In [7]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt #visualizing data
%matplotlib inline
import seaborn as sns
```

In [8]:
```
df = pd.read_csv('Diwali Sales Data.csv', encoding= 'unicode_escape')
# To avoid encoding error, use unicode_escape
```

In [9]:
```
df.shape
```

Out[9]:
```
(11251, 15)
```

In [10]:
```
df.head()
```

Out[10]:

	User_ID	Cust_name	Product_ID	Gender	Age Group	Age	Marital_Status	State	Zone	Occupation	Product_Category	Orders	Amount	Status	unnamed1
0	1002903	Sanskriti	P00125942	F	26-35	28	0	Maharashtra	Western	Healthcare	Auto	1	23952.0	NaN	NaN
1	1000732	Kartik	P00110942	F	26-35	35	1	Andhra Pradesh	Southern	Govt	Auto	3	23934.0	NaN	NaN
2	1001990	Bindu	P00118542	F	26-35	35	1	Uttar Pradesh	Central	Automobile	Auto	3	23924.0	NaN	NaN
3	1001425	Sudevi	P00237842	M	0-17	16	0	Karnataka	Southern	Construction	Auto	2	23912.0	NaN	NaN
4	1000588	Joni	P00057942	M	26-35	28	1	Gujarat	Western	Food Processing	Auto	2	23877.0	NaN	NaN

In [11]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 11251 entries, 0 to 11250
Data columns (total 15 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   User_ID           11251 non-null  int64
 1   Cust_name         11251 non-null  object
 2   Product_ID        11251 non-null  object
 3   Gender            11251 non-null  object
 4   Age Group         11251 non-null  object
 5   Age               11251 non-null  int64
 6   Marital_Status    11251 non-null  int64
 7   State             11251 non-null  object
 8   Zone              11251 non-null  object
 9   Occupation        11251 non-null  object
 10  Product_Category  11251 non-null  object
 11  Orders            11251 non-null  int64
 12  Amount            11239 non-null  float64
 13  Status            0 non-null      float64
 14  unnamed1          0 non-null      float64
dtypes: float64(3), int64(4), object(8)
memory usage: 1.3+ MB
```

In [14]:
```
#Drop unrelated/blank columns
df.drop(['Status', 'unnamed1'], axis=1, inplace=True)
```

In [15]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 11251 entries, 0 to 11250
Data columns (total 13 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   User_ID           11251 non-null  int64
 1   Cust_name         11251 non-null  object
 2   Product_ID        11251 non-null  object
 3   Gender            11251 non-null  object
 4   Age Group         11251 non-null  object
 5   Age               11251 non-null  int64
 6   Marital_Status    11251 non-null  int64
 7   State             11251 non-null  object
 8   Zone              11251 non-null  object
 9   Occupation        11251 non-null  object
 10  Product_Category  11251 non-null  object
 11  Orders            11251 non-null  int64
 12  Amount            11239 non-null  float64
dtypes: float64(1), int64(4), object(8)
memory usage: 1.1+ MB
```

In [16]:
```
#Check for null values
pd.isnull(df).sum()
```

Out[16]:
```
User_ID              0
Cust_name            0
Product_ID           0
Gender               0
Age Group            0
Age                  0
Marital_Status       0
State                0
Zone                 0
Occupation           0
Product_Category     0
Orders               0
Amount              12
dtype: int64
```

In [17]:
```
df.shape
```

Out[17]:
```
(11251, 13)
```

In [18]:
```
#Drop null values
df.dropna(inplace=True)
```

In [19]:
```
df.shape
```

Out[19]:
```
(11239, 13)
```

In [21]:
```
#change data type
df['Amount'] = df['Amount'].astype('int')
```

In [22]:
```
df['Amount'].dtypes
```

Out[22]:
```
dtype('int32')
```

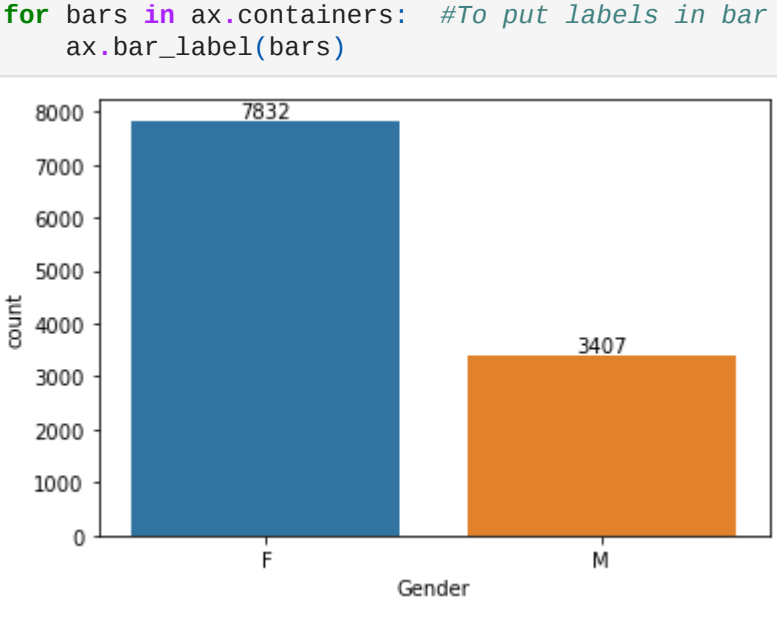
In [23]:
```
df.columns
```

Out[23]:
```
Index(['User_ID', 'Cust_name', 'Product_ID', 'Gender', 'Age Group', 'Age',
       'Marital_Status', 'State', 'Zone', 'Occupation', 'Product_Category',
       'Orders', 'Amount'],
      dtype='object')
```

Exploratory Data Analysis

Gender

In [24]:
```
ax = sns.countplot(x ='Gender' ,data = df)
for bars in ax.containers:  #To put labels in bar chart
    ax.bar_label(bars)
```



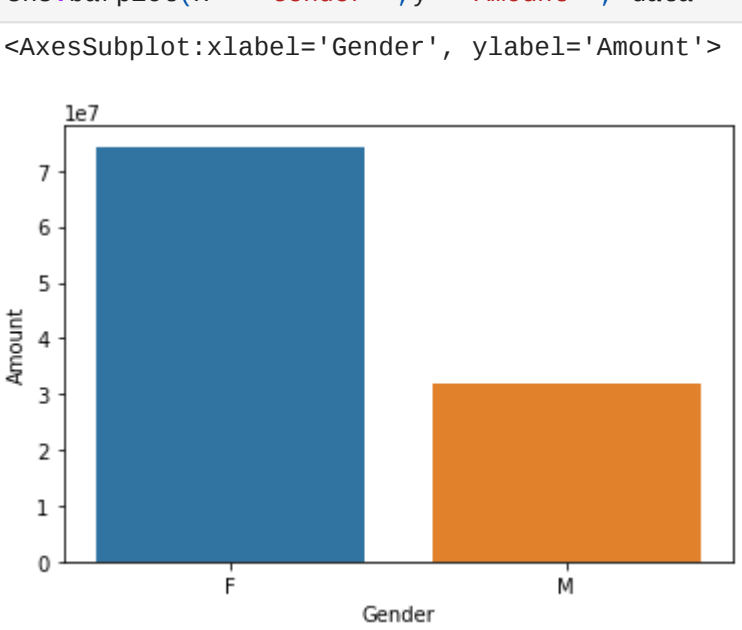
In [25]:
```
df.groupby(['Gender'], as_index=False)['Amount'].sum().sort_values(by='Amount' , ascending=False)
```

Out[25]:

	Gender	Amount
0	F	74335853
1	M	31913276

In [26]:
```
sales_gen = df.groupby(['Gender'], as_index=False)['Amount'].sum().sort_values(by='Amount' , ascending=False)
sns.barplot(x = 'Gender' ,y= 'Amount' , data = sales_gen)
```

Out[26]:
```
<AxesSubplot:xlabel='Gender', ylabel='Amount'>
```



From above graph we can see that most of the buyers are females and even the purchasing power of female are greater than male

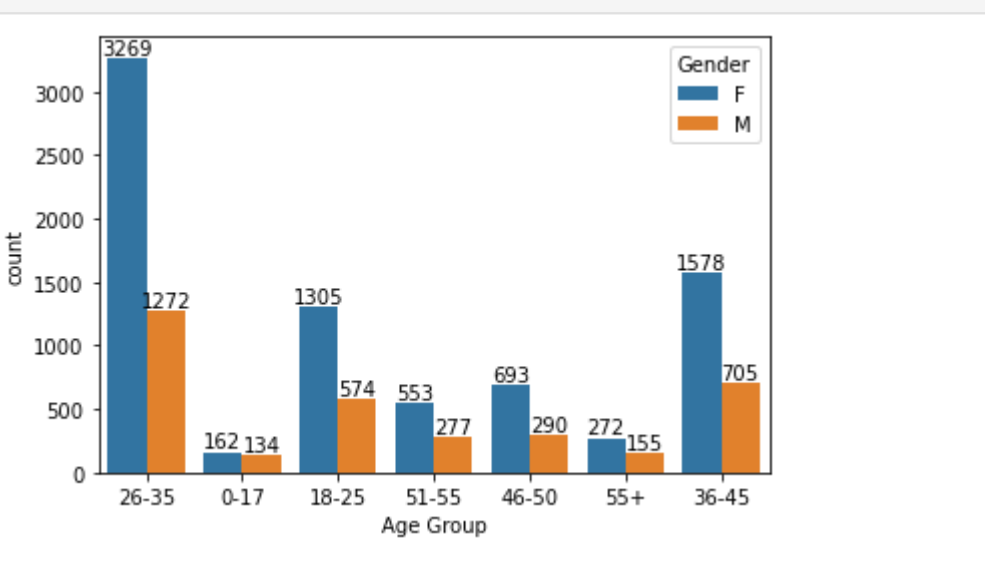
Age

In [27]:
```
df.columns
```

Out[27]:
```
Index(['User_ID', 'Cust_name', 'Product_ID', 'Gender', 'Age Group', 'Age',
       'Marital_Status', 'State', 'Zone', 'Occupation', 'Product_Category',
       'Orders', 'Amount'],
      dtype='object')
```

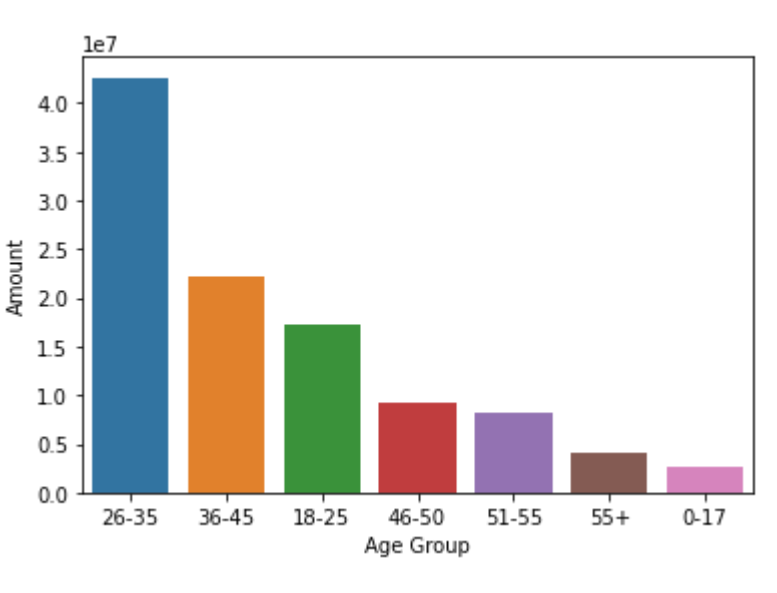
In [28]:
```
ax = sns.countplot(data = df, x = 'Age Group' , hue = 'Gender')

for bars in ax.containers:
    ax.bar_label(bars)
```



In [29]:
```
#Total Amount vs Age Group
sales_age = df.groupby(['Age Group'], as_index= False)['Amount'].sum().sort_values(by ='Amount', ascending=False)
sns.barplot(x ='Age Group' ,y= 'Amount', data= sales_age)
```

Out[29]:
```
<AxesSubplot:xlabel='Age Group', ylabel='Amount'>
```

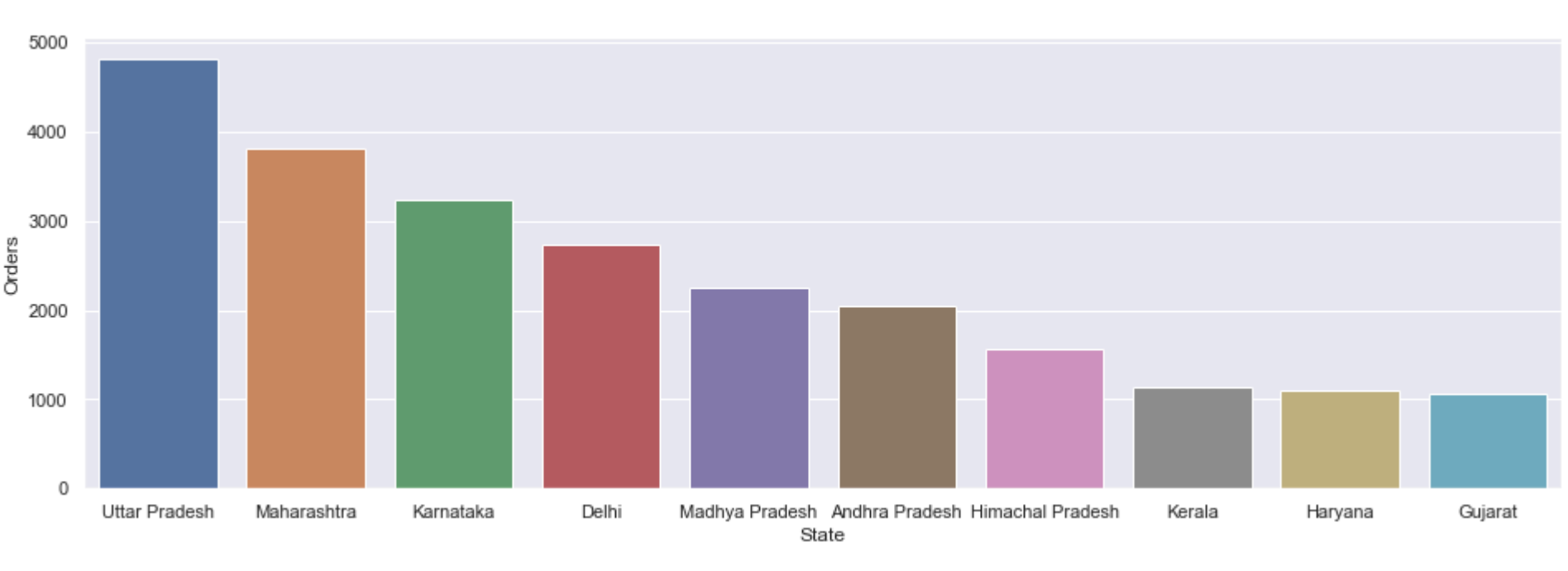


From above graphs we can see that most of the buyers are of age group between 26-35 female

State

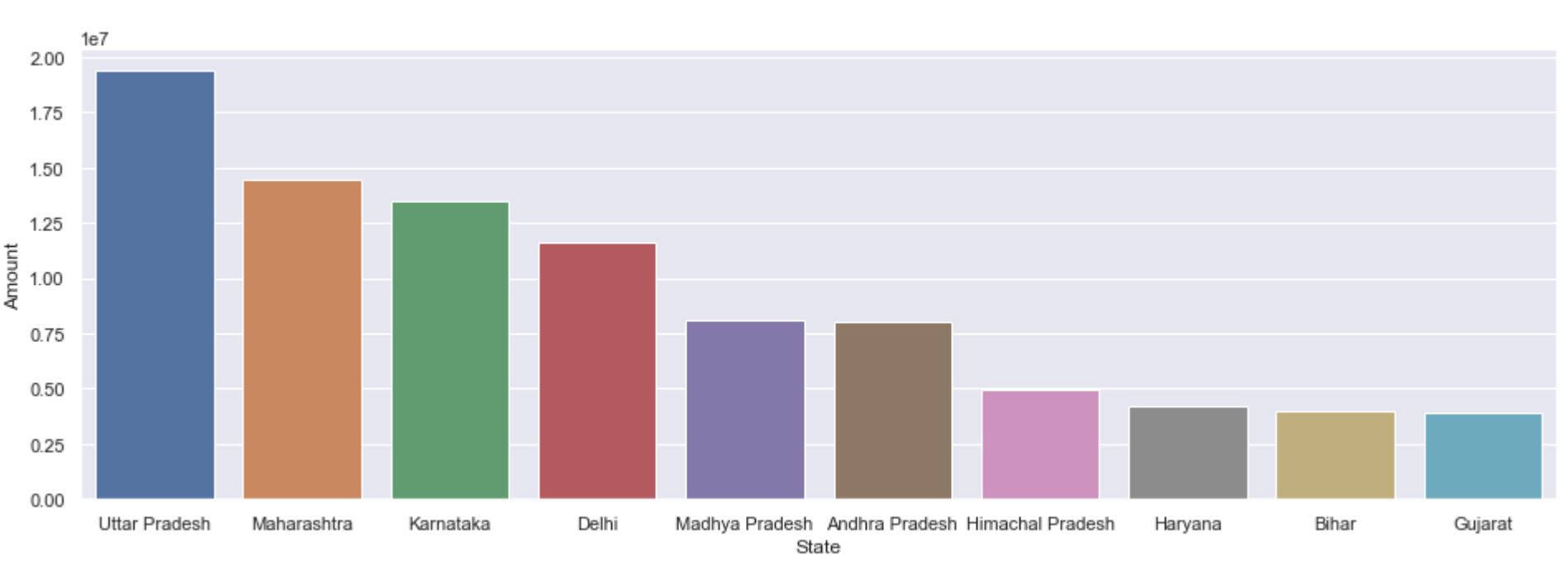
In [31]:
```
#Total number of orders from Top 10 states
sales_state = df.groupby(['State'], as_index= False)['Orders'].sum().sort_values(by='Orders', ascending=False).head(10)
sns.set(rc={ 'figure.figsize' : (16,5)})
sns.barplot(data= sales_state, x = 'State', y= 'Orders')
```

Out[31]:
```
<AxesSubplot:xlabel='State', ylabel='Orders'>
```



In [32]:
```
#Total Amount from Top 10 states
sales_state = df.groupby(['State'], as_index= False)['Amount'].sum().sort_values(by='Amount', ascending=False).head(10)
sns.set(rc={ 'figure.figsize' : (16,5)})
sns.barplot(data= sales_state, x = 'State', y= 'Amount')
```

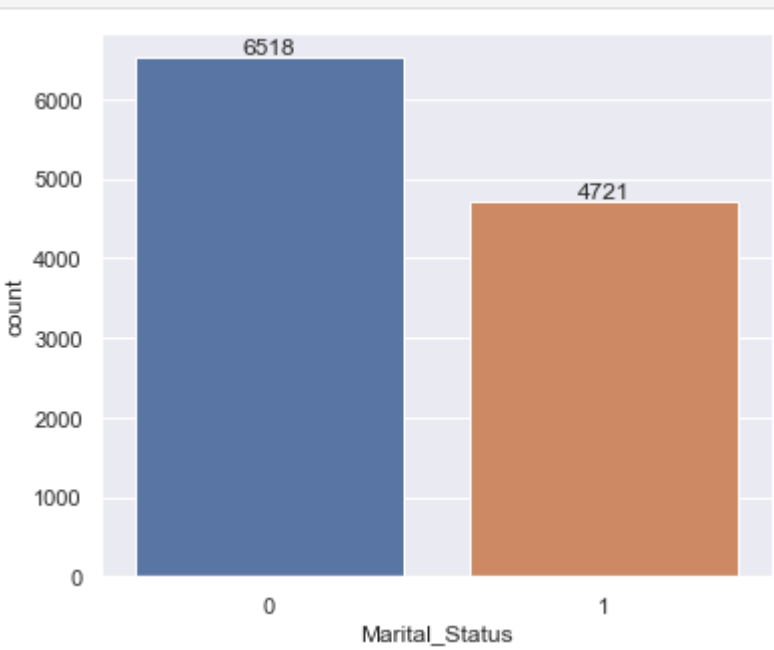
Out[32]:
```
<AxesSubplot:xlabel='State', ylabel='Amount'>
```



From above graphs we can see that most of the orders & Total sales/Amount are from Uttar Pradesh, Maharashtra and Karnataka

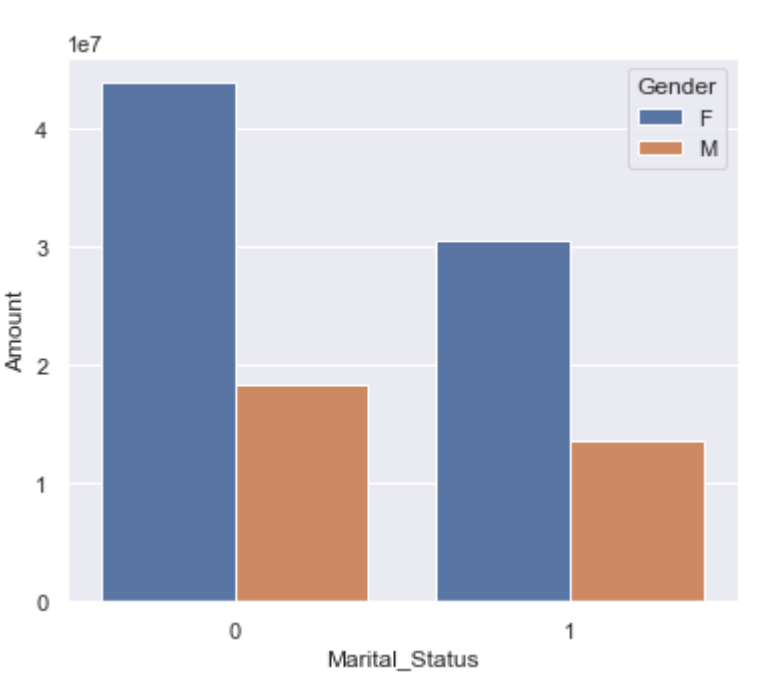
Marital Status

In [37]:
```
ax = sns.countplot(data = df, x = 'Marital_Status')
sns.set(rc={ 'figure.figsize' : (7,5)})
for bars in ax.containers:
    ax.bar_label(bars)
```



In [52]:
```
sales_maritalstatus = df.groupby(['Marital_Status','Gender'], as_index= False)['Amount'].sum().sort_values(by='Amount', ascending=False)
sns.set(rc={ 'figure.figsize' : (6,5)})
sns.barplot(data = sales_maritalstatus, x = 'Marital_Status',y= 'Amount' , hue = 'Gender')
```

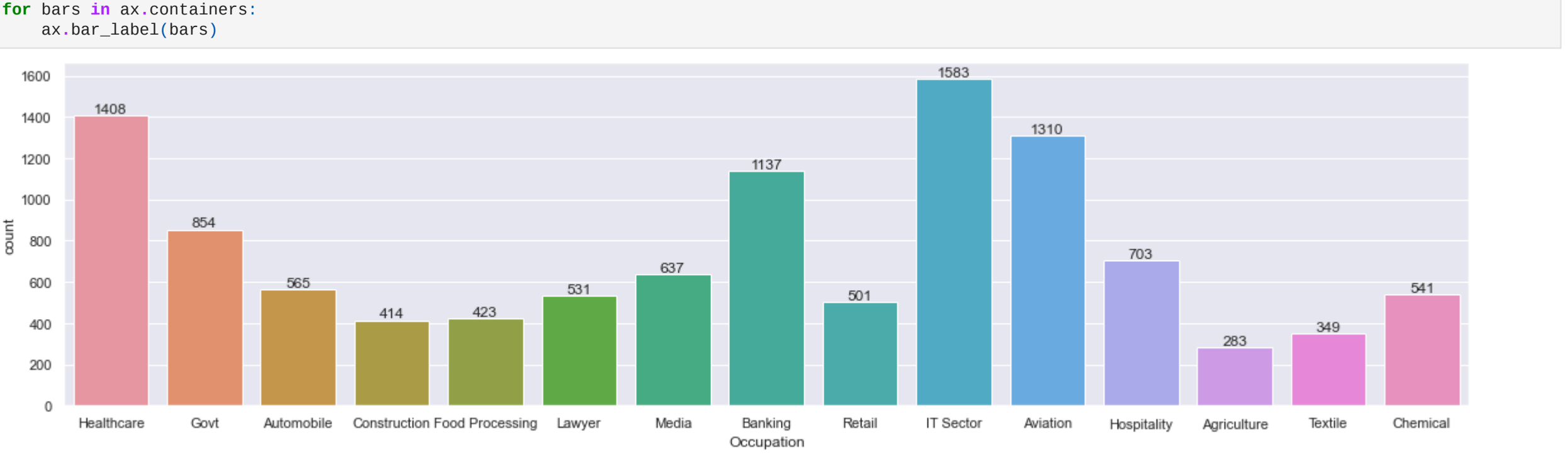
Out[52]:
```
<AxesSubplot:xlabel='Marital_Status', ylabel='Amount'>
```



From above graphs we can see that most of the buyers are married(women) and they havev high purchasing power

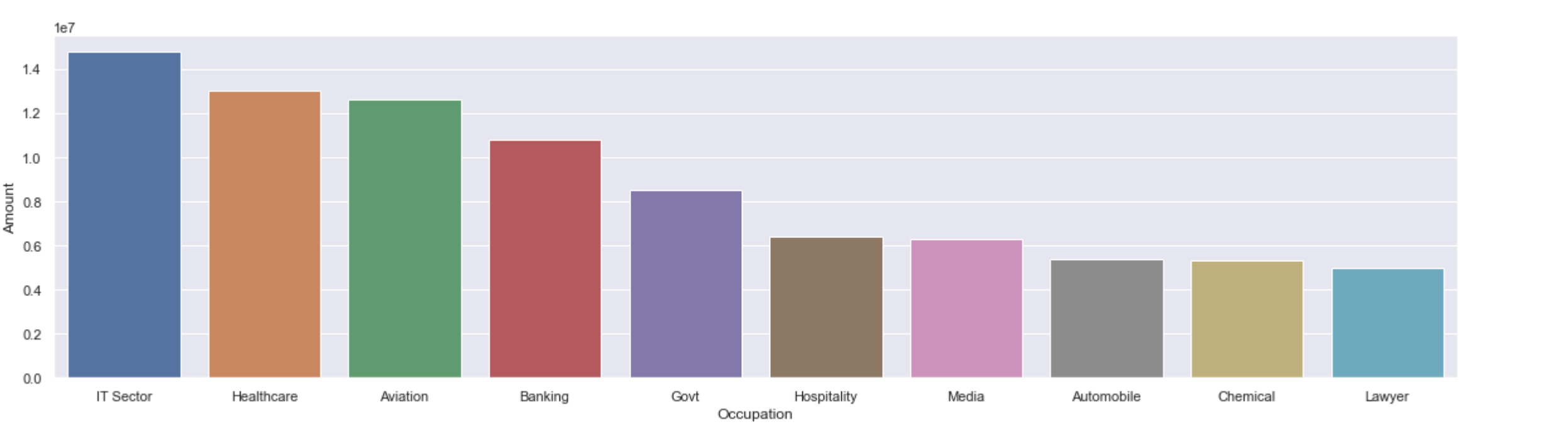
Occupation

In [46]:
```
sns.set(rc={'figure.figsize':(20,5)})
ax = sns.countplot(data= df, x= 'Occupation')
for bars in ax.containers:
    ax.bar_label(bars)
```



In [47]:
```
sales_occupation = df.groupby(['Occupation'], as_index= False)['Amount'].sum().sort_values(by='Amount', ascending=False).head(10)
sns.set(rc={ 'figure.figsize' : (20,5)})
sns.barplot(data= sales_occupation, x = 'Occupation', y= 'Amount')
```

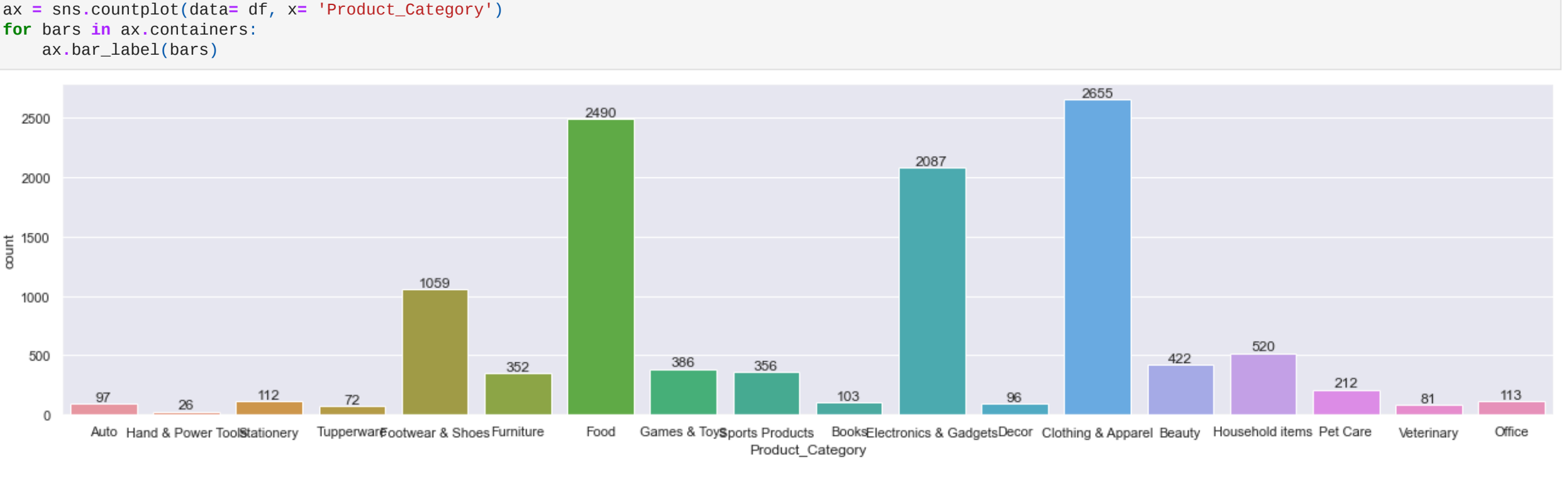
Out[47]:
```
<AxesSubplot:xlabel='Occupation', ylabel='Amount'>
```



From above graphs we can see that most of the buyers are working in IT, Healthcare and Aviation sector

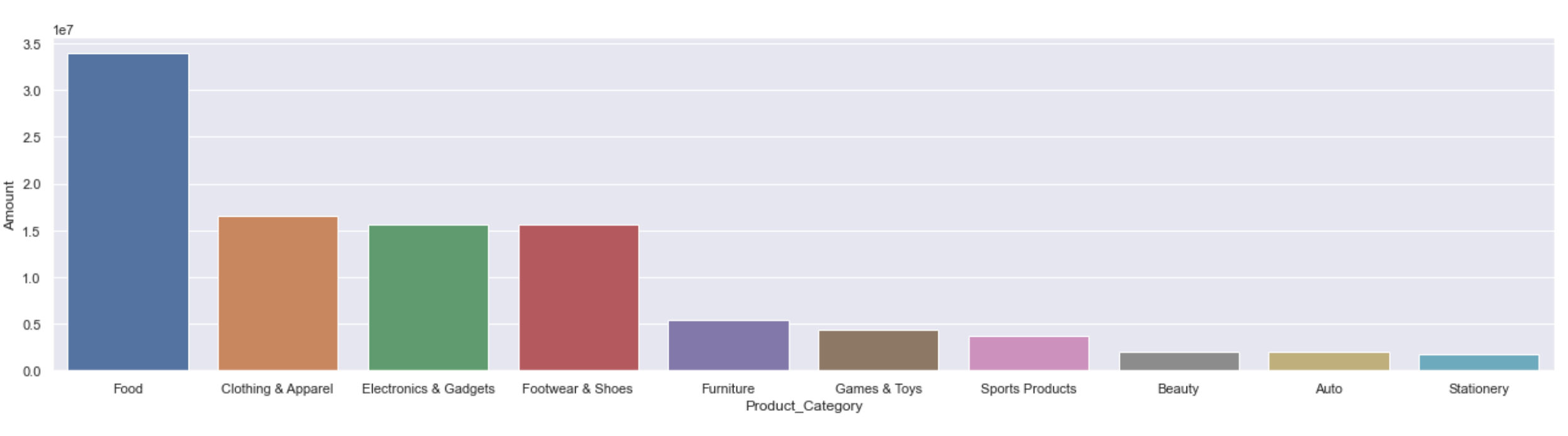
Product Category

In [49]:
```
sns.set(rc={'figure.figsize':(22,5)})
ax = sns.countplot(data= df, x= 'Product_Category')
for bars in ax.containers:
    ax.bar_label(bars)
```



In [53]:
```
sales_pc = df.groupby(['Product_Category'], as_index= False)['Amount'].sum().sort_values(by='Amount', ascending=False).head(10)
sns.set(rc={ 'figure.figsize' : (20,5)})
sns.barplot(data= sales_pc, x = 'Product_Category', y= 'Amount')
```

Out[53]:
```
<AxesSubplot:xlabel='Product_Category', ylabel='Amount'>
```

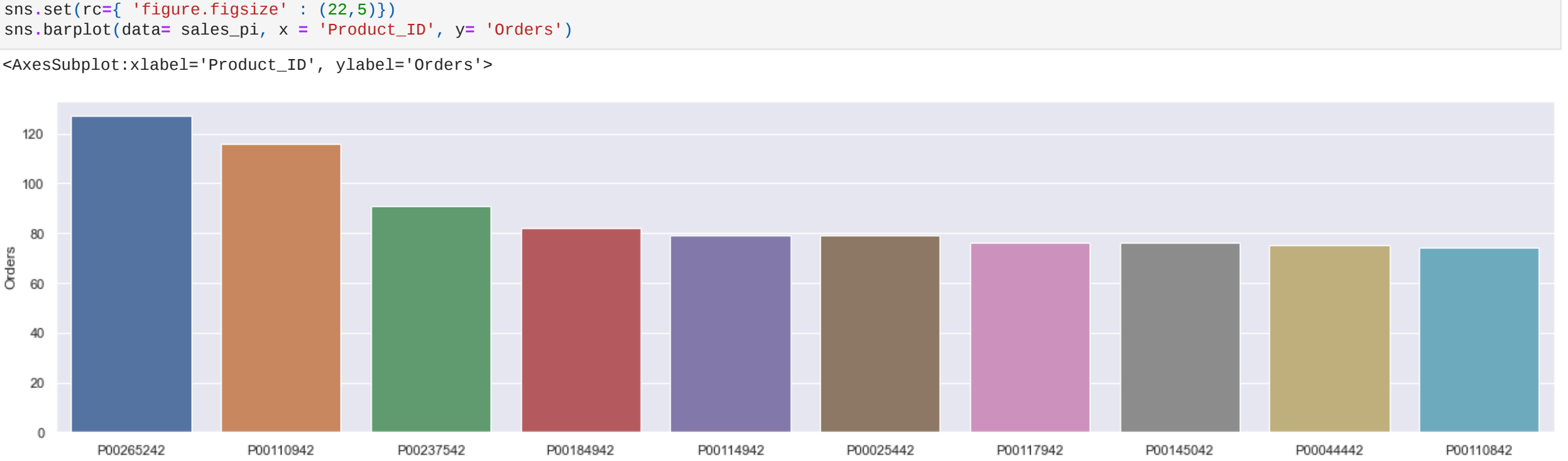


From above graphs we can see that most of the sold products are from Food, Clothing and Electronics & Gadgets category

Product id

In [54]:
```
sales_pi = df.groupby(['Product_ID'], as_index= False)['Orders'].sum().sort_values(by='Orders', ascending=False).head(10)
sns.set(rc={ 'figure.figsize' : (22,5)})
sns.barplot(data= sales_pi, x = 'Product_ID', y= 'Orders')
```

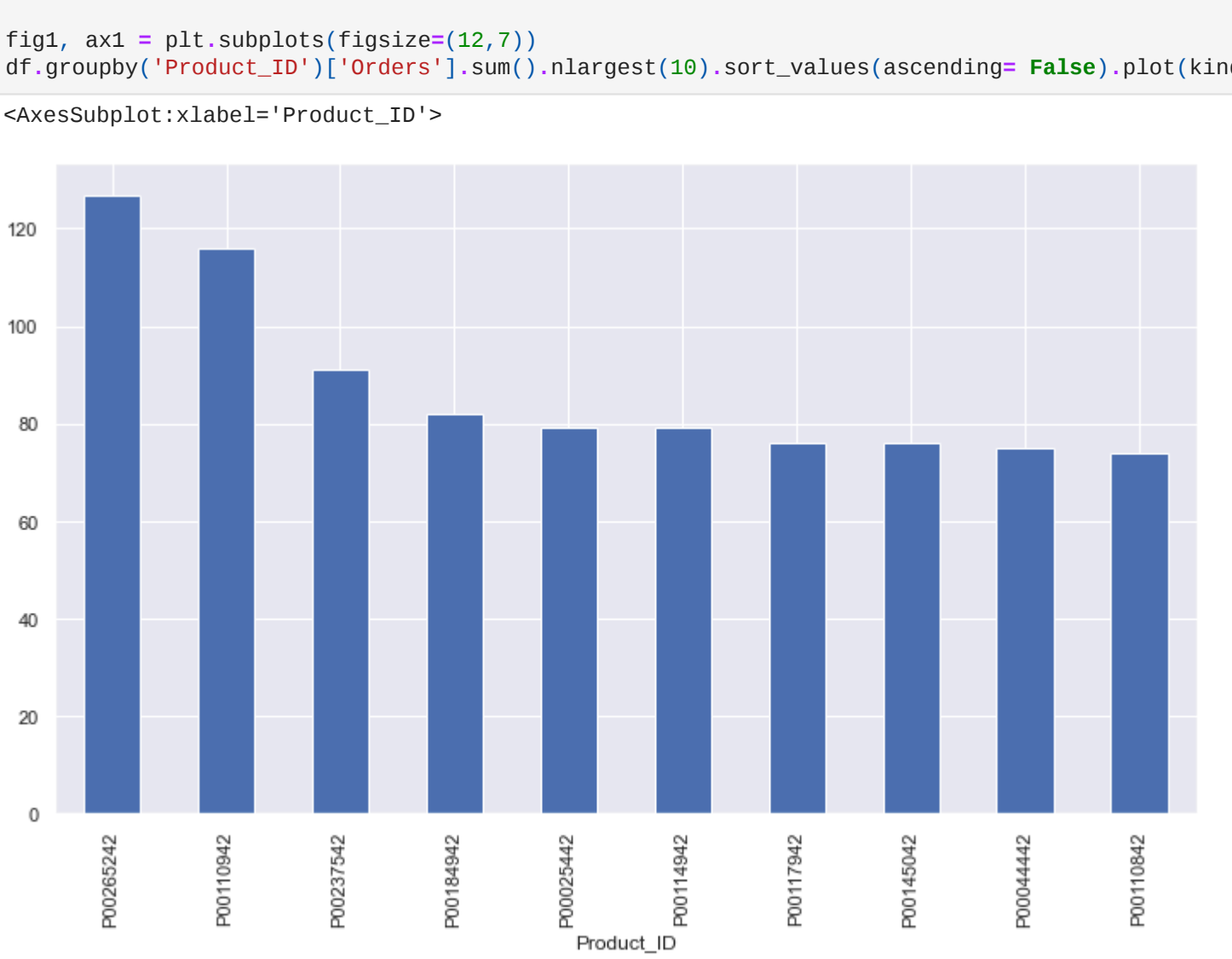
Out[54]:
```
<AxesSubplot:xlabel='Product_ID', ylabel='Orders'>
```



In [57]:
```
#Top 10 most sold products ( same as above)

fig1, ax1 = plt.subplots(figsize=(12,7))
df.groupby('Product_ID')['Orders'].sum().nlargest(10).sort_values(ascending= False).plot(kind='bar')
```

Out[57]:
```
<AxesSubplot:xlabel='Product_ID'>
```



Conclusion

Married women age group 26-35 years from UP, Maharashtra and Karnataka working in IT, Healthcare and Aviation are more likely buy products from Food, Clothing and Electronics & Gadgets category

In [ ]: