Lets Install the Libraries

In [1]:
```
# install these libraries given below to run the program successfully,
# if already installed ignore.
#pip install numpy
#pip install pandas
#pip seaborn
#pip matplotlib
```

In [2]:
```
# for mathematical operations
import numpy as np

# for dataframe operations
import pandas as pd

# for data visualizations
import matplotlib.pyplot as plt
import seaborn as sns

# lets select  a background style
plt.style.use('fivethirtyeight')
plt.rcParams['figure.figsize'] = (16, 7)

# for interactivity
import ipywidgets as widgets
from ipywidgets import interact
from ipywidgets import interact_manual
```

Reading the data

In [3]:
```
# lets import the data
data = pd.read_csv("startup_funding.csv")

# changing the names of the columns inside the data
data.columns = ["SNo", "Date", "StartupName", "IndustryVertical", "SubVertical",
                        "City", "InvestorsName", "InvestmentType", "AmountInUSD", "Remarks"]

# lets clean the strings
def clean_string(x):
    return str(x).replace("\\xc2\\xa0","").replace("\\\\xc2\\\\xa0", "")

# lets apply the function to clean the data
for col in ["StartupName", "IndustryVertical", "SubVertical", "City",
            "InvestorsName", "InvestmentType", "AmountInUSD", "Remarks"]:
    data[col] = data[col].apply(lambda x: clean_string(x))

# lets check the head of the data
data.head()
```

Out[3]:

	SNo	Date	StartupName	IndustryVertical	SubVertical	City	InvestorsName	InvestmentType	AmountInUSD	Remarks
0	1	09/01/2020	BYJU'S	E-Tech	E-learning	Bengaluru	Tiger Global Management	Private Equity Round	20,00,00,000	nan
1	2	13/01/2020	Shuttl	Transportation	App based shuttle service	Gurgaon	Susquehanna Growth Equity	Series C	80,48,394	nan
2	3	09/01/2020	Mamaearth	E-commerce	Retailer of baby and toddler products	Bengaluru	Sequoia Capital India	Series B	1,83,58,860	nan
3	4	02/01/2020	https://www.wealthbucket.in/	FinTech	Online Investment	New Delhi	Vinod Khatumal	Pre-series A	30,00,000	nan
4	5	02/01/2020	Fashor	Fashion and Apparel	Embroiled Clothes For Women	Mumbai	Sprout Venture Partners	Seed Round	18,00,000	nan

In [4]:
```
# lets check the column names of the data
data.columns
```

Out[4]:
```
Index(['SNo', 'Date', 'StartupName', 'IndustryVertical', 'SubVertical', 'City',
       'InvestorsName', 'InvestmentType', 'AmountInUSD', 'Remarks'],
      dtype='object')
```

In [5]:
```
# lets check the shape of the data
print("Size of data", data.shape)
```

```
Size of data (3044, 10)
```

Data Cleaning

In [6]:
```
# missing data

# lets import warnings module
import warnings
warnings.filterwarnings('ignore')

# lets calculate the total missing values in the data
total = data.isnull().sum().sort_values(ascending = False)

# lets calculate the percentage of missing values in the data
percent = ((data.isnull().sum()/data.isnull().count())*100).sort_values(ascending = False)

# lets store the above two values in a dataset called missing data
missing_data = pd.concat([total, percent], axis=1, keys=['Total', 'Percent %'])

# lets check the head of the data
missing_data
```

Out[6]:

	Total	Percent %
SNo	0	0.0
Date	0	0.0
StartupName	0	0.0
IndustryVertical	0	0.0
SubVertical	0	0.0
City	0	0.0
InvestorsName	0	0.0
InvestmentType	0	0.0
AmountInUSD	0	0.0
Remarks	0	0.0

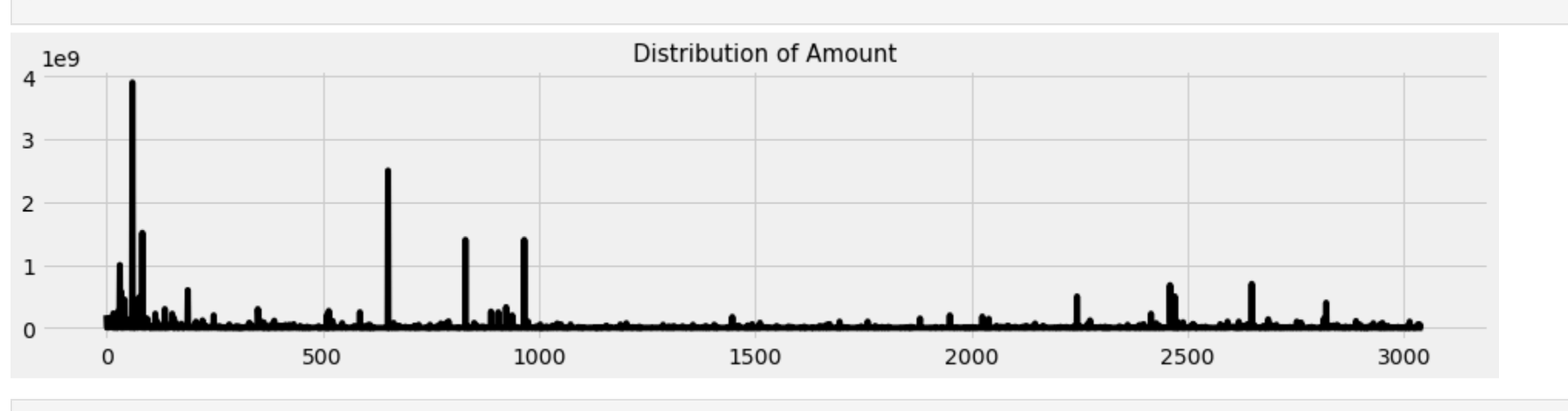
In [7]:
```
# lets check the values in the Remarks column
data['Remarks'].value_counts()
```

