In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

In [3]:
```
df = pd.read_csv('casestudy.csv')
```

In [4]:
```
df
```

Out[4]:

	Unnamed: 0	customer_email	net_revenue	year
0	0	nhknapwsbx@gmail.com	249.92	2015
1	1	joiuzbvcpn@gmail.com	87.61	2015
2	2	ukkjctepxt@gmail.com	168.38	2015
3	3	gykatilzrt@gmail.com	62.40	2015
4	4	mmsgsrtxah@gmail.com	43.08	2015
...	...	...	...	...
685922	685922	qzqttwiftu@gmail.com	184.58	2017
685923	685923	pjodiifjop@gmail.com	133.03	2017
685924	685924	appaplmgko@gmail.com	200.98	2017
685925	685925	wvkpmwsgck@gmail.com	235.35	2017
685926	685926	aregboumbw@gmail.com	208.43	2017

685927 rows × 4 columns

In [5]:
```
################## Q.1 ##############################
current_year_revenue = df[df['year'] == 2017]['net_revenue'].sum()
print('current year revenue =', current_year_revenue )
```

```
current year revenue = 31417495.030000016
```

In [6]:
```
################## Q.2 ####################
```

In [7]:
```
df.sort_values('year')
```

Out[7]:

	Unnamed: 0	customer_email	net_revenue	year
0	0	nhknapwsbx@gmail.com	249.92	2015
154189	154189	dmwhwcevtw@gmail.com	68.56	2015
154190	154190	aufzyxucjw@gmail.com	180.88	2015
154191	154191	eciohbmgyp@gmail.com	216.81	2015
154192	154192	eqfchvvoak@gmail.com	186.75	2015
...	...	...	...	...
519273	519273	noaniodrmk@gmail.com	177.29	2017
519274	519274	zwnejhirja@gmail.com	139.01	2017
519275	519275	jgovbltxmu@gmail.com	131.82	2017
519277	519277	pzytmjawlp@gmail.com	11.15	2017
685926	685926	aregboumbw@gmail.com	208.43	2017

685927 rows × 4 columns

In [8]:
```
df['Occurance'] = np.where(~df['customer_email'].duplicated(),'New','Existir
```

In [9]:
```
df
```

Out[9]:

	Unnamed: 0	customer_email	net_revenue	year	Occurance
0	0	nhknapwsbx@gmail.com	249.92	2015	New
1	1	joiuzbvcpn@gmail.com	87.61	2015	New
2	2	ukkjctepxt@gmail.com	168.38	2015	New
3	3	gykatilzrt@gmail.com	62.40	2015	New
4	4	mmsgsrtxah@gmail.com	43.08	2015	New
...	...	...	...	...	...
685922	685922	qzqttwiftu@gmail.com	184.58	2017	New
685923	685923	pjodiifjop@gmail.com	133.03	2017	New
685924	685924	appaplmgko@gmail.com	200.98	2017	New
685925	685925	wvkpmwsgck@gmail.com	235.35	2017	New
685926	685926	aregboumbw@gmail.com	208.43	2017	New

685927 rows × 5 columns

In [10]:
```
df_newonly = df[df['Occurance']=='New']
```

In [11]:
```
df_newonly.groupby('year')['net_revenue'].sum()
```

Out[11]:
```
year
2015    29036749.19
2016    18245491.01
2017    28676607.64
Name: net_revenue, dtype: float64
```

In [12]:
```
print('\033[1m','Total New Customer Revenue = ', str(round(df_newonly['net_r
```

Total New Customer Revenue = 75958847.84

In [13]:
```
################ Q.3 ################################
```

In [14]:
```
df_existingCust = df[df['Occurance']== 'Existing']
```

In [15]:
```
df_existingCust
```

Out[15]:

	Unnamed: 0	customer_email	net_revenue	year	Occurance
231302	231302	baiikostmd@gmail.com	142.57	2016	Existing
231303	231303	lfeafnigbu@gmail.com	35.06	2016	Existing
231309	231309	tqxsjlgjpi@gmail.com	33.50	2016	Existing
231310	231310	hxshgpdxtr@gmail.com	217.35	2016	Existing
231318	231318	zvhsssvgor@gmail.com	43.84	2016	Existing
...	...	...	...	...	...
640562	640562	flkeldljhv@gmail.com	180.01	2017	Existing
640568	640568	ecrvkbfunu@gmail.com	205.42	2017	Existing
640571	640571	tpdtoiokyt@gmail.com	242.63	2017	Existing
640580	640580	dcakqgznnm@gmail.com	62.66	2017	Existing
640583	640583	fkweqlmmjw@gmail.com	21.78	2017	Existing

81309 rows × 5 columns

In [16]:
```
df_existingCust.groupby('year')['net_revenue'].sum()
```

Out[16]:
```
year
2016    7485452.58
2017    2740887.39
Name: net_revenue, dtype: float64
```

In [17]:
```
Existing_Cust_growth = df_existingCust[df_existingCust['year']==2017]['net_r
```

In [18]:
```
print('\033[1m','Existing Customer Growth in Current Year =', Existing_Cust_
```

Existing Customer Growth in Current Year = -4744565.19

Existing customer growth is negative. Revenue from existing customers is reduced compared to last year

In [19]:
```
############ Q.4 ###############
```

In [20]:
```
yearly_revenue = df.groupby('year')['net_revenue'].sum()
```

In [21]:
```
yearly_revenue
```

Out[21]:
```
year
2015    29036749.19
2016    25730943.59
2017    31417495.03
Name: net_revenue, dtype: float64
```

In [22]:
```
print('\033[1m','Revenue Lost in Attrition in 2017 =', str(round(df[df['year
print('\033[1m','Revenue Lost Attrition in 2016 =', str(round(df[df['year']=
#print('\033[1m','NO REVENUE LOST IN ATTRItTION IN 2017')
```

Revenue Lost in Attrition in 2017 = -5686551.44
Revenue Lost Attrition in 2016 = 3305805.6

In [23]:
```
 df_existingCust[df_existingCust['year']==2017]['net_revenue'].sum(),2)))
df_existingCust[df_existingCust['year']==2016]['net_revenue'].sum(),2)))
```

Revenue Lost in Existing Customers Attrition_in 2017 = 15504603.62
Revenue Lost in Existing Custoner Attrition in 2016 = 21551296.61

In [24]:
```
############## Q.5 ################
```

In [25]:
```
e in Current Year =', str(round(df_existingCust[df_existingCust['year']==201
```

Existing Customer Revenue in Current Year = 2740887.39

In [ ]:
```
############ Q.6 ##############
```

In [26]:
```
print('\033[1m','Existing Customer Revenue in Prior Year =', df_existingCust
```

Existing Customer Revenue in Prior Year = 7485452.58 USD

In [ ]:
```
########## Q.7 ###########3
```

In [27]:
```
print('\033[1m','Total Customers in Current Year =', df[df['year']==2017]['c
```

Total Customers in Current Year = 249987

In [28]:
```
########### Q.8 ##############3
```

In [29]:
```
print('\033[1m','Total Customers in Previous Year =', df[df['year']==2016]['
```

Total Customers in Previous Year = 204646

In [30]:
```
########## Q.9 ###############
```

In [31]:
```
print('New Customers =', df_newonly['customer_email'].count())
```

New Customers = 604618

In [32]:
```
print('\033[1m','New Customers in Current Year =', df_newonly[df_newonly['ye
```

New Customers in Current Year = 228262

In [33]:
```
############ Q.10 #################
```

In [34]:
```
#Existing_Customers_2016 = df_existingCust[df_existingCust['year']==2016]['c
#Existing_Customers_2016
```

In [35]:
```
df_newonly[df_newonly['year']==2015]['customer_email'].count()
```

Out[35]: 231294

In [36]:
```
df_existingCust[df_existingCust['year']==2016]['customer_email'].count()
```

Out[36]: 59584

In [37]:
```
Lost_Customers_2016 = df[df['year']==2015]['customer_email'].count() - df_e
print('\033[1m'+'Lost Customers in 2016 =', Lost_Customers_2016)
```

Lost Customers in 2016 = 171710

In [38]:
```
Lost_Customers_2017 = df[df['year']==2016]['customer_email'].count() - df_ex
print('\033[1m','Lost Customers in 2017 =', Lost_Customers_2017)
```

