xticks(rotation=90)  
    plt.show()
```

```
Out[15]: Text(0.5, 1.0, 'Presence of online assistance through multi-channel')

Out[15]: <AxesSubplot:title={'center':'Presence of online assistance through multi-channel'}, xlabel='Presence of online assistance through multi-channel', ylabel='count'>

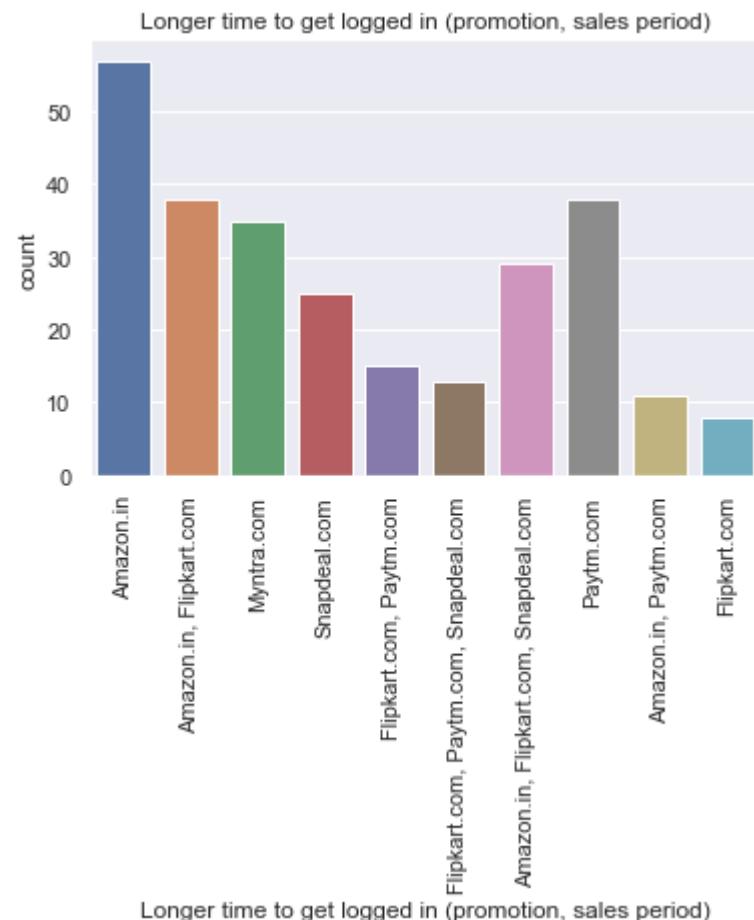
Out[15]: (array([0, 1, 2, 3, 4, 5, 6, 7, 8, 9]),
 [Text(0, 0, 'Paytm.com'),
  Text(1, 0, 'Amazon.in, Flipkart.com, Myntra.com'),
  Text(2, 0, 'Myntra.com'),
  Text(3, 0, 'Amazon.in, Flipkart.com, Myntra.com, Snapdeal'),
  Text(4, 0, 'Amazon.in, Myntra.com'),
  Text(5, 0, 'Amazon.in, Flipkart.com, Paytm.com'),
  Text(6, 0, 'Amazon.in'),
  Text(7, 0, 'Amazon.in, Flipkart.com'),
  Text(8, 0, 'Amazon.in, Snapdeal'),
  Text(9, 0, 'Flipkart.com')])
```



```
Out[15]: Text(0.5, 1.0, 'Longer time to get logged in (promotion, sales period)')

Out[15]: <AxesSubplot:title={'center':'Longer time to get logged in (promotion, sales period)'}, xlabel='Longer time to get logged in (promotion, sales period)', ylabel='count'>

Out[15]: (array([0, 1, 2, 3, 4, 5, 6, 7, 8, 9]),
 [Text(0, 0, 'Amazon.in'),
  Text(1, 0, 'Amazon.in, Flipkart.com'),
  Text(2, 0, 'Myntra.com'),
  Text(3, 0, 'Snapdeal.com'),
  Text(4, 0, 'Flipkart.com, Paytm.com'),
  Text(5, 0, 'Flipkart.com, Paytm.com, Snapdeal.com'),
  Text(6, 0, 'Amazon.in, Flipkart.com, Snapdeal.com'),
  Text(7, 0, 'Paytm.com'),
  Text(8, 0, 'Amazon.in, Paytm.com'),
  Text(9, 0, 'Flipkart.com')])
```

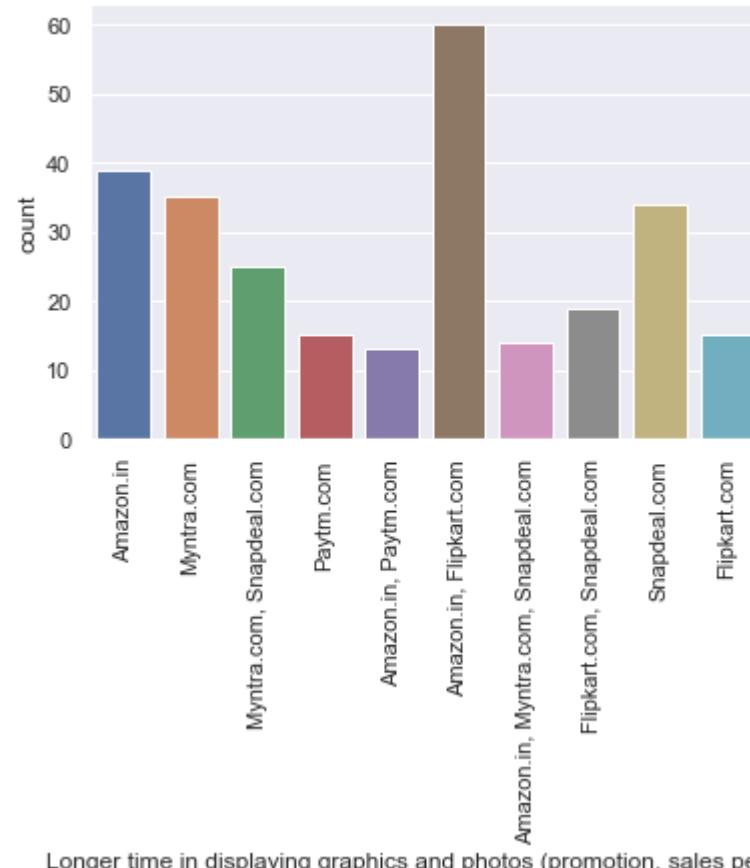


```
Out[15]: Text(0.5, 1.0, 'Longer time in displaying graphics and photos (promotion, sales period)')
```

```
Out[15]: <AxesSubplot:title={'center':'Longer time in displaying graphics and photos (promotion, sales period)'}, xlabel='Longer time in displaying graphics and photos (promotion, sales period)', ylabel='count'>
```