Out[7]:
```
nan                                   2625
Series A                               177
Series B                                64
Pre-Series A                            37
Series C                                28
                                      ...
pre Series-A                             1
QPrize Contest Winners                   1
pre series A                             1
pre-series A                             1
Strategic Funding, Minority stake        1
Name: Remarks, Length: 70, dtype: int64
```

In [8]:
```
# lets remove Remarks column, as it contains a lot of nans, and high cardinal column

data = data.drop(['Remarks'], axis = 1)

# lets check the column names after removing the Remarks Column, as it having
data.columns
```

Out[8]:
```
Index(['SNo', 'Date', 'StartupName', 'IndustryVertical', 'SubVertical', 'City',
       'InvestorsName', 'InvestmentType', 'AmountInUSD'],
      dtype='object')
```

In [9]:
```
# lets convert the amount column into numerical, so that we can analyze the values inside it

# function to clean the AmounInUsd Column
def clean_amount(x):
    x = ''.join([c for c in str(x) if c in ['0', '1', '2', '3', '4', '5', '6', '7', '8', '9']])
    x = str(x).replace(",","").replace("+","")
    x = str(x).lower().replace("undisclosed","")
    x = str(x).lower().replace("n/a","")
    if x == '':
        x = '-999'
    return x

# lets apply the function on the column
data["AmountInUSD"] = data["AmountInUSD"].apply(lambda x: float(clean_amount(x)))

# lets check the head of the column after cleaning it
plt.rcParams['figure.figsize'] = (15, 3)
data['AmountInUSD'].plot(kind = 'line', color = 'black')
plt.title('Distribution of Amount', fontsize = 15)
plt.show()
```

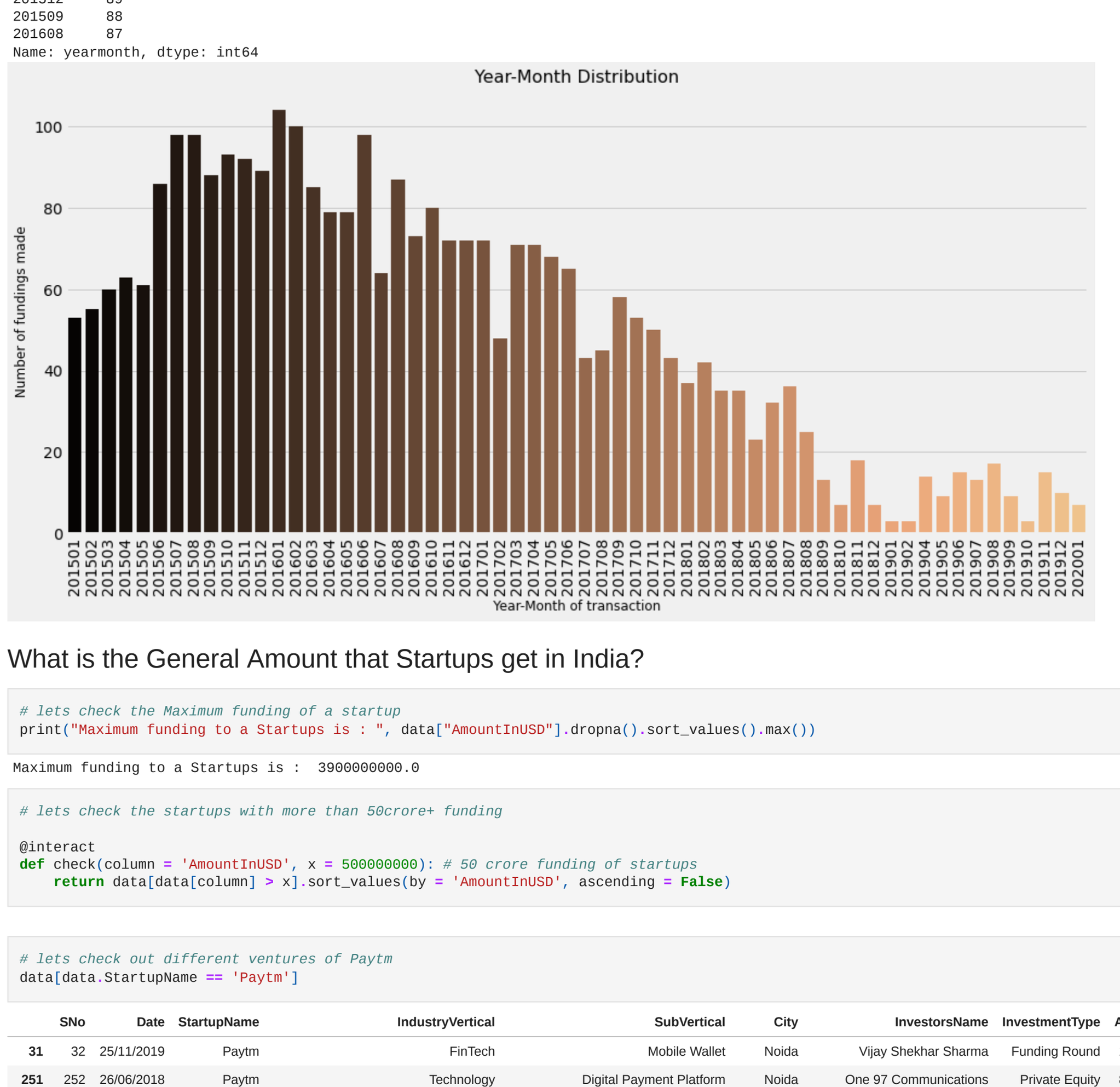


In [10]:
```
## Cleaning the dates

data['Date'][data['Date']=='12/05.2015'] = '12/05/2015'
data['Date'][data['Date']=='13/04.2015'] = '13/04/2015'
data['Date'][data['Date']=='15/01.2015'] = '15/01/2015'
data['Date'][data['Date']=='22/01//2015'] = '22/01/2015'
data['Date'][data['Date']=='05/072018'] = '05/07/2018'
data['Date'][data['Date']=='01/07/015'] = '01/07/2015'
data['Date'][data['Date']=='\\\\xc2\\\\xa010/7/2015'] = '10/07/2015'
```

How Does the Funding Ecosystem changes with respect to Time?

In [11]:
```
# some of the date formats are written wrongly so we have to clean them thoroughly so that we can analyze these values

# converting them into a Datetime object
data["yearmonth"] = (pd.to_datetime(data['Date'],
         format='%d/%m/%Y').dt.year*100)+(pd.to_datetime(data['Date'],format='%d/%m/%Y').dt.month)


temp = data['yearmonth'].value_counts().sort_values(ascending = False).head(10)
print("Number of funding per month in decreasing order(Top 10)\n",temp)
year_month = data['yearmonth'].value_counts()

# lets plot the data
plt.rcParams['figure.figsize'] = (15, 7)
sns.barplot(year_month.index, year_month.values, palette = 'copper')
plt.xticks(rotation = 90)
plt.xlabel('Year-Month of transaction', fontsize=12)
plt.ylabel('Number of fundings made', fontsize=12)
plt.title("Year-Month Distribution", fontsize=16)
plt.show()
```

```
Number of funding per month in decreasing order(Top 10)
 201601    104
201602    100
201507     98
201606     98
201508     98
201510     93
201511     92
201512     89
201509     88
201608     87
Name: yearmonth, dtype: int64
```



What is the General Amount that Startups get in India?

In [12]:
```
# lets check the Maximum funding of a startup
print("Maximum funding to a Startups is : ", data["AmountInUSD"].dropna().sort_values().max())
```

```
Maximum funding to a Startups is :  3900000000.0
```

In [13]:
```
# lets check the startups with more than 50crore+ funding

@interact
def check(column = 'AmountInUSD', x = 500000000): # 50 crore funding of startups
    return data[data[column] > x].sort_values(by = 'AmountInUSD', ascending = False)
```

In [14]:
```
# lets check out different ventures of Paytm
data[data.StartupName == 'Paytm']
```

Out[14]:

	SNo	Date	StartupName	IndustryVertical	SubVertical	City	InvestorsName	InvestmentType	AmountInUSD	yearmonth
31	32	25/11/2019	Paytm	FinTech	Mobile Wallet	Noida	Vijay Shekhar Sharma	Funding Round	1.000000e+09	201911
251	252	26/06/2018	Paytm	Technology	Digital Payment Platform	Noida	One 97 Communications	Private Equity	8.950000e+06	201806
830	831	18/05/2017	Paytm	ECommerce	Mobile Wallet & ECommerce platform	Bangalore	SoftBank Group	Private Equity	1.400000e+09	201705
1493	1494	30/08/2016	Paytm	eCommerce	Mobile Wallet & ECommerce platform	Bangalore	MediaTek Inc.	Private Equity	6.000000e+07	201608
2459	2460	29/09/2015	Paytm	E-Commerce & M-Commerce platform	nan	New Delhi	Alibaba Group, Ant Financial	Private Equity	6.800000e+08	201509
2890	2891	13/03/2015	Paytm	nan	nan	nan	Ratan Tata	Private Equity	-9.990000e+02	201503
2948	2949	05/02/2015	Paytm	nan	nan	nan	Ant Financial Services (Alipay)	Private Equity	-9.990000e+02	201502

In [15]:
```
# lets check out different ventures of Flipkart
data[data.StartupName == 'Flipkart']
```

Out[15]:

	SNo	Date	StartupName	IndustryVertical	SubVertical	City	InvestorsName	InvestmentType	AmountInUSD	yearmonth
651	652	11/08/2017	Flipkart	eCommerce	Online Marketplace	Bangalore	Softbank	Private Equity	2.500000e+09	201708
773	774	26/06/2017	Flipkart	eCommerce	Online marketplace	Bangalore	Naspers	Private Equity	7.100000e+07	201706
966	967	21/03/2017	Flipkart	eCommerce	ECommerce Marketplace	Bangalore	Microsoft, eBay, Tencent Holdings	Private Equity	1.400000e+09	201703
1032	1033	20/02/2017	Flipkart	eCommerce	Online Marketplace	Bangalore	Bennett, Coleman and Co. Ltd (BCCL)	Private Equity	3.870000e+07	201702
2689	2690	04/06/2015	Flipkart	ECommerce platform	nan	Bangalore	Morgan Stanley	Private Equity	5.000000e+07	201506

In [16]:
```
# lets check the minimum funding in a startup
print("Minimum funding to a Startups is : ", data["AmountInUSD"].dropna().sort_values().min())
```

```
Minimum funding to a Startups is :  -999.0
```

In [17]:
```
# lets check the startups with least funding
data[['AmountInUSD','StartupName']].sort_values(by = 'AmountInUSD', ascending = True).head(5)
```

Out[17]:

	AmountInUSD	StartupName
2125	-999.0	Splikart
1464	-999.0	TAC Security
708	-999.0	FableStreet
709	-999.0	Monsoon Fintech
710	-999.0	MonkeyBox

In [18]:
```
data[data['AmountInUSD'] == -999.0].shape
```

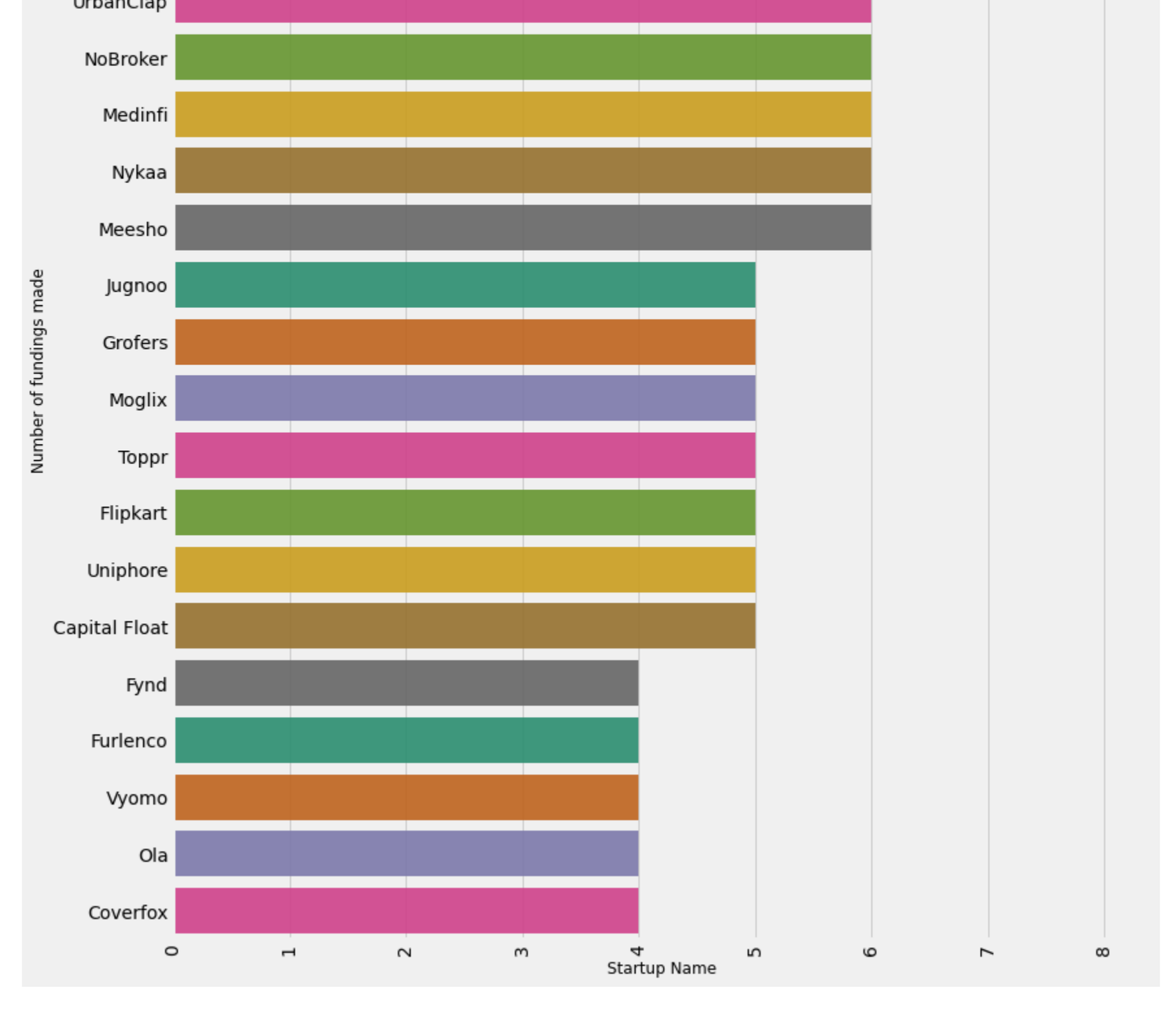
Out[18]:
```
(971, 10)
```

In [19]:
```
# Average Funding
print("On Average indian startups got funding of : ", data["AmountInUSD"].dropna().sort_values().mean())
```

```
On Average indian startups got funding of :  13270058.261169514
```

In [20]:
```
# lets check the no. of funding each startup got

print("Total startups funded : ", len(data["StartupName"].unique()))
print(data["StartupName"].value_counts().head(10))
startupname = data['StartupName'].value_counts().head(20)

# lets plot the data
plt.rcParams['figure.figsize'] = (12, 15)
sns.barplot(y = startupname.index, x = startupname.values, alpha=0.9, palette = 'Dark2')
plt.xticks(rotation='vertical')
plt.xlabel('Startup Name', fontsize=12)
plt.ylabel('Number of fundings made', fontsize=12)
plt.title("Number of fundings Startups Have", fontsize=16)
plt.show()
```

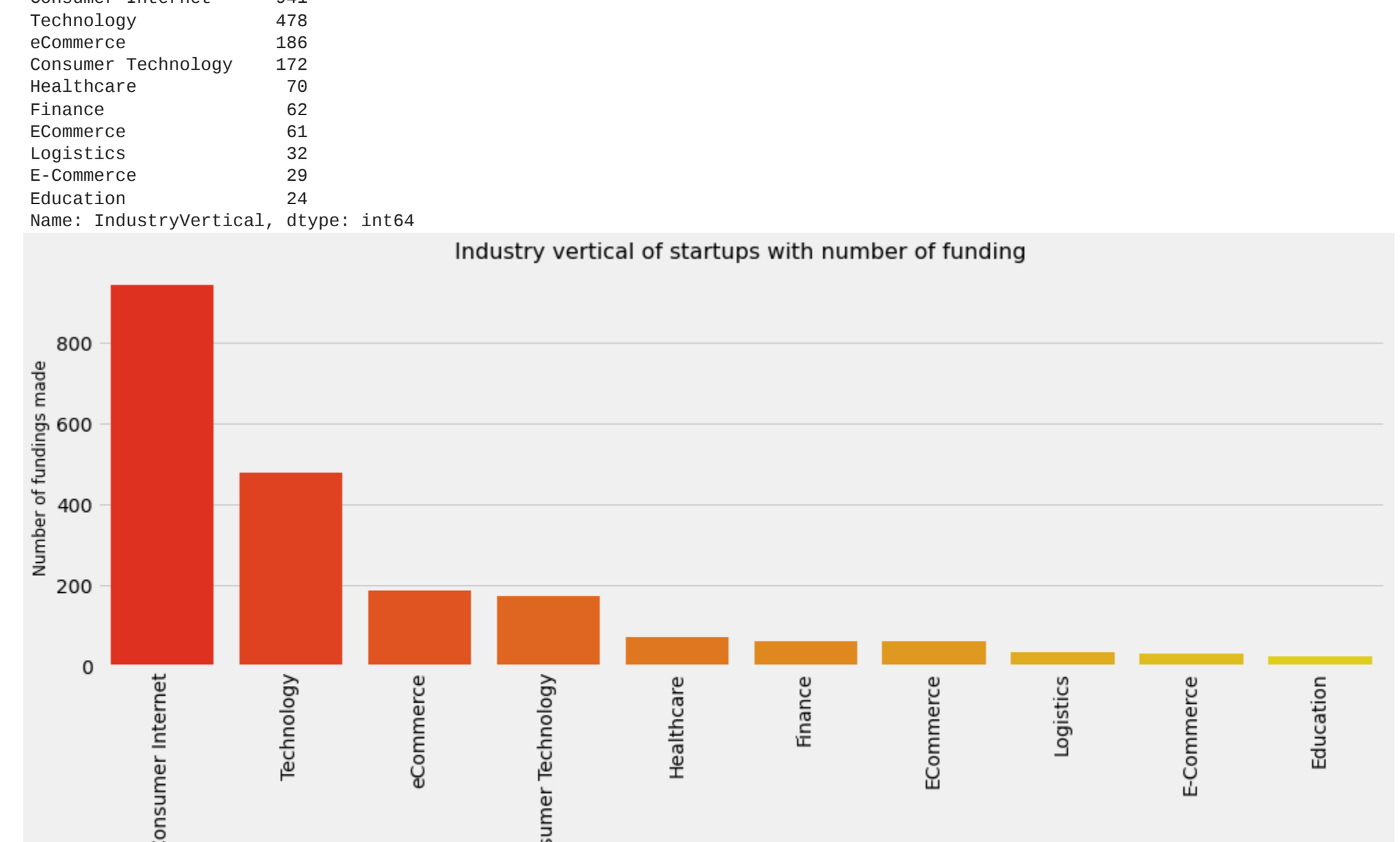
```
Total startups funded :  2457
Ola Cabs      8
Swiggy        8
Paytm         7
UrbanClap     6
NoBroker      6
Medinfi       6
Nykaa         6
Meesho        6
Jugnoo        5
Grofers       5
Name: StartupName, dtype: int64
```



Which Kind of Industries are more preferred for Startups?

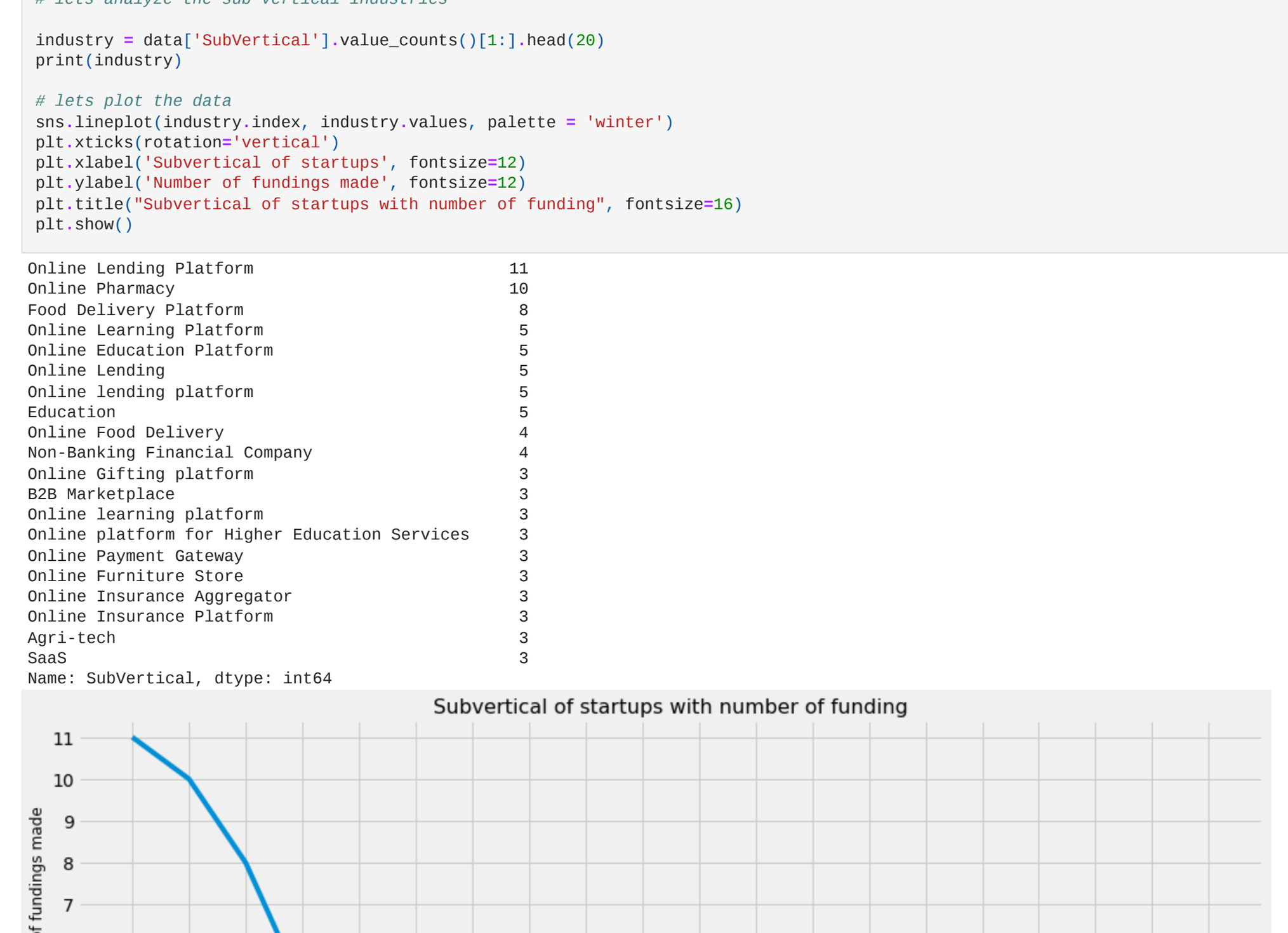
In [21]:
```
# lets analyze the Industry of the Startups

# data cleaning
data['IndustryVertical'] = data['IndustryVertical'].replace('nan', 'Consumer Technology')

industry = data['IndustryVertical'].value_counts().head(10)
print(industry)

# lets plot the data
plt.rcParams['figure.figsize'] = (15, 5)
sns.barplot(industry.index, industry.values, palette = 'autumn')
plt.xticks(rotation='vertical')
plt.xlabel('Industry vertical of startups', fontsize=12)
plt.ylabel('Number of fundings made', fontsize=12)
plt.title("Industry vertical of startups with number of funding", fontsize=16)
plt.show()
```

```
Consumer Internet      941
Technology             478
eCommerce              186
Consumer Technology    172
Healthcare              70
Finance                 62
ECommerce               61
Logistics               32
E-Commerce              29
Education               24
Name: IndustryVertical, dtype: int64
```



In [22]:
```
# lets analyze the sub vertical industries

industry = data['SubVertical'].value_counts()[1:].head(20)
print(industry)

# lets plot the data
sns.lineplot(industry.index, industry.values, palette = 'winter')
plt.xticks(rotation='vertical')
plt.xlabel('Subvertical of startups', fontsize=12)
plt.ylabel('Number of fundings made', fontsize=12)
plt.title("Subvertical of startups with number of funding", fontsize=16)
plt.show()
```

```
Online Lending Platform                           11
Online Pharmacy                                   10
Food Delivery Platform                             8
Online Learning Platform                           5
Online Education Platform                          5
Online Lending                                     5
Online lending platform                            5
Education                                          5
Online Food Delivery                               4
Non-Banking Financial Company                      4
Online Gifting platform                            3
B2B Marketplace                                    3
Online learning platform                           3
Online platform for Higher Education Services      3
Online Payment Gateway                             3
Online Furniture Store                             3
Online Insurance Aggregator                        3
Online Insurance Platform                          3
Agri-tech                                          3
SaaS                                               3
Name: SubVertical, dtype: int64
```



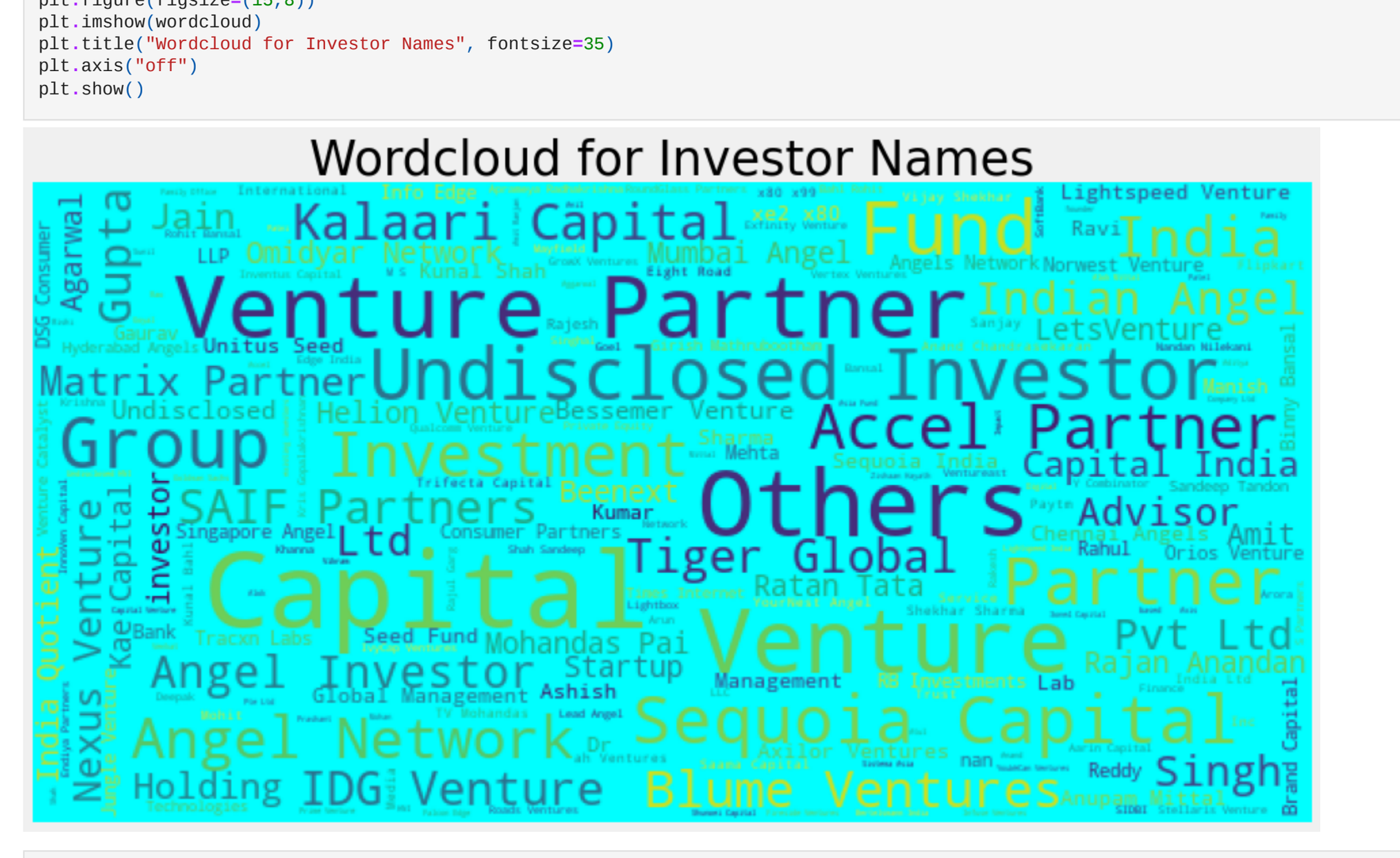
Does Location also play a role, In determining the Growth of a Startup?

In [23]:
```
# analyzing the effect of Cities on a Startup

# lets clean the data for better analysis
data['City'] = data['City'].replace(('Bengaluru', 'nan'),('Bangalore', 'Bangalore'))

city = data['City'].value_counts().head(10)
print(city)

# lets plot the data
sns.barplot(city.index, city.values, palette = 'Wistia')
plt.xticks(rotation='vertical')
plt.xlabel('city location of startups', fontsize=12)
plt.ylabel('Number of fundings made', fontsize=12)
plt.title("city location of startups with number of funding", fontsize=16)
plt.show()
```

```
Bangalore    1022
Mumbai        568
New Delhi     424
Gurgaon       291
Pune          105
Hyderabad      99
Chennai        97
Noida          93
Gurugram       50
Ahmedabad      38
Name: City, dtype: int64
```

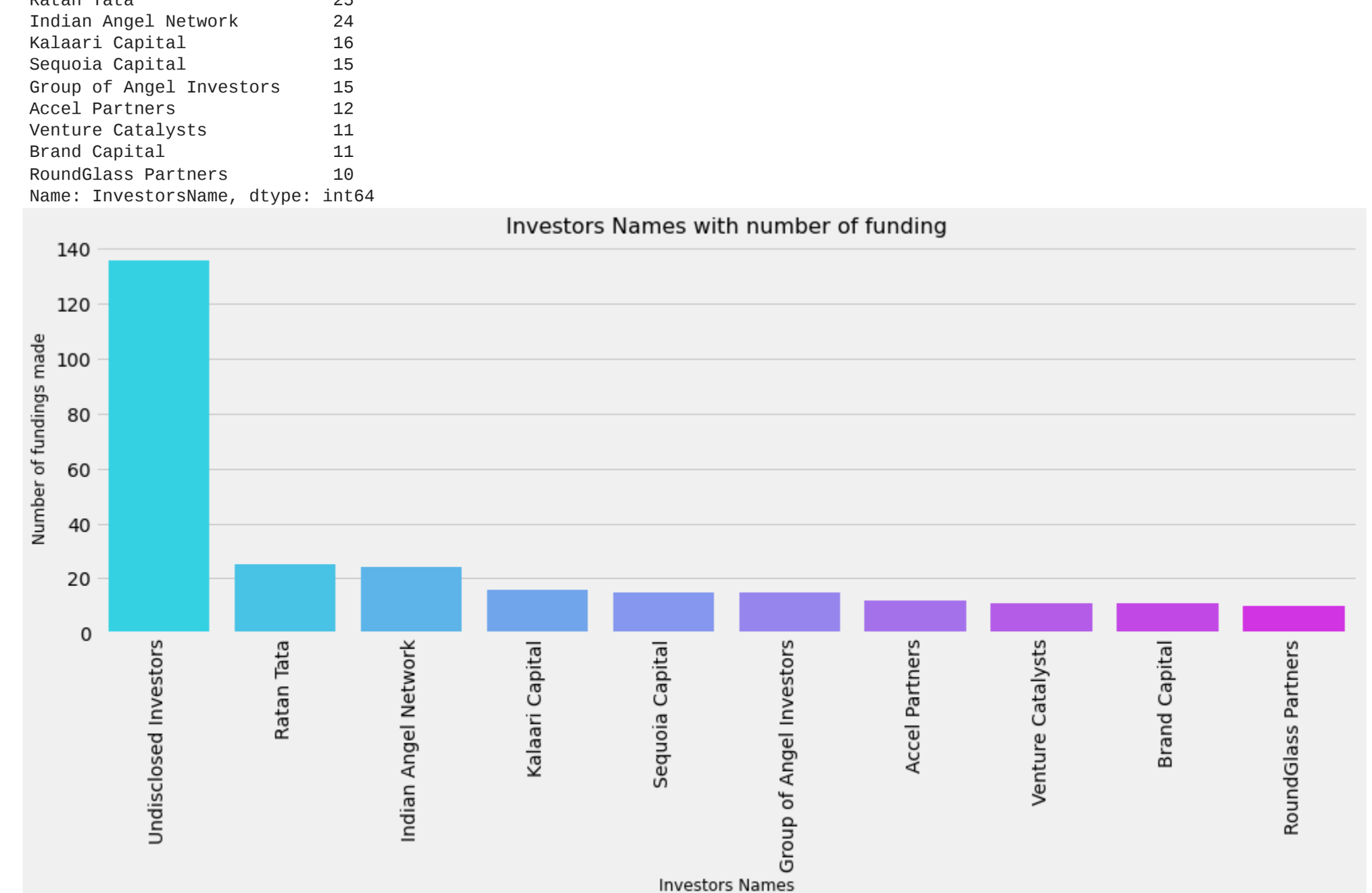
Who plays the main role in Indian Startups Ecosystem?

In [24]:
```
from wordcloud import WordCloud

names = data["InvestorsName"][~pd.isnull(data["InvestorsName"])]
wordcloud = WordCloud(max_font_size=50, width=600, height=300, background_color = 'cyan').generate(' '.join(names))
plt.figure(figsize=(15,8))
plt.imshow(wordcloud)
plt.title("Wordcloud for Investor Names", fontsize=35)
plt.axis("off")
plt.show()
```



In [25]:
```
# lets analyze the investors on startups

# lets clean the dataset
data['InvestorsName'][data['InvestorsName'] == 'Undisclosed investors'] = 'Undisclosed Investors'
data['InvestorsName'][data['InvestorsName'] == 'undisclosed Investors'] = 'Undisclosed Investors'
data['InvestorsName'][data['InvestorsName'] == 'undisclosed investors'] = 'Undisclosed Investors'
data['InvestorsName'][data['InvestorsName'] == 'Undisclosed investor'] = 'Undisclosed Investors'
data['InvestorsName'][data['InvestorsName'] == 'Undisclosed Investor'] = 'Undisclosed Investors'
data['InvestorsName'][data['InvestorsName'] == 'Undisclosed'] = 'Undisclosed Investors'
data['InvestorsName'][data['InvestorsName'] == 'nan'] = 'Undisclosed Investors'

# lets check the value counts
investors = data['InvestorsName'].value_counts().head(10)
print(investors)

# lets plot the data
sns.barplot(investors.index, investors.values, palette = 'cool')
plt.xticks(rotation='vertical')
plt.xlabel('Investors Names', fontsize=12)
plt.ylabel('Number of fundings made', fontsize=12)
plt.title("Investors Names with number of funding", fontsize=16)
plt.show()
```

```
Undisclosed Investors       136
Ratan Tata                   25
Indian Angel Network         24
Kalaari Capital              16
Sequoia Capital              15
Group of Angel Investors     15
Accel Partners               12
Venture Catalysts            11
Brand Capital                11
RoundGlass Partners          10
Name: InvestorsName, dtype: int64
```



What are the different Types of Funding for Startups?

In [26]:
```
# lets analyze the investment
investment = data['InvestmentType'].value_counts().head(10)
print(investment)

# lets clean the dataset
data['InvestmentType'][data['InvestmentType'] == 'SeedFunding'] = 'Seed Funding'
data['InvestmentType'][data['InvestmentType'] == 'Crowd funding'] = 'Crowd Funding'
data['InvestmentType'][data['InvestmentType'] == 'PrivateEquity'] = 'Private Equity'

# lets plot the data
sns.barplot(investment.index, investment.values, palette = 'summer')
plt.xticks(rotation='vertical')
plt.xlabel('Investment Type', fontsize=12)
plt.ylabel('Number of fundings made', fontsize=12)
plt.title("Investment Type with number of funding", fontsize=16)
plt.show()
```

```
Private Equity          1356
Seed Funding            1355
Seed/ Angel Funding       60
Seed / Angel Funding      47
Seed\nFunding             30
Debt Funding              25
Series A                  24
Seed/Angel Funding        23
Series B                  20
Series C                  14
Name: InvestmentType, dtype: int64
```