

Project title: World Happiness Visualisation

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Introduction:

The data that I have selected for my project is to explain the quality of life across different countries which is collected from World Happiness Report, which was contributed by Gallup World Poll. In this Report we will be looking at the Happiness Score of different Countries from 2016 to 2021. We will be also comparing the pre COVID and when COVID impacted years, to see the quality of life across different Countries. The data for our research is available through the website of World Happiness Report.

1. Project Description and Motivation:

In this project we have different variables that will contribute to the overall quality of life. We will be looking into Happiness_Score, Happiness_Rank, Log_GDP_per_Capita, Generosity, Social_Support, Healthy_LifeExpectancy, Freedom_to_LifeChoice, Corruption. We will explore data to find out how these factors affect the Happiness Score and overall quality of Life.

The World Happiness Report has different visualisation reports with high level in nature, but may not be really user friendly. We will also be concentrating on user friendly visualisations, and combining data available to look at the relationship between pre covid and when covid impacted our lives.

This project will give general public insights on top countries having high happiness, Also comparing them and looking at different factors that may be common in them. It will allow to compare different variables in different years.

2. Project Value:

Being Happy plays a major role in individual health and Well-being. Happiness improves over all quality of life. This project will concentrate on exploring the happiness across the globe and compare different countries and Continents.

The main objective of this project is to identify valuable data insights that would help general public to gain insight in factors contributing to happiness and compare happiness, which enhances quality of life across the globe.

Some Question that may be included are as below:

1. Relationship between different factors from 2016 to 2021.
2. Comparing Happiness Score before and during COVID impact.
3. Relationship between happiness and different factors of top 5 and bottom 5 Countries and what they have in common.

(* Clarification on changes made to question from assessment 1:

I thought to focus on top 5 and bottom 5 Countries instead of 20, combined 1st and 3rd question from assessment1 and added question 1).

3. Data Collection and Wrangling:

The Data Wrangling for the project was carried out using R Markdown.

The data we got from World Happiness Report, is in xls format. To load data and we need to perform data wrangling techniques.

The data from 2005 to 2020 is stored in one file, while the data for 2021 was stored separately.

We first need to load data from 2005 to 2020. We will filter the values to get data from 2016 to 2020. We will then check the data type for each variable. Once we done with filtering and checking, we will then load 2021 data.

In the 2021 data, year column is missing. So we will add the year column to it. Then once the year column is added, we will make sure that all the names are similar in both columns and if not change the names, as it will be easier to merge the data. We will merge both the data using full join. So we can get a complete data from year 2016 to year 2021. After merging we will delete all unwanted columns and renamed and arranged them. The Continents column is then added using Contrrycode library. Only Kosovo Continent was missing. So replaced the value for continents as Europe for Kosovo. Once the data is merged we will do some preliminary data exploration and after that we will filter data to gain insights of top20 and bottom20 Countries. Also filtering data into the year before covid and when we were impacted by covid. To do some preliminary analysis we will have to convert the variables Country, Continent and year into factor type. But to filter data using year we will have to convert the year data back to numeric.

```

10 # Loading data
11 ...
12 world_data <- readxl::read_xls("./Users/Akshata/Desktop/World_happiness/2005_2021_happiness_data.xls")
13 ...
14 ...
15 ...
16 ...
17 head(world_data)
18 ...

```

Country name	year	Life Ladder	Log GDP per capita	Social support
Afghanistan	2008	3.723590	7.370100	0.490623
Afghanistan	2009	4.401778	7.539972	0.5523084
Afghanistan	2010	4.756381	7.646709	0.5590752
Afghanistan	2011	3.831719	7.619532	0.5211036
Afghanistan	2012	3.782938	7.705479	0.5206367
Afghanistan	2013	3.572100	7.725029	0.4835519

```

19 ...
20 ...
21 # We are going to concentrate the data from 2016 to 2021. So filtering the data and then merging
22 the data with 2021 year.
23 data_h <- world_data %>% filter(year>=2015)
24 ...
38:4 Loading data : R Markdown

```

Fig1: Loading data from year 2005 to 2021 and Filtering data from year 2016

```

35 ...
36 # Checking filtered data types for variables in data
37 ...
38 str(data_h)
39 ...

```

Country name	year	Life Ladder	Log GDP per capita	Social support	Healthy life expectancy at birth	Freedom to make life choices	Generosity	Perceptions of corruption	Positive affect	Negative affect	
Afghanistan	2016	4.34	7.456	2.69	5.9	4.51	0.599	7.7	7.4	7.7	3.1
Afghanistan	2017	4.47	7.577	2.77	6.0	4.61	0.609	7.7	7.4	7.7	3.1
Afghanistan	2018	4.51	7.698	2.89	6.1	4.71	0.619	7.7	7.4	7.7	3.1
Afghanistan	2019	4.51	7.819	2.99	6.2	4.81	0.629	7.7	7.4	7.7	3.1
Afghanistan	2020	4.51	7.940	3.11	6.3	4.91	0.639	7.7	7.4	7.7	3.1
Afghanistan	2021	4.51	8.061	3.23	6.4	5.01	0.649	7.7	7.4	7.7	3.1

```

40 ...
41 ...
42 ...
43 # Reading 2021 data
44 data_2021 <- readxl::read_xls("./Users/Akshata/Desktop/World_happiness/2021world-happiness.xls")
45 ...
46 ...
47 ...
48 ...
49 ...
50 ...
51 ...
52 ...

```

Fig2: loading data 2021

```

Source | Visual
110 # Making sure all the names of columns are same, so changing to appropriate names.
111 ````{r}
112
113 names(data_h)[1] <- "Country"
114 names(data_h)[4] <- "Log_GDP/capita"
115 names(data_h)[5] <- "Social_support"
116 names(data_h)[6] <- "Healthy_LifeExpectancy"
117 names(data_h)[7] <- "Freedom_to_lifeChoice"
118 names(data_h)[9] <- "Corruption"
119 ...
120 ...
121 ...
122 ````{r}
123 str(data_2021)
124
125 ...
126 ````{r}
127 names(data_2021)[1] <- "Country"
128 names(data_2021)[4] <- "Log_GDP/capita"
129 names(data_2021)[5] <- "Social_support"
130 names(data_2021)[6] <- "Healthy_LifeExpectancy"
131 names(data_2021)[7] <- "Freedom_to_lifeChoice"
132 names(data_2021)[9] <- "Corruption"
133 ...
134 ...
135 ...
136 ...
137 str(data_2021)
138 str(data_h)
139
140

```

Fig3: Displaying columns of data without year

```

69
70 ````{r}
71 # adding year column to above dataframe
72 data_2021$year <- 2021
73
74 ````{r}
75
76

```

Fig4: Adding year column to the data

```

Source | Visual
53 ````{r}
54 str(data_2021)
55


|   | Country         | Year | Log_GDP/capita | Social_support | Healthy_LifeExpectancy | Freedom_to_lifeChoice | Corruption |
|---|-----------------|------|----------------|----------------|------------------------|-----------------------|------------|
| 0 | Finland         | 2021 | 24.5           | 8.67           | 80.55                  | 0.946                 | 0.670      |
| 1 | Denmark         | 2021 | 24.3           | 8.65           | 80.59                  | 0.946                 | 0.670      |
| 2 | Switzerland     | 2021 | 24.2           | 8.64           | 80.59                  | 0.946                 | 0.670      |
| 3 | ... (truncated) | ...  | ...            | ...            | ...                    | ...                   | ...        |


56
57
58
59

```

```

144
145
146 ````{r}
147 # Merging the data from 2016 to 2020 with the data 2021
148
149 data_world <- data_h %>% full_join(data_2021)
150
151 ````{r}
Joining, by = c("Country", "year", "Happiness_Score", "Log_GDP/capita", "Social_support",
"Healthy_LifeExpectancy", "Freedom_to_lifeChoice", "Generosity", "Corruption")

```

Fig6: Merging data

Fig5: Making sure all the names of both columns in both data are same

we will check data after merging for any missing values. As we can see below we do not have more missing values, so we will omit the rows with missing values.

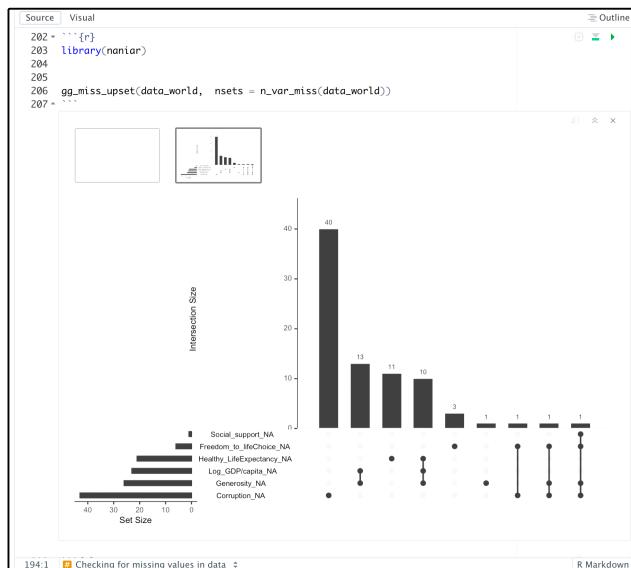


Fig7: Missing values using library naniar

```

Source: Visual
281 data_2016 <- data_world %>% filter(year == 2016)
282 data_2017 <- data_world %>% filter(year == 2017)
283 data_2018 <- data_world %>% filter(year == 2018)
284 data_2019 <- data_world %>% filter(year == 2019)
285 data_2020 <- data_world %>% filter(year == 2020)
286 data_2021 <- data_world %>% filter(year == 2021)
287 -
288
289
290
291 - # Adding Happiness Rank
292 ````{r}
293 data_2016$Happiness_Rank <- rank(data_2016$Happiness_Score)
294 data_2017$Happiness_Rank <- rank(data_2017$Happiness_Score)
295 data_2018$Happiness_Rank <- rank(data_2018$Happiness_Score)
296 data_2019$Happiness_Rank <- rank(data_2019$Happiness_Score)
297 data_2020$Happiness_Rank <- rank(data_2020$Happiness_Score)
298 data_2021$Happiness_Rank <- rank(data_2021$Happiness_Score)
299 -
300
301
302 ````{r}
303 data_2016$Code <- countrycode(sourcevar = data_2016[["Country"]],
304                                     origin = "country.name",
305                                     destination = "iso3c")
306 data_2017$Code <- countrycode(sourcevar = data_2017[["Country"]],
307                                     origin = "country.name",
308                                     destination = "iso3c")
309 data_2018$Code <- countrycode(sourcevar = data_2018[["Country"]],
310                                     origin = "country.name",
311                                     destination = "iso3c")
312 data_2019$Code <- countrycode(sourcevar = data_2019[["Country"]],
313                                     origin = "country.name",
314                                     destination = "iso3c")
315 data_2020$Code <- countrycode(sourcevar = data_2020[["Country"]],
316                                     origin = "country.name",
317                                     destination = "iso3c")
318 data_2021$Code <- countrycode(sourcevar = data_2021[["Country"]],
319                                     origin = "country.name",
320                                     destination = "iso3c")

```

Fig8: Splitting data in each year and adding code and continents. For further analysis.

```

````{r}
data_world_top5 <- data_2021 %>% filter(Happiness_Rank<6)
data_world_bottom5 <- data_2021 %>% filter(Happiness_Rank>144)
````

# Combining both the data top and bottom 20
````{r}
total_d <- rbind(data_world_top5, data_world_bottom5)
````

