csr_in_india_data_analysis

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https://forcats.tidyverse.org/reference/fct_relevel.html

```
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.1 --

## v ggplot2 3.3.5     v purrr   0.3.4
## v tibble  3.1.4     v dplyr   1.0.7
## v tidyr   1.1.3     v stringr 1.4.0
## v readr   2.0.1     v forcats 0.5.1

## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(janitor)
```

```
##
## Attaching package: 'janitor'

## The following objects are masked from 'package:stats':
##
##     chisq.test, fisher.test
```

```
library(readxl)
options(scipen = 0)
```

```
state <- readxl::read_excel("CSR_Data_State_Sector_Wise.xlsx" , range = "A2:H40") %>%
  janitor::clean_names()

new_names <- c("state_ut", "FY14-15","FY15-16","FY16-17","FY17-18","FY18-19","FY19-20", "FY20-21")

state <- state %>%
  set_names(new_names) %>%
  pivot_longer(-state_ut, names_to = "financial_year", values_to = "amount_inr_crores") %>%
  mutate(amount_inr_crores = format(amount_inr_crores, scientific = F, digits = 2),
         amount_inr_crores = as.double(amount_inr_crores))
```

```
new_names <- c("sector", "FY14-15","FY15-16","FY16-17","FY17-18","FY18-19","FY19-20", "FY20-21")
sector <- readxl::read_excel("CSR_Data_Development_Sector_Wise.xlsx", range = "A2:H31") %>%
  clean_names() %>%
  set_names(new_names) %>%
  pivot_longer(-sector, names_to = "financial_year", values_to = "amount_inr_crores")
```

Per FY FY14 to FY21

```
sector %>%
  group_by(financial_year) %>%
  summarize(total_csr_spend_per_fy =  sum(amount_inr_crores)) %>%
  mutate(total_csr_spend_per_fy = round(total_csr_spend_per_fy, 0))
```

```
## # A tibble: 7 x 2
##   financial_year total_csr_spend_per_fy
##   <chr>                           <dbl>
## 1 FY14-15                         10066
## 2 FY15-16                         14517
## 3 FY16-17                         14344
## 4 FY17-18                         17098
## 5 FY18-19                         20150
## 6 FY19-20                         24689
## 7 FY20-21                          8828
```

```
state %>%
  group_by(financial_year) %>%
  summarize(total_csr_spend_per_fy =  sum(amount_inr_crores)) %>%
   mutate(total_csr_spend_per_fy = round(total_csr_spend_per_fy, 0))
```

```
## # A tibble: 7 x 2
##   financial_year total_csr_spend_per_fy
##   <chr>                           <dbl>
## 1 FY14-15                         10066
## 2 FY15-16                         14517
## 3 FY16-17                         14344
## 4 FY17-18                         17098
## 5 FY18-19                         20150
## 6 FY19-20                         24689
## 7 FY20-21                          8828
```

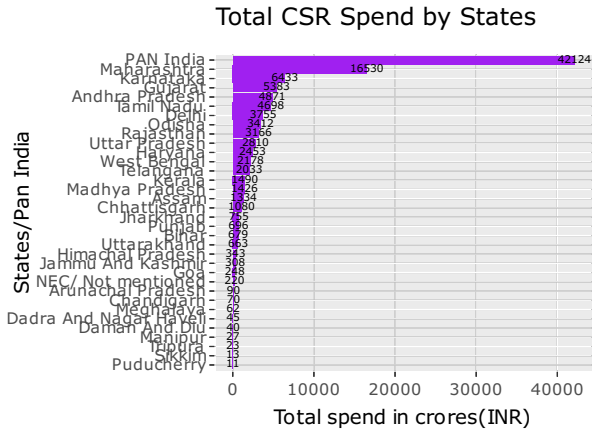
Total FY,Average, Max, Min

```
state %>%
  group_by(financial_year) %>%
  summarize(total_csr_spend_per_fy =  sum(amount_inr_crores)) %>%
  summarize(total_csr_spend = sum(total_csr_spend_per_fy),
            average_csr = mean(total_csr_spend_per_fy),
            max_csr_fy = max(total_csr_spend_per_fy),
            min_csr_fy = min(total_csr_spend_per_fy))
```

```
## # A tibble: 1 x 4
##   total_csr_spend average_csr max_csr_fy min_csr_fy
##             <dbl>       <dbl>      <dbl>      <dbl>
## 1         109692.      15670.     24689.      8828.
```

