# Country GDP Economy Analysis

In [1]:
```
import warnings
warnings.filterwarnings('ignore')
```

In [2]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

In [3]:
```
pd.__version__
```

Out[3]:
```
'1.5.3'
```

In [4]:
```
df = pd.read_csv("data.csv")
```

In [5]:
```
df
```

Out[5]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup |
|---|---|---|---|---|---|
| **0** | Aruba | ABW | 10.244 | 78.9 | High income |
| **1** | Afghanistan | AFG | 35.253 | 5.9 | Low income |
| **2** | Angola | AGO | 45.985 | 19.1 | Upper middle income |
| **3** | Albania | ALB | 12.877 | 57.2 | Upper middle income |
| **4** | United Arab Emirates | ARE | 11.044 | 88.0 | High income |
| **...** | ... | ... | ... | ... | ... |
| **190** | Yemen, Rep. | YEM | 32.947 | 20.0 | Lower middle income |
| **191** | South Africa | ZAF | 20.850 | 46.5 | Upper middle income |
| **192** | Congo, Dem. Rep. | COD | 42.394 | 2.2 | Low income |
| **193** | Zambia | ZMB | 40.471 | 15.4 | Lower middle income |
| **194** | Zimbabwe | ZWE | 35.715 | 18.5 | Low income |

195 rows × 5 columns

In [6]:
```
id(df)
```

Out[6]:
```
2323115610896
```

In [7]:
```
len(df)
```

Out[7]:
```
195
```

In [8]:
```
df.columns
```

Out[8]:
```
Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
       'IncomeGroup'],
      dtype='object')
```

In [9]:
```
len(df.columns)
```

Out[9]:
```
5
```

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

Out[10]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup |
|---|---|---|---|---|---|
| **0** | False | False | False | False | False |
| **1** | False | False | False | False | False |
| **2** | False | False | False | False | False |
| **3** | False | False | False | False | False |
| **4** | False | False | False | False | False |
| **...** | ... | ... | ... | ... | ... |
| **190** | False | False | False | False | False |
| **191** | False | False | False | False | False |
| **192** | False | False | False | False | False |
| **193** | False | False | False | False | False |
| **194** | False | False | False | False | False |

195 rows × 5 columns

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

Out[11]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup |
|---|---|---|---|---|---|
| **0** | False | False | False | False | False |
| **1** | False | False | False | False | False |
| **2** | False | False | False | False | False |
| **3** | False | False | False | False | False |
| **4** | False | False | False | False | False |
| **...** | ... | ... | ... | ... | ... |
| **190** | False | False | False | False | False |
| **191** | False | False | False | False | False |
| **192** | False | False | False | False | False |
| **193** | False | False | False | False | False |
| **194** | False | False | False | False | False |

195 rows × 5 columns

In [12]:
```
df.isnull().sum()
```

Out[12]:
```
CountryName      0
CountryCode      0
BirthRate        0
InternetUsers    0
IncomeGroup      0
dtype: int64
```

In [13]:
```
df.isna().sum()
```

Out[13]:
```
CountryName      0
CountryCode      0
BirthRate        0
InternetUsers    0
IncomeGroup      0
dtype: int64
```

In [14]:
```
df.head()
```

Out[14]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup |
|---|---|---|---|---|---|
| **0** | Aruba | ABW | 10.244 | 78.9 | High income |
| **1** | Afghanistan | AFG | 35.253 | 5.9 | Low income |
| **2** | Angola | AGO | 45.985 | 19.1 | Upper middle income |
| **3** | Albania | ALB | 12.877 | 57.2 | Upper middle income |
| **4** | United Arab Emirates | ARE | 11.044 | 88.0 | High income |

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

Out[15]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup |
|---|---|---|---|---|---|
| **190** | Yemen, Rep. | YEM | 32.947 | 20.0 | Lower middle income |
| **191** | South Africa | ZAF | 20.850 | 46.5 | Upper middle income |
| **192** | Congo, Dem. Rep. | COD | 42.394 | 2.2 | Low income |
| **193** | Zambia | ZMB | 40.471 | 15.4 | Lower middle income |
| **194** | Zimbabwe | ZWE | 35.715 | 18.5 | Low income |

