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# # Part 3: Analysis
#
#     In this notebook we will do funding_type, country analysis,
#     and sector-wise analysis.
#     The sector-wise analysis will require us to merge the mapping
#     file with the master.
#     Hence we will do it at last.
#     Lets start with funding type analysis

# ## 1. Funding analysis
#
#     In this we will look at the funding type and funding amount
#     for each of the companies
#     We will also have a constraint of investment amount of 5-15
#     million USD.
#     So will look at the funding type with average amount in this
#     range

#     Types of funding-
#
#     venture - a sum of money investors commit for investment in
#     early-stage companies.
#     The investors who supply the fund with money are
#     designated as limited partners.
#
#     seed - is the first official equity funding stage.
#
#     debt_financing - loan
#
#     angel - one-time/ongoing investment in return for equity
#
#     grant - usually from a non-profit
#
#     private_equity - investment on a private company in return for
#     equity
#
#     convertible_notes- investor would be loaning money to a
#     startup and instead of a return in
#     the form of principal plus interest, the
#     investor would receive equity in the company.
#
#     equity_crowdfunding - Equity crowdfunding is the online
#     offering of private company securities
#     to a group of people for investment
#
#     post_ipo_equity- equity based investment is done after the
#     company has gone public.
#
#     product_crowd_funding - it seems it is another form of crowd
#     funding but based on product.
#
#     We have to look further
#
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#      post_ipo_debt - debt based investment is done after the
company has gone public.
#
#      non_equity_assistance - funding without getting equity on the
company,
#                               these can be futures contract or any
other OTC tools
#
#      secondary_market- buying and selling securities already owned.
#

#      Sparks Fund wants to invest in the funding type as invested by
other companies.
#      This seems to be pattern for a firm that is trying to invest
in startups or are
#      in early phase of business.
#
#
#      Keeping this in mind following are the appropriate investment
strategies -
#      1. venture
#      2. seed
#      3. angel
#      4. private_equity
#      5. convertible_notes
#      6. equity_crowdfunding
#      7. debt_financing
#      8. non_equity_assistance
#
#      We can further drop non_equity_assistance as it has only `60`
investors
#      which is the least popular funding type.
# We will investigate each type of funding type and match the based
on the
# raised amount as our constraint is `5-15 million USD`

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funding_round_type	angel	convertible_note	debt_financing	equity_crowdfunding	private_equity	seed	venture
raised_amount_usd	971573.891136	1.337187e+06	1.716765e+07	509897.967199	7.393849e+07	747793.682484	1.172422e+07

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funding_round_type	angel	convertible_note	debt_financing	equity_crowdfunding	private_equity	seed	venture
raised_amount_usd	414906.0	300000.0	1096653.0	85000.0	20000000.0	300000.0	5000000.0

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# We see the average and median funding amount have huge

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differences. This is because of outliers in  
 # the data. So its more appropriate to choose the `median` value to  
 get the basic stat  
 # of each funding\_type

country_code	CAN	GBR	IND	USA	
status	acquired	closed	ipo	operating	acquired
	closed ipo	operating		acquired	closed ipo
	operating	acquired		closed ipo	operating
raised_amount_usd		5711912.0		4880000.0	4124454.0
	3800000.0	8272447.0		2991619.0	12550010.0
	3952278.0	10000000.0		8750000.0	13000000.0
	7000000.0	7600000.0		5000000.0	11100000.0
	4250000.0				

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funding_round_type
private_equity      20000000.0
venture             5000000.0
debt_financing      1096653.0
angel               414906.0
convertible_note    300000.0
seed                300000.0
equity_crowdfunding 85000.0
Name: raised_amount_usd, dtype: float64

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# The private\_equity type funding has a median funding type of about  
 `20 MM USD`  
 # this is beyond the range of Sparks Fund.  
 #  
 # The most suitable is venture type funding which has a median  
 amount of `5 MM USD`  
 #  
 # The rest all are less than the amount Sparks Funds are looking to  
 invest.

# ## 2. Country Analysis  
 #  
 # This analysis requires those countries where english is the  
 official language or  
 # common speaking language

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country_code
USA      4.200680e+11
CHN      3.933892e+10
GBR      2.007281e+10
IND      1.426151e+10
CAN      9.482218e+09
FRA      7.226851e+09
ISR      6.854350e+09
DEU      6.306922e+09
JPN      3.167647e+09
SWE      3.145857e+09
Name: raised_amount_usd, dtype: float64

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# Out of the top ten companies `USA`, `GBR`, `IND`, `CAN` are the
top english speaking countries
# or countries with official language as english.

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country_code	CAN	GBR	IND	USA	
status	acquired	closed	ipo	operating	acquired
	closed	ipo	operating	acquired	closed
	operating	acquired	closed	ipo	operating
raised_amount_usd		5711912.0		4880000.0	4124454.0
	3800000.0	8272447.0		2991619.0	12550010.0
	3952278.0	10000000.0		8750000.0	13000000.0
	7000000.0	7600000.0		5000000.0	11100000.0
	4250000.0				

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# It shows `IND` has the highest median investments among all
countries with `7.5 MM USD`.
# This is followed by `USA`, `GBR` and `CAN`
#
# We also plotted a graph for the companies with present status.
# Although we are not needed to know the status but we should be
able to check which are operating and those that
# are closed.
#
# We will check on this after checking the sectorwise analysis

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# ## 3. Sector-wise Analysis
#
#       There is a mapping file for mapping the sectors into some
categories.

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# But first lets check the category_list of the dataframe
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After doing all analysis and imputation we get the final sector-country wise statistics

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		sum
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country_code	sector	
CAN	Automotive & Sports	1.500000e+07
	Cleantech / Semiconductors	1.015888e+09
	Entertainment	1.600221e+08
	Health	1.683451e+08
	Manufacturing	2.376331e+08
	News, Search and Messaging	4.201211e+08
	Others	9.261380e+08
	Social, Finance, Analytics, Advertising	6.561431e+08
GBR	Automotive & Sports	1.670516e+08
	Cleantech / Semiconductors	1.163990e+09
	Entertainment	4.827847e+08
	Health	2.145375e+08
	Manufacturing	3.619403e+08
	News, Search and Messaging	6.157462e+08
	Others	1.283624e+09
	Social, Finance, Analytics, Advertising	1.089404e+09
IND	Automotive & Sports	1.369000e+08
	Cleantech / Semiconductors	1.653800e+08
	Entertainment	2.808300e+08
	Health	1.677400e+08
	Manufacturing	2.009000e+08
	News, Search and Messaging	4.338345e+08
	Others	1.013410e+09
	Social, Finance, Analytics, Advertising	5.505496e+08
USA	Automotive & Sports	1.454104e+09
	Cleantech / Semiconductors	2.164292e+10
	Entertainment	5.099198e+09
	Health	8.211859e+09
	Manufacturing	7.258553e+09
	News, Search and Messaging	1.397157e+10
	Others	2.632101e+10
	Social, Finance, Analytics, Advertising	2.380738e+10

		mean
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country_code	sector	
CAN	Automotive & Sports	7.500000e+06
	Cleantech / Semiconductors	9.070425e+06
	Entertainment	6.957481e+06
	Health	8.016432e+06
	Manufacturing	7.665583e+06

GBR	News, Search and Messaging	9.133068e+06
	Others	8.496679e+06
	Social, Finance, Analytics, Advertising	8.412091e+06
	Automotive & Sports	1.044072e+07
	Cleantech / Semiconductors	8.953770e+06
	Entertainment	8.621155e+06
	Health	8.939063e+06
	Manufacturing	8.617627e+06
	News, Search and Messaging	8.434880e+06
IND	Others	8.732138e+06
	Social, Finance, Analytics, Advertising	8.191008e+06
	Automotive & Sports	1.053077e+07
	Cleantech / Semiconductors	8.269000e+06
	Entertainment	8.510000e+06
	Health	8.828421e+06
	Manufacturing	9.566667e+06
	News, Search and Messaging	8.342972e+06
	Others	9.212814e+06
USA	Social, Finance, Analytics, Advertising	9.175826e+06
	Automotive & Sports	8.707212e+06
	Cleantech / Semiconductors	9.205835e+06
	Entertainment	8.628085e+06
	Health	9.033949e+06
	Manufacturing	9.084547e+06
	News, Search and Messaging	8.826006e+06
	Others	8.922375e+06
	Social, Finance, Analytics, Advertising	8.772062e+06

count		median
country_code	sector	
CAN	Automotive & Sports	7500000.0
2	Cleantech / Semiconductors	8600000.0
112	Entertainment	5960000.0
23	Health	7057847.0
21	Manufacturing	7000000.0
31	News, Search and Messaging	8685000.0
46	Others	8000000.0
109	Social, Finance, Analytics, Advertising	7500000.0
78	Automotive & Sports	10945000.0
GBR	Cleantech / Semiconductors	8342136.5
16	Entertainment	8502954.0
130	Health	7846072.5
56		

24		
	Manufacturing	7965208.0
42		
	News, Search and Messaging	7520000.0
73		
	Others	8000000.0
147		
	Social, Finance, Analytics, Advertising	7719600.0
133		
IND	Automotive & Sports	11000000.0
13		
	Cleantech / Semiconductors	8000000.0
20		
	Entertainment	8000000.0
33		
	Health	9000000.0
19		
	Manufacturing	10000000.0
21		
	News, Search and Messaging	8000000.0
52		
	Others	9000000.0
110		
	Social, Finance, Analytics, Advertising	8178025.0
60		
USA	Automotive & Sports	8181488.0
167		
	Cleantech / Semiconductors	9000000.0
2351		
	Entertainment	8000000.0
591		
	Health	8600000.0
909		
	Manufacturing	8800000.0
799		
	News, Search and Messaging	8000000.0
1583		
	Others	8250000.0
2950		
	Social, Finance, Analytics, Advertising	8000000.0
2714		

# 1. In CAN highest amount is invested in cleantech/  
semiconductores followed by others.

# With median investment of 9.07 MM USD and 8.5 MM USD  
respectively.

# Total companies are 112 and 109 respectively

#

# 2. In GBR highest amount invested is in others followed by

cleantech/semiconductors.

# Median investment is about 8.73 and 8.95 MM USD respectively.

# Total companies are 147 and 130 respectively.

#

# 3. In IND most investments are in others category followed by Social, Finance, Analytics, Advertising.

# Median investment of 9.21 and 9.18 MM USD respectively.

# Total companies are 110 and 60 respectively.

#

# 4. USA is the leading hub for companies and investments.

# With Others leading followed by Social, Finance, Analytics, Advertising.

# Median investment are 8.92 and 8.77 MM USD respectively.

# Total companies count is also very high with 2950 and 2714 respectively

#

# ##### Note. All these investments are of English speaking countries with venture type funding between 5 to 15 MM USD of investments each.