```
Out[15]: (array([0, 1, 2, 3, 4, 5, 6, 7, 8, 9]),
 [Text(0, 0, 'Amazon.in'),
 Text(1, 0, 'Myntra.com'),
 Text(2, 0, 'Myntra.com, Snapdeal.com'),
 Text(3, 0, 'Paytm.com'),
 Text(4, 0, 'Amazon.in, Paytm.com'),
 Text(5, 0, 'Amazon.in, Flipkart.com'),
 Text(6, 0, 'Amazon.in, Myntra.com, Snapdeal.com'),
 Text(7, 0, 'Flipkart.com, Snapdeal.com'),
 Text(8, 0, 'Snapdeal.com'),
 Text(9, 0, 'Flipkart.com')])
```

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

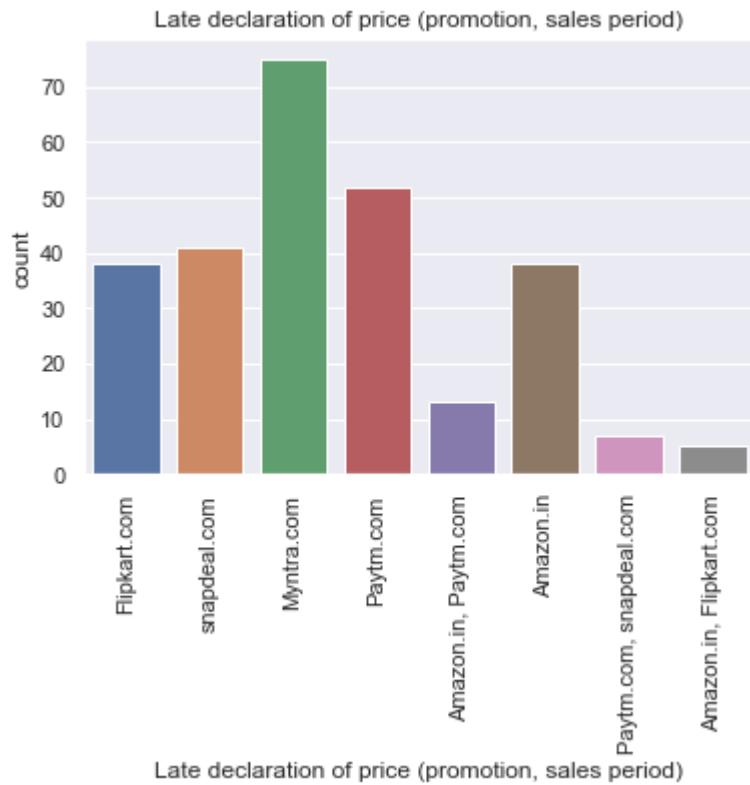


Longer time in displaying graphics and photos (promotion, sales period)

```
Out[15]: Text(0.5, 1.0, 'Late declaration of price (promotion, sales period)')
```

```
Out[15]: <AxesSubplot:title={'center':'Late declaration of price (promotion, sales period)'}, xlabel='Late declaration of price (promotion, sales period)', ylabel='count'>
```

```
Out[15]: (array([0, 1, 2, 3, 4, 5, 6, 7]),  
 [Text(0, 0, 'Flipkart.com'),  
  Text(1, 0, 'snapdeal.com'),  
  Text(2, 0, 'Mynta.com'),  
  Text(3, 0, 'Paytm.com'),  
  Text(4, 0, 'Amazon.in, Paytm.com'),  
  Text(5, 0, 'Amazon.in'),  
  Text(6, 0, 'Paytm.com, snapdeal.com'),  
  Text(7, 0, 'Amazon.in, Flipkart.com')])
```

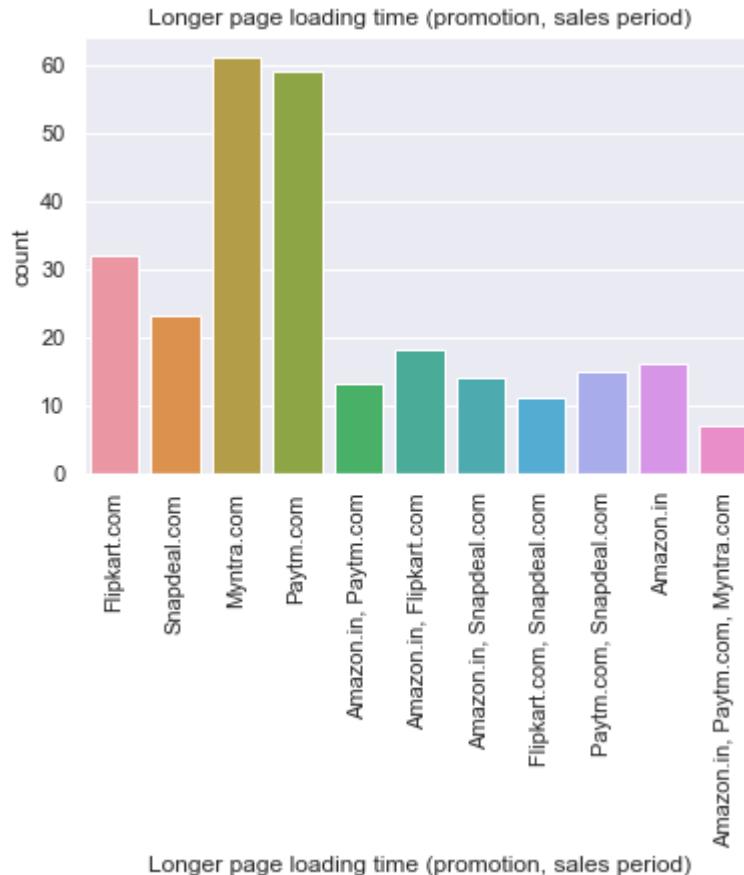


```
Out[15]: Text(0.5, 1.0, 'Longer page loading time (promotion, sales period)')
```

```
Out[15]: <AxesSubplot:title={'center':'Longer page loading time (promotion, sales period)'}, xlabel='Longer page loading time (promotion, sales period)', ylabel='count'>
```

```
Out[15]: (array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10]),  
 [Text(0, 0, 'Flipkart.com'),  
  Text(1, 0, 'Snapdeal.com'),  
  Text(2, 0, 'Mynta.com'),  
  Text(3, 0, 'Paytm.com'),  
  Text(4, 0, 'Amazon.in, Paytm.com'),  
  Text(5, 0, 'Amazon.in, Flipkart.com'),  
  Text(6, 0, 'Amazon.in, Snapdeal.com'),
```

```
Text(7, 0, 'Flipkart.com, Snapdeal.com'),
Text(8, 0, 'Paytm.com, Snapdeal.com'),
Text(9, 0, 'Amazon.in'),
Text(10, 0, 'Amazon.in, Paytm.com, Myntra.com'))
```

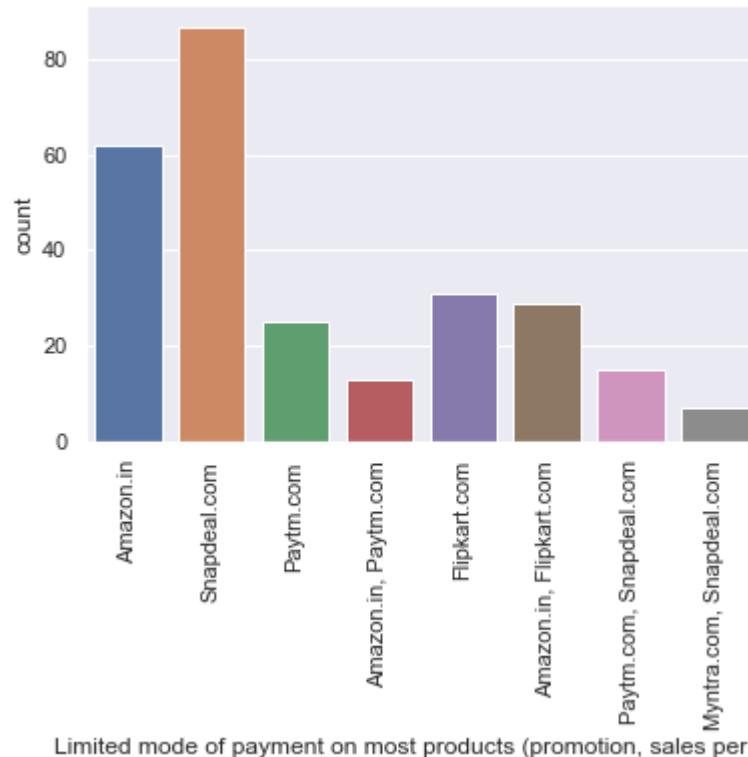


```
Out[15]: Text(0.5, 1.0, 'Limited mode of payment on most products (promotion, sales period)')
```

```
Out[15]: <AxesSubplot:title={'center':'Limited mode of payment on most products (promotion, sales period)'}, xlabel='Limited mode of payment on most products (promotion, sales period)', ylabel='count'>
```