In [16]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 195 entries, 0 to 194
Data columns (total 5 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   CountryName    195 non-null    object 
 1   CountryCode    195 non-null    object 
 2   BirthRate      195 non-null    float64
 3   InternetUsers  195 non-null    float64
 4   IncomeGroup    195 non-null    object 
dtypes: float64(2), object(3)
memory usage: 7.7+ KB
```

In [17]:
```
df[:]
```

Out[17]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup |
|---|---|---|---|---|---|
| **0** | Aruba | ABW | 10.244 | 78.9 | High income |
| **1** | Afghanistan | AFG | 35.253 | 5.9 | Low income |
| **2** | Angola | AGO | 45.985 | 19.1 | Upper middle income |
| **3** | Albania | ALB | 12.877 | 57.2 | Upper middle income |
| **4** | United Arab Emirates | ARE | 11.044 | 88.0 | High income |
| **...** | ... | ... | ... | ... | ... |
| **190** | Yemen, Rep. | YEM | 32.947 | 20.0 | Lower middle income |
| **191** | South Africa | ZAF | 20.850 | 46.5 | Upper middle income |
| **192** | Congo, Dem. Rep. | COD | 42.394 | 2.2 | Low income |
| **193** | Zambia | ZMB | 40.471 | 15.4 | Lower middle income |
| **194** | Zimbabwe | ZWE | 35.715 | 18.5 | Low income |

195 rows × 5 columns

In [18]:
```
df[1:]
```

Out[18]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup |
|---|---|---|---|---|---|
| **1** | Afghanistan | AFG | 35.253 | 5.9 | Low income |
| **2** | Angola | AGO | 45.985 | 19.1 | Upper middle income |
| **3** | Albania | ALB | 12.877 | 57.2 | Upper middle income |
| **4** | United Arab Emirates | ARE | 11.044 | 88.0 | High income |
| **5** | Argentina | ARG | 17.716 | 59.9 | High income |
| **...** | ... | ... | ... | ... | ... |
| **190** | Yemen, Rep. | YEM | 32.947 | 20.0 | Lower middle income |
| **191** | South Africa | ZAF | 20.850 | 46.5 | Upper middle income |
| **192** | Congo, Dem. Rep. | COD | 42.394 | 2.2 | Low income |
| **193** | Zambia | ZMB | 40.471 | 15.4 | Lower middle income |
| **194** | Zimbabwe | ZWE | 35.715 | 18.5 | Low income |

194 rows × 5 columns

In [19]:
```
df[1:11]
```

Out[19]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup |
|---|---|---|---|---|---|
| **1** | Afghanistan | AFG | 35.253 | 5.9000 | Low income |
| **2** | Angola | AGO | 45.985 | 19.1000 | Upper middle income |
| **3** | Albania | ALB | 12.877 | 57.2000 | Upper middle income |
| **4** | United Arab Emirates | ARE | 11.044 | 88.0000 | High income |
| **5** | Argentina | ARG | 17.716 | 59.9000 | High income |
| **6** | Armenia | ARM | 13.308 | 41.9000 | Lower middle income |
| **7** | Antigua and Barbuda | ATG | 16.447 | 63.4000 | High income |
| **8** | Australia | AUS | 13.200 | 83.0000 | High income |
| **9** | Austria | AUT | 9.400 | 80.6188 | High income |
| **10** | Azerbaijan | AZE | 18.300 | 58.7000 | Upper middle income |

In [20]:
```
df[::-1]
```

Out[20]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup |
|---|---|---|---|---|---|
| **194** | Zimbabwe | ZWE | 35.715 | 18.5 | Low income |
| **193** | Zambia | ZMB | 40.471 | 15.4 | Lower middle income |
| **192** | Congo, Dem. Rep. | COD | 42.394 | 2.2 | Low income |
| **191** | South Africa | ZAF | 20.850 | 46.5 | Upper middle income |
| **190** | Yemen, Rep. | YEM | 32.947 | 20.0 | Lower middle income |
| **...** | ... | ... | ... | ... | ... |
| **4** | United Arab Emirates | ARE | 11.044 | 88.0 | High income |
| **3** | Albania | ALB | 12.877 | 57.2 | Upper middle income |
| **2** | Angola | AGO | 45.985 | 19.1 | Upper middle income |
| **1** | Afghanistan | AFG | 35.253 | 5.9 | Low income |
| **0** | Aruba | ABW | 10.244 | 78.9 | High income |

195 rows × 5 columns

In [21]:
```
df[1:100:10]
```

Out[21]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup |
|---|---|---|---|---|---|
| **1** | Afghanistan | AFG | 35.253 | 5.9000 | Low income |
| **11** | Burundi | BDI | 44.151 | 1.3000 | Low income |
| **21** | Belize | BLZ | 23.092 | 33.6000 | Upper middle income |
| **31** | Switzerland | CHE | 10.200 | 86.3400 | High income |
| **41** | Cuba | CUB | 10.400 | 27.9300 | Upper middle income |
| **51** | Egypt, Arab Rep. | EGY | 28.032 | 29.4000 | Lower middle income |
| **61** | United Kingdom | GBR | 12.200 | 89.8441 | High income |
| **71** | Guatemala | GTM | 27.465 | 19.7000 | Lower middle income |
| **81** | Ireland | IRL | 15.000 | 78.2477 | High income |
| **91** | Kenya | KEN | 35.194 | 39.0000 | Lower middle income |

In [22]:
```
df.describe()
```

Out[22]:

| | BirthRate | InternetUsers |
|---|---|---|
| **count** | 195.000000 | 195.000000 |
| **mean** | 21.469928 | 42.076471 |
| **std** | 10.605467 | 29.030788 |
| **min** | 7.900000 | 0.900000 |
| **25%** | 12.120500 | 14.520000 |
| **50%** | 19.680000 | 41.000000 |
| **75%** | 29.759500 | 66.225000 |
| **max** | 49.661000 | 96.546800 |

In [23]:
```
df.head(2)
```

Out[23]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup |
|---|---|---|---|---|---|
| **0** | Aruba | ABW | 10.244 | 78.9 | High income |
| **1** | Afghanistan | AFG | 35.253 | 5.9 | Low income |

In [24]:
```
df.describe()   #Descriptive statistics
```

Out[24]:

| | BirthRate | InternetUsers |
|---|---|---|
| **count** | 195.000000 | 195.000000 |
| **mean** | 21.469928 | 42.076471 |
| **std** | 10.605467 | 29.030788 |
| **min** | 7.900000 | 0.900000 |
| **25%** | 12.120500 | 14.520000 |
| **50%** | 19.680000 | 41.000000 |
| **75%** | 29.759500 | 66.225000 |
| **max** | 49.661000 | 96.546800 |

In [25]:
```
df.head(1)
```

Out[25]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup |
|---|---|---|---|---|---|
| **0** | Aruba | ABW | 10.244 | 78.9 | High income |

In [26]:
```
df['CountryName']
```

Out[26]:
```
0                    Aruba
1              Afghanistan
2                   Angola
3                  Albania
4      United Arab Emirates
               ...
190            Yemen, Rep.
191           South Africa
192       Congo, Dem. Rep.
193                 Zambia
194               Zimbabwe
Name: CountryName, Length: 195, dtype: object
```

In [27]:
```
df['CountryCode']
```

Out[27]:
```
0      ABW
1      AFG
2      AGO
3      ALB
4      ARE
      ...
190    YEM
191    ZAF
192    COD
193    ZMB
194    ZWE
Name: CountryCode, Length: 195, dtype: object
```

In [28]:
```
df[['CountryName','CountryCode','IncomeGroup']]
```

Out[28]:

| | CountryName | CountryCode | IncomeGroup |
|---|---|---|---|
| 0 | Aruba | ABW | High income |
| 1 | Afghanistan | AFG | Low income |
| 2 | Angola | AGO | Upper middle income |
| 3 | Albania | ALB | Upper middle income |
| 4 | United Arab Emirates | ARE | High income |
| ... | ... | ... | ... |
| 190 | Yemen, Rep. | YEM | Lower middle income |
| 191 | South Africa | ZAF | Upper middle income |
| 192 | Congo, Dem. Rep. | COD | Low income |
| 193 | Zambia | ZMB | Lower middle income |
| 194 | Zimbabwe | ZWE | Low income |

195 rows × 3 columns

In [29]:
```
df_cat = df[['CountryName','CountryCode','IncomeGroup']]
df_cat
```

Out[29]:

| | CountryName | CountryCode | IncomeGroup |
|---|---|---|---|
| 0 | Aruba | ABW | High income |
| 1 | Afghanistan | AFG | Low income |
| 2 | Angola | AGO | Upper middle income |
| 3 | Albania | ALB | Upper middle income |
| 4 | United Arab Emirates | ARE | High income |
| ... | ... | ... | ... |
| 190 | Yemen, Rep. | YEM | Lower middle income |
| 191 | South Africa | ZAF | Upper middle income |
| 192 | Congo, Dem. Rep. | COD | Low income |
| 193 | Zambia | ZMB | Lower middle income |
| 194 | Zimbabwe | ZWE | Low income |

195 rows × 3 columns

In [30]:
```
print(len(df.columns))
print(len(df_cat.columns))
```

```
5
3
```

In [31]:
```
print((df.columns))
```

```
Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
       'IncomeGroup'],
      dtype='object')
```

In [32]:
```
print((df_cat.columns))
```