Per State total CSR Spent from FY14-15 to FY20-21

```
g1 <- state %>%
  filter(amount_inr_crores >= 10) %>%
  group_by(state_ut) %>%
  summarize(total_state_inr_crores = sum(amount_inr_crores)) %>%
  mutate(state_ut = fct_reorder(state_ut, total_state_inr_crores)) %>%
  ggplot(aes(y = state_ut, x = total_state_inr_crores)) +
  geom_col(fill = "purple") +
  geom_text(aes(label = round(total_state_inr_crores,0)), size = 2, hjust = 0, fontface = "bold") +
  labs(y = "States/Pan India",
       x = "Total spend in crores(INR)",
       title = "Total CSR Spend by States", subtitle = "combined total from FY14-15 to FY20-21",
       caption = "data: MCA, India, graph:os2137@caa.columbia.edu")



  plotly::ggplotly(g1)
```

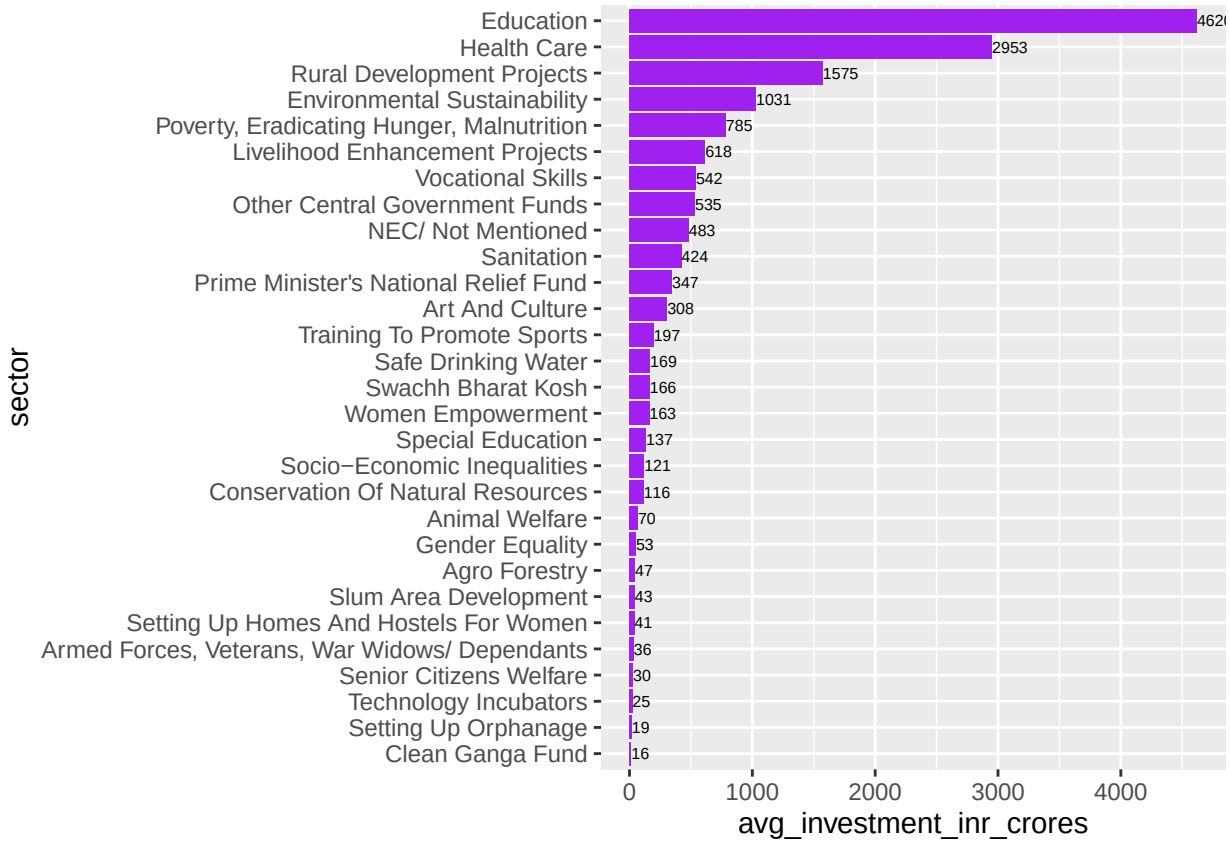


Per State per FY csr spend

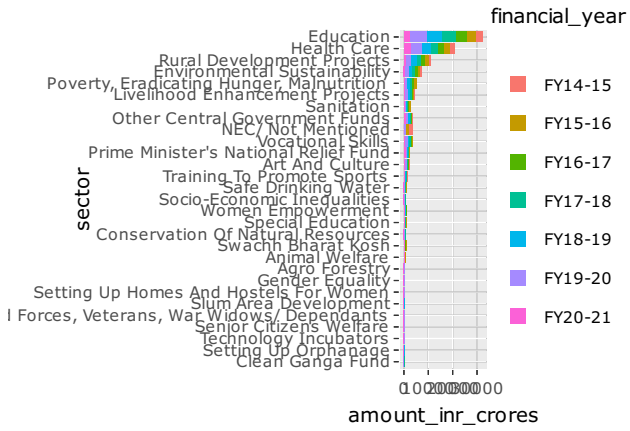
```
g <- state %>%
  # mutate(financial_year = fct_relevel(
  #   financial_year,
  #   c(
  #     "FY14-15",
  #     "FY15-16",
  #     "FY16-17",
  #     "FY17-18",
  #     "FY18-19",
  #     "FY19-20",
  #     "FY20-21"
  #   )
mutate(financial_year = as.factor(financial_year))%>%

  mutate(state_ut = fct_reorder(state_ut, amount_inr_crores)) %>%
  ggplot(aes(y = financial_year, x = amount_inr_crores, fill = forcats::fct_rev(financial_year))) +
  geom_col(position = "dodge") +
geom_text(aes(label = round(amount_inr_crores,0)), size = 2, hjust = 0, vjust = 0.5) +
  facet_wrap(~state_ut)+

scale_fill_discrete(guide=guide_legend(reverse=T))
#   reference: https://stackoverflow.com/questions/38425908/reverse-stacking-order-without-affecting-le
# or +  guides(fill = guide_legend(reverse = TRUE))


# plotly::ggplotly(g)

  # levels(as.factor(state$financial_year))
```

```
g2 <- sector %>%
  group_by(sector) %>%
  summarize(total_investment_inr_crores = sum(amount_inr_crores, na.rm = T)) %>%
  mutate(sector =
           fct_reorder(sector, total_investment_inr_crores)) %>%
  mutate(total_investment_inr_crores = round(total_investment_inr_crores, 0)) %>%