```
Out[15]: (array([0, 1, 2, 3, 4, 5, 6, 7]),
[Text(0, 0, 'Amazon.in'),
Text(1, 0, 'Snapdeal.com'),
Text(2, 0, 'Paytm.com'),
Text(3, 0, 'Amazon.in, Paytm.com'),
Text(4, 0, 'Flipkart.com'),
Text(5, 0, 'Amazon.in, Flipkart.com'),
Text(6, 0, 'Paytm.com, Snapdeal.com'),
Text(7, 0, 'Myntra.com, Snapdeal.com')])
```

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

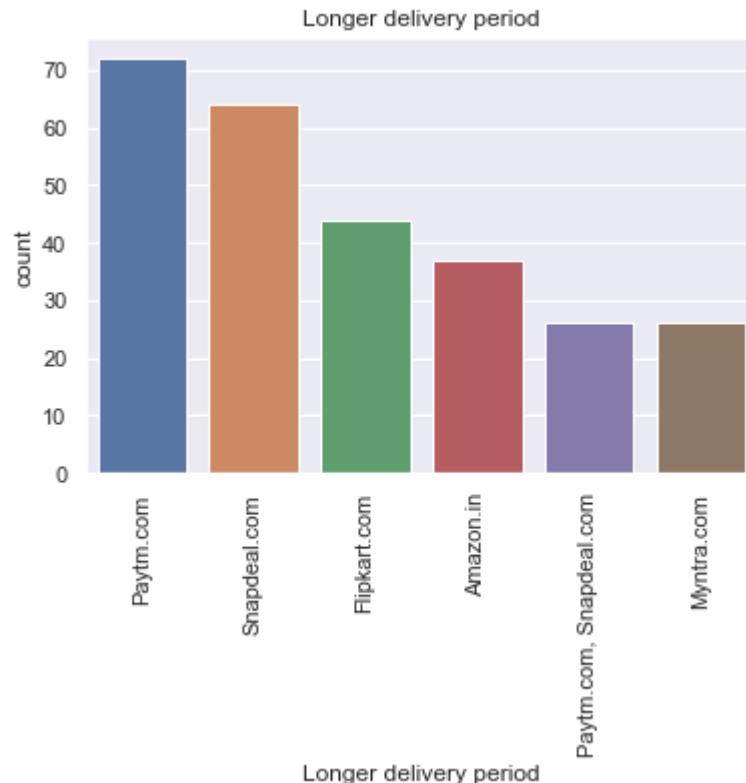


Limited mode of payment on most products (promotion, sales period)

Out[15]: Text(0.5, 1.0, 'Longer delivery period')

Out[15]: <AxesSubplot:title={'center':'Longer delivery period'}, xlabel='Longer delivery period', ylabel='count'>

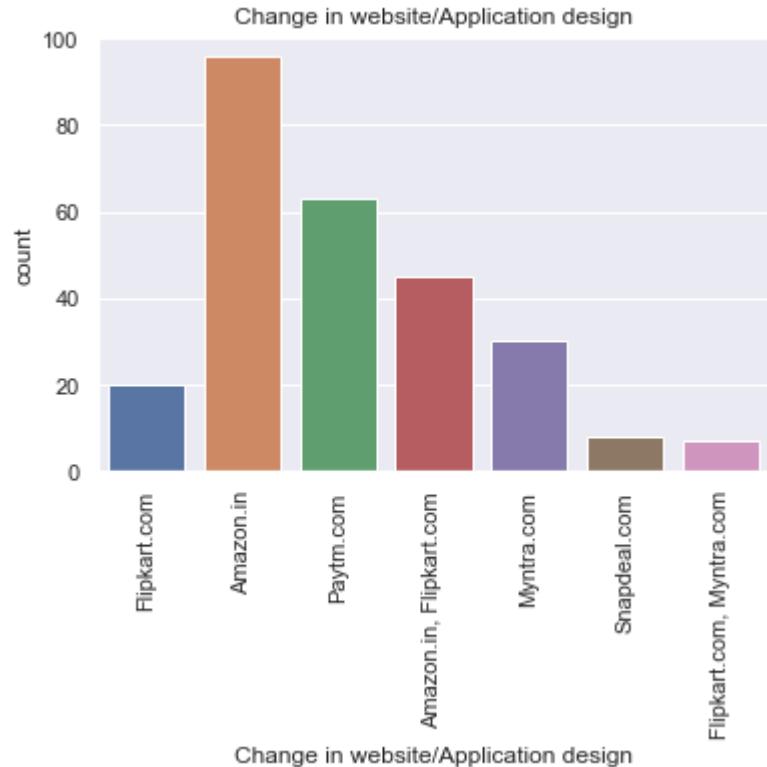
Out[15]: (array([0, 1, 2, 3, 4, 5]),
 [Text(0, 0, 'Paytm.com'),
 Text(1, 0, 'Snapdeal.com'),
 Text(2, 0, 'Flipkart.com'),
 Text(3, 0, 'Amazon.in'),
 Text(4, 0, 'Paytm.com, Snapdeal.com'),
 Text(5, 0, 'Myntra.com')])



```
Out[15]: Text(0.5, 1.0, 'Change in website/Application design')
```

```
Out[15]: <AxesSubplot:title={'center':'Change in website/Application design'}, xlabel='Change in website/Application design', ylabel='count'>
```

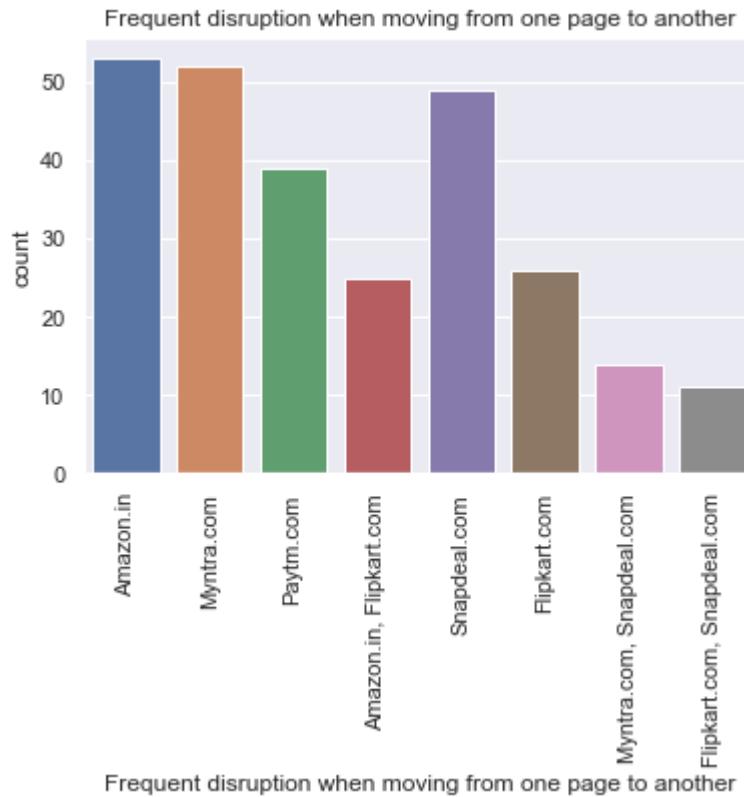
```
Out[15]: (array([0, 1, 2, 3, 4, 5, 6]),
 [Text(0, 0, 'Flipkart.com'),
  Text(1, 0, 'Amazon.in'),
  Text(2, 0, 'Paytm.com'),
  Text(3, 0, 'Amazon.in, Flipkart.com'),
  Text(4, 0, 'Myntra.com'),
  Text(5, 0, 'Snapdeal.com'),
  Text(6, 0, 'Flipkart.com, Myntra.com')])
```



```
Out[15]: Text(0.5, 1.0, 'Frequent disruption when moving from one page to another')
```

