

# Spark Fund Investment Analysis

## Overview:

Spark Funds is looking to invest 5 - 15 million USD. They have collected internal investment data from separate countries all across the globe. This data includes information about the type of investment these countries are making (Private Equity, Venture, Seed, Angel, etc), the total amount USD they are investing, the specific industries they are investing in, and much more. Spark Fund wants to know what is the best investment strategy for them. Using the data collected, Spark Funds wants an investment analysis that produces key insights into the global economic trends to give us insight into our own investments

## Business Objective / Goals:

Our investment strategy is simple. We are going to use the data we have gathered to find the countries that invest the most, and uncover what industries they are investing the most in. To achieve this overall goal we are going to break down this analysis into three separate goals that are as follows:

1. Investment Type Analysis: Compare typical investment amounts in different types such as venture, seed, angel, and private equity. Determine the investment type that aligns best with Spark Funds' risk tolerance and investment strategy.
2. Country Analysis: Identifying the countries which have been the most heavily invested in the past.
3. Sector Analysis: Map investments from sub-sectors to the eight main sectors provided in the mapping file. Assess the distribution of investments across these main sectors to determine which sectors are currently attracting the most investment.

## Data Description:

The Spark Funds dataset is a simulated dataset used for educational purposes, designed to mimic real-world investment data. It includes information about companies that have received investments, details of various investment rounds, and mappings of sub-sectors to main sectors. Key columns include unique identifiers for companies, investment types, amounts raised, and corresponding dates. The data spans multiple years and regions, providing a comprehensive basis for analyzing global investment trends and making strategic investment recommendations

This data is compiled of three separate files. Companies.csv, rounds2.csv, and mapping.csv. All of which I received from Kaggle.

## Data Exploration and Cleaning

Our analysis is based on data compiled from three separate files. Initially, all three files were imported into a Python environment for processing. To ensure data integrity, we eliminated any inconsistent values across the datasets. Following the cleaning process, the files were merged into a single data frame, resulting in a consolidated dataset. Unnecessary columns were then removed, leaving us with a data frame comprising five unique columns and just over 113,000 rows.

The final columns included in the data frame are: **Funding\_round\_type**, which indicates the type of funding (e.g., Private Equity, Seed, Venture, or Angel); **Raised\_amount\_usd**, representing the total amount of dollars raised for each individual investment in million USD; **main\_sector**, detailing the general industry sector of the investment; **Category\_list**, specifying the sub-sector in which the investment is made; and **country\_code**, denoting the country where the investment is being made. A snippet of this data frame is provided below to illustrate its structure and content.

	funding_round_type	raised_amount_usd	category_list	country_code	main_sector
0	venture	10.00	Media	IND	Entertainment
1	seed	0.70	Application Platforms Real Time Social Network...	USA	NaN
2	venture	2.00	Curated Web	CHN	News, Search and Messaging
4	seed	0.04	Biotechnology	CAN	Cleantech / Semiconductors
5	venture	0.72	Biotechnology	CAN	Cleantech / Semiconductors
...	...	...	...	...	...
88523	venture	1.59	Enterprise Software	CHN	Others
88524	seed	0.01	Advertising Mobile Web Development Wireless	HRV	NaN
88525	seed	0.03	Advertising Mobile Web Development Wireless	HRV	NaN
88527	seed	0.03	Advertising Mobile Web Development Wireless	HRV	NaN
88528	seed	0.02	Consumer Electronics Internet of Things Teleco...	USA	NaN

## Funding Type Analysis

Our first objective is to find the best funding type that is most compatible with our investment strategy at Spark Fund. Prior to our analysis, our CEO stated that they are only looking at either Private Equity, Seed, Angel, or Venture. Out of these 4 funding types, we need to find the most suitable for our strategy.

Using analysis techniques we have visualized some important trends that we think will impact what funding type we are going to use.

Referring to *Figure 1*, you can see the distribution of the frequency of investments between each investment type. The chart shows that the most frequent investment type is Venture (63.6%). The least frequent is Private Equity (2.4%).

If you take a look at *Figure 2* you can see the total investment amount USD invested per each funding type category. What is fascinating is that although private equity only accounted for 2.4% of the total occurrence of investment, Private Equity still averages the most amount raised USD. This is because Private Equity involves much larger investment amounts because it comes from large companies targeting mature businesses. In contrast, Seed and Angel investing focus on early-stage startups and involve smaller sums due to higher risk and unproven business models. Venture Capital falls between these, providing more funding than Seed/Angel but less than Private Equity, as it supports the growth of companies after initial development stages.

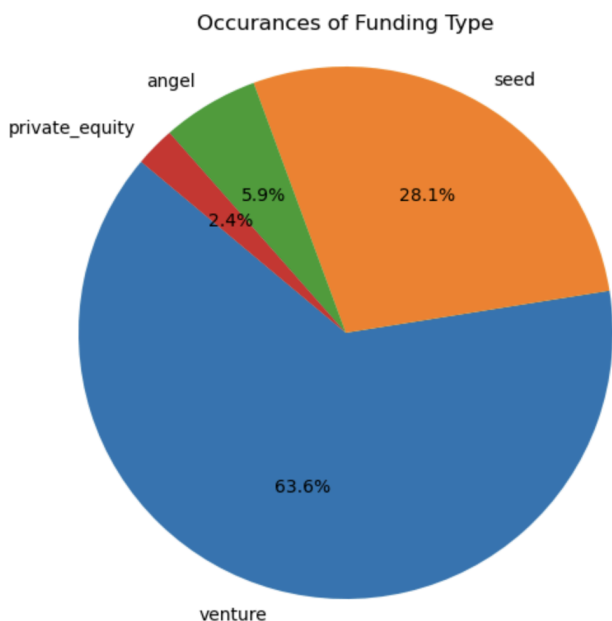


Figure 1

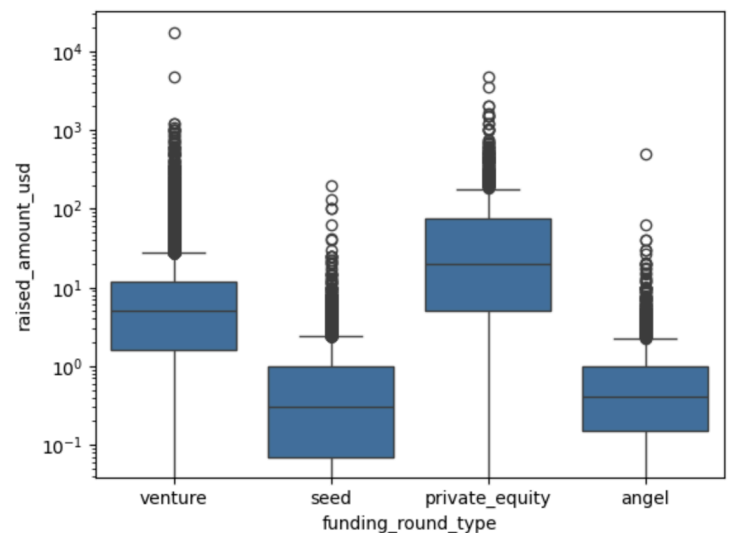


Figure 2

## Funding Type Analysis

Now that we have visualized the differences between each funding type, we now need to make a decision which funding type is the best for Spark Fund. As stated before, we are looking to invest 5 - 15 million. In order to gauge which funding type is the best suitable for that amount of money we are going to compare the mean and median values of all 4 funding types below.

funding_round_type	median				mean			
	angel	private_equity	seed	venture	angel	private_equity	seed	venture
raised_amount_usd	0.415	20.0	0.3	5.0	0.97148	73.938478	0.747736	11.724214

Note that there is a significant difference between the mean and median values for all four funding types. In Venture funding, the median is about 5 million while the mean is about 11.7 million. The drastic difference between mean and median is caused by skewed outliers. Because of that I am going to use the median value of each funding type to determine where our estimated 5 - 15 million will best fit.

The median investment amount for 'private\_equity' is approximately 20 million USD, which exceeds Spark Funds' target range of USD 5-15 million. The median for 'venture' investments is around USD 5 million, aligning well with their range. In contrast, the average amounts for 'angel' and 'seed' investments fall below their target range. Therefore, 'venture' type investments are the most suitable for Spark Funds.

## Country Analysis

Now that we have established the best investment type for Spark Funds (Venture) we can now narrow down the countries to see which country uses Venture type investing the most to further gain insight into where Spark Funds should invest their money. To start, we are going to display the top 9 countries with the most total amount raised for Venture funding. The list below shows these countries.

raised_amount_usd	
country_code	
USA	420067.65
CHN	39338.79
GBR	20072.77
IND	14261.56
CAN	9482.20
FRA	7226.81
ISR	6854.34
DEU	6307.00
JPN	3167.67

## Country Analysis

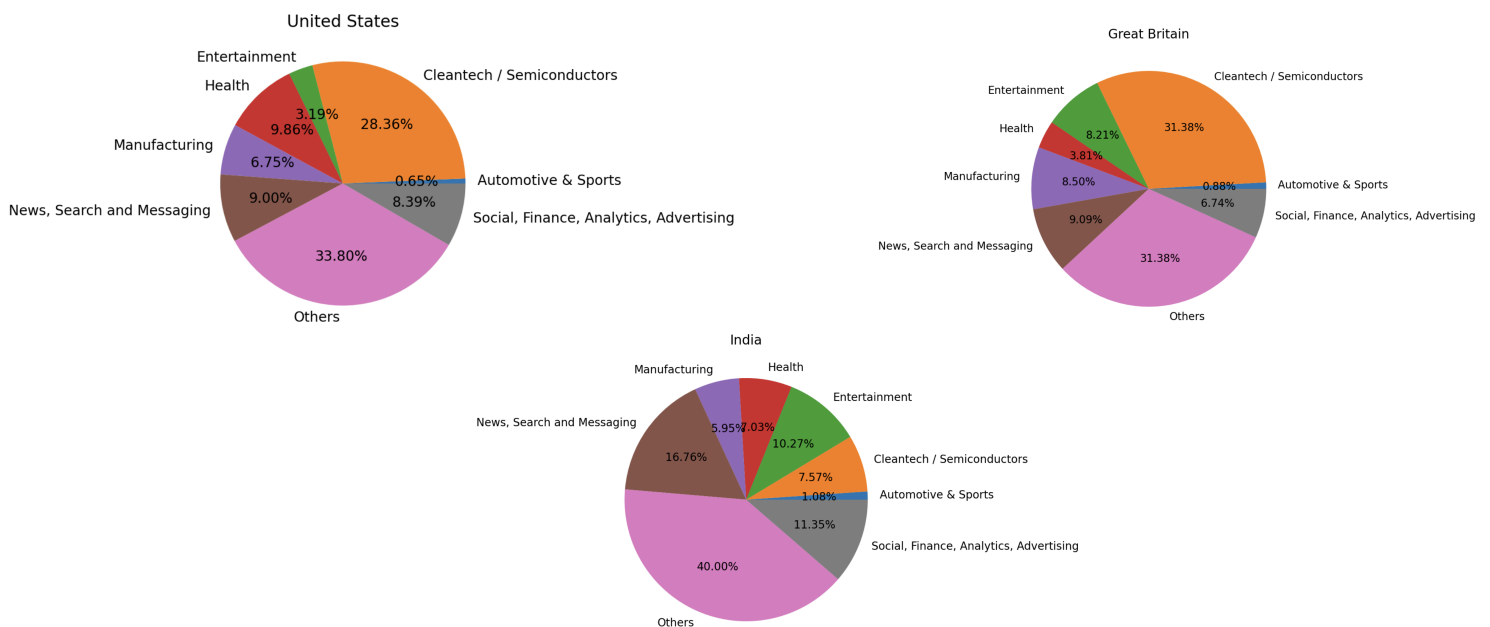
The top three countries that have the most amount raised USD for Venture funding are USA, China, and Great Britain. The only issue is that English is not a common language in China. Since that is the case we are going to eliminate China on the list and use India where English is more common. This leaves us with the United States, Great Britain, and India. These three countries have invested the most in Venture Capital within our data set. We are going to base our investment strategy off their trends.

## Sector Analysis

This is the third goal of our analysis — sector analysis. Having identified the best funding type (Venture) and the countries that have raised the most capital through Venture investing (USA, GBR, IND), we will now determine the best industry sectors to invest Spark Funds' capital. We will focus on the most common industries across the three mentioned countries.

The sectors are categorized into main sectors and sub-sectors. Our objective is to identify the top three most common main sectors among the USA, GBR, and IND. From these main sectors, we will then identify the most common sub-sectors for investment.

In order to accomplish this first we need to see between each of the three countries, how their total Venture investment is divided up between their total portfolio. This is visualized below.



The three pie charts above compare the total occurrences of Venture capital investments in each sector for the United States, Great Britain, and India. The investment patterns in the USA and GBR are very similar, with both countries most commonly investing in Cleantech/Semiconductors, which make up just over 20% of their portfolios, excluding the 'Others' category. In contrast, India's most common investment sector is News, Search, and Messaging, with Cleantech/Semiconductors being their fourth most common industry.

## Sector Analysis

Based on our sector analysis, we recommend focusing our investments in three main sectors and their respective sub-sectors. For Cleantech / Semiconductors, the best sub-sectors to invest in are Biotechnology, Clean Technology, and Semiconductors. In the Health sector, the most promising sub-sectors are Health Care, Health and Wellness, and Medical Devices. For the News, Search, and Messaging sector, the recommended sub-sectors are Mobile, Curated Web, and Messaging. The results are visualized in *Figure 3* below.

These sectors and sub-sectors are the highest funded based on the data we gathered from India, United States, and Great Britain.

	Cleantech / Semiconductors Occurances	Health Occurances	News, Search and Messaging Occurances
Category			
Biotechnology	1215.000000	nan	nan
Clean Technology	325.000000	nan	nan
Semiconductors	301.000000	nan	nan
Health Care	nan	393.000000	nan
Health and Wellness	nan	138.000000	nan
Medical Devices	nan	26.000000	nan
Mobile	nan	nan	319.000000
Curated Web	nan	nan	150.000000
Messaging	nan	nan	52.000000

*Figure 3*

## Conclusion

After analyzing global financial data from Spark Funds, we have gained crucial insights to inform our next investment strategy. Using our analytical tools, we have successfully achieved our three main goals:

**Investment Analysis:** Based on global trends and our investment range of 5-15 million USD, we have concluded that the most suitable investment type for Spark Funds is Venture Capital.

**Country Analysis:** We have identified that the countries with the highest levels of Venture Capital investments are the United States, Great Britain, and India. We recommend following the popular investment trends observed in these countries.

**Sector Analysis:** The main sectors we recommend for Spark Funds' investments are Cleantech / Semiconductors, Health, and News, Search and Messaging, as these sectors have shown significant investment activity.

These insights will guide Spark Funds in making informed and strategic investment decisions moving forward.

## **Note**

Along with the project - there will also be a link to my github account where you can see all the code and a more in depth analysis on the physical data and actions taken to come to this conclusion. This project was done using Python code. All the data processing and visualizations was done through Python.