Lost Customers in 2017 = 182921

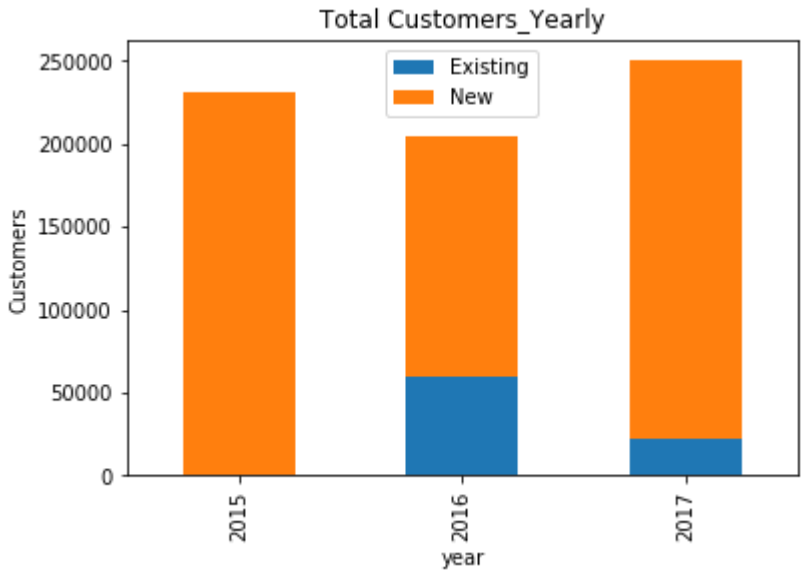
In [39]:
```
print('\033[1m','Total Lost Customers =', Lost_Customers_2016 + Lost_Custome
```

Total Lost Customers = 354631

In [40]:
```
############ Plots ###############3
```

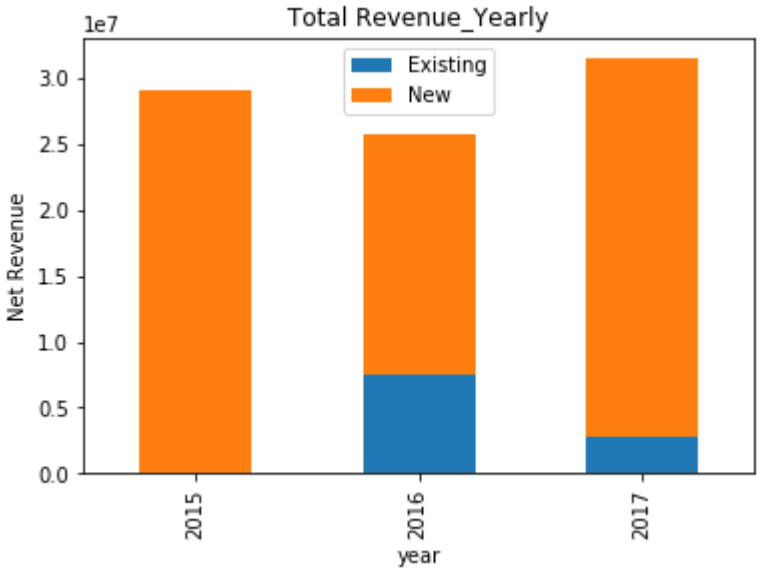
In [41]:
```
Total_Cust_Yearly=df.groupby(['year', 'Occurance'])['customer_email'].size()
Total_Cust_Yearly.set_title('Total Customers_Yearly')
Total_Cust_Yearly.legend( loc='upper center', fancybox=True,) #bbox_to_ancho
Total_Cust_Yearly.set_xlabel('year')
Total_Cust_Yearly.set_ylabel('Customers')
```

Out[41]: Text(0, 0.5, 'Customers')



In [42]:
```
Total_yearly_revenue_ = df.groupby(['year', 'Occurance'])['net_revenue'].sum
Total_yearly_revenue_.set_title('Total Revenue_Yearly')
Total_yearly_revenue_.legend( loc='upper center', fancybox=True,) #bbox_to_a
Total_yearly_revenue_.set_xlabel('year')
Total_yearly_revenue_.set_ylabel('Net Revenue')
```

Out[42]: Text(0, 0.5, 'Net Revenue')



Customer retention and revenue from existing customers deopped in 2017.

In [43]:
```
Percent_of_customers_retained_in_2016 = ((df[df['year']==2015]['customer_ema
Percent_of_customers_retained_in_2016 = str(round(Percent_of_customers_retai
print('\033[1m','Percent of existing customers retained in 2016=',Percent_of
```

Percent of existing customers retained in 2016= 25.76 %

In [44]:
```
Percent_of_customers_retained_in_2017 = ((df[df['year']==2016]['customer_ema
Percent_of_customers_retained_in_2017 = str(round(Percent_of_customers_retai
print('\033[1m','Percent of existing customers retained in 2017=',Percent_of
```

Percent of existing customers retained in 2017= 10.62 %

In [ ]:
```
## It is observed in bar plot for customer that the company could retain arc
##and in 2017 the company retained 10% customers but however made more total
```