```
Out[15]: <AxesSubplot:title={'center':'Frequent disruption when moving from one page to another'}, xlabel='Frequent disruption when moving from one page to another', ylabel='count'>
```

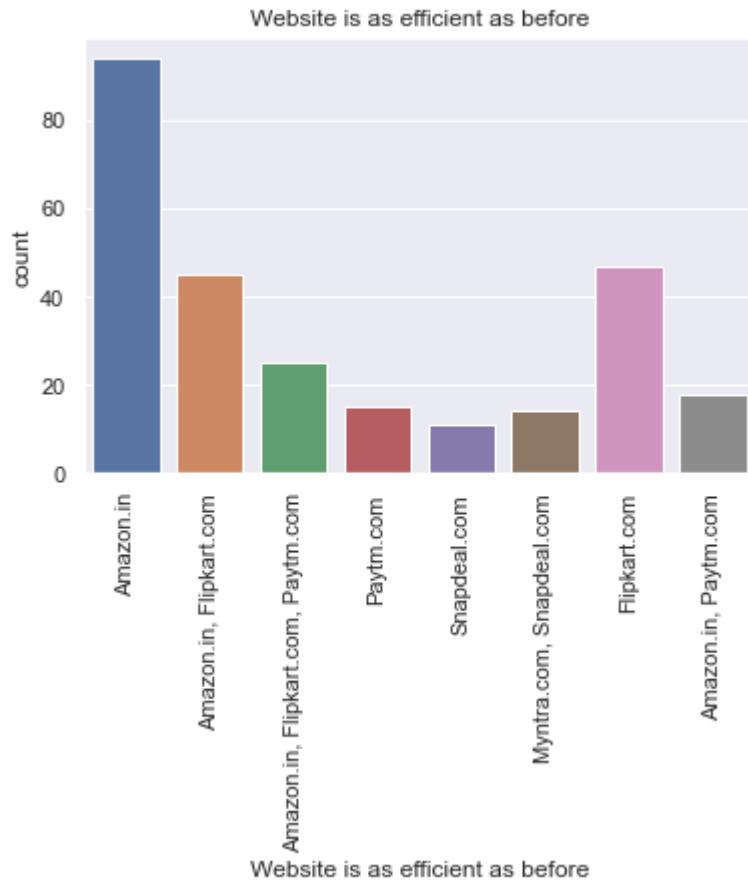
```
Out[15]: (array([0, 1, 2, 3, 4, 5, 6, 7]),  
 [Text(0, 0, 'Amazon.in'),  
  Text(1, 0, 'Myntra.com'),  
  Text(2, 0, 'Paytm.com'),  
  Text(3, 0, 'Amazon.in, Flipkart.com'),  
  Text(4, 0, 'Snapdeal.com'),  
  Text(5, 0, 'Flipkart.com'),  
  Text(6, 0, 'Myntra.com, Snapdeal.com'),  
  Text(7, 0, 'Flipkart.com, Snapdeal.com')])
```



```
Out[15]: Text(0.5, 1.0, 'Website is as efficient as before')
```

```
Out[15]: <AxesSubplot:title={'center':'Website is as efficient as before'}, xlabel='Website is as efficient as before', ylabel='count'>
```

```
Out[15]: (array([0, 1, 2, 3, 4, 5, 6, 7]),  
 [Text(0, 0, 'Amazon.in'),  
  Text(1, 0, 'Amazon.in, Flipkart.com'),  
  Text(2, 0, 'Amazon.in, Flipkart.com, Paytm.com'),  
  Text(3, 0, 'Paytm.com'),  
  Text(4, 0, 'Snapdeal.com'),  
  Text(5, 0, 'Mynta.com, Snapdeal.com'),  
  Text(6, 0, 'Flipkart.com'),  
  Text(7, 0, 'Amazon.in, Paytm.com')])
```

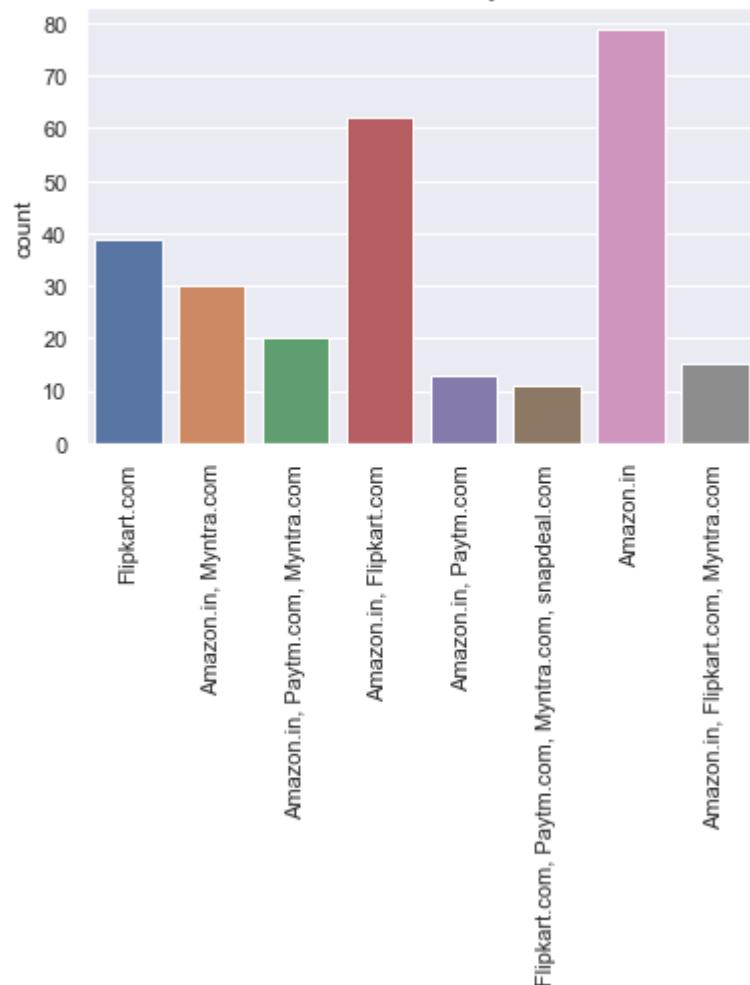


```
Out[15]: Text(0.5, 1.0, 'Which of the Indian online retailer would you recommend to a friend?')
```

```
Out[15]: <AxesSubplot:title={'center':'Which of the Indian online retailer would you recommend to a friend?'}, xlabel='Which of the Indian online retailer would you recommend to a friend?', ylabel='count'>
```

```
Out[15]: (array([0, 1, 2, 3, 4, 5, 6, 7]),
 [Text(0, 0, 'Flipkart.com'),
  Text(1, 0, 'Amazon.in, Myntra.com'),
  Text(2, 0, 'Amazon.in, Paytm.com, Myntra.com'),
  Text(3, 0, 'Amazon.in, Flipkart.com'),
  Text(4, 0, 'Amazon.in, Paytm.com'),
  Text(5, 0, 'Flipkart.com, Paytm.com, Myntra.com, snapdeal.com'),
  Text(6, 0, 'Amazon.in'),
  Text(7, 0, 'Amazon.in, Flipkart.com, Myntra.com')])
```

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



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

Encoder:

In [16]:

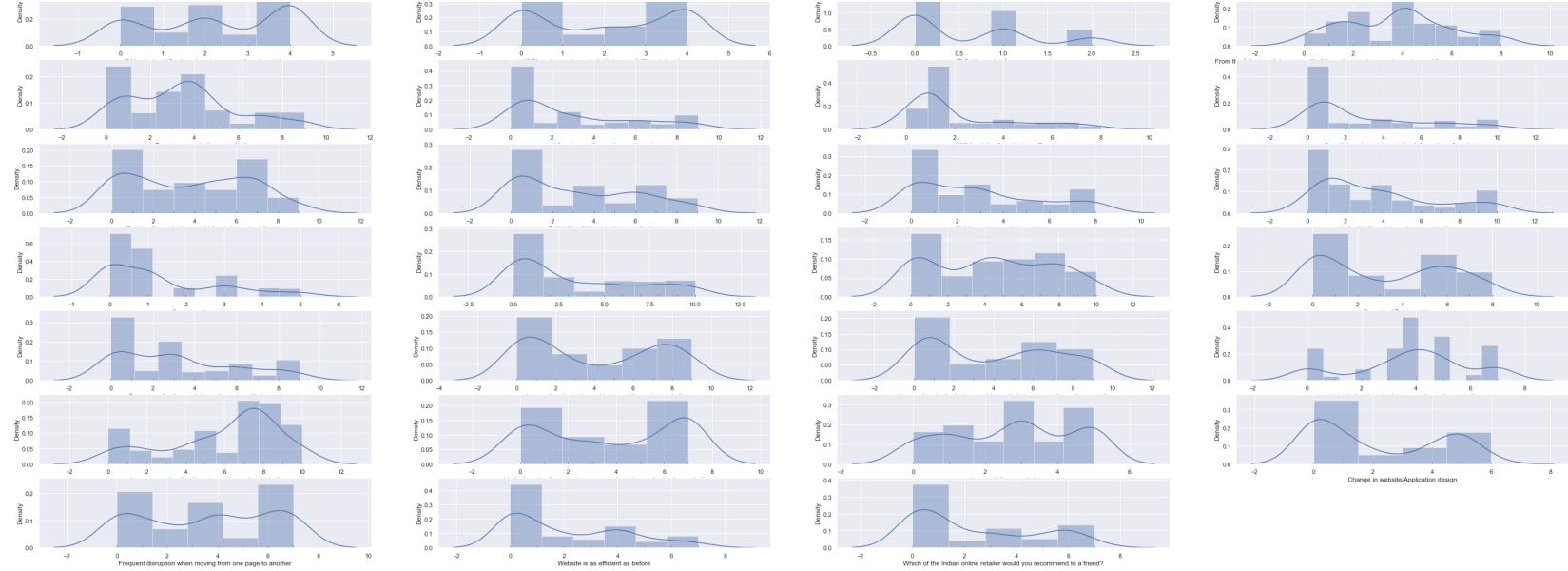
```
from sklearn.preprocessing import LabelEncoder
le=LabelEncoder()
for i in data:
    data[i]=le.fit_transform(data[i])
```

Data Distribution:

In [17]:

```
#data_1=data.select_dtypes(exclude='object')
plt.figure(figsize=(50,50))
plot=1
for i in data:
    if plot<=71:
        plt.subplot(18,4,plot)
        sns.distplot(data[i],rug=True,color='b')
        plt.xlabel(i)
        plot=plot+1
plt.show();
```

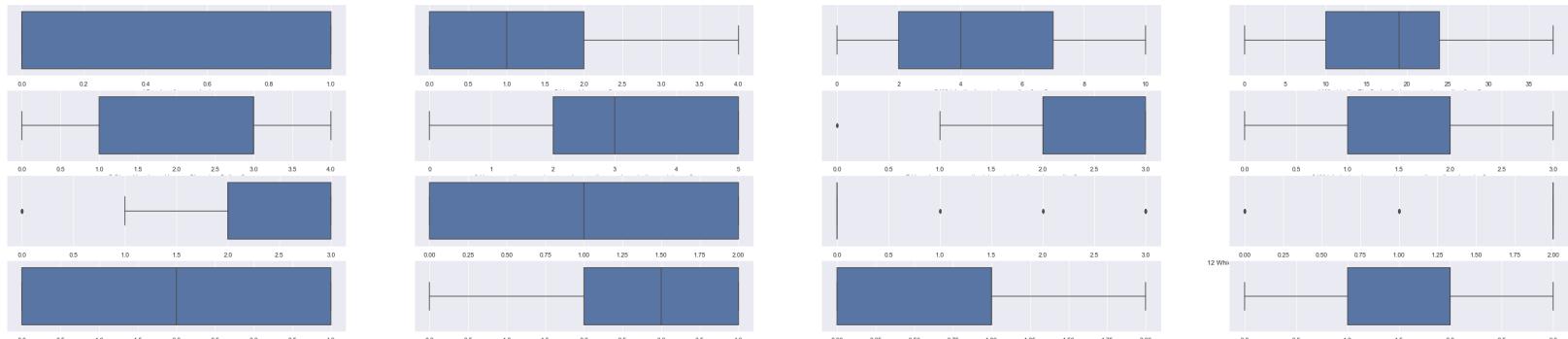




Checking for Outliers:

```
In [18]: plt.figure(figsize=(50,50))
plot=1
for i in data:

    if plot<=71:
        plt.subplot(18,4,plot)
        sns.boxplot(data[i])
        plt.xlabel(i)
        plot=plot+1
plt.show();
```





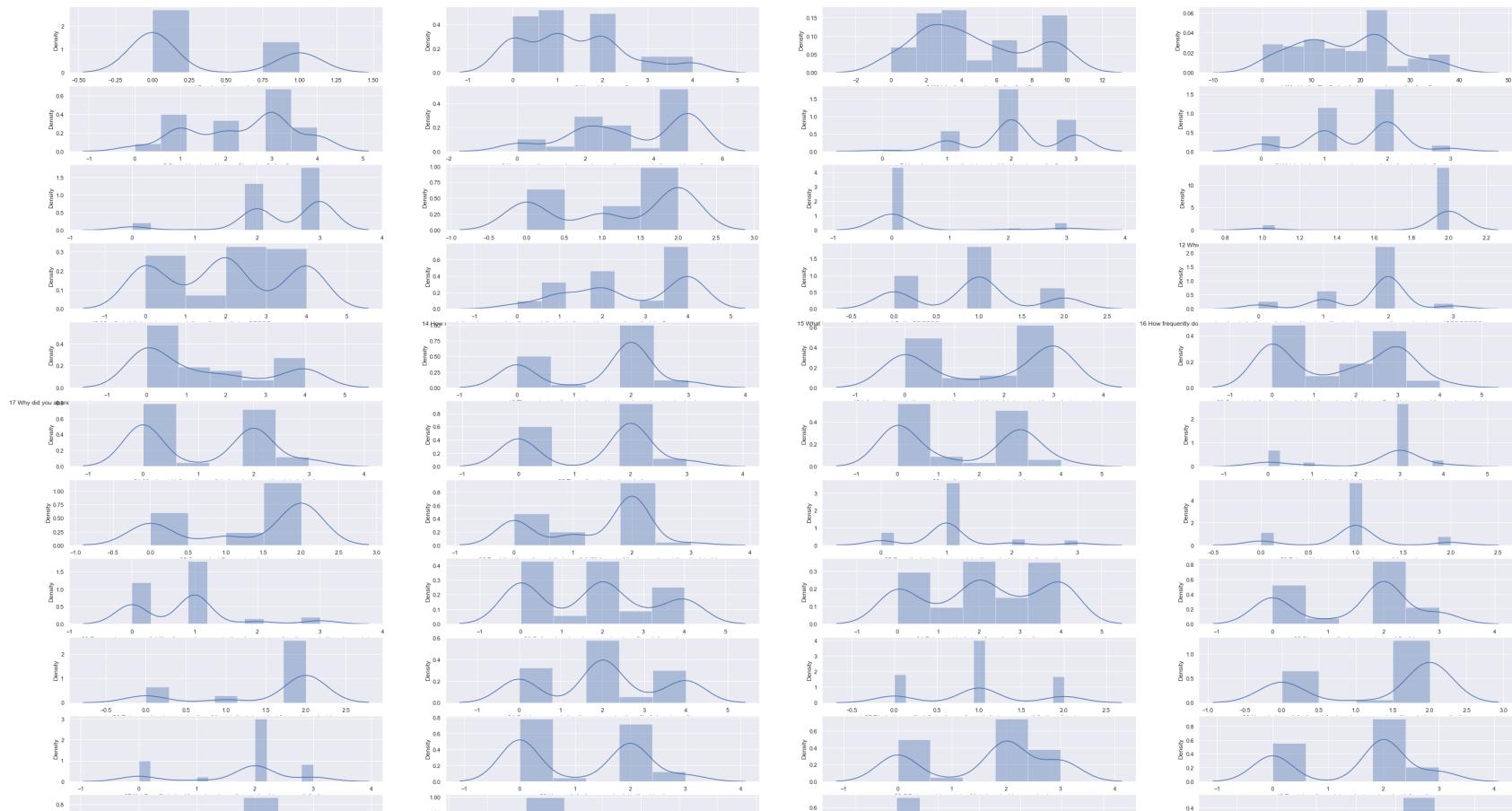
```
In [19]: from scipy.stats import zscore
z = np.abs(zscore(data))
print(z.shape)
data = data.loc[(z<3).all(axis=1)]
print(data.shape)
```

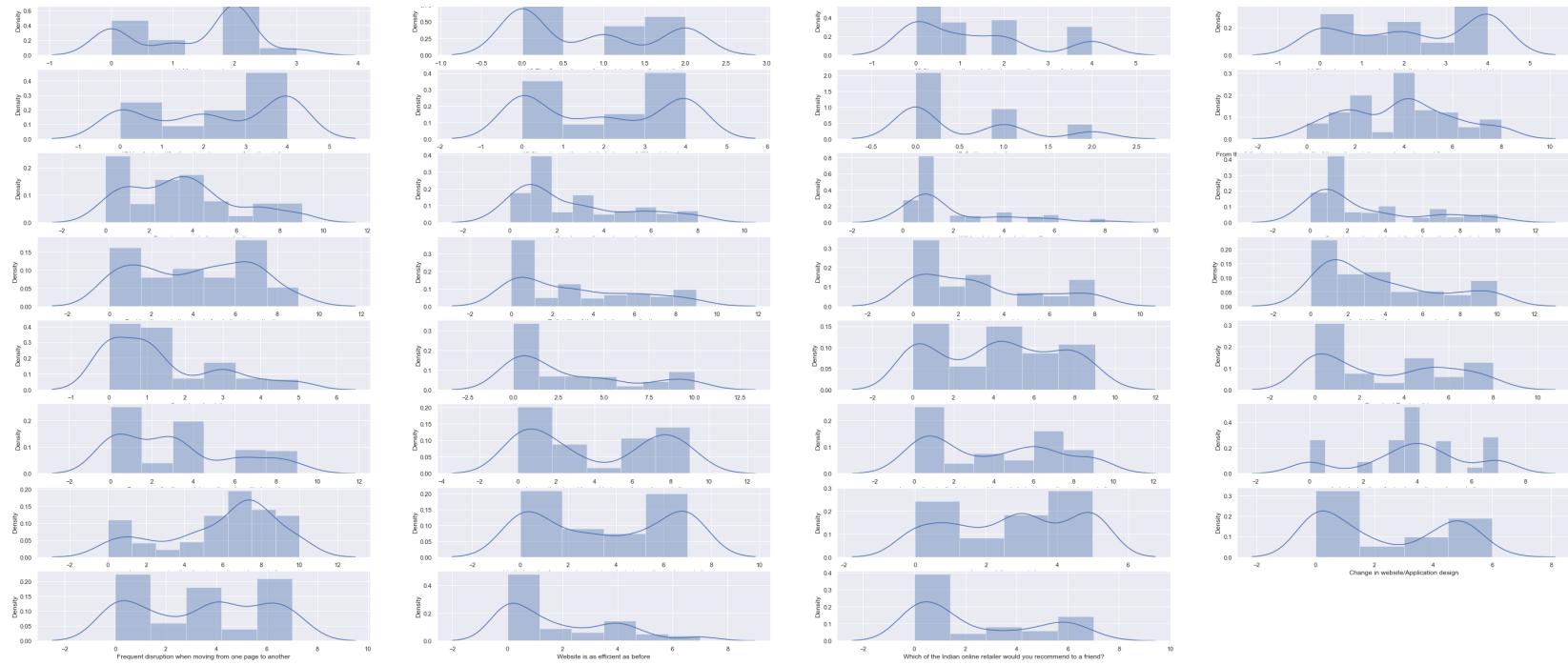
$$(269, 71)$$

Skewness:

In [20]:

```
plt.figure(figsize=(50,50))
plot=1
for i in data:
    if plot<=71:
        plt.subplot(18,4,plot)
        sns.distplot(data[i])
        plt.xlabel(i)
        plot=plot+1
plt.show();
```





In [21]:

```
data.skew()
```

Out[21]: 1Gender 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 ?

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?

Length: 71, dtype: float64

0.730773

0.605744

0.318168

0.134266

-0.316125

...

-0.160113

0.227580

-0.054329

0.859981

0.585446

Dropping Target Variable:

In [22]:

```
x=data.drop(['1Gender of respondent'],axis=1)
y=data[['1Gender of respondent']]
```

Model Implementaion:

In [23]:

```
from sklearn.linear_model import LogisticRegression,LinearRegression,Lasso,Ridge,ElasticNet
from sklearn.tree import DecisionTreeClassifier
from sklearn.naive_bayes import GaussianNB
from sklearn.neighbors import KNeighborsClassifier
from sklearn.svm import SVC
from sklearn.ensemble import RandomForestClassifier
from sklearn.ensemble import AdaBoostClassifier
from sklearn.ensemble import GradientBoostingClassifier
from sklearn.metrics import mean_absolute_error,mean_squared_error,r2_score
from sklearn.metrics import accuracy_score,roc_auc_score,roc_curve,auc,classification_report,confusion_matrix
from sklearn.model_selection import cross_val_score,GridSearchCV,train_test_split
```

In [24]:

```
x_train, x_test ,y_train, y_test = train_test_split(x,y,test_size=.25,random_state=40)
```

In [25]:

```
def accuracy(clf,x,y):
    max_accuracy=0
    for i in range(42,100):
        clf.fit(x_train,y_train)
        pred = clf.predict(x_test)
        accuracy_s = accuracy_score(y_test,pred)
        if accuracy_s > max_accuracy:
            max_accuracy = accuracy_s
            result = i

    print('max_accuracy_score',result,'is',max_accuracy*100)
    print('cross validation score',cross_val_score(clf,x,y,scoring='accuracy').mean()*100)
    print('Standard Deviation',cross_val_score(clf,x,y,scoring='accuracy').std()*100)
    print('Training accuracy',clf.score(x_train,y_train)*100)
    print('Test Accuracy',clf.score(x_test,y_test)*100)
    print('Confusion_Matrix',confusion_matrix(y_test,pred))
    print('Classification_Report',classification_report(y_test,pred))

    print('Roc_auc Score',roc_auc_score(y_test,pred))
    false_positive_rate, true_positive_rate, thresholds = roc_curve(y_test,pred)
    roc_auc = auc( false_positive_rate, true_positive_rate)
    plt.plot(false_positive_rate, true_positive_rate,label = "AUC = %0.2f"% roc_auc)
    plt.plot([0,1],[0,1],'r--')
    plt.legend(loc = 'lower right')
    plt.ylabel("True positive rate")
```

```
plt.xlabel("False positive rate")
print("\n\n")

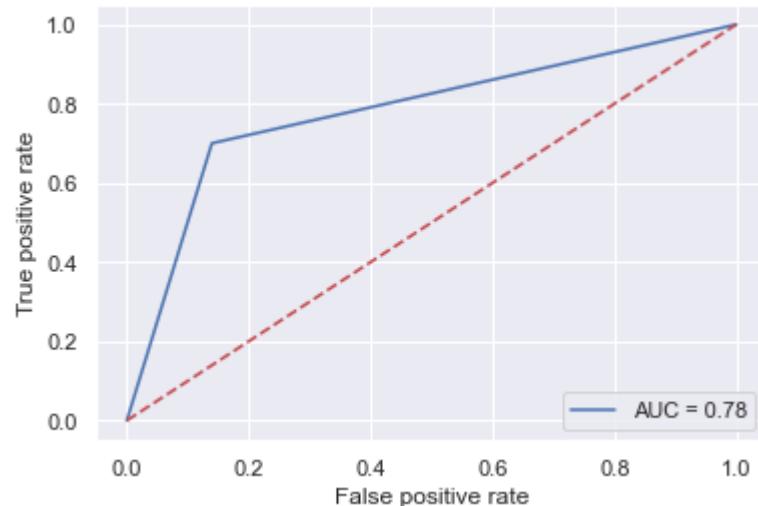
return result
```

In [26]:

```
lg=LogisticRegression()
accuracy(lg,x,y)
```

```
max_accuracy_score 42 is 80.95238095238095
cross validation score 85.98367346938775
Standard Deviation 10.338014103790073
Training accuracy 88.17204301075269
Test Accuracy 80.95238095238095
Confusion_Matrix [[37  6]
 [ 6 14]]
Classification_Report
precision    recall   f1-score   support
          0       0.86      0.86      0.86      43
          1       0.70      0.70      0.70      20
accuracy           0.81      0.81      0.81      63
macro avg       0.78      0.78      0.78      63
weighted avg     0.81      0.81      0.81      63
Roc_auc Score 0.7802325581395348
```

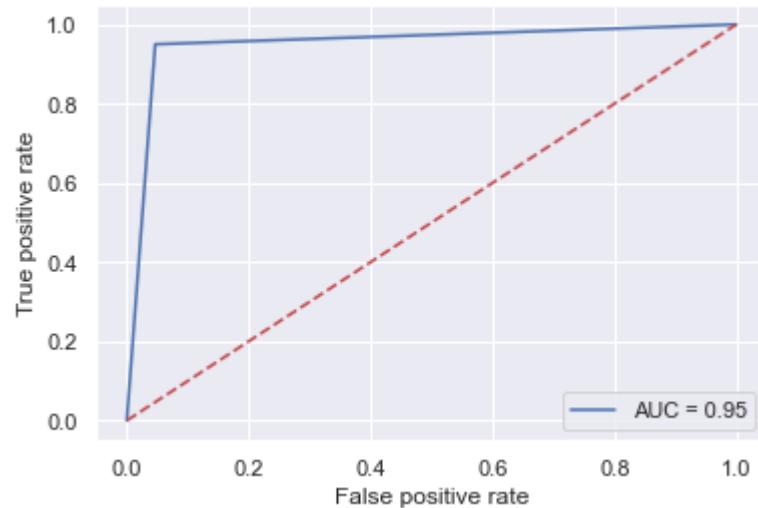
Out[26]: 42



```
In [27]:  
dt=DecisionTreeClassifier()  
accuracy(dt,x,y)
```

```
max_accuracy_score 42 is 95.23809523809523  
cross validation score 96.4  
Standard Deviation 9.6  
Training accuracy 100.0  
Test Accuracy 95.23809523809523  
Confusion_Matrix [[41  2]  
[ 1 19]]  
Classification_Report  
precision    recall   f1-score   support  
0            0.98     0.95     0.96      43  
1            0.90     0.95     0.93      20  
  
accuracy          0.95  
macro avg       0.94     0.95     0.95      63  
weighted avg     0.95     0.95     0.95      63  
  
Roc_auc Score 0.9517441860465117
```

```
Out[27]: 42
```

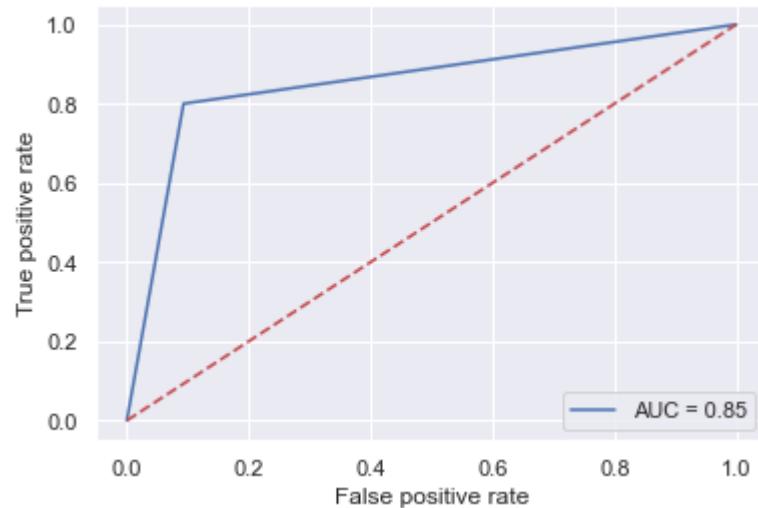


In [28]:

```
knn=KNeighborsClassifier()  
accuracy(knn,x,y)
```

```
max_accuracy_score 42 is 87.3015873015873  
cross validation score 85.57551020408162  
Standard Deviation 10.818085340252585  
Training accuracy 91.39784946236558  
Test Accuracy 87.3015873015873  
Confusion_Matrix [[39  4]  
 [ 4 16]]  
Classification_Report  
precision recall f1-score support  
0      0.91    0.91    0.91      43  
1      0.80    0.80    0.80      20  
  
accuracy          0.87      63  
macro avg       0.85    0.85    0.85      63  
weighted avg     0.87    0.87    0.87      63  
  
Roc_auc Score 0.8534883720930233
```

Out[28]: 42

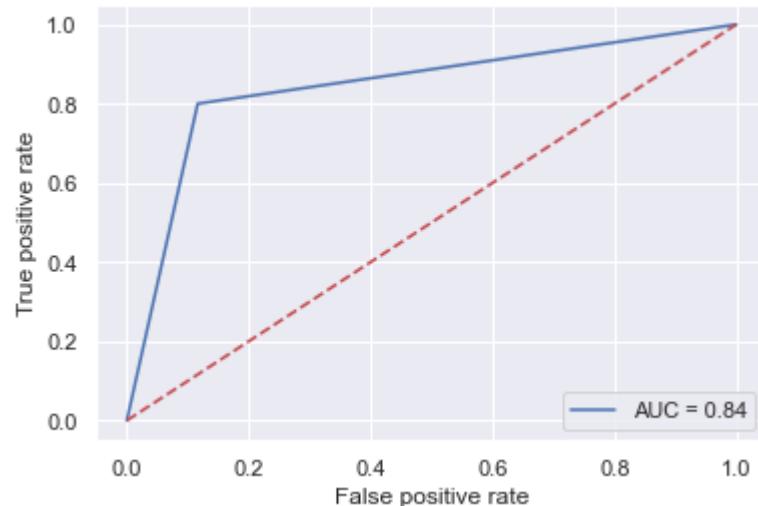


In [29]:

```
sv=SVC()  
accuracy(sv,x,y)
```

```
max_accuracy_score 42 is 85.71428571428571  
cross validation score 84.3591836734694  
Standard Deviation 9.390927591718668  
Training accuracy 87.09677419354838  
Test Accuracy 85.71428571428571  
Confusion_Matrix [[38  5]  
                  [ 4 16]]  
Classification_Report  
precision    recall   f1-score   support  
0            0.90    0.88    0.89      43  
1            0.76    0.80    0.78      20  
  
accuracy          0.83    0.84    0.84      63  
macro avg       0.83    0.84    0.84      63  
weighted avg    0.86    0.86    0.86      63  
  
Roc_auc Score 0.8418604651162791
```

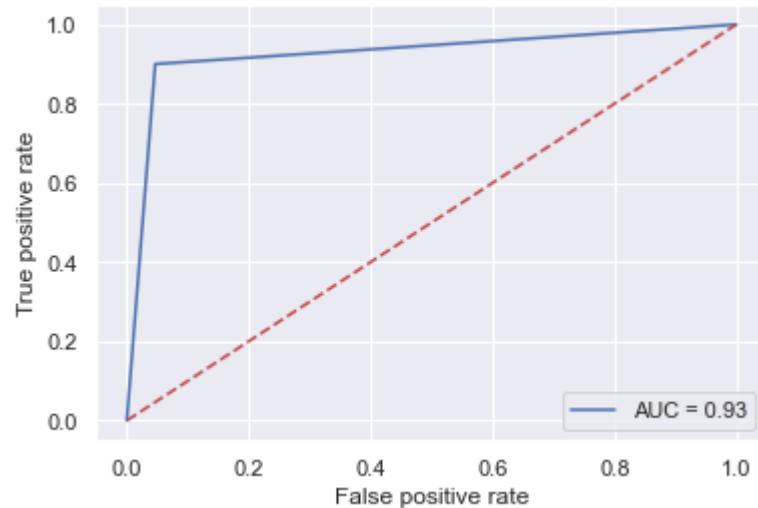
Out[29]: 42



```
In [30]: rf=RandomForestClassifier()  
accuracy(rf,x,y)
```

```
max_accuracy_score 42 is 93.65079365079364  
cross validation score 93.6  
Standard Deviation 12.496399481450645  
Training accuracy 100.0  
Test Accuracy 93.65079365079364  
Confusion_Matrix [[41  2]  
 [ 2 18]]  
Classification_Report  
precision recall f1-score support  
0      0.95    0.95    0.95     43  
1      0.90    0.90    0.90     20  
  
accuracy          0.94     63  
macro avg       0.93    0.93    0.93     63  
weighted avg    0.94    0.94    0.94     63  
  
Roc_auc Score 0.9267441860465117
```

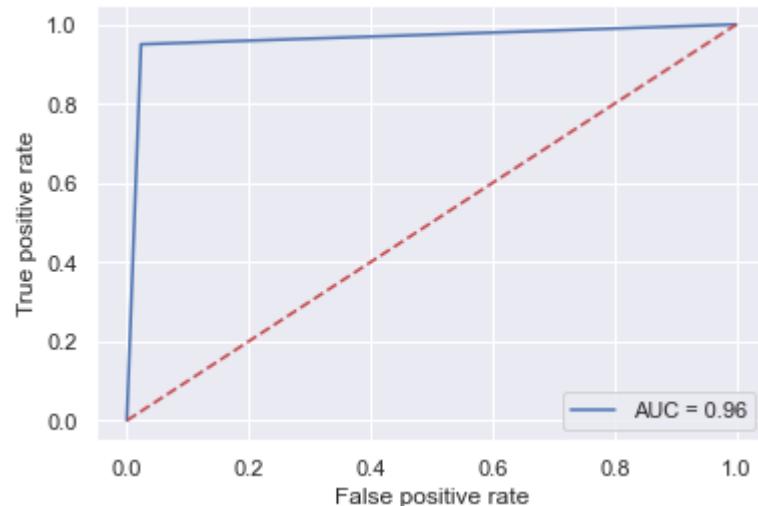
```
Out[30]: 42
```



```
In [31]:  
Adb=AdaBoostClassifier()  
accuracy(Adb,x,y)
```

```
max_accuracy_score 42 is 96.82539682539682  
cross validation score 95.19999999999999  
Standard Deviation 9.6  
Training accuracy 100.0  
Test Accuracy 96.82539682539682  
Confusion_Matrix [[42  1]  
 [ 1 19]]  
Classification_Report  
precision recall f1-score support  
 0       0.98    0.98    0.98      43  
 1       0.95    0.95    0.95      20  
  
accuracy          0.97    0.97      63  
macro avg       0.96    0.96    0.96      63  
weighted avg     0.97    0.97    0.97      63  
  
Roc_auc Score 0.9633720930232557
```

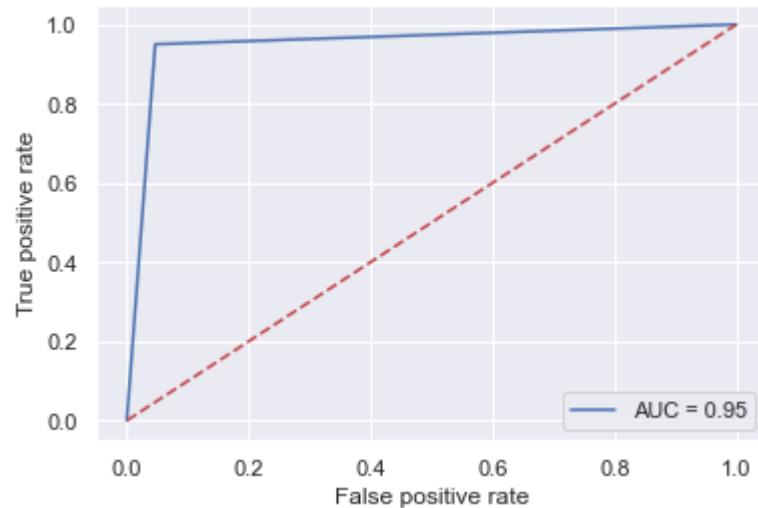
```
Out[31]: 42
```



```
In [32]:  
gnb=GradientBoostingClassifier()  
accuracy(gnb,x,y)
```

```
max_accuracy_score 42 is 95.23809523809523  
cross validation score 97.19999999999999  
Standard Deviation 5.6000000000000005  
Training accuracy 100.0  
Test Accuracy 95.23809523809523  
Confusion_Matrix [[41  2]  
[ 1 19]]  
Classification_Report  
precision    recall   f1-score   support  
0            0.98     0.95     0.96      43  
1            0.90     0.95     0.93      20  
  
accuracy          0.95     0.95     0.95      63  
macro avg       0.94     0.95     0.95      63  
weighted avg    0.95     0.95     0.95      63  
  
Roc_auc Score 0.9517441860465117
```

```
Out[32]: 42
```



Hyperparameter Tuning:

```
In [33]: dt = DecisionTreeClassifier()
grid_param={

    'criterion':['entropy','gini'],
    'max_depth':(10,15),
    'min_samples_split':(10,12),
    'min_samples_leaf':(4,5),
    'max_leaf_nodes':(5,7) }

grd= GridSearchCV(estimator=dt,
                  param_grid=grid_param,
                  cv=5,
                  n_jobs=-1)

grd.fit(x_train,y_train)
print('best_params=> ',grd.best_params_)

dt=grd.best_estimator_
dt.fit(x_train,y_train)
y_pred=dt.predict(x_test)

dt_conf_mat = confusion_matrix(y_test,y_pred)
```

```
print('con_mat=> ','\n',dt_conf_mat)
print('Accuracy of dt After Hyperparameter Tuning=> ',accuracy_score(y_test,y_pred)*100)
```

```
Out[33]: GridSearchCV(cv=5, estimator=DecisionTreeClassifier(), n_jobs=-1,
                      param_grid={'criterion': ['entropy', 'gini'],
                                  'max_depth': (10, 15), 'max_leaf_nodes': (5, 7),
                                  'min_samples_leaf': (4, 5),
                                  'min_samples_split': (10, 12)})
best_params=> {'criterion': 'entropy', 'max_depth': 15, 'max_leaf_nodes': 7, 'min_samples_leaf': 5, 'min_samples_split': 10}
Out[33]: DecisionTreeClassifier(criterion='entropy', max_depth=15, max_leaf_nodes=7,
                                 min_samples_leaf=5, min_samples_split=10)
con_mat=>
 [[36  7]
 [ 2 18]]
Accuracy of dt After Hyperparameter Tuning=> 85.71428571428571
```

Save the model:

```
In [34]: import joblib
joblib.dump(dt,'final.pkl')
```

```
Out[34]: ['final.pkl']
```

```
In [35]: loaded_model=joblib.load('final.pkl')
prediction=loaded_model.predict(x_test)
```

```
In [36]: prediction
```

```
Out[36]: array([0, 1, 1, 0, 0, 0, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0, 1, 1, 0, 0, 1,
 1, 0, 1, 0, 1, 1, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 1, 0, 1, 0, 1, 0, 0,
 1, 0, 1, 1, 0, 0, 1, 0, 1, 0, 1, 0, 1, 0, 0, 1, 0, 0, 0, 0])
```

Conclusion:

1 After analysing the dataset it is observed that female customers are more active than male in online purchasing. 2 Average age of customers are of 21 to 40 years. 3 Cities from where the most orders placed are 1-Delhi 2-Greater Noida 3-Noida

4-Banglore

5-Ghaziabad

4 Customers using online retails stores from more than 4 years. 5 Smartphones are widely used for online purchase. 6 Customers spend more than 15 min while purchasing anything. 7 Online payment is more liked and convinient for the customers. 8 Payment via credit or debit card are 1st preference and than COD. 9 Amazon.in comes as the 1st preference for online purchase. 10 On 2nd is Flipkart.com.

These two sites comes as the most liked and convinient sites due to its user friendly application,graphics,webpage layout fast loading,wast variety of products,reliabilty,quickness to complete the order,availibilty of multiple online payment options, speedy delivery,privacy of customer data,financial security and trustworthiness.

So as conclusion retaining customers can be easy when we keep having customers feedback, keep figuring out who's the right customers, build trust, inform customers about about vital informations.

In []:

In []: