In [1]:
```
# Import necessary libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.linear_model import LinearRegression
from sklearn.ensemble import RandomForestRegressor
from sklearn.metrics import mean_squared_error,r2_score
```

In [2]:
```
# load the dataset
data = pd.read_csv(r"D:\machine learning\unicorns till sep 2022.csv")
print(data.shape)
print(data.columns)
data.head()
```

```
(1186, 7)
Index(['Company', 'Valuation ($B)', 'Date Joined', 'Country', 'City ',
       'Industry', 'Investors'],
      dtype='object')
```

Out[2]:

	Company	Valuation ($B)	Date Joined	Country	City	Industry	Investors
0	ByteDance	$140	4/7/2017	China	Beijing	Artificial intelligence	Sequoia Capital China, SIG Asia Investments, S...
1	SpaceX	$127	12/1/2012	United States	Hawthorne	Other	Founders Fund, Draper Fisher Jurvetson, Rothen...
2	SHEIN	$100	7/3/2018	China	Shenzhen	E-commerce & direct-to-consumer	Tiger Global Management, Sequoia Capital China...
3	Stripe	$95	1/23/2014	United States	San Francisco	Fintech	Khosla Ventures, LowercaseCapital, capitalG
4	Canva	$40	1/8/2018	Australia	Surry Hills	Internet software & services	Sequoia Capital China, Blackbird Ventures, Mat...

In [3]:
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1186 entries, 0 to 1185
Data columns (total 7 columns):
 #   Column          Non-Null Count  Dtype 
---  ------          --------------  ----- 
 0   Company         1186 non-null   object
 1   Valuation ($B)  1186 non-null   object
 2   Date Joined     1186 non-null   object
 3   Country         1186 non-null   object
 4   City            1186 non-null   object
 5   Industry        1186 non-null   object
 6   Investors       1168 non-null   object
dtypes: object(7)
memory usage: 65.0+ KB
```

In [4]:
```
data['Valuation ($B)'] = pd.to_numeric(data['Valuation ($B)'].apply(lambda x:x.replace('$','')))
```

In [5]:
```
# month and year
data['Date Joined'] = pd.to_datetime(data['Date Joined'])
data['Month'] = pd.DatetimeIndex(data['Date Joined']).month
data['Year'] = pd.DatetimeIndex(data['Date Joined']).year
```

In [6]:
```
data[['Investor_1','Investor_2','Investor_3','Investor_4']] = data['Investors'].str.split(',',expand =  True)
data.drop(columns = 'Investors',inplace = True)
data.head()
```

Out[6]:

	Company	Valuation ($B)	Date Joined	Country	City	Industry	Month	Year	Investor_1	Investor_2	Investor_3	Investor_4
0	ByteDance	140.0	2017-04-07	China	Beijing	Artificial intelligence	4	2017	Sequoia Capital China	SIG Asia Investments	Sina Weibo	Softbank Group
1	SpaceX	127.0	2012-12-01	United States	Hawthorne	Other	12	2012	Founders Fund	Draper Fisher Jurvetson	Rothenberg Ventures	None
2	SHEIN	100.0	2018-07-03	China	Shenzhen	E-commerce & direct-to-consumer	7	2018	Tiger Global Management	Sequoia Capital China	Shunwei Capital Partners	None
3	Stripe	95.0	2014-01-23	United States	San Francisco	Fintech	1	2014	Khosla Ventures	LowercaseCapital	capitalG	None
4	Canva	40.0	2018-01-08	Australia	Surry Hills	Internet software & services	1	2018	Sequoia Capital China	Blackbird Ventures	Matrix Partners	None

In [7]:
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1186 entries, 0 to 1185
Data columns (total 12 columns):
 #   Column          Non-Null Count  Dtype
---  ------          --------------  -----
 0   Company         1186 non-null   object
 1   Valuation ($B)  1186 non-null   float64
 2   Date Joined     1186 non-null   datetime64[ns]
 3   Country         1186 non-null   object
 4   City            1186 non-null   object
 5   Industry        1186 non-null   object
 6   Month           1186 non-null   int32
 7   Year            1186 non-null   int32
 8   Investor_1      1168 non-null   object
 9   Investor_2      1118 non-null   object
 10  Investor_3      1027 non-null   object
 11  Investor_4      10 non-null     object
dtypes: datetime64[ns](1), float64(1), int32(2), object(8)
memory usage: 102.1+ KB
```

In [8]:
```
data.isnull().sum()
```

Out[8]:
```
Company             0
Valuation ($B)      0
Date Joined         0
Country             0
City                0
Industry            0
Month               0
Year                0
Investor_1         18
Investor_2         68
Investor_3        159
Investor_4       1176
dtype: int64
```

In [9]:
```
data[data.isnull().T.any()]
```

Out[9]:

	Company	Valuation ($B)	Date Joined	Country	City	Industry	Month	Year	Investor_1	Investor_2	Investor_3	Investor_4
1	SpaceX	127.0	2012-12-01	United States	Hawthorne	Other	12	2012	Founders Fund	Draper Fisher Jurvetson	Rothenberg Ventures	None
2	SHEIN	100.0	2018-07-03	China	Shenzhen	E-commerce & direct-to-consumer	7	2018	Tiger Global Management	Sequoia Capital China	Shunwei Capital Partners	None
3	Stripe	95.0	2014-01-23	United States	San Francisco	Fintech	1	2014	Khosla Ventures	LowercaseCapital	capitalG	None
4	Canva	40.0	2018-01-08	Australia	Surry Hills	Internet software & services	1	2018	Sequoia Capital China	Blackbird Ventures	Matrix Partners	None
5	Checkout.com	40.0	2019-05-02	United Kingdom	London	Fintech	5	2019	Tiger Global Management	Insight Partners	DST Global	None
...	...	...	...	...	...	...	...	...	...	...	...	...
1181	LeadSquared	1.0	2022-06-21	India	Bengaluru	Internet software & services	6	2022	Gaja Capital Partners	Stakeboat Capital	WestBridge Capital	None
1182	FourKites	1.0	2022-06-21	United States	Chicago	Supply chain, logistics, & delivery	6	2022	Hyde Park Venture Partners	Bain Capital Ventures	Hyde Park Angels	None
1183	VulcanForms	1.0	2022-07-05	United States	Burlington	Supply chain, logistics, & delivery	7	2022	Eclipse Ventures	D1 Capital Partners	Industry Ventures	None
1184	SingleStore	1.0	2022-07-12	United States	San Francisco	Data management & analytics	7	2022	Google Ventures	Accel	Data Collective	None
1185	Unstoppable Domains	1.0	2022-07-27	United States	Las Vegas	Internet software & services	7	2022	Boost VC	Draper Associates	Gaingels	None

1176 rows × 12 columns

In [10]:
```
data.nunique()
```

Out[10]:
```
Company          1183
Valuation ($B)    222
Date Joined       695
Country            48
City              286
Industry           34
Month              12
Year               13
Investor_1        589
Investor_2        648
Investor_3        619
Investor_4         10
dtype: int64
```

Data visualization

In [11]:
```
data.groupby('Industry')[['Investor_1','Investor_2','Investor_3','Investor_4']].count()
```

Out[11]:

Industry	Investor_1	Investor_2	Investor_3	Investor_4
500 Global, Rakuten Ventures, Golden Gate Ventures	0	0	0	0
Andreessen Horowitz, DST Global, IDG Capital	0	0	0	0
Artificial Intelligence	11	11	11	0
Artificial intelligence	74	70	66	2
Auto & transportation	40	38	32	1
B Capital Group, Monk's Hill Ventures, Dynamic Parcel Distribution	0	0	0	0
Consumer & retail	28	25	20	0
Cybersecurity	58	58	56	0
Data management & analytics	45	45	42	1
Dragonfly Captial, Qiming Venture Partners, DST Global	0	0	0	0

In [12]:
```
data.loc[data['Industry'] == 'Artificial intelligence','Industry'] = 'Artificial Intelligence'
data.loc[data['Industry'] == 'Finttech','Industry'] = 'Fintech'
```

In [13]:
```
Industry_group = data.groupby('Industry')[['Investor_1','Investor_2','Investor_3','Investor_4']].count()
Industry_group
```

Out[13]:

Industry	Investor_1	Investor_2	Investor_3	Investor_4
500 Global, Rakuten Ventures, Golden Gate Ventures	0	0	0	0
Andreessen Horowitz, DST Global, IDG Capital	0	0	0	0
Artificial Intelligence	85	81	77	2
Auto & transportation	40	38	32	1
B Capital Group, Monk's Hill Ventures, Dynamic Parcel Distribution	0	0	0	0
Consumer & retail	28	25	20	0
Cybersecurity	58	58	56	0
Data management & analytics	45	45	42	1
Dragonfly Captial, Qiming Venture Partners, DST Global	0	0	0	0
E-commerce & direct-to-consumer	103	99	92	0
Edtech	32	31	30	0
Fintech	239	229	215	0
GIC. Apis Partners, Insight Partners	0	0	0	0
Hardware	38	38	34	0
Health	94	90	81	1
Hopu Investment Management, Boyu Capital, DC Thomson Ventures	0	0	0	0
Internet	2	2	2	1
Internet software & services	224	216	200	0
Jungle Ventures, Accel, Venture Highway	0	0	0	0
Kuang-Chi	0	0	0	0
Mobile & telecommunications	36	33	29	2
Mundi Ventures, Doqling Capital Partners, Activant Capital	0	0	0	0
Other	65	55	44	0
Sequoia Capital China, ING, Alibaba Entrepreneurs Fund	0	0	0	0
Sequoia Capital China, Shunwei Capital Partners, Qualgro	0	0	0	0
Sequoia Capital, Thoma Bravo, Softbank	0	0	0	0
SingTel Innov8, Alpha JWC Ventures, Golden Gate Ventures	0	0	0	0
Supply chain, logistics, & delivery	65	64	60	2
Temasek, Guggenheim Investments, Qatar Investment Authority	0	0	0	0
Tiger Global Management, Tiger Brokers, DCM Ventures	0	0	0	0
Travel	14	14	13	0
Vertex Ventures SE Asia, Global Founders Capital, Visa Ventures	0	0	0	0
Vision Plus Capital, GSR Ventures, ZhenFund	0	0	0	0

In [14]:
```
Industry_group['Total_Investors'] = Industry_group[['Investor_1','Investor_2','Investor_3','Investor_4']].sum(axis=
Industry_group.drop(columns=['Investor_1','Investor_2','Investor_3','Investor_4'],inplace = True)
Industry_group1 = Industry_group.sort_values(by = 'Total_Investors',ascending=False)
Industry_group1
```

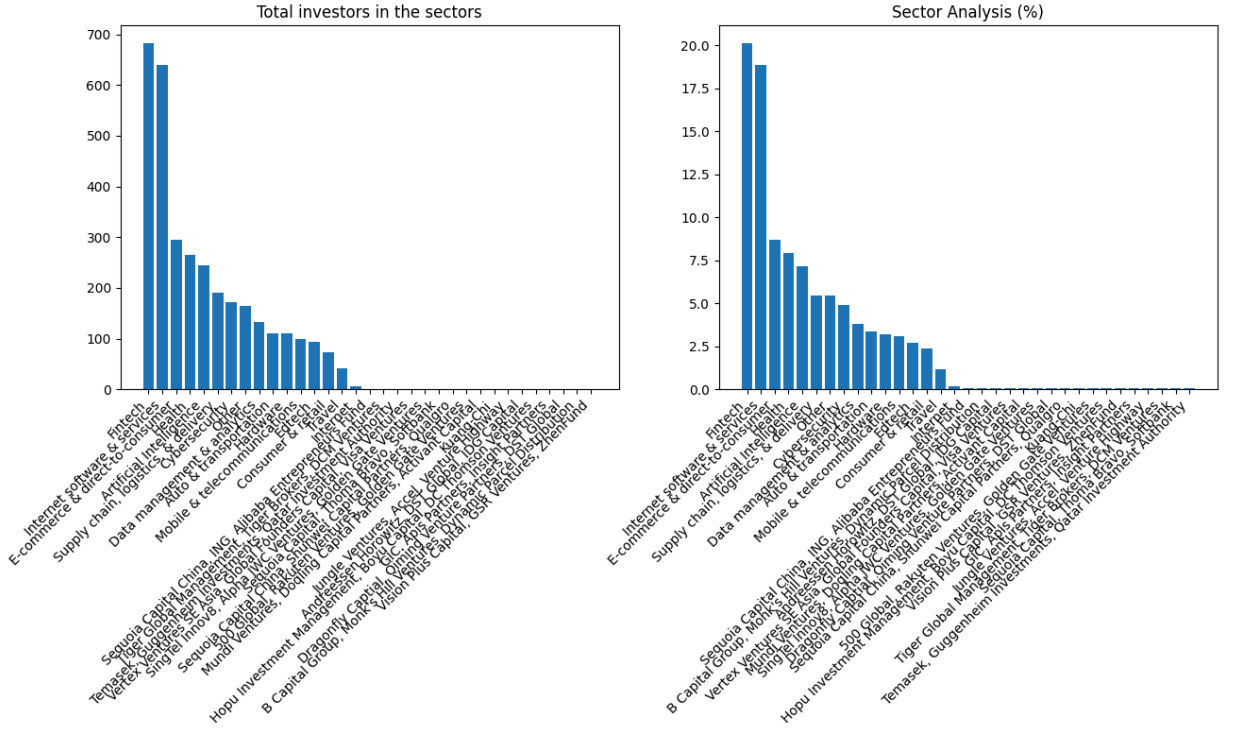
Out[14]:

Industry	Total_Investors
Fintech	683
Internet software & services	640
E-commerce & direct-to-consumer	294
Health	266
Artificial Intelligence	245
Supply chain, logistics, & delivery	191
Cybersecurity	172
Other	164
Data management & analytics	133
Auto & transportation	111
Hardware	110
Mobile & telecommunications	100
Edtech	93
Consumer & retail	73
Travel	41
Internet	7
Sequoia Capital China, ING, Alibaba Entrepreneurs Fund	0
Tiger Global Management, Tiger Brokers, DCM Ventures	0
Temasek, Guggenheim Investments, Qatar Investment Authority	0
Vertex Ventures SE Asia, Global Founders Capital, Visa Ventures	0
SingTel Innov8, Alpha JWC Ventures, Golden Gate Ventures	0
Sequoia Capital, Thoma Bravo, Softbank	0
Sequoia Capital China, Shunwei Capital Partners, Qualgro	0
500 Global, Rakuten Ventures, Golden Gate Ventures	0
Mundi Ventures, Doqling Capital Partners, Activant Capital	0
Kuang-Chi	0
Jungle Ventures, Accel, Venture Highway	0
Andreessen Horowitz, DST Global, IDG Capital	0
Hopu Investment Management, Boyu Capital, DC Thomson Ventures	0
GIC. Apis Partners, Insight Partners	0
Dragonfly Captial, Qiming Venture Partners, DST Global	0
B Capital Group, Monk's Hill Ventures, Dynamic Parcel Distribution	0
Vision Plus Capital, GSR Ventures, ZhenFund	0

In [15]:
```
Industry_group =round(data['Industry'].value_counts(normalize = True)*100,2)
Industry_group
```

Out[15]:
```
Industry
Fintech                                                 20.15
Internet software & services                            18.89
E-commerce & direct-to-consumer                          8.68
Health                                                   7.93
Artificial Intelligence                                  7.17
Supply chain, logistics, & delivery                      5.48
Other                                                    5.48
Cybersecurity                                            4.89
Data management & analytics                              3.79
Auto & transportation                                    3.37
Hardware                                                 3.20
Mobile & telecommunications                              3.12
Edtech                                                   2.70
Consumer & retail                                        2.36
Travel                                                   1.18
Internet                                                 0.17
Sequoia Capital China, ING, Alibaba Entrepreneurs Fund   0.08
B Capital Group, Monk's Hill Ventures, Dynamic Parcel Distribution    0.08
Andreessen Horowitz, DST Global, IDG Capital             0.08
```

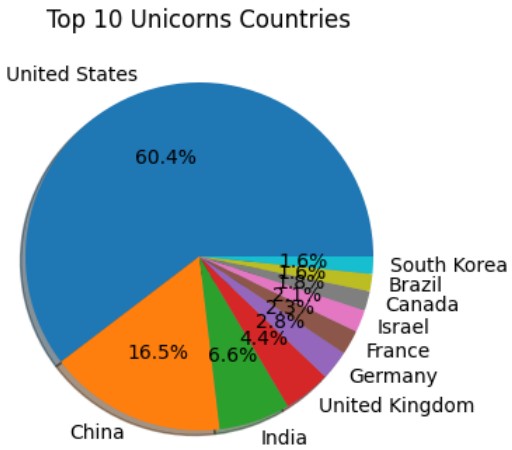
In [16]:
```
plt.figure(figsize = (15,5))

plt.subplot(1,2,1)
plt.title('Total investors in the sectors')

plt.bar(Industry_group1.index,Industry_group1.Total_Investors)
plt.xticks(rotation = 45,ha = 'right')

plt.subplot(1,2,2)
plt.title('Sector Analysis (%)')
plt.bar(Industry_group.index,Industry_group.values)
plt.xticks(rotation = 45, ha = 'right')
plt.show()
```



In [17]:
```
analysis = round(data['Country'].value_counts(normalize = True)*100,2)
analysis = analysis.head(10).copy()
analysis
```

Out[17]:
```
Country
United States     53.63
China             14.67
India              5.90
United Kingdom     3.88
Germany            2.45
France             2.02
Israel             1.85
Canada             1.60
Brazil             1.43
South Korea        1.43
Name: proportion, dtype: float64
```

In [27]:
```
plt.figure(figsize = (4,5))
plt.title('Top 10 Unicorns Countries')
plt.pie(analysis,labels = analysis.index,shadow =True,startangle = 360,autopct = '%1.1f%%')
plt.show()
```



In [19]:
```
Grouping = data.groupby(by = ['Country','Year','Month','Company']).count().reset_index()
Grouping
```

Out[19]:

	Country	Year	Month	Company	Valuation ($B)	Date Joined	City	Industry	Investor_1	Investor_2	Investor_3	Investor_4
0	Argentina	2021	8	Uala	1	1	1	1	1	1	1	0
1	Australia	2018	1	Canva	1	1	1	1	1	1	1	0
2	Australia	2019	3	Airwallex	1	1	1	1	1	1	1	0
3	Australia	2021	5	SafetyCulture	1	1	1	1	1	1	1	0
4	Australia	2021	7	Culture Amp	1	1	1	1	1	1	1	0
...	...	...	...	...	...	...	...	...	...	...	...	...
1181	United States	2022	8	Flow	1	1	1	1	1	0	0	0
1182	United States	2022	8	Incredible Health	1	1	1	1	1	1	1	0
1183	United States	2022	8	Orna Therapeutics	1	1	1	1	1	1	1	0

In [20]:
```
Grouping.loc[Grouping['Country'] == 'Brazil']
```

Out[20]:

	Country	Year	Month	Company	Valuation ($B)	Date Joined	City	Industry	Investor_1	Investor_2	Investor_3	Investor_4
16	Brazil	2018	7	Movile	1	1	1	1	1	1	1	0
17	Brazil	2018	11	iFood	1	1	1	1	1	1	1	0
18	Brazil	2019	6	Loggi	1	1	1	1	1	1	0	0
19	Brazil	2019	9	QuintoAndar	1	1	1	1	1	1	1	0
20	Brazil	2019	10	EBANX	1	1	1	1	1	1	0	0
21	Brazil	2019	12	Wildlife Studios	1	1	1	1	1	1	0	0
22	Brazil	2020	1	Loft	1	1	1	1	1	1	1	0
23	Brazil	2020	12	C6 Bank	1	1	1	1	1	0	0	0
24	Brazil	2020	12	Creditas	1	1	1	1	1	1	1	0
25	Brazil	2021	1	MadeiraMadeira	1	1	1	1	1	1	1	0
26	Brazil	2021	8	Nuvemshop	1	1	1	1	1	1	1	0
27	Brazil	2021	8	Unico	1	1	1	1	1	1	1	0
28	Brazil	2021	9	CloudWalk	1	1	1	1	1	1	1	0
29	Brazil	2021	10	CargoX	1	1	1	1	1	1	1	0
30	Brazil	2021	12	Olist	1	1	1	1	1	1	1	0
31	Brazil	2022	2	Neon	1	1	1	1	1	1	1	0
32	Brazil	2022	5	Dock	1	1	1	1	1	1	1	0

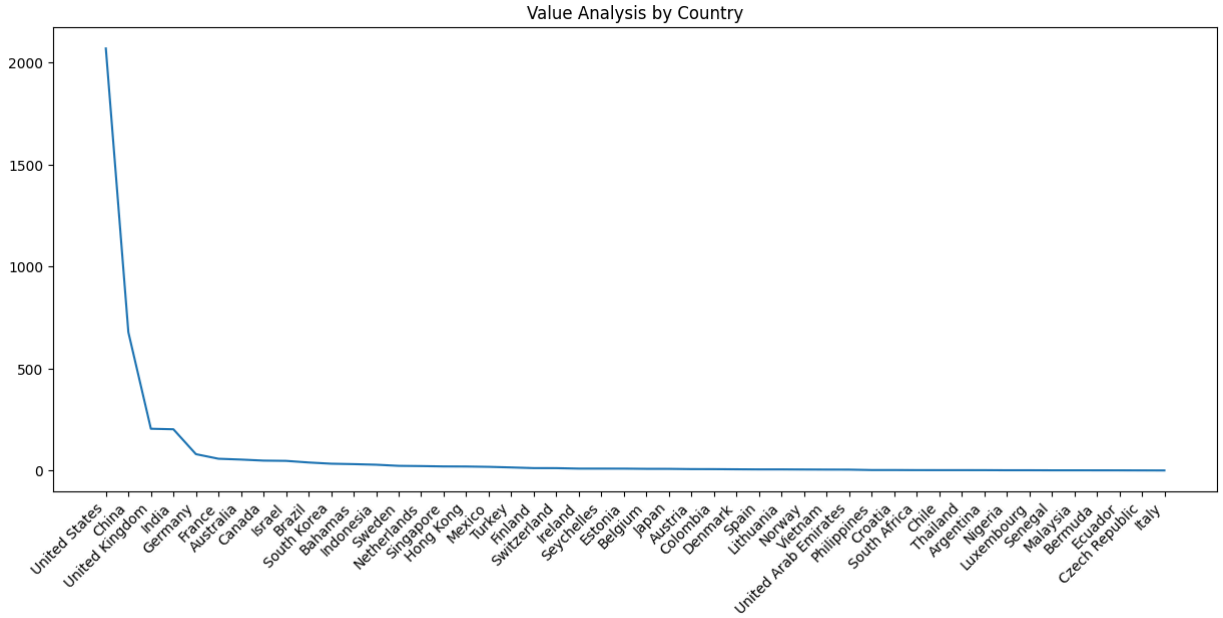
In [21]:
```
Grouping = data.groupby(by = ['Country'])['Valuation ($B)'].sum().reset_index().sort_values('Valuation ($B)',ascend
Grouping
```

Out[21]:

	Country	Valuation ($B)
46	United States	2069.89
9	China	678.59
45	United Kingdom	205.45
20	India	202.92
18	Germany	80.88
17	France	58.42
1	Australia	54.40
7	Canada	49.23
23	Israel	48.02
6	Brazil	40.08
38	South Korea	34.13

Linkcode

In [22]:
```
plt.figure(figsize=(15,6))
plt.title('Value Analysis by Country')
plt.plot(Grouping['Country'], Grouping['Valuation ($B)'])
plt.xticks(rotation = 45, ha= 'right')
plt.show()
```



In [ ]:
```
```