````{r}
summary(total_d)
````



Country	Continents	year	Happiness_Score	Happiness_Rank
Afghanistan	:1 Africa	:4 2016: 0	Min. :2.523	Min. : 1.00
Botswana	:1 Americas	:0 2017: 0	1st Qu.:3.428	1st Qu.: 3.25
Denmark	:1 Asia	:1 2018: 0	Median :5.488	Median : 75.00
Finland	:1 Europe	:5 2019: 0	Mean :5.411	Mean : 75.00
Iceland	:1 Oceania	:0 2020: 0	3rd Qu.:7.567	3rd Qu.:146.75
Lesotho	:1	2021:0	Max. :7.842	Max. :149.00
(Other)	:4			
Log_GDP_per_capita	Social_Support	Healthy_LifeExpectancy	Freedom_to_lifeChoice	
Min. : 7.676	Min. :0.4626	Min. :48.70	Min. :-0.3817	
1st Qu.: 7.930	1st Qu.:0.7589	1st Qu.:56.97	1st Qu.:-0.7423	
Median :10.278	Median :0.8642	Median :66.70	Median :0.9049	
Mean : 9.566	Mean :0.8111	Mean :64.26	Mean : -0.8176	
3rd Qu.:10.918	3rd Qu.:0.9586	3rd Qu.:72.62	3rd Qu.:0.9389	
Max. :11.117	Max. :0.9829	Max. :74.40	Max. :0.9551	
Generosity	Corruption	Code		
Min. :-0.24616	Min. :0.1668	Length:10		
1st Qu.:-0.10070	1st Qu.:0.2123	Class :character		
Median : -0.01136	Median :0.5054	Mode :character		
Mean : -0.01725	Mean :0.5295			
3rd Qu.: 0.05292	3rd Qu.:0.8159			
Max. : 0.17540	Max. :0.9243			


```

Fig9 : Dividing into top 5 and bottom 5 countries and then merging them together to carry out further exploration

4. Data Exploration

we will explore our data outliers, and correlations.

We will check the data summary and plot some box plots for each variables.

We will also see how each variable vary each year using violin plots.

```
263 ~ t[1]
264 summary(data_world)
265 ~ ```

Country Continents year Happiness_Score Happiness_Rank Log_GDP/capita
Albania : 6 Africa :205 2016:124 Min. :2.375 Min. : 1.0 Min. : 6.635
Argentina : 6 Americas:117 2017:132 1st Qu.:4.748 1st Qu.:185.2 1st Qu.: 8.534
Australia : 6 Asia :172 2018:126 Median :5.551 Median :369.5 Median : 9.569
Austria : 6 Europe :228 2019:126 Mean :5.544 Mean :369.5 Mean : 9.433
Bangladesh: 6 Oceania : 12 2020: 81 3rd Qu.:6.280 3rd Qu.:553.8 3rd Qu.:10.390
Belgium : 6 2021:149 Max. :7.889 Max. :738.0 Max. :11.648
(Other) :702
Social_support Healthy_LifeExpectancy Freedom_to_lifeChoice Generosity
Min. :-0.2902 Min. :-44.90 Min. :0.3035 Min. :-0.33504
1st Qu.:0.7406 1st Qu.:59.30 1st Qu.:0.7159 1st Qu.:-0.12171
Median :0.8414 Median :66.40 Median :0.8069 Median :-0.03452
Mean :0.8143 Mean :64.79 Mean :0.7872 Mean :-0.01160
3rd Qu.:0.9126 3rd Qu.:69.70 3rd Qu.:0.8794 3rd Qu.: 0.07931
Max. :0.9849 Max. :77.10 Max. :0.9852 Max. : 0.67943

Corruption
Min. :0.04731
1st Qu.:0.67715
Median :0.79202
Mean :0.72956
3rd Qu.:0.85488
Max. :0.96948
```

Fig10: Summary statistics

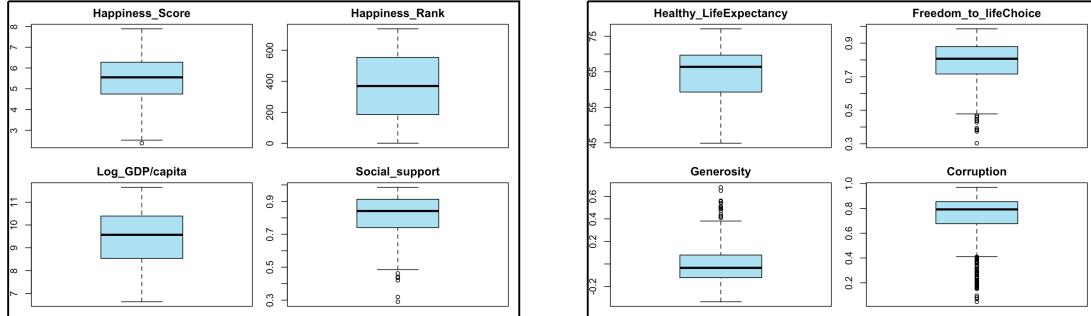


Fig11: Boxplot for variables

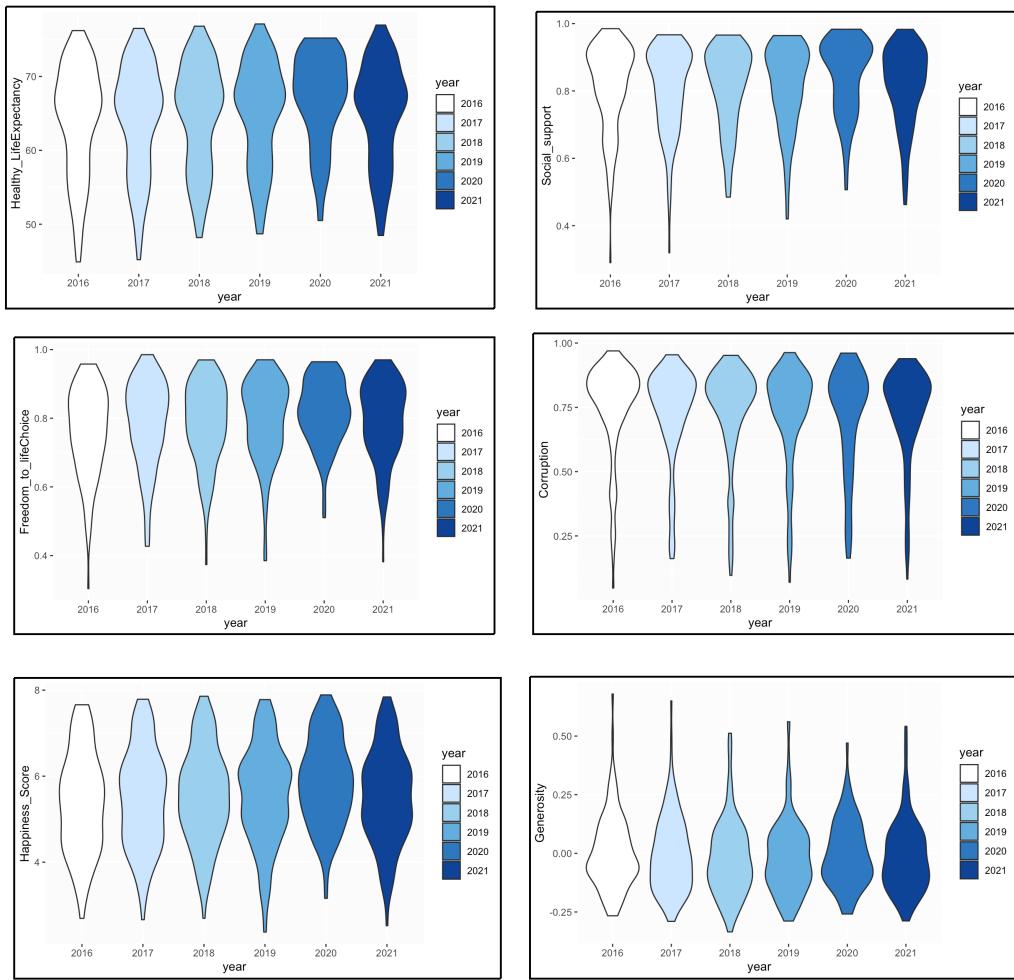


Fig12: Violin plots for variables

In the box plots we can see some outliers, but this could be due to different countries might have extreme values for corruption, Generosity, Freedom to make life choice and Social Support.

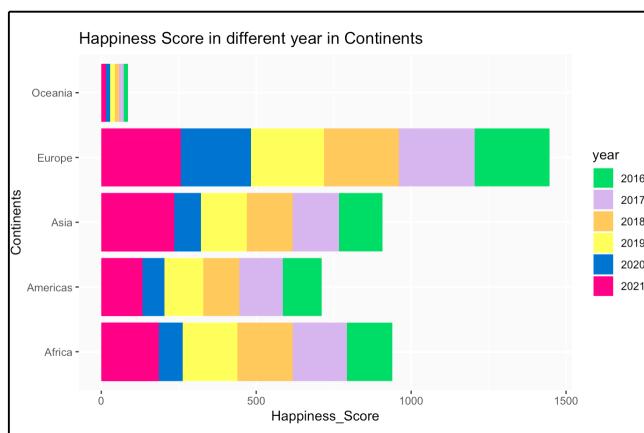


Fig13:Happiness Score for different continents between 2016 to 2021

Comparing the Happiness Score at different years for continents. As we can see the happiness Score for most continents was very low in 2020 as compared to other years.

And Let us see some correlation between each dependant variables. I have created an interactive correlation plot matrix as below.

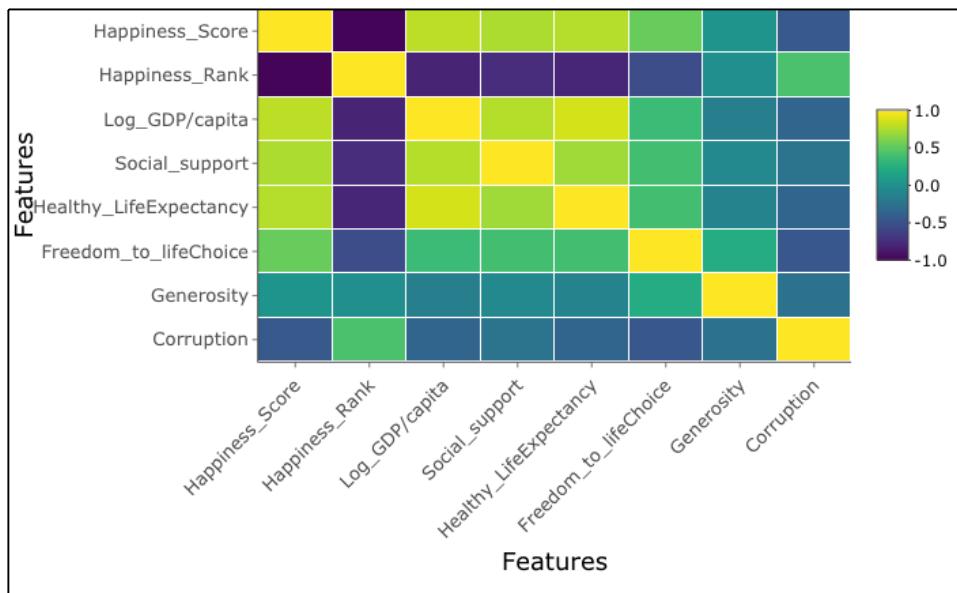


Fig14: Correlation between different features.