```
Index(['CountryName', 'CountryCode', 'IncomeGroup'], dtype='object')
```

In [33]:
```
df_cat.describe()
```

Out[33]:

| | CountryName | CountryCode | IncomeGroup |
|---|---|---|---|
| **count** | 195 | 195 | 195 |
| **unique** | 195 | 195 | 4 |
| **top** | Aruba | ABW | High income |
| **freq** | 1 | 1 | 67 |

In [34]:
```
df_num = df[['BirthRate', 'InternetUsers']]
df_num
```

Out[34]:

| | BirthRate | InternetUsers |
|---|---|---|
| **0** | 10.244 | 78.9 |
| **1** | 35.253 | 5.9 |
| **2** | 45.985 | 19.1 |
| **3** | 12.877 | 57.2 |
| **4** | 11.044 | 88.0 |
| **...** | ... | ... |
| **190** | 32.947 | 20.0 |
| **191** | 20.850 | 46.5 |
| **192** | 42.394 | 2.2 |
| **193** | 40.471 | 15.4 |
| **194** | 35.715 | 18.5 |

195 rows × 2 columns

In [35]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 195 entries, 0 to 194
Data columns (total 5 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   CountryName    195 non-null    object 
 1   CountryCode    195 non-null    object 
 2   BirthRate      195 non-null    float64
 3   InternetUsers  195 non-null    float64
 4   IncomeGroup    195 non-null    object 
dtypes: float64(2), object(3)
memory usage: 7.7+ KB
```

In [36]:
```
df_cat.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 195 entries, 0 to 194
Data columns (total 3 columns):
 #   Column       Non-Null Count  Dtype 
---  ------       --------------  ----- 
 0   CountryName  195 non-null    object
 1   CountryCode  195 non-null    object
 2   IncomeGroup  195 non-null    object
dtypes: object(3)
memory usage: 4.7+ KB
```

In [37]:
```
df_num.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 195 entries, 0 to 194
Data columns (total 2 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   BirthRate      195 non-null    float64
 1   InternetUsers  195 non-null    float64
dtypes: float64(2)
memory usage: 3.2 KB
```

In [38]:
```
df.describe()
```

Out[38]:

| | BirthRate | InternetUsers |
|---|---|---|
| **count** | 195.000000 | 195.000000 |
| **mean** | 21.469928 | 42.076471 |
| **std** | 10.605467 | 29.030788 |
| **min** | 7.900000 | 0.900000 |
| **25%** | 12.120500 | 14.520000 |
| **50%** | 19.680000 | 41.000000 |
| **75%** | 29.759500 | 66.225000 |
| **max** | 49.661000 | 96.546800 |

In [39]:
```
df.describe().transpose()
```

Out[39]:

| | count | mean | std | min | 25% | 50% | 75% | max |
|---|---|---|---|---|---|---|---|---|
| **BirthRate** | 195.0 | 21.469928 | 10.605467 | 7.9 | 12.1205 | 19.68 | 29.7595 | 49.6610 |
| **InternetUsers** | 195.0 | 42.076471 | 29.030788 | 0.9 | 14.5200 | 41.00 | 66.2250 | 96.5468 |

In [40]:
```
df.describe().T
```

Out[40]:

| | count | mean | std | min | 25% | 50% | 75% | max |
|---|---|---|---|---|---|---|---|---|
| **BirthRate** | 195.0 | 21.469928 | 10.605467 | 7.9 | 12.1205 | 19.68 | 29.7595 | 49.6610 |
| **InternetUsers** | 195.0 | 42.076471 | 29.030788 | 0.9 | 14.5200 | 41.00 | 66.2250 | 96.5468 |

In [41]:
```
df.columns
```

Out[41]:
```
Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
       'IncomeGroup'],
      dtype='object')
```

In [42]:
```
df.columns = ['a','b','c','d','e']
```

In [43]:
```
df.columns
```

Out[43]:
```
Index(['a', 'b', 'c', 'd', 'e'], dtype='object')
```

In [44]:
```
df.head()
```

Out[44]:

| | a | b | c | d | e |
|---|---|---|---|---|---|
| **0** | Aruba | ABW | 10.244 | 78.9 | High income |
| **1** | Afghanistan | AFG | 35.253 | 5.9 | Low income |
| **2** | Angola | AGO | 45.985 | 19.1 | Upper middle income |
| **3** | Albania | ALB | 12.877 | 57.2 | Upper middle income |
| **4** | United Arab Emirates | ARE | 11.044 | 88.0 | High income |

In [45]:
```
df.head(1)
```

Out[45]:

| | a | b | c | d | e |
|---|---|---|---|---|---|
| **0** | Aruba | ABW | 10.244 | 78.9 | High income |

In [46]:
```
df.columns=['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
       'IncomeGroup']
```

In [47]:
```
df.head()
```

Out[47]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup |
|---|---|---|---|---|---|
| **0** | Aruba | ABW | 10.244 | 78.9 | High income |
| **1** | Afghanistan | AFG | 35.253 | 5.9 | Low income |
| **2** | Angola | AGO | 45.985 | 19.1 | Upper middle income |
| **3** | Albania | ALB | 12.877 | 57.2 | Upper middle income |
| **4** | United Arab Emirates | ARE | 11.044 | 88.0 | High income |

In [48]:
```
df[['CountryName', 'BirthRate', 'InternetUsers']][4:8] #subet
```

Out[48]:

| | CountryName | BirthRate | InternetUsers |
|---|---|---|---|
| **4** | United Arab Emirates | 11.044 | 88.0 |
| **5** | Argentina | 17.716 | 59.9 |
| **6** | Armenia | 13.308 | 41.9 |
| **7** | Antigua and Barbuda | 16.447 | 63.4 |

In [49]:
```
df[4:8][['CountryCode','BirthRate','InternetUsers']]
```

Out[49]:

| | CountryCode | BirthRate | InternetUsers |
|---|---|---|---|
| **4** | ARE | 11.044 | 88.0 |
| **5** | ARG | 17.716 | 59.9 |
| **6** | ARM | 13.308 | 41.9 |
| **7** | ATG | 16.447 | 63.4 |

In [50]:
```
df.columns
```

Out[50]:
```
Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
       'IncomeGroup'],
      dtype='object')
```

In [51]:
```
df.BirthRate * df.InternetUsers
```

Out[51]:
```
0      808.2516
1      207.9927
2      878.3135
3      736.5644
4      971.8720
         ...
190    658.9400
191    969.5250
192     93.2668
193    623.2534
194    660.7275
Length: 195, dtype: float64
```

In [52]:
```
df.head(2)
```

Out[52]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup |
|---|---|---|---|---|---|
| **0** | Aruba | ABW | 10.244 | 78.9 | High income |
| **1** | Afghanistan | AFG | 35.253 | 5.9 | Low income |

In [53]:
```
df['newcolumn'] = df.BirthRate * df.InternetUsers
```

In [54]:
```
df.head(5)
```

Out[54]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup | newcolumn |
|---|---|---|---|---|---|---|
| **0** | Aruba | ABW | 10.244 | 78.9 | High income | 808.2516 |
| **1** | Afghanistan | AFG | 35.253 | 5.9 | Low income | 207.9927 |
| **2** | Angola | AGO | 45.985 | 19.1 | Upper middle income | 878.3135 |
| **3** | Albania | ALB | 12.877 | 57.2 | Upper middle income | 736.5644 |
| **4** | United Arab Emirates | ARE | 11.044 | 88.0 | High income | 971.8720 |

In [55]:
```
len(df.columns)
```

Out[55]:
```
6
```

In [56]:
```
df = df.drop('newcolumn',axis = 1)
```

In [57]:
```
df.head(1)
```

Out[57]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup |
|---|---|---|---|---|---|
| **0** | Aruba | ABW | 10.244 | 78.9 | High income |

In [58]:
```
df
```

Out[58]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup |
|---|---|---|---|---|---|
| **0** | Aruba | ABW | 10.244 | 78.9 | High income |
| **1** | Afghanistan | AFG | 35.253 | 5.9 | Low income |
| **2** | Angola | AGO | 45.985 | 19.1 | Upper middle income |
| **3** | Albania | ALB | 12.877 | 57.2 | Upper middle income |
| **4** | United Arab Emirates | ARE | 11.044 | 88.0 | High income |
| **...** | ... | ... | ... | ... | ... |
| **190** | Yemen, Rep. | YEM | 32.947 | 20.0 | Lower middle income |
| **191** | South Africa | ZAF | 20.850 | 46.5 | Upper middle income |
| **192** | Congo, Dem. Rep. | COD | 42.394 | 2.2 | Low income |
| **193** | Zambia | ZMB | 40.471 | 15.4 | Lower middle income |
| **194** | Zimbabwe | ZWE | 35.715 | 18.5 | Low income |

195 rows × 5 columns

In [59]:
```
df.InternetUsers<2
```

Out[59]:
```
0      False
1      False
2      False
3      False
4      False
       ...
190    False
191    False
192    False
193    False
194    False
Name: InternetUsers, Length: 195, dtype: bool
```

In [60]:
```
df[df.InternetUsers<2]
```

Out[60]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup |
|---|---|---|---|---|---|
| **11** | Burundi | BDI | 44.151 | 1.3 | Low income |
| **52** | Eritrea | ERI | 34.800 | 0.9 | Low income |
| **55** | Ethiopia | ETH | 32.925 | 1.9 | Low income |
| **64** | Guinea | GIN | 37.337 | 1.6 | Low income |
| **117** | Myanmar | MMR | 18.119 | 1.6 | Lower middle income |
| **127** | Niger | NER | 49.661 | 1.7 | Low income |
| **154** | Sierra Leone | SLE | 36.729 | 1.7 | Low income |
| **156** | Somalia | SOM | 43.891 | 1.5 | Low income |
| **172** | Timor-Leste | TLS | 35.755 | 1.1 | Lower middle income |

In [61]:
```
len(df[df.InternetUsers<2])
```

Out[61]:
```
9
```

In [62]:
```
df.BirthRate>40
```

Out[62]:
```
0      False
1      False
2       True
3      False
4      False
       ...
190    False
191    False
192     True
193     True
194    False
Name: BirthRate, Length: 195, dtype: bool
```

In [63]:
```
df[df.BirthRate>40]
```

Out[63]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup |
|---|---|---|---|---|---|
| **2** | Angola | AGO | 45.985 | 19.1 | Upper middle income |
| **11** | Burundi | BDI | 44.151 | 1.3 | Low income |
| **14** | Burkina Faso | BFA | 40.551 | 9.1 | Low income |
| **65** | Gambia, The | GMB | 42.525 | 14.0 | Low income |
| **115** | Mali | MLI | 44.138 | 3.5 | Low income |
| **127** | Niger | NER | 49.661 | 1.7 | Low income |
| **128** | Nigeria | NGA | 40.045 | 38.0 | Lower middle income |
| **156** | Somalia | SOM | 43.891 | 1.5 | Low income |
| **167** | Chad | TCD | 45.745 | 2.3 | Low income |
| **178** | Uganda | UGA | 43.474 | 16.2 | Low income |
| **192** | Congo, Dem. Rep. | COD | 42.394 | 2.2 | Low income |
| **193** | Zambia | ZMB | 40.471 | 15.4 | Lower middle income |

In [64]:
```
Filter = df.InternetUsers < 2
```

In [65]:
```
Filter2 = df.BirthRate > 40
```

In [66]:
```
df[Filter & Filter2]
```

Out[66]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup |
|---|---|---|---|---|---|
| **11** | Burundi | BDI | 44.151 | 1.3 | Low income |
| **127** | Niger | NER | 49.661 | 1.7 | Low income |
| **156** | Somalia | SOM | 43.891 | 1.5 | Low income |

In [67]:
```
df[df.IncomeGroup == 'High income']
```

Out[67]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup |
|---|---|---|---|---|---|
| **0** | Aruba | ABW | 10.244 | 78.90 | High income |
| **4** | United Arab Emirates | ARE | 11.044 | 88.00 | High income |
| **5** | Argentina | ARG | 17.716 | 59.90 | High income |
| **7** | Antigua and Barbuda | ATG | 16.447 | 63.40 | High income |
| **8** | Australia | AUS | 13.200 | 83.00 | High income |
| **...** | ... | ... | ... | ... | ... |
| **174** | Trinidad and Tobago | TTO | 14.590 | 63.80 | High income |
| **180** | Uruguay | URY | 14.374 | 57.69 | High income |
| **181** | United States | USA | 12.500 | 84.20 | High income |
| **184** | Venezuela, RB | VEN | 19.842 | 54.90 | High income |
| **185** | Virgin Islands (U.S.) | VIR | 10.700 | 45.30 | High income |

67 rows × 5 columns

In [70]:
```
df[df.IncomeGroup == 'Low income']
```

Out[70]:

| | CountryName | CountryCode | BirthRate | InternetUsers | IncomeGroup |
|---|---|---|---|---|---|
| **1** | Afghanistan | AFG | 35.253 | 5.90 | Low income |
| **11** | Burundi | BDI | 44.151 | 1.30 | Low income |
| **13** | Benin | BEN | 36.440 | 4.90 | Low income |
| **14** | Burkina Faso | BFA | 40.551 | 9.10 | Low income |
| **29** | Central African Republic | CAF | 34.076 | 3.50 | Low income |
| **38** | Comoros | COM | 34.326 | 6.50 | Low income |
| **52** | Eritrea | ERI | 34.800 | 0.90 | Low income |
| **55** | Ethiopia | ETH | 32.925 | 1.90 | Low income |
| **64** | Guinea | GIN | 37.337 | 1.60 | Low income |
| **65** | Gambia, The | GMB | 42.525 | 14.00 | Low income |
| **66** | Guinea-Bissau | GNB | 37.503 | 3.10 | Low income |
| **77** | Haiti | HTI | 25.345 | 10.60 | Low income |
| **93** | Cambodia | KHM | 24.462 | 6.80 | Low income |
| **99** | Liberia | LBR | 35.521 | 3.20 | Low income |
| **111** | Madagascar | MDG | 34.686 | 3.00 | Low income |
| **115** | Mali | MLI | 44.138 | 3.50 | Low income |
| **120** | Mozambique | MOZ | 39.705 | 5.40 | Low income |
| **123** | Malawi | MWI | 39.459 | 5.05 | Low income |
| **127** | Niger | NER | 49.661 | 1.70 | Low income |
| **132** | Nepal | NPL | 20.923 | 13.30 | Low income |
| **148** | Rwanda | RWA | 32.689 | 9.00 | Low income |
| **154** | Sierra Leone | SLE | 36.729 | 1.70 | Low income |
| **156** | Somalia | SOM | 43.891 | 1.50 | Low income |
| **158** | South Sudan | SSD | 37.126 | 14.10 | Low income |
| **167** | Chad | TCD | 45.745 | 2.30 | Low income |
| **168** | Togo | TGO | 36.080 | 4.50 | Low income |
| **177** | Tanzania | TZA | 39.518 | 4.40 | Low income |
| **178** | Uganda | UGA | 43.474 | 16.20 | Low income |
| **192** | Congo, Dem. Rep. | COD | 42.394 | 2.20 | Low income |
| **194** | Zimbabwe | ZWE | 35.715 | 18.50 | Low income |

In [86]:
```
df.IncomeGroup.unique()
```

Out[86]:
```
array(['High income', 'Low income', 'Upper middle income',
       'Lower middle income'], dtype=object)
```

In [87]:
```
df.IncomeGroup.nunique()
```

Out[87]:
```
4
```

In [90]:
```
import warnings
warnings.filterwarnings('ignore')
```

In [91]:
```
import matplotlib.pyplot as plt  #Visualization
import seaborn as sns  #Statstic Visualization, Advanced Visualization

%matplotlib inline
plt.rcParams['figure.figsize'] = 6,2 #rcparam comes from plt library
```

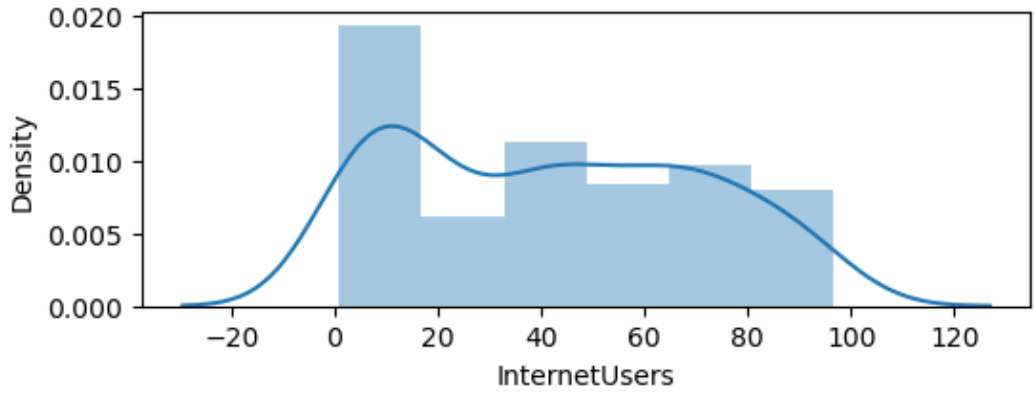
In [92]:
```
df.columns
```

Out[92]:
```
Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
       'IncomeGroup'],
      dtype='object')
```

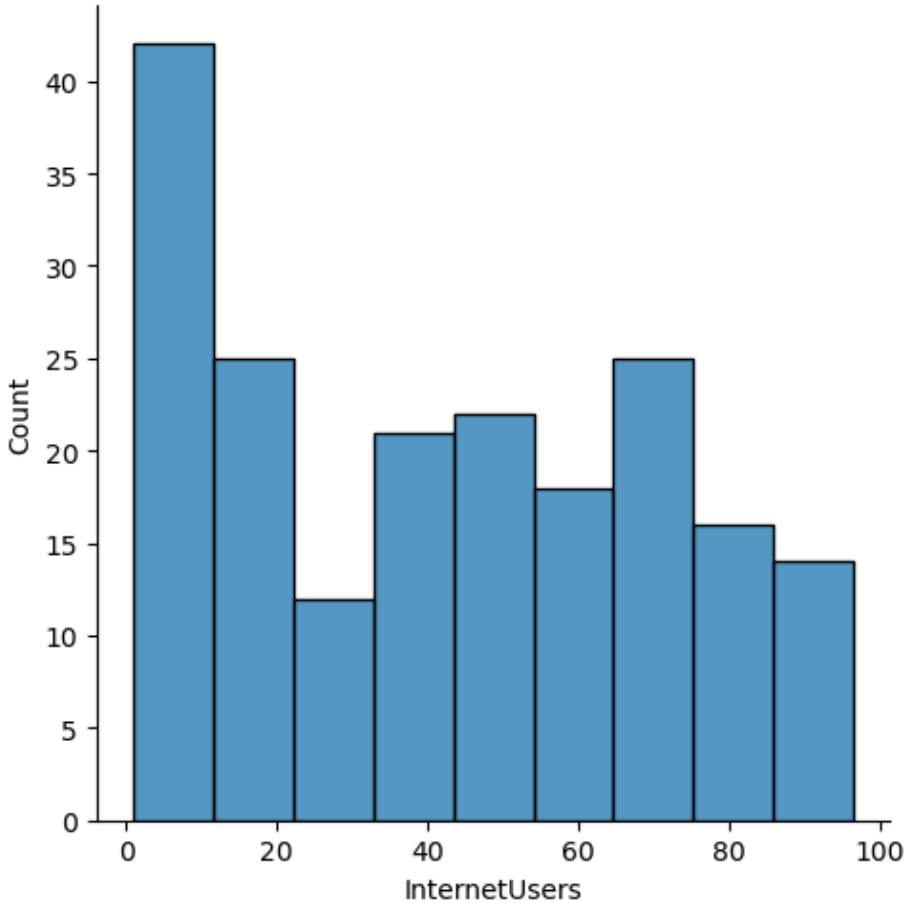
In [93]:
```
df['InternetUsers']
```

Out[93]:
```
0      78.9
1       5.9
2      19.1
3      57.2
4      88.0
       ...
190    20.0
191    46.5
192     2.2
193    15.4
194    18.5
Name: InternetUsers, Length: 195, dtype: float64
```

In [94]:
```
vis1 = sns.distplot(df['InternetUsers'])    # 1 varibale graph means univarient gr
```

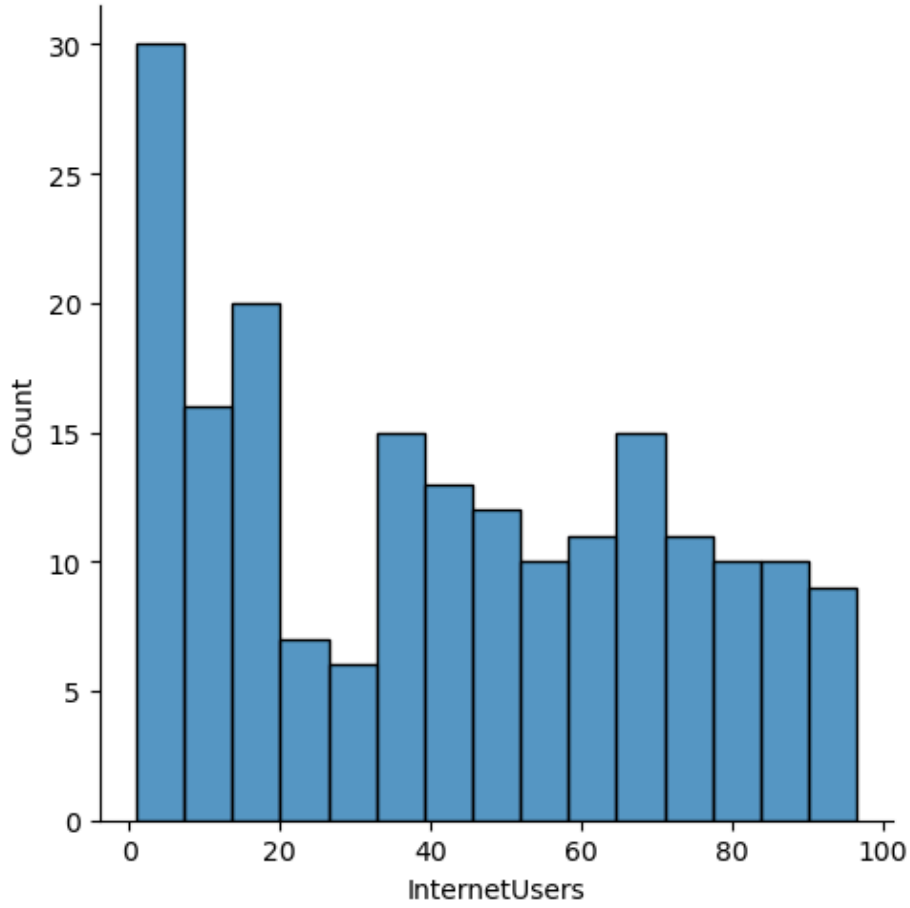


In [95]:
```
vis1 = sns.displot(df['InternetUsers'])
plt.show(vis1),
```

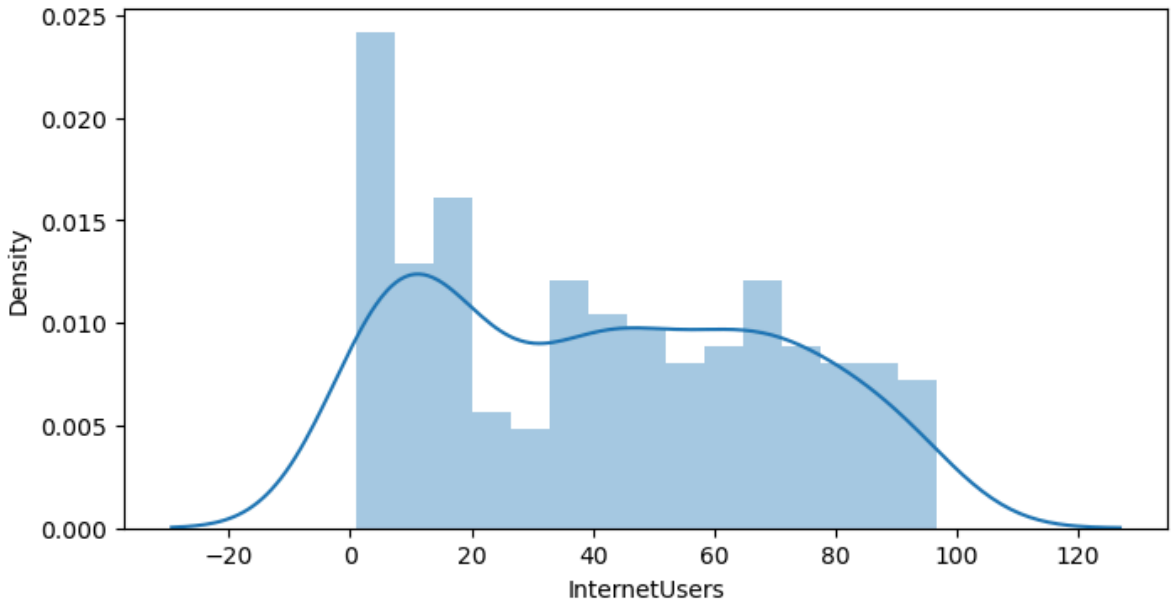



Out[95]: (None,)

In [96]:
```
vis1 = sns.displot(df['InternetUsers'],bins=15)
plt.show(vis1)
```

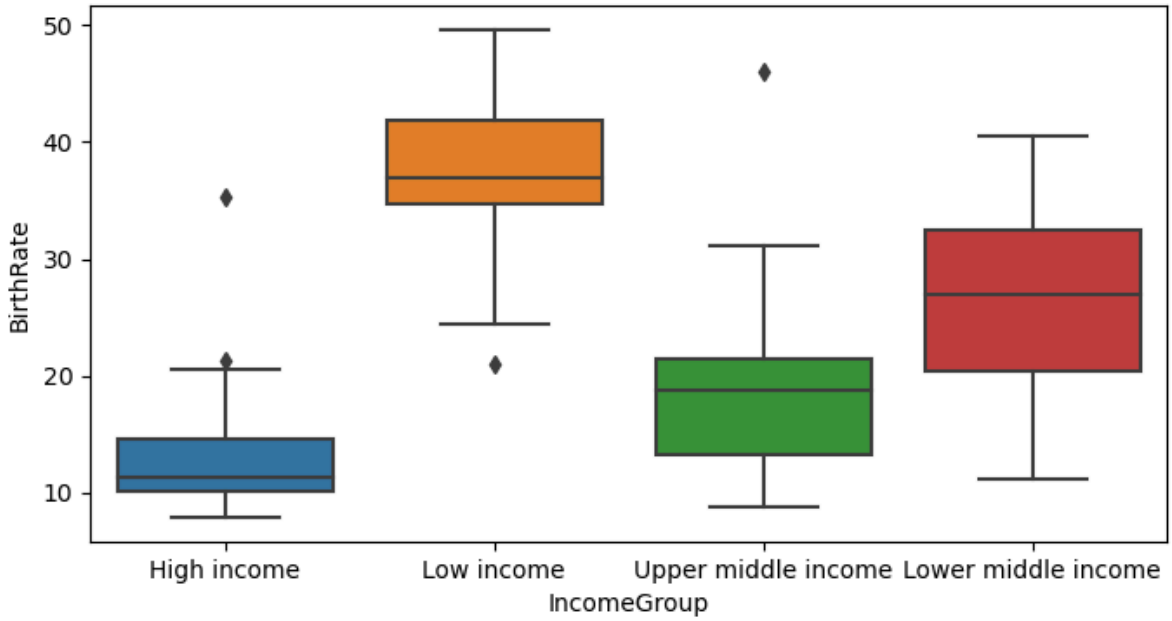



In [115]:
```
vis1 = sns.distplot(df['InternetUsers'],bins=15)
```

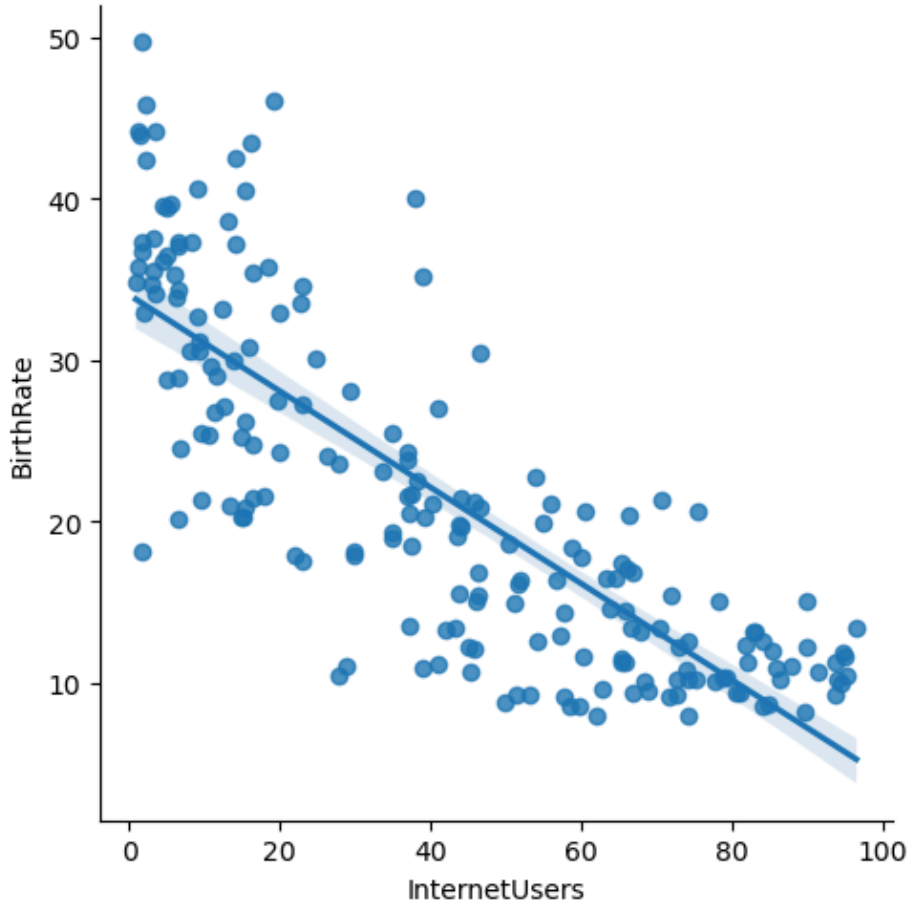



In [116]:
```
plt.rcParams['figure.figsize'] = 8,4
```

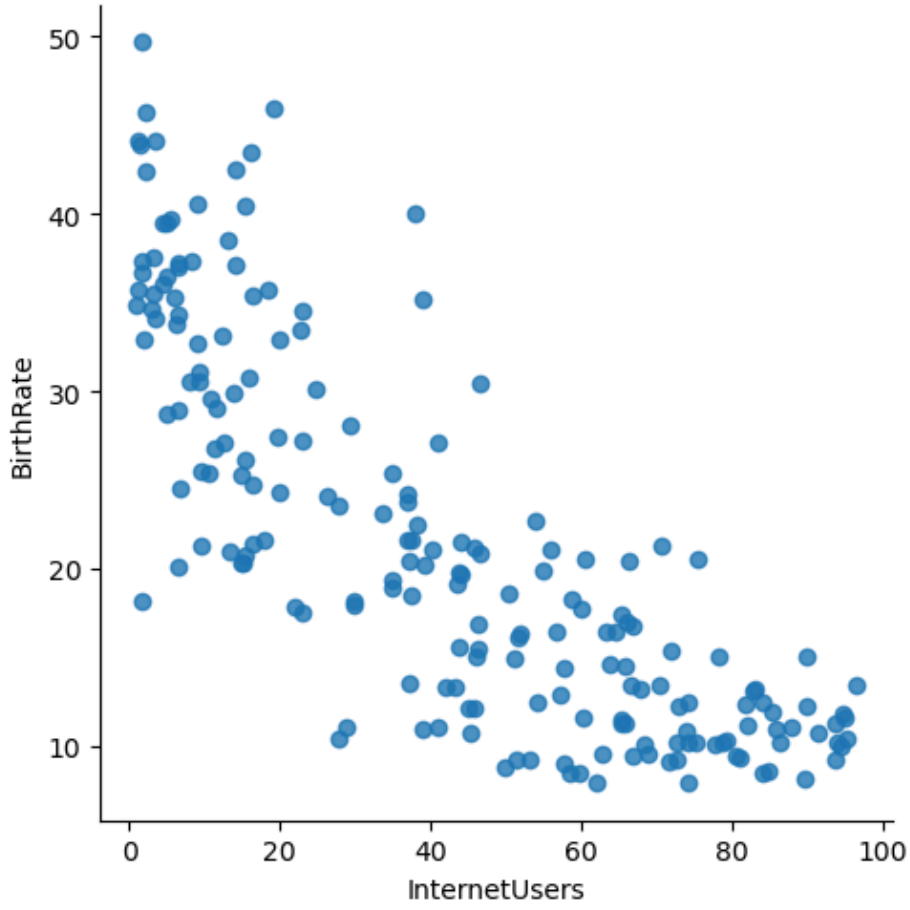
In [117]:
```
vis4 = sns.boxplot(data = df ,x= 'IncomeGroup',y = 'BirthRate') #Bivariate analysi
```



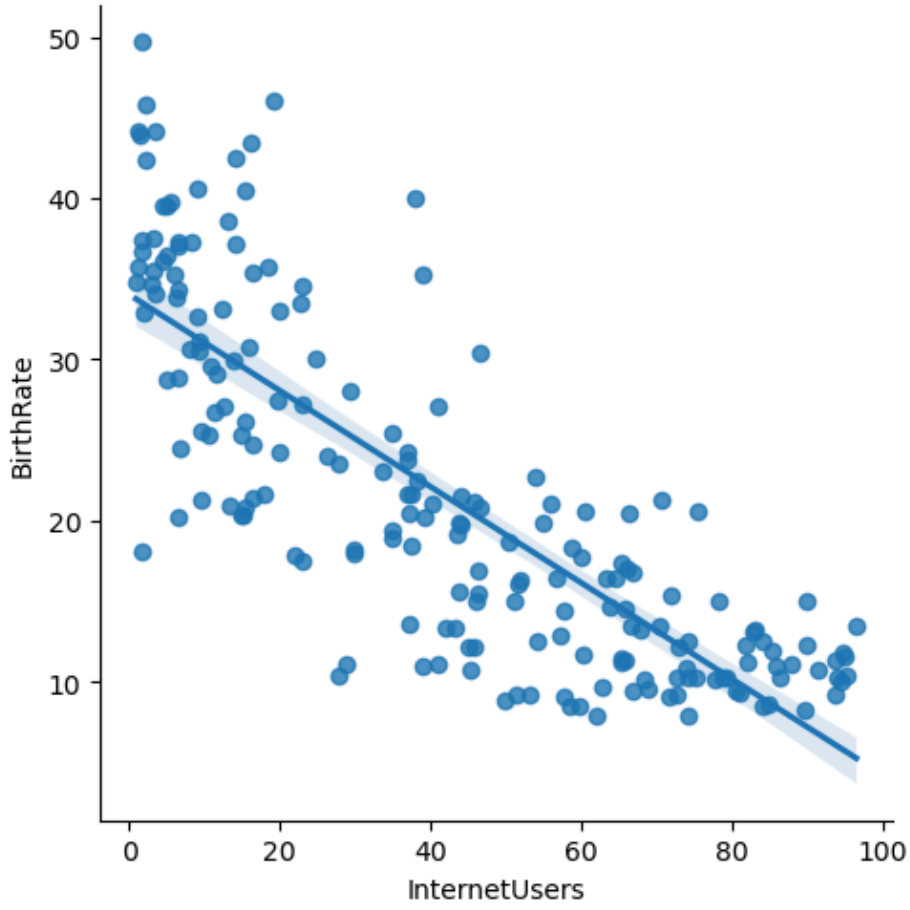

In [118]:
```
vis5 = sns.lmplot(data = df ,x= 'InternetUsers',y = 'BirthRate')
```



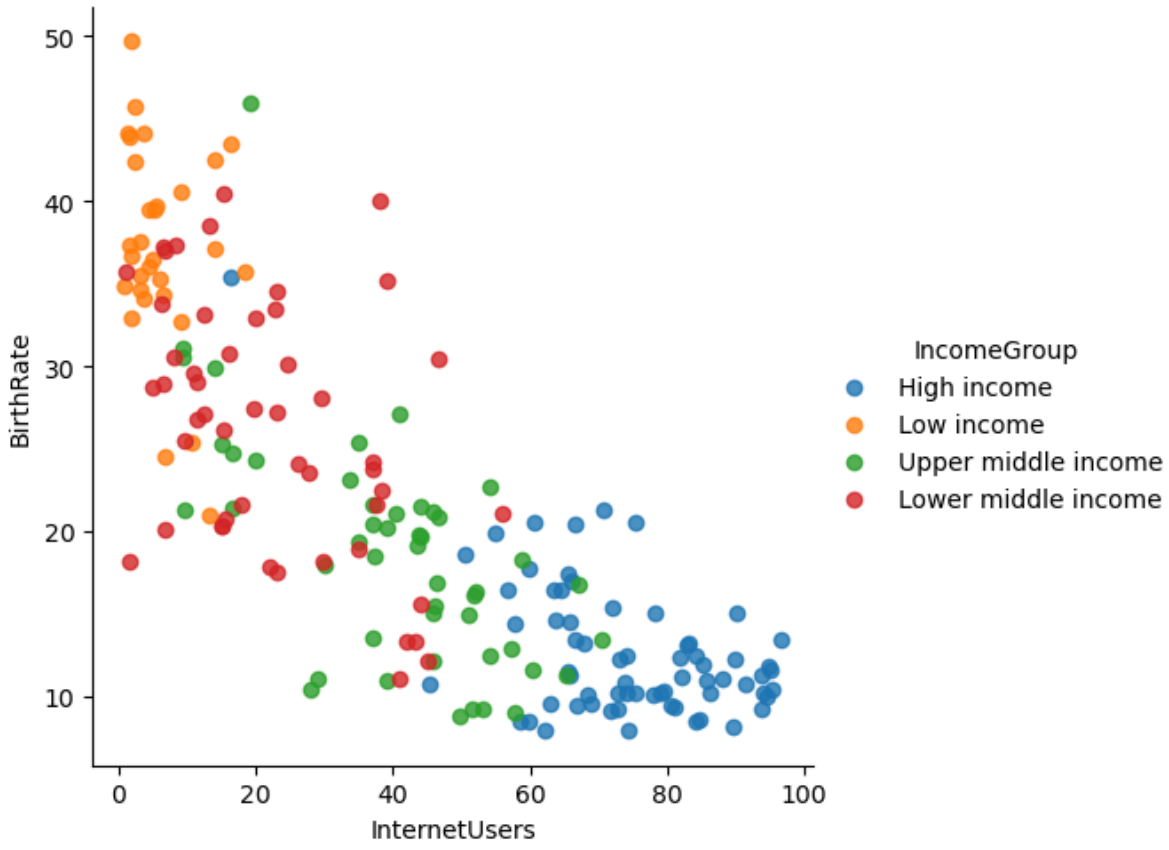
In [119]:
```
vis5 = sns.lmplot(data = df ,x= 'InternetUsers',y = 'BirthRate',fit_reg=False)
```




In [120]:
```
vis5 = sns.lmplot(data = df ,x= 'InternetUsers',y = 'BirthRate',fit_reg=True)
```



In [121]:
```
vis5 = sns.lmplot(data = df ,x= 'InternetUsers',y = 'BirthRate',fit_reg=False,hue
```




In [122]:
```
vis5 = sns.lmplot(data = df ,x= 'InternetUsers',y = 'BirthRate',fit_reg=True,hue =
```