          ggplot(aes(x = total_investment_inr_crores, y = sector)) +
  geom_col(fill = "purple") +
geom_text(aes(label = total_investment_inr_crores), size = 2, hjust = 0)

# plotly::ggplotly(g2)
```

```
sector %>%
  group_by(sector) %>%
  summarize(avg_investment_inr_crores = mean(amount_inr_crores, na.rm = T)) %>%
  mutate(sector =
           fct_reorder(sector, avg_investment_inr_crores)) %>%
  mutate(avg_investment_inr_crores = round(avg_investment_inr_crores, 0)) %>%
          ggplot(aes(x = avg_investment_inr_crores, y = sector)) +
  geom_col(fill = "purple") +

  geom_text(aes(label = avg_investment_inr_crores), size = 2, hjust = 0, vjust = 0.5)
```




```
g <- sector %>%
  mutate(sector = fct_reorder(sector, amount_inr_crores)) %>%
  mutate(amount_inr_crores = round(amount_inr_crores, 0)) %>%
          ggplot(aes(x = amount_inr_crores, y = sector, fill = financial_year)) +
  geom_col() +
  guides(fill = guide_legend(reverse=TRUE))



plotly::ggplotly(g)
```




```
psu_non_psu <- readxl::read_excel("CSR_Data_PSU_Non_PSU_wise.xlsx", range = "A2:O4") %>%
  clean_names()
```

```
names(psu_non_psu)
```

```
##  [1] "psu_non_psu"                     "total_company_fy_2014_15"
##  [3] "amount_spent_fy_2014_15_inr_cr"  "total_company_fy_2015_16"
##  [5] "amount_spent_fy_2015_16_inr_cr"  "total_company_fy_2016_17"
##  [7] "amount_spent_fy_2016_17_inr_cr"  "total_company_fy_2017_18"
##  [9] "amount_spent_fy_2017_18_inr_cr"  "total_company_fy_2018_19"
## [11] "amount_spent_fy_2018_19_inr_cr"  "total_company_fy_2019_20"
## [13] "amount_spent_fy_2019_20_inr_cr"  "total_company_fy_2020_2021"
## [15] "amount_spent_fy_20120_21_inr_cr"
```

```
dim(psu_non_psu)
```

```
## [1]  2 15
```

```
new_names <- c("psu_non_psu",
               "comp_2014to2015",
               "spendinrcrores_2014to2015",
               "comp_2015to2016",
               "spendinrcrores_2015to2016",
               "comp_2016to2017",
```

