



# WIREFRAME DOCUMENT

Foreign Direct Investment  
Analysis

BY



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## Document Version Control

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05 JULY 2022	1.1	Created Content Page ,Introduction Page & DataSet Information Page	Vikash
06 JULY 2022	1.2	Created Exploratory Analysis,Power-Bi dashboard, Add Page Number in Content Section	Vikash
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## ABSTRACT

Foreign Direct Investment (FDI) is considered as an engine of economic growth. Before the economic reforms, the flow of foreign direct investment to India has been comparatively limited because of the type of industrial development strategy and the various foreign investment policy followed by India. Government policy towards. Foreign capital was very selective. Foreign investment was normally permitted only in high technology industries in priority areas and export-oriented areas. So the inflow of FDI before the 1990s was very low. To fully utilize the country's immense economic potential, the government launched economic reform in 1991. The new government policies are simple, transparent. And promote domestic and foreign investment. India's abundant and diversified natural resources, its sound economic policy, good market condition and high skilled human resources make it a proper generation for FDI. After long years of journey, FDI was also introduced in various sectors and states in India. The investment of FDI in various States and sectors leads to the rapid growth of the Indian economy.

## INTRODUCTION

### WHY THIS WIREFRAME DOCUMENT

This document represent the complex tasks involved in a project in an easy-to-understand visual format. By these we can also communicate any changes to all stakeholders quickly and efficiently. This also assist in keeping project on track and help to reduce misunderstanding between stakeholders.

### PROBLEM STATEMENT

Investment is a game of understanding historic data of investment objects under different events but it is still a game of chance to minimize the risk we apply analytics to find the equilibrium investment. To understand the Foreign direct investment in India for the last 17years from 2000-01 to 2016-17.This dataset contains sector and financial year wise data of FDI in India. Sector wise investment analysis, Year wise investment analysis. Find key metrics and factors and show the meaningful relationships between attributes.

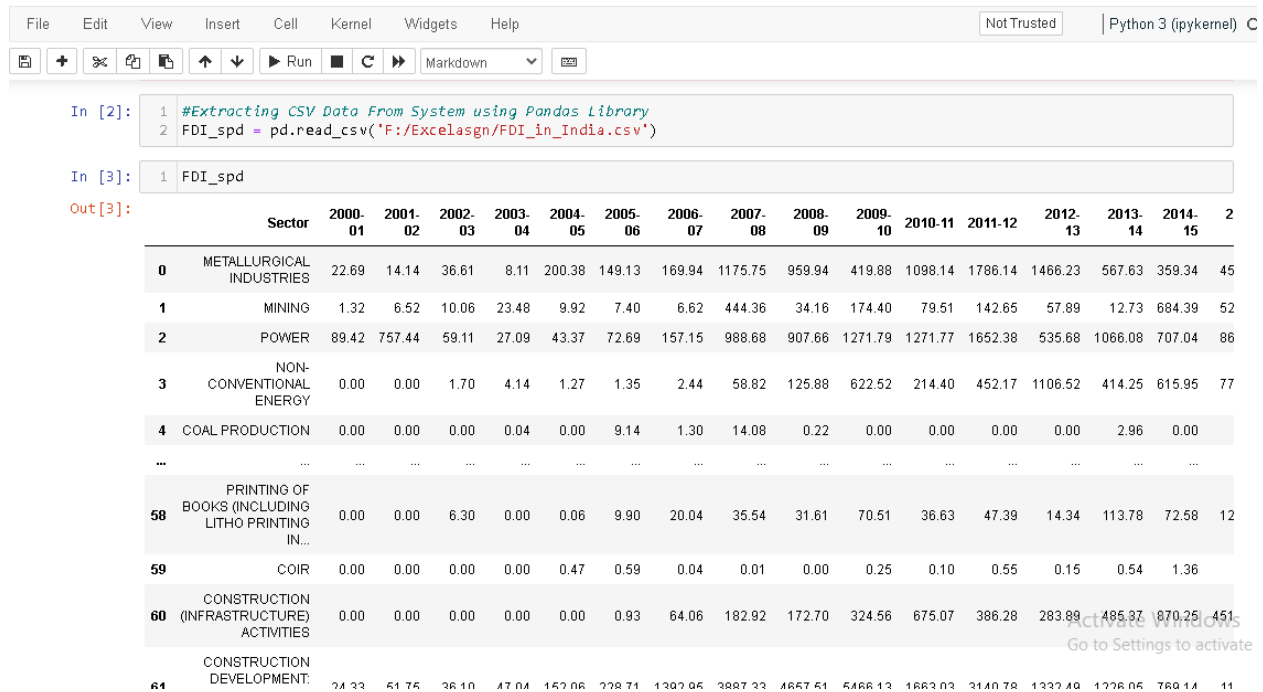
## DATASET INFORMATION

The file name FDI\_in\_India.csv contains different sector names and period interval i.e. from 2000-2017 and contain amount received corresponding years against particular sectors. Sample data below.

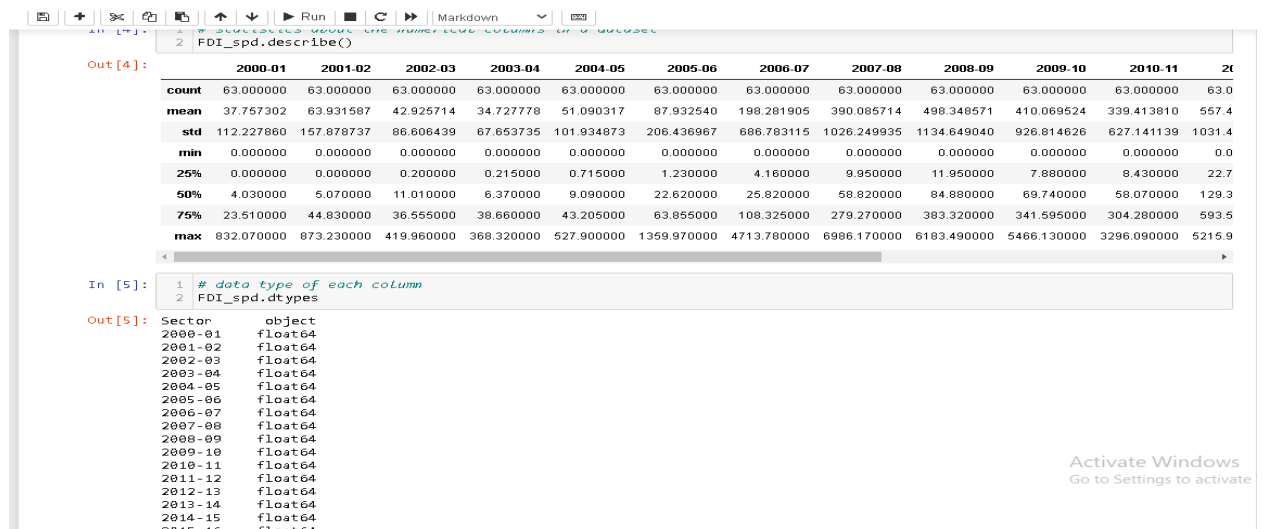
3-FDI\_in\_India - Excel (Product Activation Failed)

	Sector	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
1	Sector																	
2	METALLUR	22.69	14.14	36.61	8.11	200.38	149.13	169.94	1175.75	959.94	419.88	1098.14	1786.14	1466.23	567.63	359.34	456.31	1440.18
3	MINING	1.32	6.52	10.06	23.48	9.92	7.4	6.62	444.36	34.16	174.4	79.51	142.65	57.89	12.73	684.39	520.67	55.75
4	POWER	89.42	757.44	59.11	27.09	43.37	72.69	157.15	988.68	907.66	1271.79	1271.77	1652.38	535.68	1066.08	707.04	868.8	1112.98
5	NON-CON	0	0	1.7	4.14	1.27	1.35	2.44	58.82	125.88	622.52	214.4	452.17	1106.52	414.25	615.95	776.51	783.57
6	COAL PRO	0	0	0	0.04	0	9.14	1.3	14.08	0.22	0	0	0	0	2.96	0	0	0
7	PETROLEU	9.35	211.07	56.78	80.64	102.78	12.09	87.71	1405.04	349.29	265.53	556.43	2029.98	214.8	112.23	1079.02	103.02	180.4
8	BOILERS A	0	0	0	0.04	0.54	0	3.31	1.51	0	3.96	0.63	31.79	20.05	0.17	1.33	77.91	53.91
9	PRIME MC	0	0	0	0	2.66	0.74	25.57	40.53	74.88	39.5	166.44	313.75	184.6	212.78	230.7	159.13	286.88
10	ELECTRICA	79.76	65.76	34.71	73.2	97.4	39.5	76.85	653.74	417.35	728.27	153.9	566.39	195.87	134.31	574.83	444.88	2230.69
11	COMPUTE	228.39	419.39	314.24	368.32	527.9	1359.97	2613.33	1382.25	1543.34	871.86	779.81	796.35	485.96	1126.27	2296.04	5904.36	3651.71
12	ELECTRON	8.34	12.47	295.88	82.31	88.1	40.91	42.14	136.03	147.51	52.14	59.72	194.41	38.24	132.58	96.84	208.39	83.97
13	TELECOMM	177.69	873.23	191.6	86.49	118.33	617.98	476.51	1260.7	2548.63	2539.26	1664.5	1997.24	303.87	1306.95	2894.94	1324.4	5563.69
14	INFORMA	81.5	4.54	36.5	13.72	9.85	55.93	75.7	288.49	735.04	490.83	412.11	675.96	404.04	428.52	254.96	1009.34	1516.68
15	AUTOMOE	195.33	235.76	419.96	119.09	121.97	139.93	260.72	656.1	1150.03	1236.29	1299.41	922.99	1537.28	1517.28	2725.64	2526.82	1609.32
16	AIR TRAN	0	0	3.8	0.94	4.11	10.27	62.29	99.08	61.37	23.71	136.6	31.22	15.89	45.95	74.56	361.25	83.4
17	SEA TRAN	2.41	19.81	29.32	21.95	36.95	53.63	72.52	128.36	50.21	284.85	300.51	129.36	64.62	20.49	333.22	429.3	735.06
18	PORTS	0	15.48	2.03	116.36	13.04	0.5	0	918.18	493.15	65.41	10.92	0	0	0.31	1.9	0	0
19	RAILWAY	0	0	0.56	2.95	10.75	22.62	25.82	12.41	18.01	34.43	70.66	42.27	29.85	236.93	129.73	73.99	87.57
20	INDUSTRI	5.48	32.04	19.4	3.18	8.89	42.8	25.96	119.57	110.54	341.88	467.92	620.66	503.83	477.38	716.79	568.26	329.3
21	MACHINE	1.42	4.31	14.17	54.51	11.04	23	37.28	56.87	45.66	133.83	11.63	127.87	101.39	64.52	24.06	126.38	23.89
22	AGRICULT	3.64	1.04	13.48	47.54	0	92.71	25.19	6.72	5.57	1.88	0.49	2.77	95.41	48.78	72.35	16.44	15.19
23	EARTH-M	0	0.11	13.77	0.01	0.1	50.87	0.99	67.94	2.27	15.62	1.77	16.4	5.1	34.44	30.11	97.66	52.23
24	MISCELL	44.5	61.4	45.07	22.73	12.83	51.22	84.44	211.15	142.31	149.59	108.67	1295.34	89.45	288.13	186.69	274.57	245.74

## EXPLORATORY ANALYSIS



In the above figure we have load dataset read the data with help of pandas. We created a data frame name as FDI\_spd.



In the above figure we read some statistical value of the dataset as well as datatypes present in the dataset. We have use of FDI\_spd.describe() for statistical value and FDI\_spd.dtypes for datatypes.

```

2 FDI_spd.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 63 entries, 0 to 62
Data columns (total 18 columns):
#   Column      Non-Null Count  Dtype
---  -
0   Sector      63 non-null    object
1   2000-01     63 non-null    float64
2   2001-02     63 non-null    float64
3   2002-03     63 non-null    float64
4   2003-04     63 non-null    float64
5   2004-05     63 non-null    float64
6   2005-06     63 non-null    float64
7   2006-07     63 non-null    float64
8   2007-08     63 non-null    float64
9   2008-09     63 non-null    float64
10  2009-10     63 non-null    float64
11  2010-11     63 non-null    float64
12  2011-12     63 non-null    float64
13  2012-13     63 non-null    float64
14  2013-14     63 non-null    float64
15  2014-15     63 non-null    float64
16  2015-16     63 non-null    float64
17  2016-17     63 non-null    float64
dtypes: float64(17), object(1)
memory usage: 9.0+ KB

```

Activate Windows  
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In the above figure we find out if there any null values present in the dataset or not. We have use of `FDI_spd.info()` check null value.

**from Above we got 2 type of Columns .**

Firstone 'Sector' column in which there are different Sectors names with investment received from 2000-01 to 2016-17  
 Secondone 'Year-wise' columns in which we can see how much each sectors received investment from 2000-01 to 2016-17

**From Above We Also got that**

There is no missing values and null values

```

In [11]: 1 Yrs_ws = ['2000-01', '2001-02', '2002-03', '2003-04', '2004-05', '2005-06', '2006-07', '2007-08', '2008-09',
2         '2009-10', '2010-11', '2011-12', '2012-13', '2013-14', '2014-15', '2015-16', '2016-17']
3         Sect_ws = ['Sector']

```

**Conversion of Investment which received in dollar from to indian rupee**

**Exchange rate from year 2000 to 2017 required Reference Exchange rate history of the indian rupee from wikipedia**

Here in the reference there are two values of exchange rate that is annual average and end-year rate  
 i have taken average exchange rate

```

In [12]: 1 # Exchange rate 2000-2017
2         ExchangeRt_Avg = [45.68,47.69,48.39,45.95,44.93,44.27,45.25,40.26,45.99,47.44,45.56,47.92,54.40,
3         60.50,61.14,65.47,67.07]

```

```

In [13]: 1 FDI_spdUSD = FDI_spd.copy()

```

```

In [14]: 1 # here df is FDI_spd colm taken as year rts as exchange rate
2         def Convers_UsdInr(df,colm,rts):
3             for ele in colm:
4                 df[ele] = df[ele] * rts[colm.index(ele)]/10
5             return df

```

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In the above figure we have taken exchange rate from Wikipedia for conversion of dollar to rupee that too year wise. We created a list for `ExchnageRt_Avg` with year wise average conversion rate.



Now we replace some Long values of Sector Column to Short form

```
In [26]: 1 Fdi_Sorte = Fdi_Sorte[['Sector', 'FDI(INR Crores)', 'FDI(USD Million)']
2         ,]].replace(["CONSTRUCTION DEVELOPMENT: Townships, housing, built-up infrastructure and construction-d
3         , "SERVICES SECTOR (Fin.,Banking,Insurance,Non Fin/Business,Outsourcing,R&D,Courier,Tech.
4         , "TEA AND COFFEE (PROCESSING & WAREHOUSING COFFEE & RUBBER)"]
5         , ["CONSTRUCTION DEVELOPMENT", "SERVICES SECTOR", "TEA AND COFFEE"])
```

## Sector Wise FDI

```
In [27]: 1 #Grouping by Sector column to find Total FDI Inflow per Sector from FY2000-01 to FY2016-17
2 FDI_Sctrws = Fdi_Sorte.groupby('Sector').sum()
3 FDI_Sctrws.sort_values(by='FDI(USD Million)',ascending=False)
```

```
Out[27]:
```

	FDI(INR Crores)	FDI(USD Million)
Sector		
SERVICES SECTOR	316359.18	59476.49
COMPUTER SOFTWARE & HARDWARE	137285.34	24669.49
CONSTRUCTION DEVELOPMENT	115187.47	24293.09
TELECOMMUNICATIONS	130967.85	23946.01
AUTOMOBILE INDUSTRY	92625.45	16673.92
...	...	...
PHOTOGRAPHIC RAW FILM AND PAPER	278.38	67.28
COAL PRODUCTION	122.13	27.74
MATHEMATICAL,SURVEYING AND DRAWING INSTRUMENTS	41.61	7.98
DECEMBER INDUSTRIES	26.00	5.17

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In the above figure we replace some Long values of sector column to short form.

## Percent Increase in FDI compared to previous years

```
In [32]: 1 melt_02['% growth over previous year'] = round(melt_02.pct_change()*100,2)
```

```
In [33]: 1 melt_02.fillna('-')
```

```
Out[33]:
```

	FDI(INR Crores)	% growth over previous year
Year		
2000-01	10865.97	-
2001-02	19208.02	76.77
2002-03	13086.22	-31.87
2003-04	10053.15	-23.18
2004-05	14461.59	43.85
2005-06	24524.51	69.58
2006-07	56525.22	130.48
2007-08	98940.57	75.04
2008-09	144390.03	45.94
2009-10	122558.27	-15.12
2010-11	97421.29	-20.51
2011-12	168298.80	72.75
2012-13	121984.32	-27.52
2013-14	147010.90	20.52
2014-15	189108.88	28.64
2015-16	261886.46	38.48
2016-17	291608.67	11.35

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In the above figure we show how year on year there variation on the FDI received.

### Top Sectors

```
In [35]: 1 Sect_HighFdi = FDI_Sctrws.nlargest(10,['FDI(INR Crores)'])
2 Fdiin_Tot = round(melt_01['FDI(INR Crores)'].sum(),2)
3 Sum = Sect_HighFdi['FDI(INR Crores)'].sum()
4 Sect_HighFdi['In %age'] = round(Sect_HighFdi['FDI(INR Crores)']/Sum*100,2)
5 Sect_HighFdi['%age to Total Inflows'] = round((Sect_HighFdi['FDI(INR Crores)']/Fdiin_Tot)*100,2)
```

```
In [36]: 1 Sect_HighFdi
```

```
Out[36]:
```

	FDI(INR Crores)	FDI(USD Million)	In %age	%age to Total Inflows
Sector				
SERVICES SECTOR	316359.18	59476.49	27.66	17.65
COMPUTER SOFTWARE & HARDWARE	137285.34	24669.49	12.00	7.66
TELECOMMUNICATIONS	130967.85	23946.01	11.45	7.31
CONSTRUCTION DEVELOPMENT	115187.47	24293.09	10.07	6.43
AUTOMOBILE INDUSTRY	92625.45	16673.92	8.10	5.17
TRADING	84491.79	14210.88	7.39	4.72
DRUGS & PHARMACEUTICALS	76378.61	14706.90	6.68	4.26
CHEMICALS (OTHER THAN FERTILIZERS)	70032.79	13293.09	6.12	3.91
POWER	60398.99	11589.13	5.28	3.37
CONSTRUCTION (INFRASTRUCTURE) ACTIVITIES	60104.16	9817.47	5.25	3.35

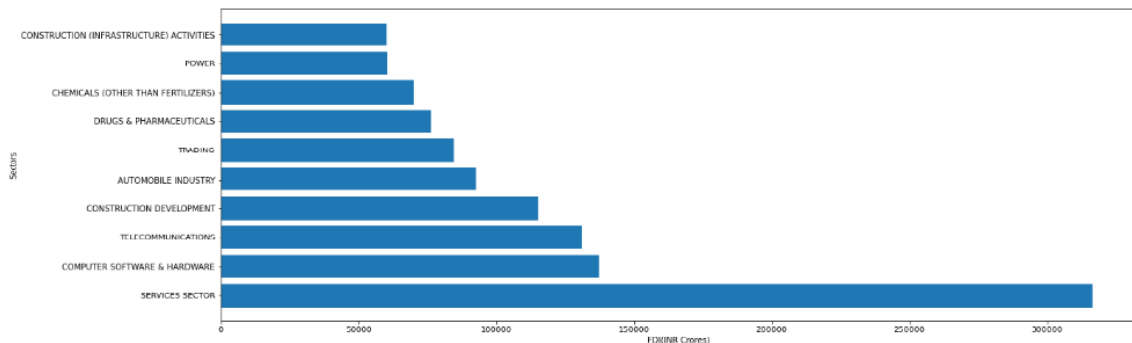
Activate Windows  
Go to Settings to activate

File Edit View Insert Cell Kernel Widgets Help Not Trusted Python 3 (ipykernel)

Run Code

### Bar Chart for top 10 Sector FDI inflows

```
In [39]: 1 plt.figure(figsize=(20,8))
2 plt.barh(Sect_HighFdi.index,Sect_HighFdi['FDI(INR Crores)'])
3 plt.xlabel('FDI(INR Crores)')
4 plt.ylabel('Sectors')
5 plt.show()
```



In above two figure showing the top ten sectors which received the max inflows of FDI.

## Bottom Sectors

```
[37]: 1 Sect_LowFdi = FDI_Sctrws.nsmallest(10,['FDI(INR Crores)'])
      2 Sum = Sect_LowFdi['FDI(INR Crores)'].sum()
      3 Sect_LowFdi['In %age'] = round(Sect_LowFdi['FDI(INR Crores)']/Sum*100,2)
      4 Sect_LowFdi['%age to Total Inflows'] = round((Sect_LowFdi['FDI(INR Crores)']/Fdiin_Tot)*100,3)
```

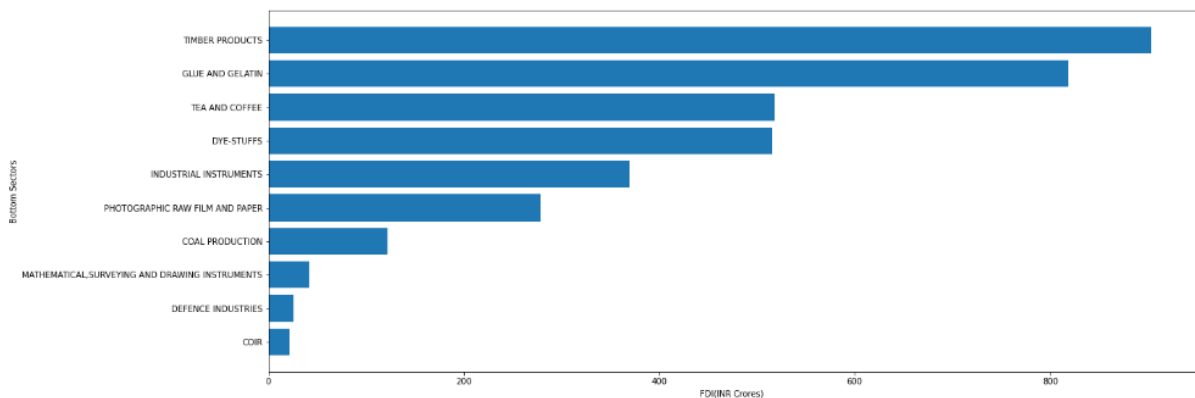
```
[38]: 1 Sect_LowFdi
```

```
: [38]:
```

	FDI(INR Crores)	FDI(USD Million)	In %age	%age to Total Inflows
Sector				
COIR	21.64	4.06	0.60	0.001
DEFENCE INDUSTRIES	26.09	5.12	0.72	0.001
MATHEMATICAL,SURVEYING AND DRAWING INSTRUMENTS	41.61	7.98	1.15	0.002
COAL PRODUCTION	122.13	27.74	3.38	0.007
PHOTOGRAPHIC RAW FILM AND PAPER	278.38	67.28	7.70	0.016
INDUSTRIAL INSTRUMENTS	369.24	76.12	10.21	0.021
DYE-STUFFS	515.92	88.40	14.27	0.029
TEA AND COFFEE	517.84	111.22	14.33	0.029
GLUE AND GELATIN	818.21	128.39	22.64	0.046

### Bar Chart for bottom 10 sector FDI inflows

```
[1]: 1 plt.figure(figsize=(20,8))
      2 plt.barh(Sect_LowFdi.index,Sect_LowFdi['FDI(INR Crores)'])
      3 plt.xlabel('FDI(INR Crores)')
      4 plt.ylabel('Bottom Sectors')
      5 plt.show()
```



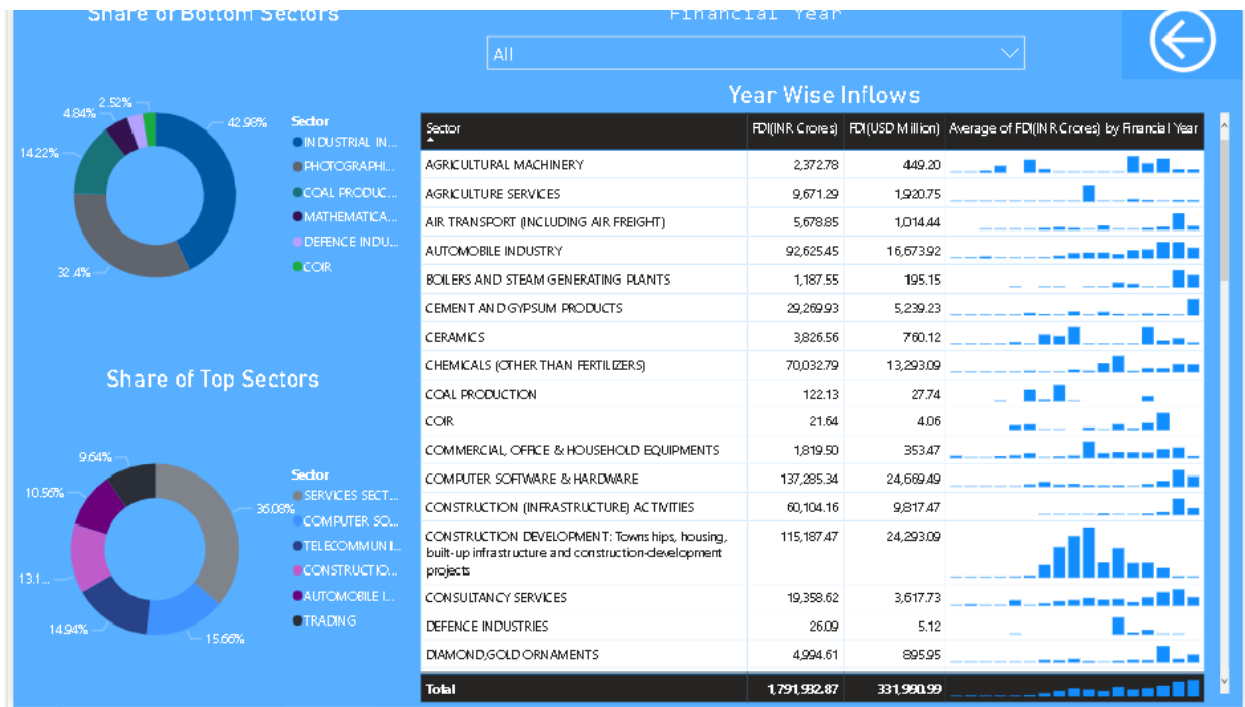
In above two figure showing the bottom ten sectors which received the min inflows of FDI.

Some conclusion Service sector received the major chunk of investment i.e. 17 percent after that computer software and hardware & telecommunication received investment of 7 percent.

## POWER-BI DASHBOARD



In the above figure in dashboard contains criteria for sector selection. Overall FDI received in form USD converted to INR, Total no sectors which received FDI. Also a graph year on increase on FDI.



In above figure we have pie chart of top 6 sectors which received FDI and bottom 6 sectors which received FDI. Year wise criteria and also year wise inflows.