Let us explore effect of different factors on Happiness Score in different continents.

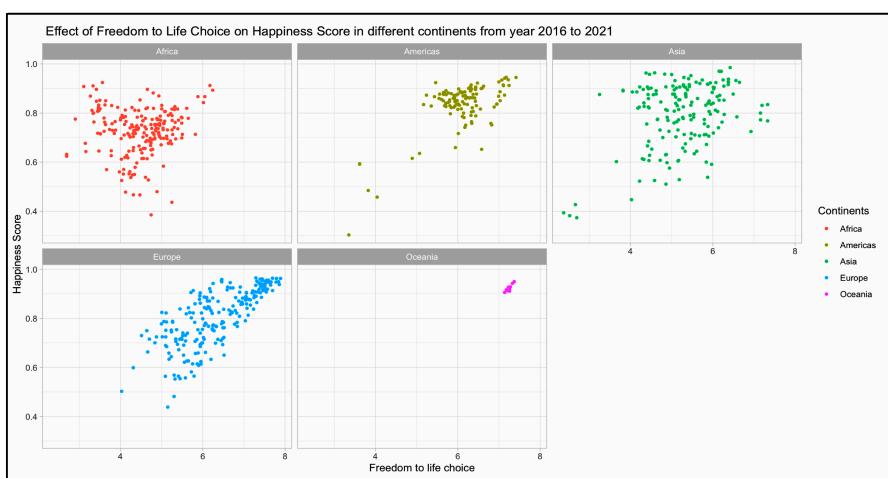


Fig15: Freedom of Life Choice Vs Happiness Score

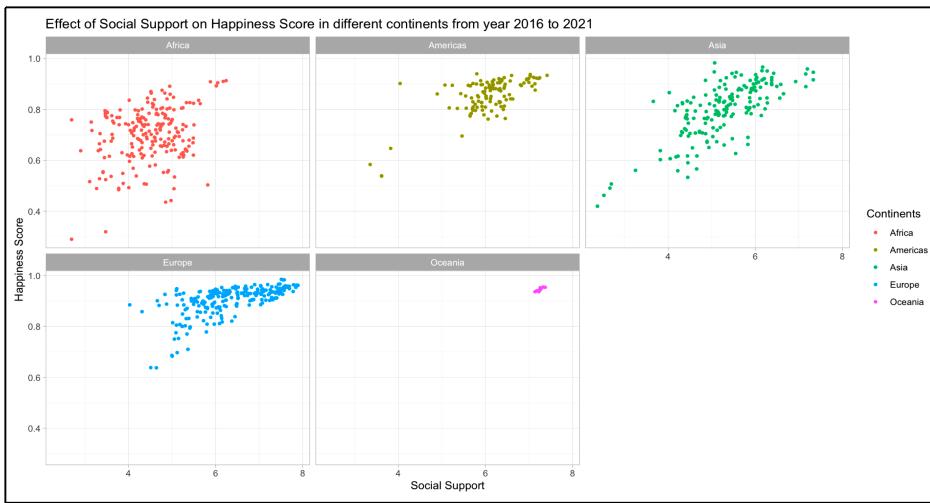


Fig16: Social Support Vs Happiness Score

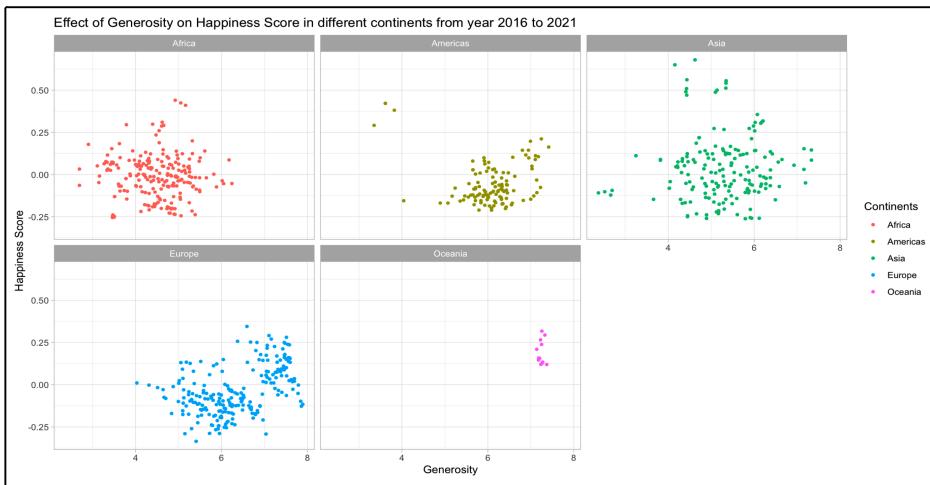


Fig17: Generosity Vs Happiness Score

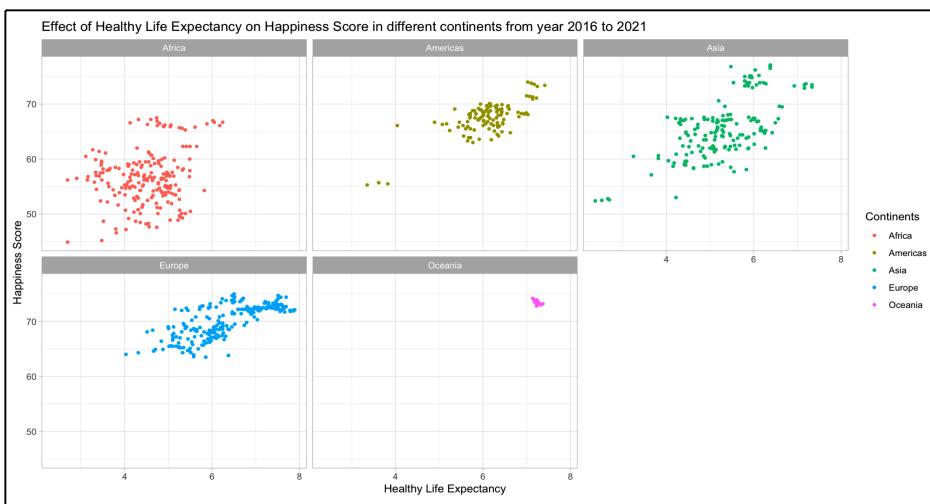


Fig18: Healthy Life Expectancy Vs Happiness Score

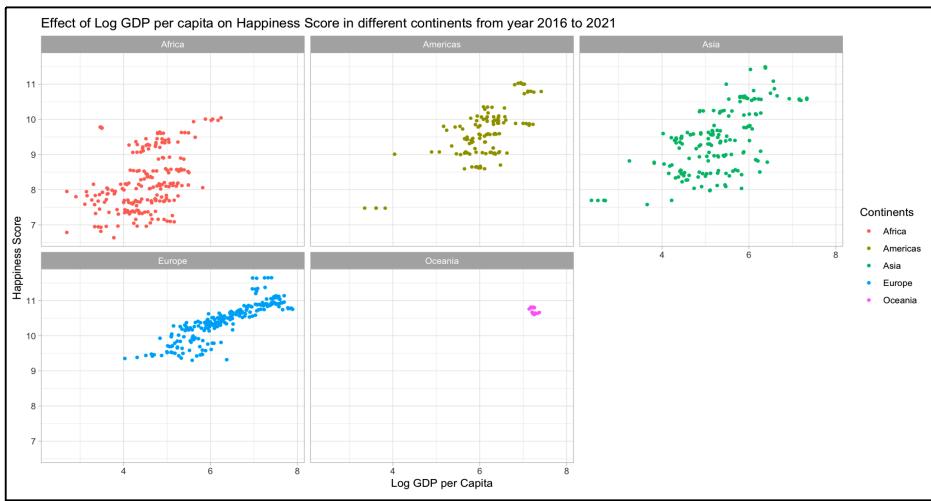


Fig19: Log GDP per Capita Vs Happiness Score

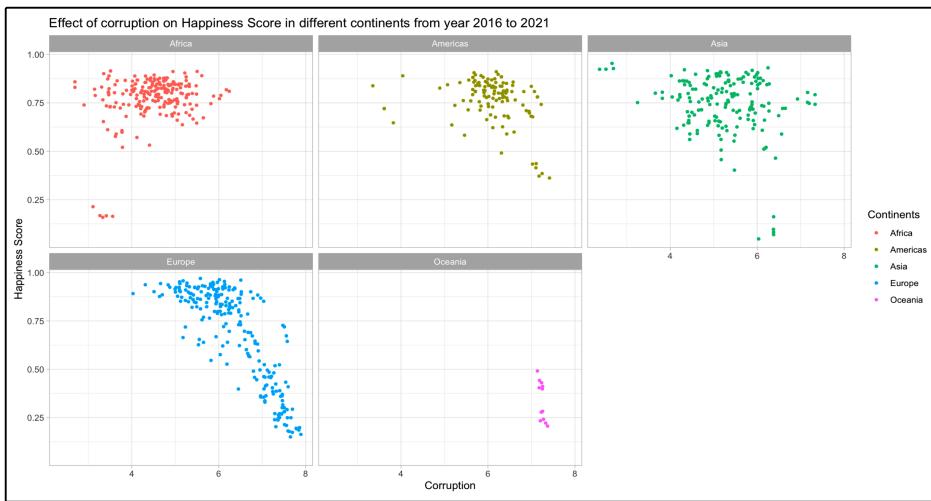


Fig20: Corruption Vs Happiness Score

From above plots we can see that higher the Happiness Score leads to higher freedom of choice, Healthy Life Expectancy, and Generosity. Also higher the Social support higher is the Happiness Score. Increase in Log GDP per capita is also related to increase in Happiness Score. Corruption is quite interesting, we can see in some continents like Africa, Asia and Americas, even though corruption is high the Happiness Score is High also. But in Europe and Oceania High corruption leads to lower Happiness Score.

Let us explore top 5 and bottom 5 countries.

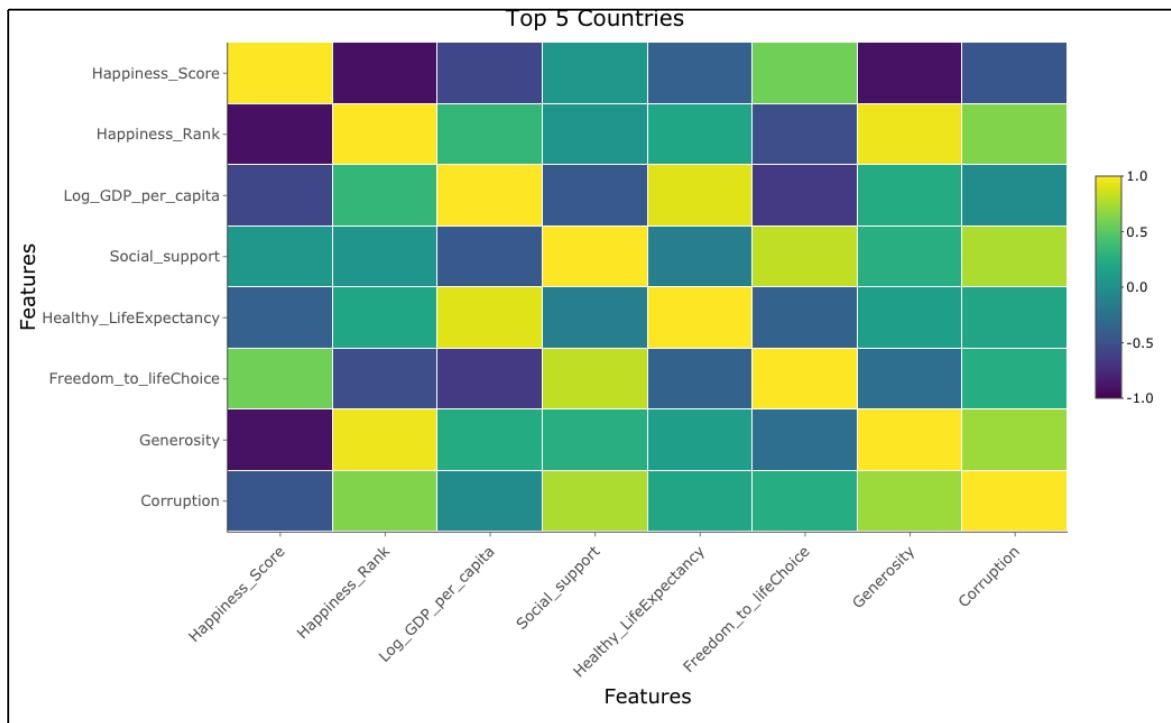


Fig21: Correlation plot for Top 5 Happiness Score Countries

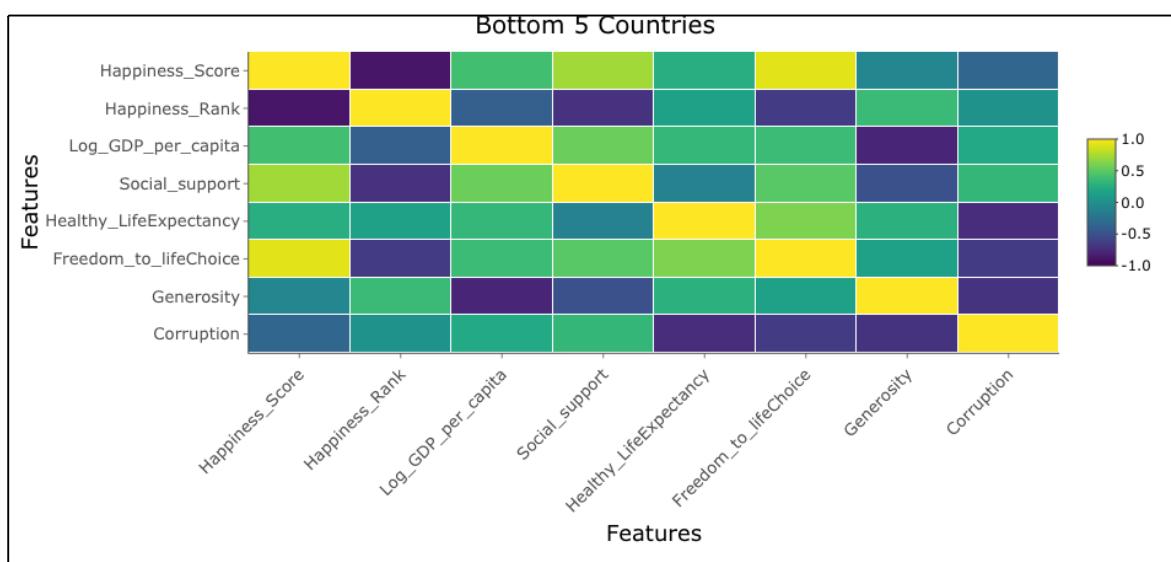


Fig22: Correlation plot for Bottom 5 Happiness Score Countries

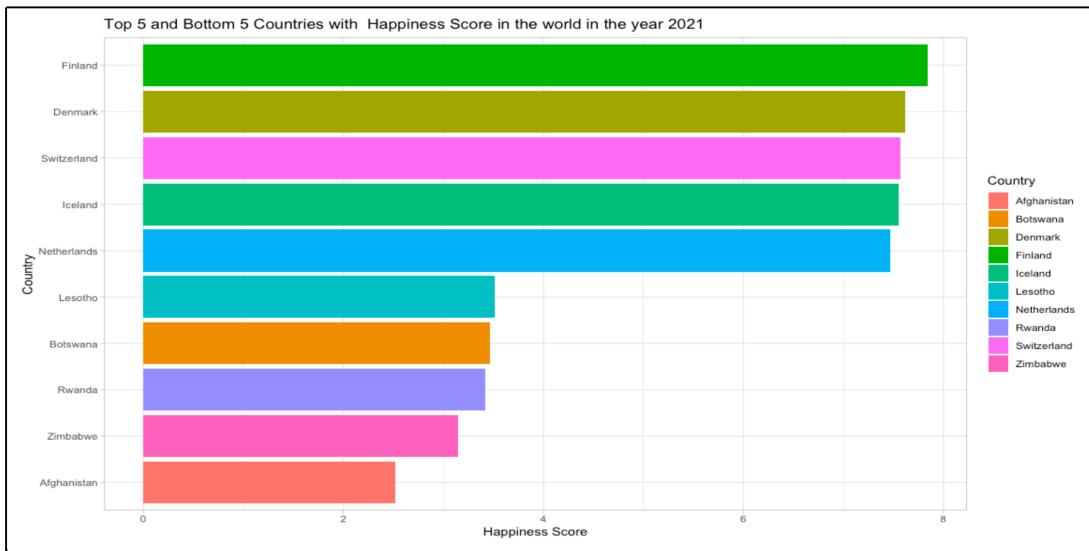


Fig23: Top 5 and Bottom 5 Countries with Happiness Score

As we can see in above plot, the top 5 countries with higher Happiness Score are:

- 1) Finland,
- 2) Denmark,
- 3) Switzerland,
- 4) Iceland,
- 5) Netherlands.

The Bottom 5 Countries with lower Happiness Score are:

- 1) Afghanistan,
- 2) Zimbabwe,
- 3) Rwanda,
- 4) Botswana,
- 5) Lesotho.

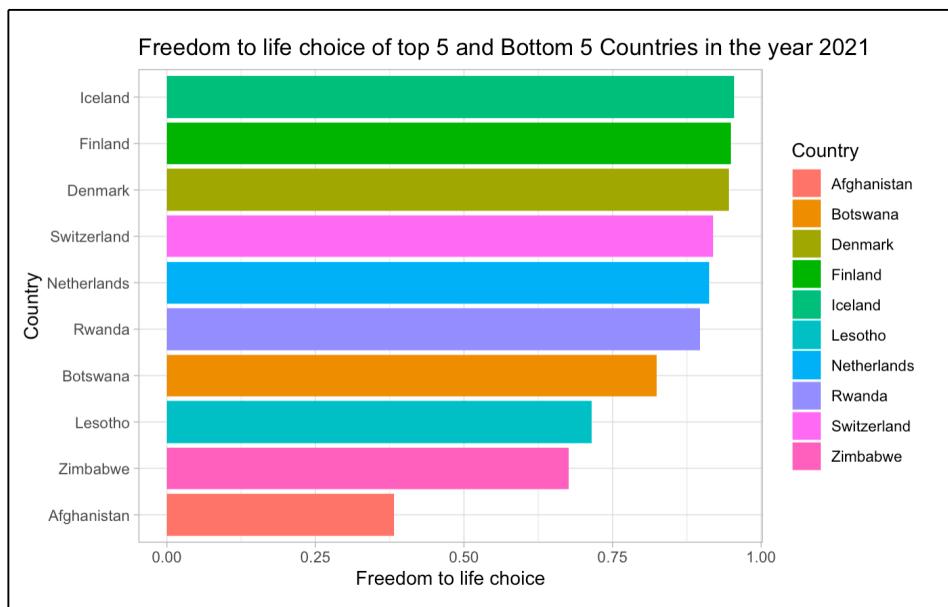


Fig24: Freedom to make Choice of Top 5 and Bottom 5 Countries

As we can see from above plot although Rwanda is having lower Happiness Score but the Score for Freedom to life Choice is as similar to top 5 countries.

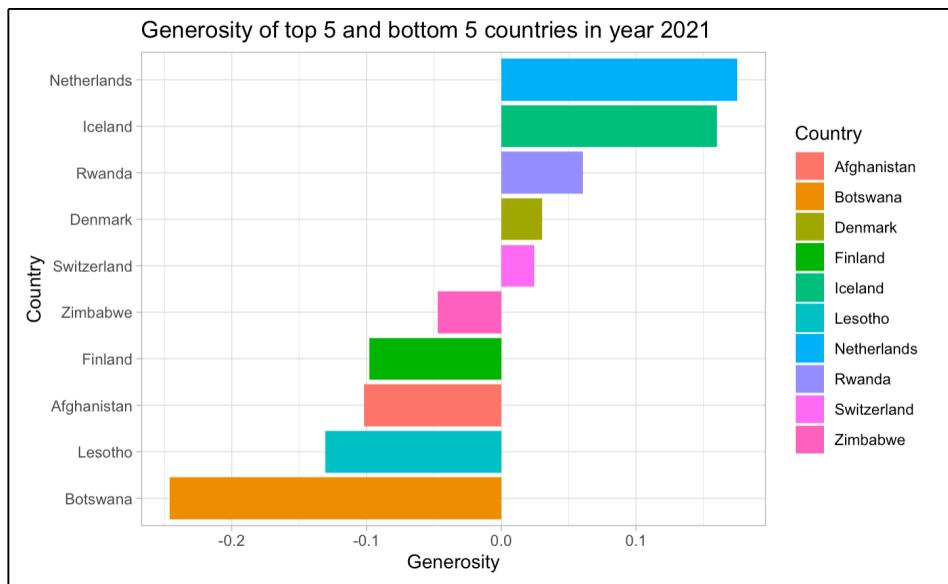


Fig25: Generosity of Top 5 and Bottom 5 Countries

Generosity is seen more in top 5 Countries.

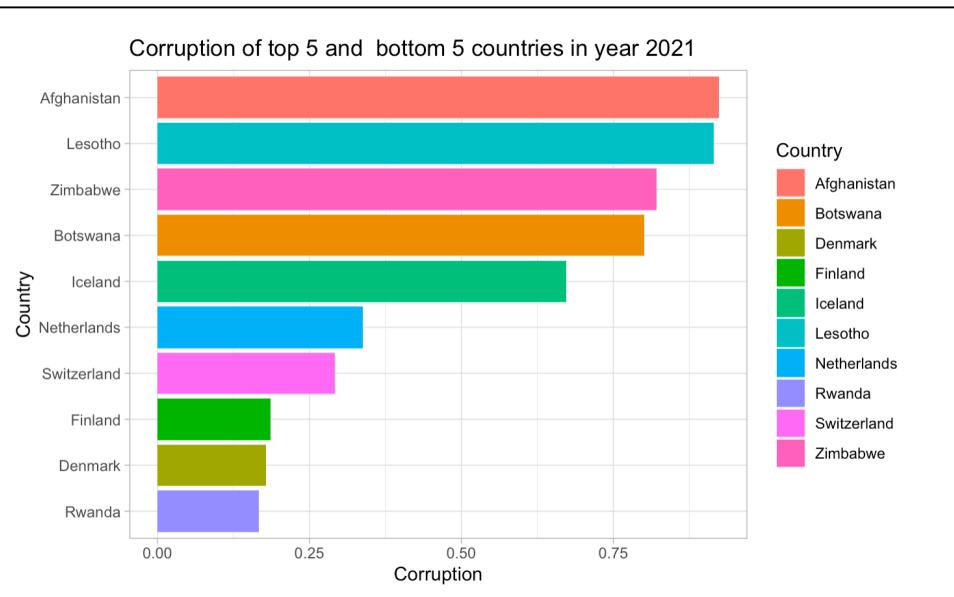


Fig26: Corruption of Top 5 and Bottom 5 Countries

We can see that the Countries with lower Happiness Score is having higher Corruption rate. But quite interesting to see that Iceland is having higher Corruption even though it is one of the top 5 Countries with higher Happiness Score.

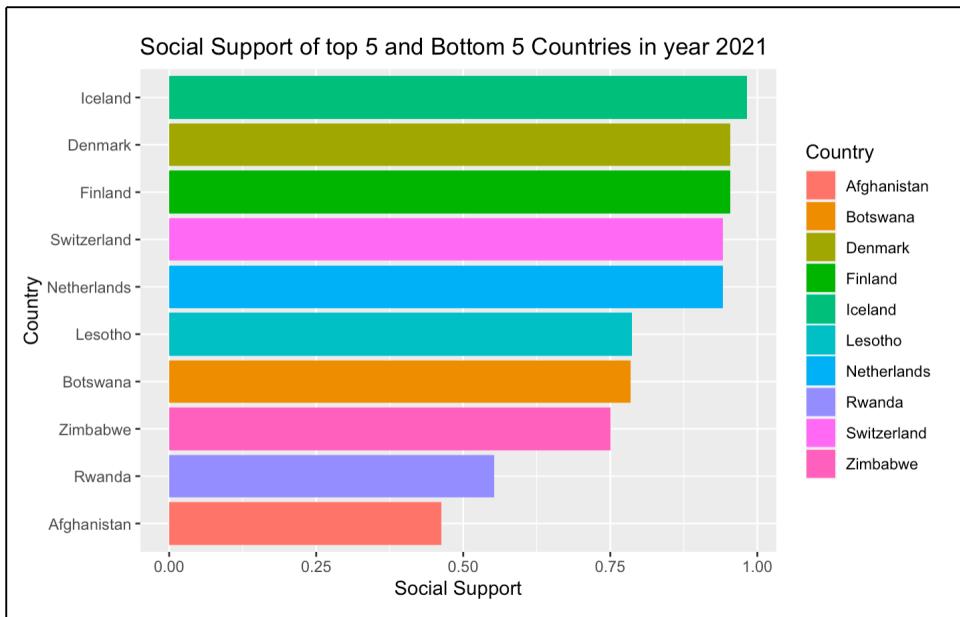


Fig27: Social Support of Top 5 and Bottom 5 Countries

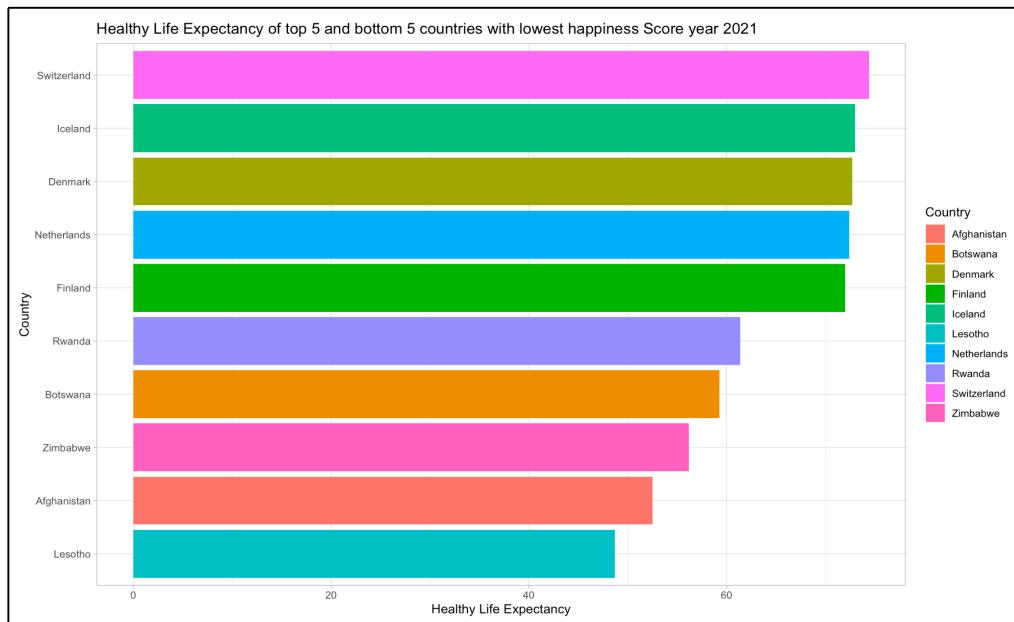


Fig28: Healthy Life Expectancy of Top 5 and Bottom 5 Countries

Top 5 Countries have higher Healthy life expectancy as compared to the bottom 5 countries.

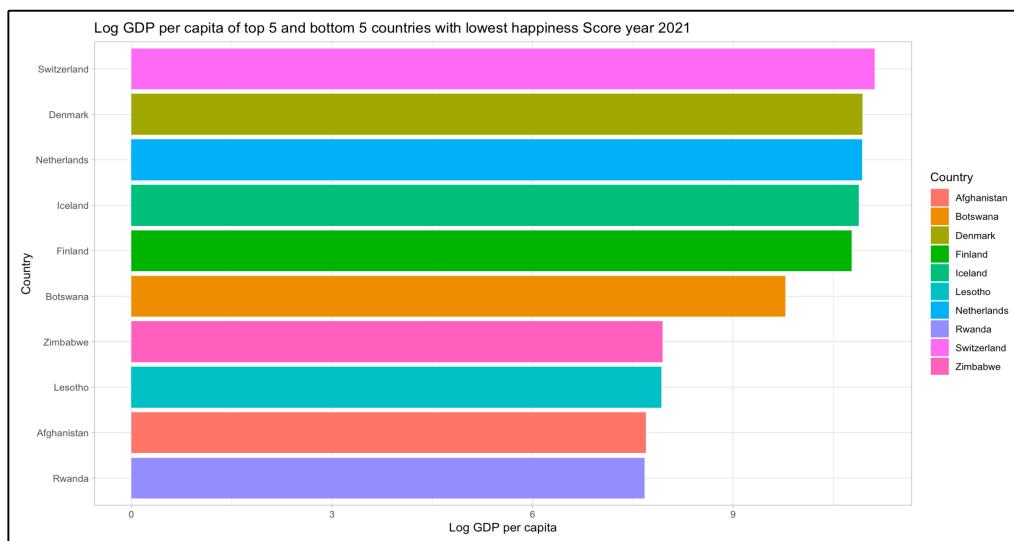


Fig28: Log GDP per Capita of Top 5 and Bottom 5 Countries

We can see that bottom 5 countries Have lower GDP per capita as compared to Top 5 countries.

But Botswana have higher Log GDP as compared to other Bottom 5 Countries.

Let us explore pre Covid years and during covid years of data.

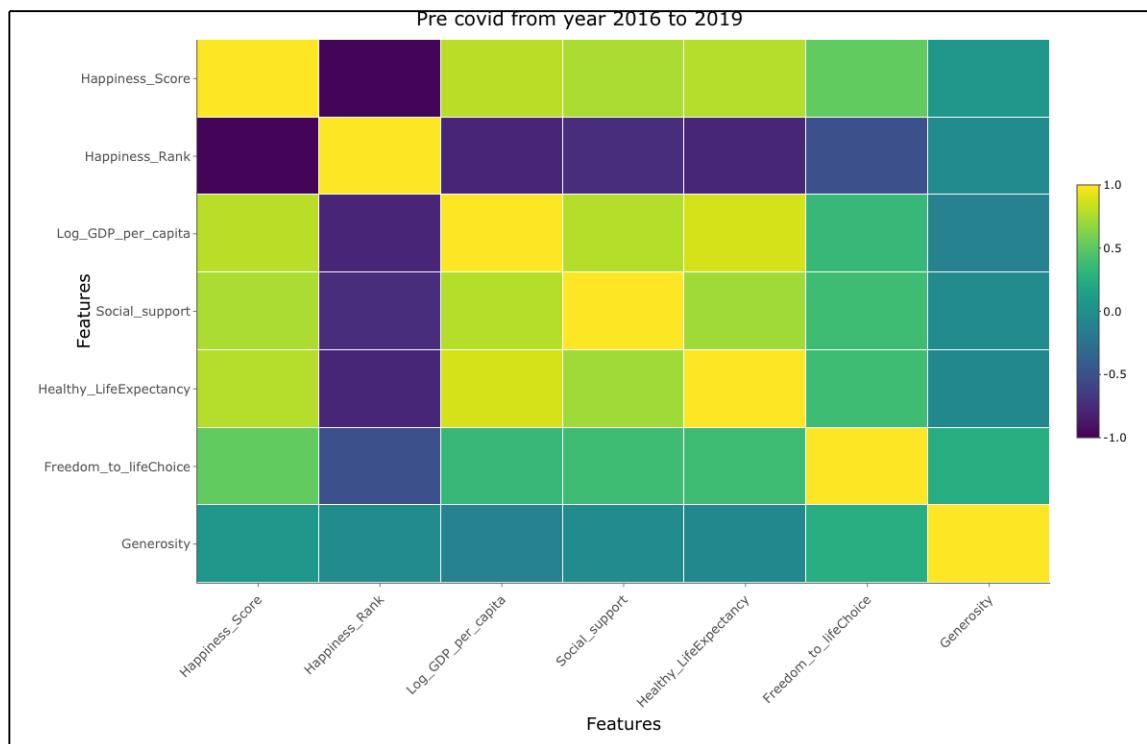


Fig29: Pre COVID year Correlation plot

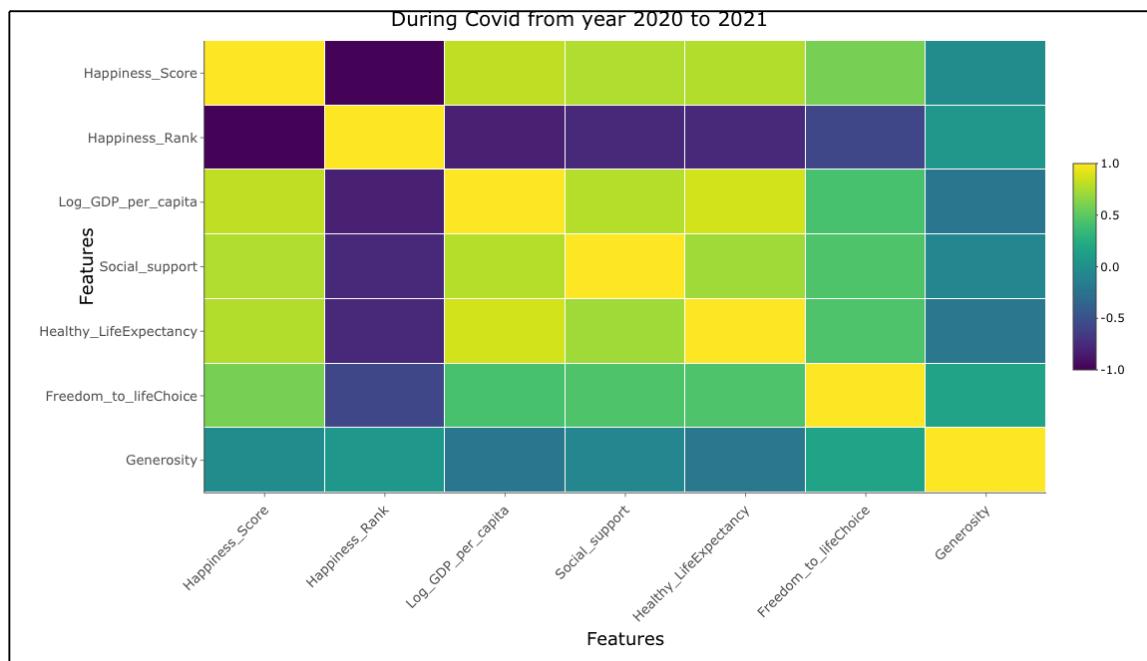


Fig30: During COVID year Correlation plot

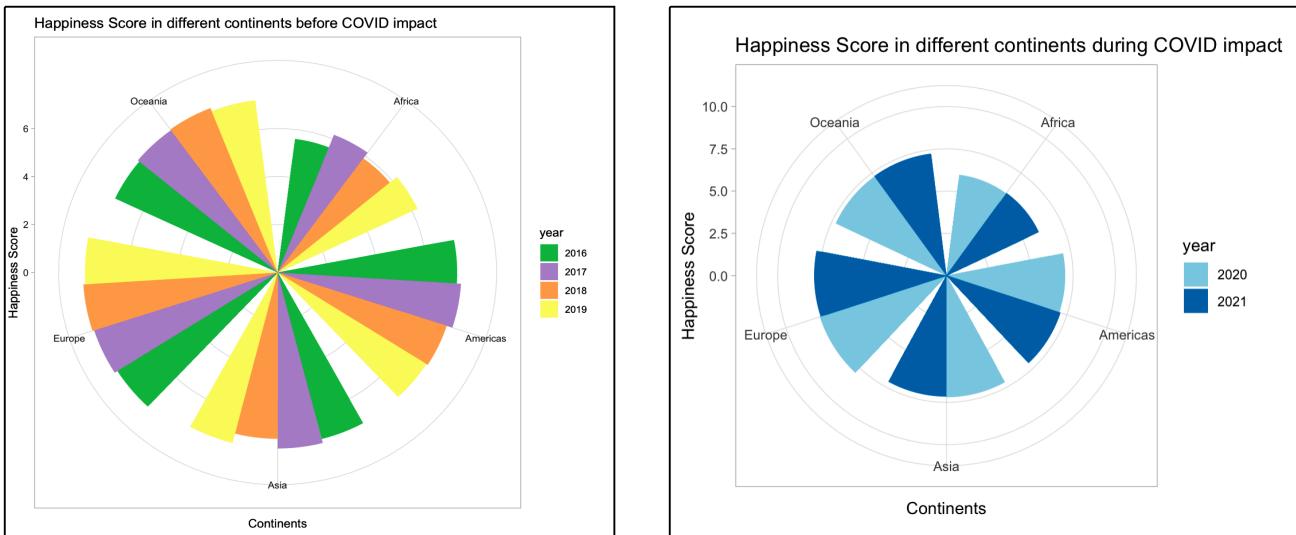


Fig31: Happiness Score in different Continents pre and during COVID

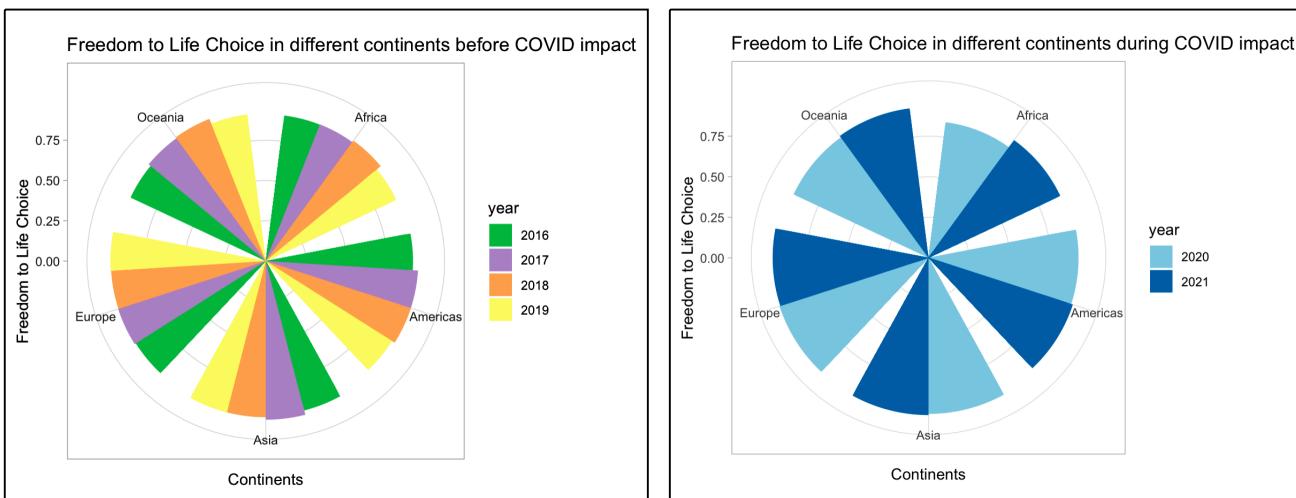


Fig32: Freedom to Life Choice in different Continents pre and during COVID

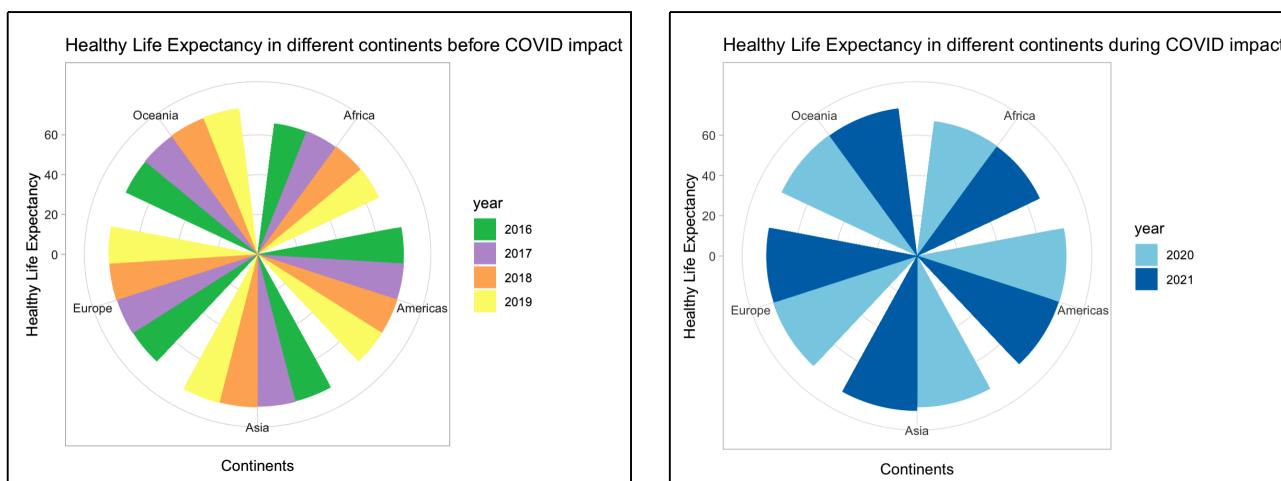


Fig33: Healthy Life Expectancy in different Continents pre and during COVID

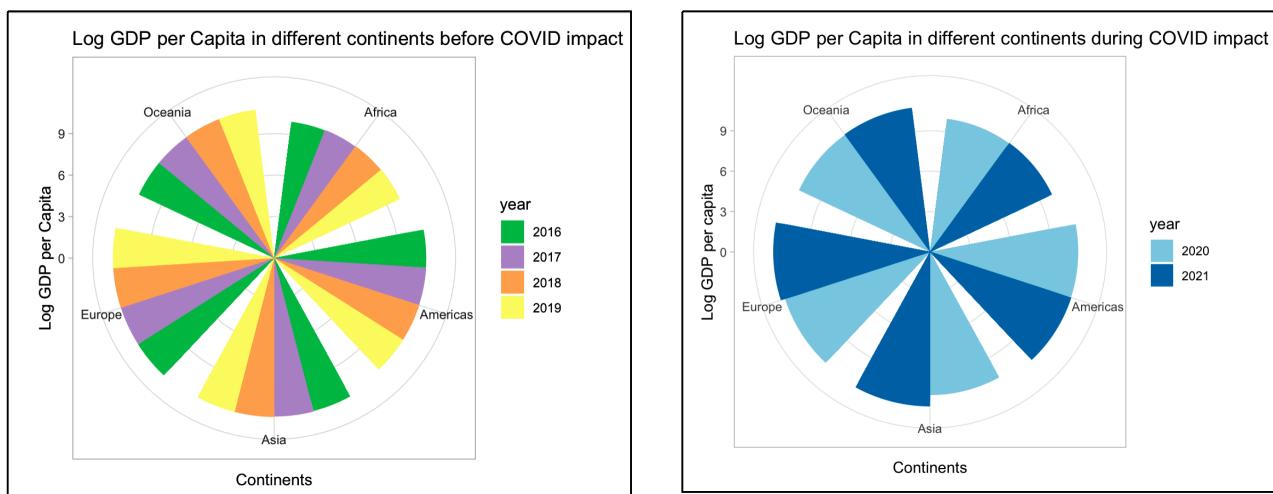


Fig34: Log GDP per Capita in different Continents pre and during COVID

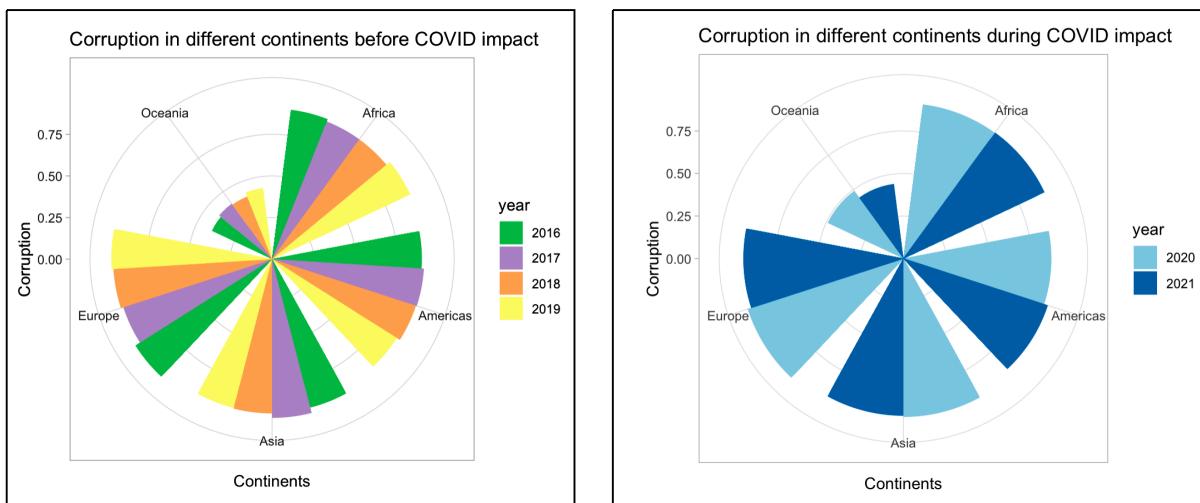


Fig35: Corruption in different Continents pre and during COVID

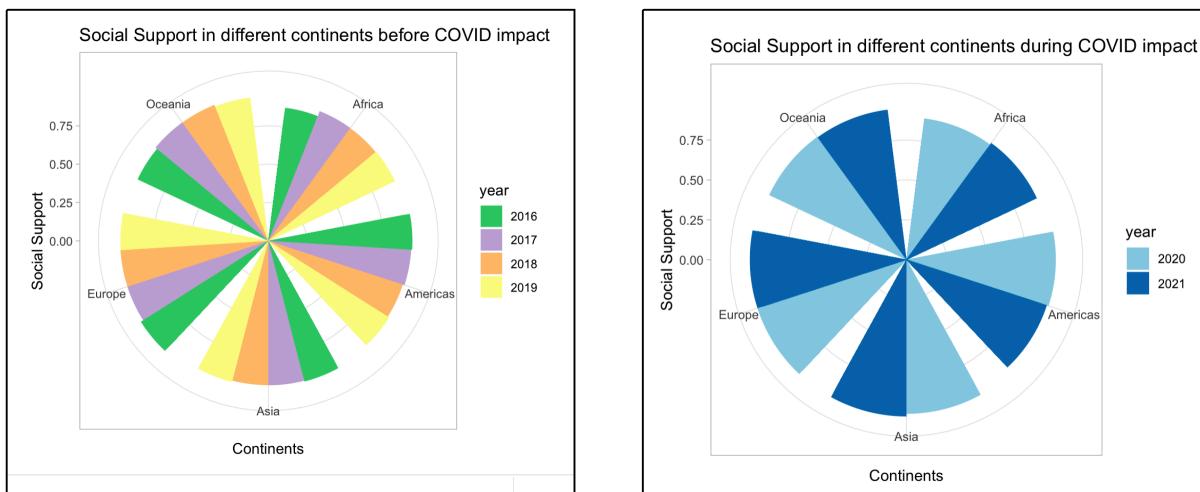


Fig36: Social Support in different Continents pre and during COVID

5. Project Action Plan

Stage 1: After exploring different resources, decided to work on project World happiness Score.

Stage 2: Collected dat from World Happiness Report Website. The data obtained was in xlsx format.

The data was from year 2005 to 2020 in one file and 2021 in another. Merged data and then performed data cleaning, wrangling.

Stage 3: Explored data by plotting box plots, violin plots, bar chart and radial bar chart, and also scatter plot. This helped to give insights on data. This visualisation will help general public explore data and try to understand,

The relationship between different factors from 2016 to 2021.

Comparing Happiness Score before and during COVID impact.

Relationship between happiness and different factors of top 5 and bottom 5 Countries and what they have in common.

Stage 4: Brain storming different Ideas to design a visualisation which can be useful for target audience in this project which are general public. After that using five sheet methodology, Finalising the design of the visualisation, that will be used in creating an inter active web based visualisation. To create an interactive web based visualisation in this project we will use R (shiny).

Stage 5: Based on finalised design from five sheet methodology, the interactive web based visualisation for World Happiness Score report will be implemented. This implementation was done using R Shiny.

Stage 6: After implementation of the visualisation, a video demo will be provided, which will incorporate the brief project information and talk about research question used to develop this visualisation. It will state the targeted audience and also demonstrate each step on how to use the application.

6. Five Sheet design:

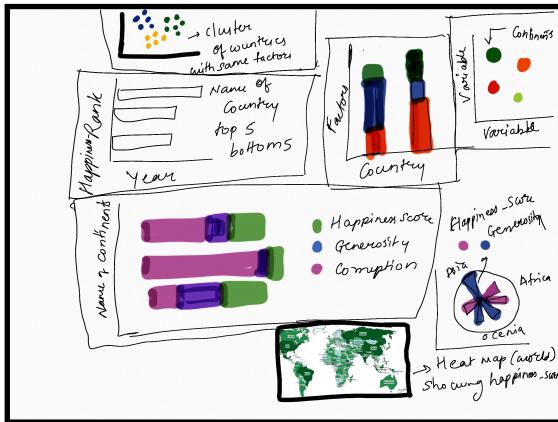


Fig37: Brain Storming

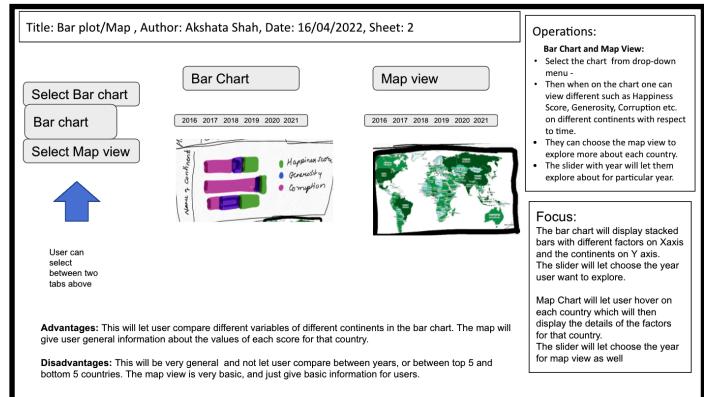


Fig38: sheet2

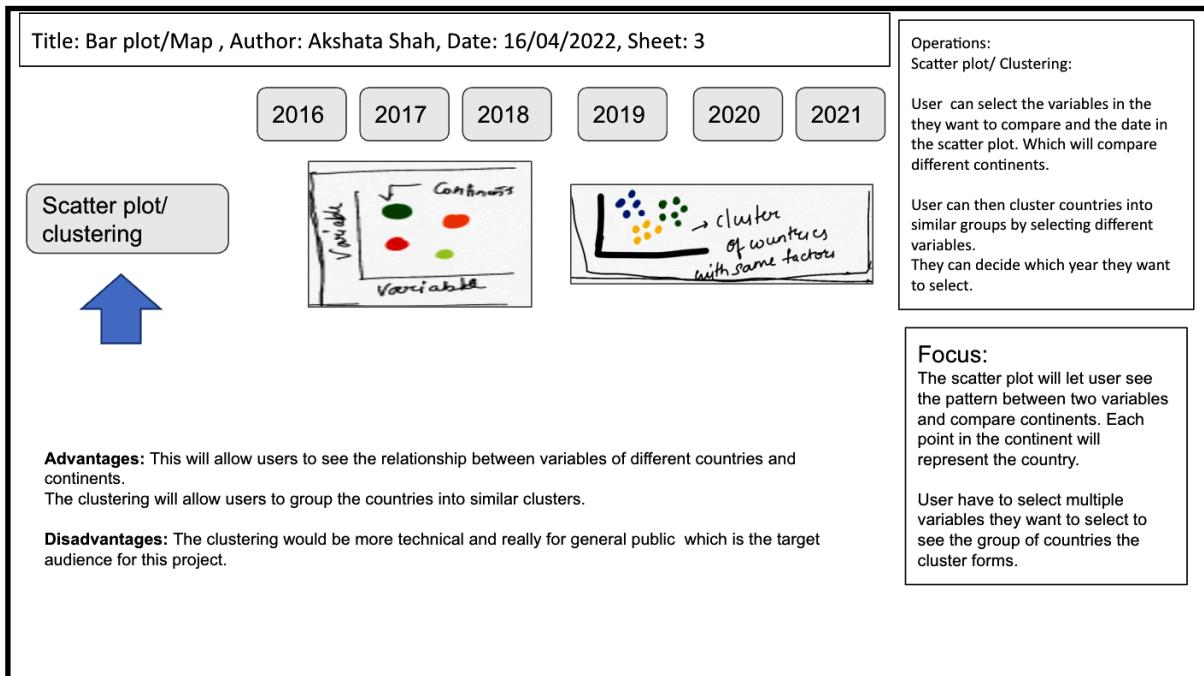


Fig39: sheet3

Title: Bar plot/Map , Author: Akshata Shah, Date: 16/04/2022, Sheet: 4

Bubble chart

Bar chart

Scatter plot



2016

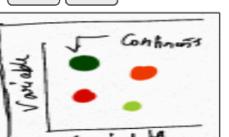
2017

2018

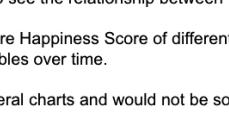
2019

2020

2021







Advantages: This will allow users to see the relationship between variables of different countries and continents.
The bubble chart will let user compare Happiness Score of different countries to other variables
Bar chart will let user compare variables over time.

Disadvantages: This would be general charts and would not be someone from more technical background.

Operations:
Scatter plot:
User can select two variables on X and Y axis and the points will represent Country and color will represent shape.
User can select the year they want to explore.

Bar Chart: This will let user compare different Variables over time. Colour will represent continents.

Bubble Chart: User can select variables. The size of the bubble will represent the Happiness Score and color will represent top 5 and bottom 5 countries. This will concentrate on only one year 2021.

Focus:
The scatter plot will let user see the pattern between two variables and compare continents. Each point in the continent will represent the country.

Column Bar chart will let user compare variables between different years.

Bubble chart will let user compare different variables of countries and Happiness Score

Fig40: sheet4

Final Design, Title: Scatter plot, Bar chart, Map view, Bubble chart , Author: Akshata Shah, Date: 16/04/2022, Sheet: 5

| | | |
|-----------------------|---|---|
| Bubble chart | | Description
The final design consists of mostly sheet4, and map view from sheet 2. This design is selected as it would be more appropriate for general public view. So try to keep graphics simple but interactive and let user give good insights. |
| Map view | | 1. The Scatter plot will let User select two variables on X and Y axis and the points will represent Country and color will represent shape. User can select the year they want to explore. |
| Bar chart | | 2. Bar Chart: This will let user compare different Variables over time. Colour will represent continents. |
| Scatter plot | | 3. The map view will give user general information about Happiness Score for year 2021 and then User can go to Bubble Chart. |
| | | 4. Bubble Chart will let User select two variables. The size of the bubble will represent the Happiness Score and color will represent top 5 and bottom 5 countries. This will concentrate on only one year 2021. |
| Time / cost estimates | <ul style="list-style-type: none"> - R-shiny is a free product so there is no cost associated with software. - Depending on how the client uses the product, there may be a cost associated with hosting the dashboard on the internet. - The graphics involved are fairly simple so the time estimate may be no more than a day to develop the interactive visualisation. | Software requirements
This project requires software to support the development of an interactive dashboard.

We propose using R-shiny as it is simple to use and can combine statistical modelling packages with interactive visualisation tools. |

Fig41: Final Design, Sheet 5

6. Visualisation Implementation

After completion of Five sheet methodology the design that has been finalised for creating interactive web based visualisation is using R shiny.

World Happiness Visualisation has 5 panel tabs. Each tab will provide a brief explanation and details of what to do to users.

The first tab consists of overview about the data used. The brief explanation of variables or factors and how were they measured. Also the link of the websites from where the data is collected.

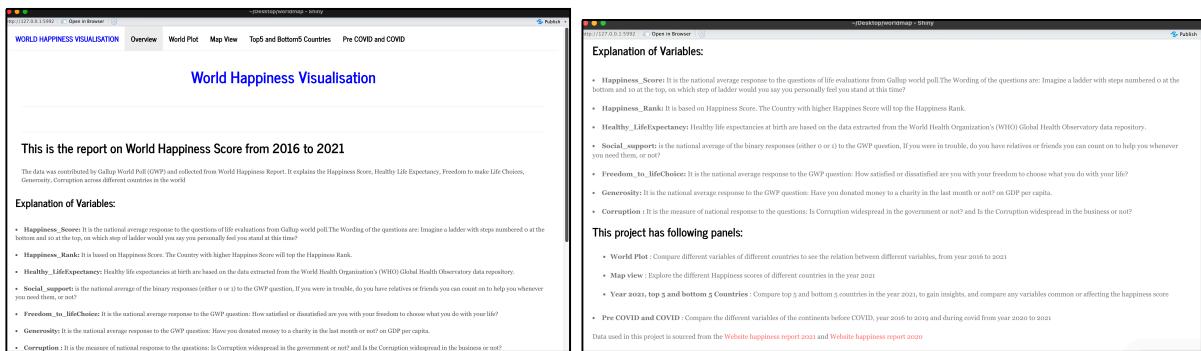


Fig42: Overview Page of Wold Happiness Visualisation

The second tab consist of Scatter plot with date and variable filtration. So the user can explore data from different years and are also able to select variables across different Continents. User can also double click and select only one continent they want to explore, or can single click after to select one or more. Each dot on Scatterplot will represent the country, and when hover on it, will give you country name and the values of selected variables.

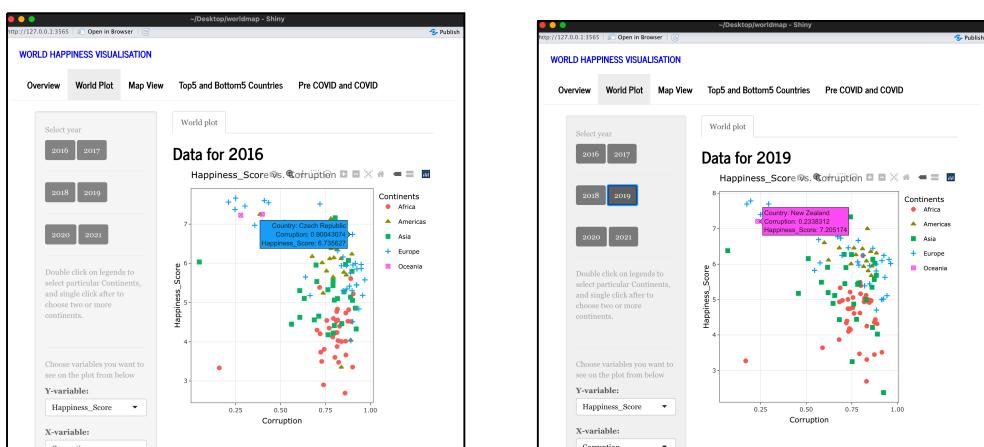


Fig43: World plot tab of Wold Happiness Visualisation

The third tab consists of world map. This map will give general happiness score of all the countries in the world and show the heat map colours to differentiate between level of Happiness Score. This map will give Happiness Score for year 2021. When we hover on each part of the country, it will give Happiness Score for that particular Country, name of Country and continent.

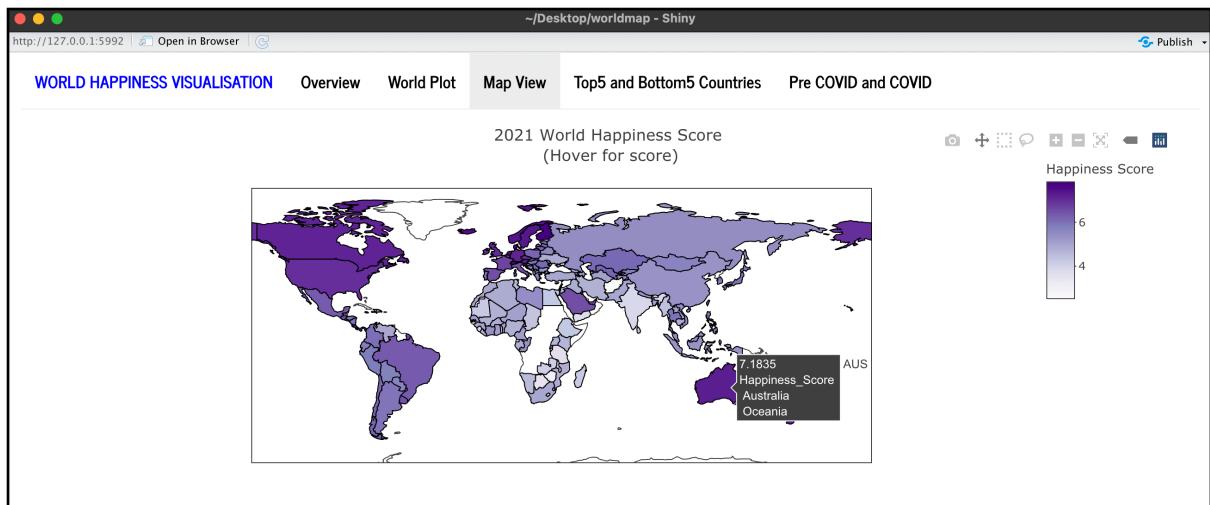


Fig44: Map view of World Happiness Visualisation

The fourth tab consists of bubble chart. The size of the bubble represents happiness Score. The larger the bubble the higher Happiness score. The colour represents the Country. This chart will help user compare different factors of top 5 and bottom 5 countries. The user can select the variables they want to choose and see if there are any common features between variable and Happiness Score between countries. They will be able to compare different countries and check if there is anything common among top 5 and bottom 5 countries.

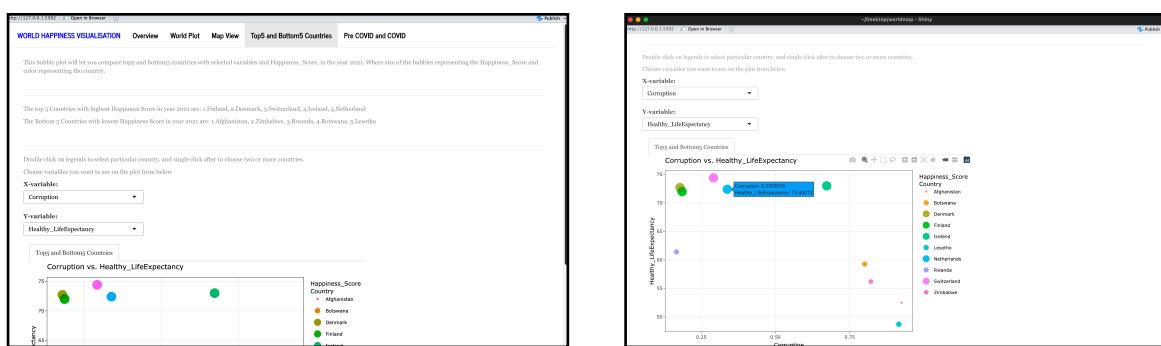


Fig45: Top5 and Bottom5 Countries of World Happiness Visualisation

The fifth tab consists of bar chart. This chart will let user select and compare the variables during the covid years and pre covid years of different continents. User can select one continent at a time by double clicking on that continent, and then single click to select more.

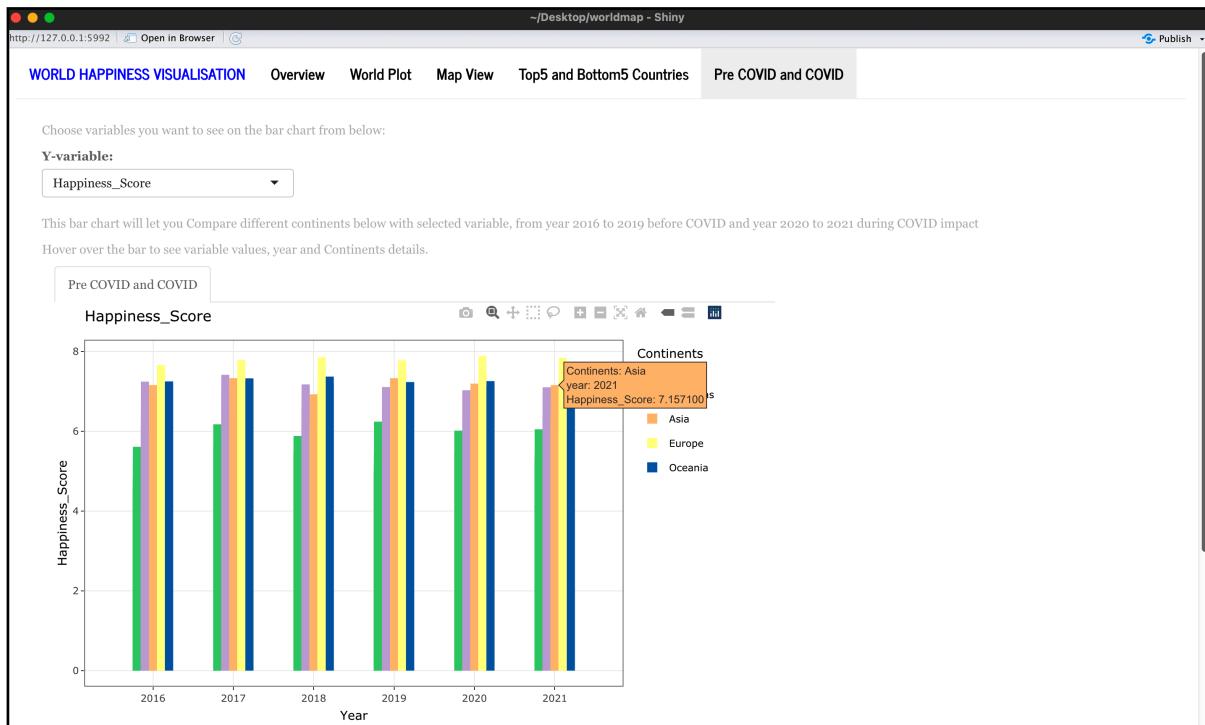


Fig46: Pre COVID and COVID of Wold Happiness Visualisation

7. Video Demonstration

The video is created which provides brief information about the project and the detailed demo of how to use the above implemented web based World Happiness Visualisation application.

Link for video is : https://youtu.be/_ald51i-XGo

8. Summary

In summary, The project will help us understand different factors contributing towards world happiness from year 2016 to year 2021. After conducting data wrangling and exploration, and designing five sheet methodology, the project design is finalised and implemented. The design is finalised by taking into account the research questions and the targeted audience. In this project the targeted audience is general public. The project will give insight of any relation between the chosen variable for particular year. The user will also able to explore world map of 2021 and check the happiness rank score for that year for that country. The project will also let user compare Happiness Score with other variables for year 2021, for top 5 and bottom 5 countries. The data is also divided into pre covid years that are from 2016 to 2019, and when Covid impacted our lives, in the year 2020, 2021. The bar chart will let you compare different continents for selected variables against year.

References

Helliwell, J F., Layard R., Sachs J., and Neve J. D., eds. (2020). *World Happiness Report 2020*. (ISBN 978-1-7348080-0-1). New York: Sustainable Development Solutions Network. Retrieved from World Happiness Report Website:

<https://worldhappiness.report/ed/2020/>

Helliwell, J F., Layard R., Sachs J., and Neve J. D., eds. (2021). *World Happiness Report 2021* (ISBN 978-1-7348080-1-8). New York: Sustainable Development Solutions Network. Retrieved from World Happiness Report Website:

<https://worldhappiness.report/ed/2021/>