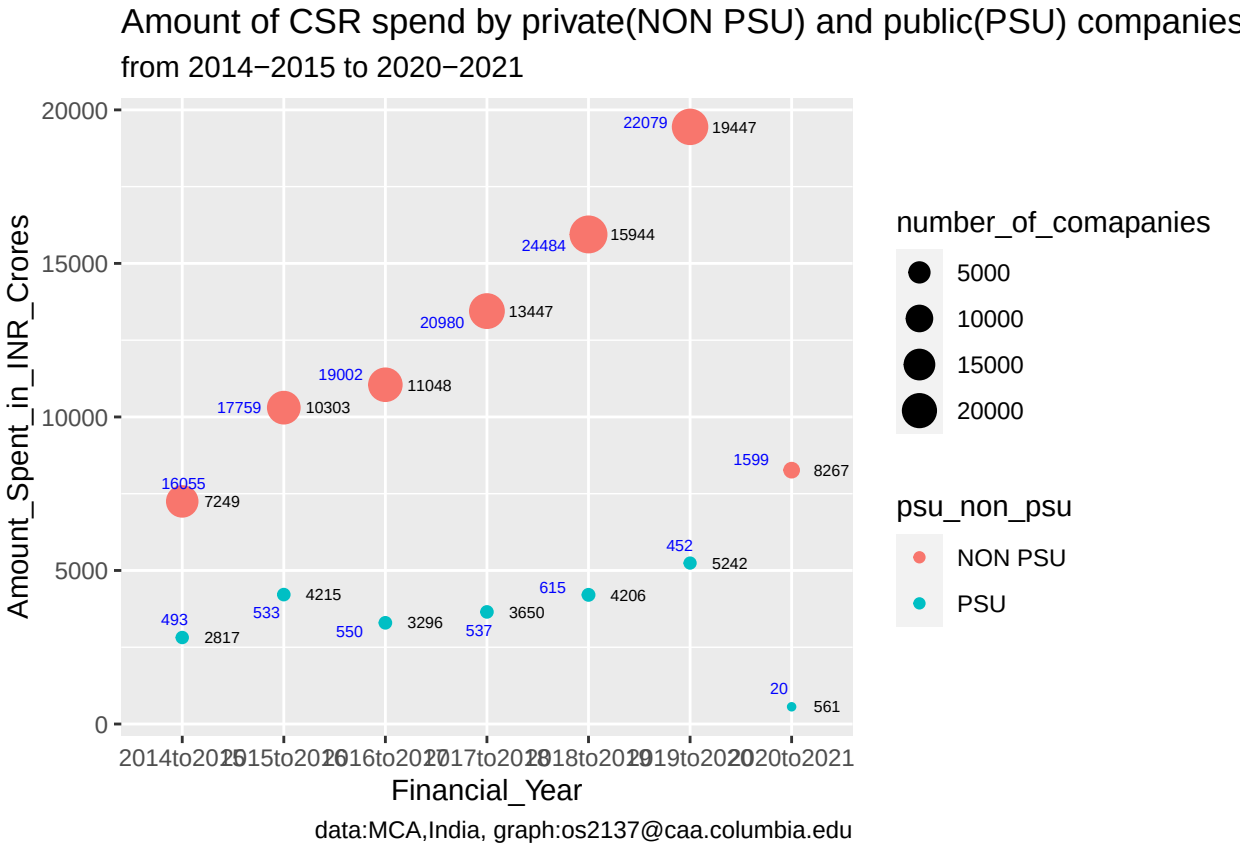
```
                "spendinrcrores_2016to2017",
                "comp_2017to2018",
                "spendinrcrores_2017to2018",
                "comp_2018to2019",
                "spendinrcrores_2018to2019",
                "comp_2019to2020",
                "spendinrcrores_2019to2020",
                "comp_2020to2021",
                "spendinrcrores_2020to2021"
                )
```

```
psu_non_psu <- psu_non_psu %>% set_names(new_names)
psu_non_psu_1 <- psu_non_psu %>%
  select(1, 2,4,6,8,10,12,14) %>%
    pivot_longer(cols = c(comp_2014to2015: comp_2020to2021),
names_to = "company_fy",
values_to = "number_of_comapanies") %>%
  separate(company_fy, c("company", "fy"), sep = "_", extra = "merge")
```

```
psu_non_psu_2 <- psu_non_psu %>%
  select(1, 3, 5, 7, 9, 11, 13, 15) %>%
 pivot_longer( cols = c(spendinrcrores_2014to2015:spendinrcrores_2020to2021),
names_to = "company_fy",
values_to = "amount_spent_inr_crores") %>%
  separate(company_fy, c("company", "fy"), sep = "_", extra = "merge")
```

```
final_psu_non_psu <- psu_non_psu_1 %>%
  left_join(psu_non_psu_2, by = c("psu_non_psu", "fy")) %>%
  select(1, 3, 4, 6)
```

```
final_psu_non_psu %>%
  ggplot(aes(x = fy, y = amount_spent_inr_crores, color = psu_non_psu, size = number_of_comapanies))+
  geom_point() +
  ggrepel::geom_text_repel(aes(label = number_of_comapanies), size = 2, color = "blue", hjust = 0)+
    ggrepel::geom_text_repel(aes(label = round(amount_spent_inr_crores,0)), size = 2, color = "black", h
  labs(x = "Financial_Year",
       y = "Amount_Spent_in_INR_Crores",
       title = "Amount of CSR spend by private(NON PSU) and public(PSU) companies in India",
       subtitle = "from 2014-2015 to 2020-2021",
       caption = "data:MCA,India, graph:os2137@caa.columbia.edu")
```


Amount of CSR spend by private(NON PSU) and public(PSU) companies
from 2014−2015 to 2020−2021
Amount_Spent_in_INR_Crores
20000
15000
10000
5000
0
22079
19447
24484
15944
20980
13447
19002
11048
17759
10303
1599
8267
16055
7249
452
5242
615
4206
533
4215
493
2817
550
3296
537
3650
20
561
2014to2015
2015to2016
2016to2017
2017to2018
2018to2019
2019to2020
2020to2021
Financial_Year
data:MCA,India, graph:os2137@caa.columbia.edu
number_of_comapanies
5000
10000
15000
20000
psu_non_psu
NON PSU
PSU