

Assignment 1: DATA VISUALIZATION

EXCEL AND TABLEAU
NOORULAIN FAHAD

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TASK – 1

The dataset used for this project is ‘The Wealth of the Nations’ Data. This dataset has information about Gross Domestic Product (GDP), Life expectancy at birth and Smart phone usage of different nations.

POLICIES AND PROCEDURES

When working with data, there are several policies and procedures that should be followed to ensure **data privacy, security, and compliance** with relevant laws and regulations. It is important to regularly review and update these policies and procedures to ensure that they are in line with the latest developments in data privacy, security, and technology. Here are some key policies and procedures to consider:

- **Data Privacy:** Data privacy laws such as the Data Protection Act (2018) and the EU's General Data Protection Regulation (GDPR) need to be considered and complied with when handling personal data. This includes obtaining consent for the collection, use, and storage of personal data, and properly securing the data to prevent unauthorized access or misuse.
- **Data Access and Security:** Only authorized personnel should have access to data, and the data should be protected using appropriate security measures such as encryption, firewalls, and secure authentication methods.
- **Data Retention and Disposal:** Data should only be retained for as long as necessary and should be disposed of securely when it is no longer needed.
- **Data Accuracy and Quality:** Data should be regularly checked for accuracy and completeness, and any errors should be corrected promptly.
- **Data Backup and Recovery:** Regular backups of data should be taken and stored in a secure location, and a disaster recovery plan should be in place to ensure that data can be recovered in the event of a disaster.
- **Data Sharing and Transfer:** Data should only be shared or transferred to other parties if it is necessary for business purposes and if appropriate safeguards are in place to protect the data.
- **Compliance with Legal and Regulatory Requirements:** Organizations should be aware of and comply with all relevant laws and regulations that apply to their use of data, such as data protection laws, data retention laws, and industry-specific regulations.

As a data analyst, it is important to be aware of the policies and procedures related to working with data for several reasons:

- **Protecting Data Privacy:** Data privacy is a critical concern for individuals and organizations alike, and as a data analyst, you have a responsibility to ensure that personal data is handled in a manner that complies with relevant privacy laws and that respects individuals' rights.
- **Maintaining Data Security:** Data security is essential for protecting sensitive information and preventing unauthorized access to data. By being aware of the

policies and procedures related to data security, you can ensure that you are taking the appropriate measures to protect the data you are working with.

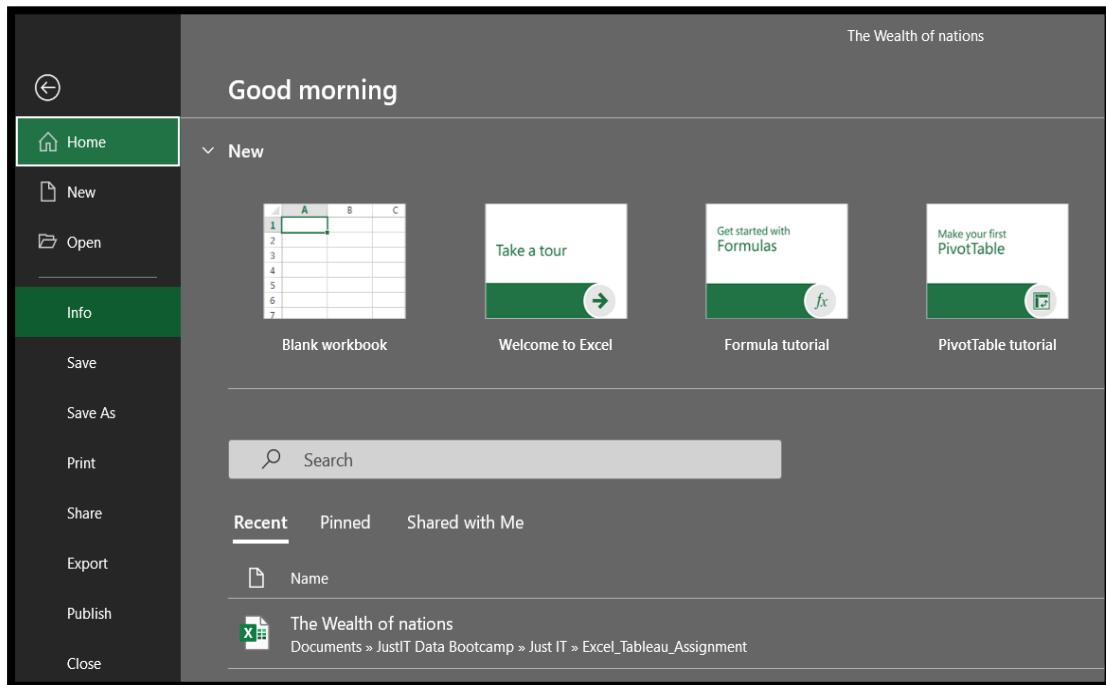
- **Ensuring Data Accuracy and Quality:** Data accuracy and quality are crucial for making informed decisions and achieving business objectives. By being aware of data quality policies and procedures, you can ensure that the data you are analysing is accurate, complete, and free from errors.
- **Complying with Legal and Regulatory Requirements:** Organizations must comply with a range of legal and regulatory requirements when handling data, such as data protection laws and data retention laws. By adhering to policies and procedures that take these requirements into account, organizations can ensure that they are operating within the bounds of the law. As a data analyst, you must be aware of these requirements and ensure that you are complying with them.
- **Building Trust with Stakeholders:** As a data analyst, you play a key role in interpreting and communicating the insights and findings derived from data. By being aware of and following policies and procedures related to working with data, you can help to build trust with stakeholders, such as customers and employees, who rely on the data you provide.

TASK – 2 : MS EXCEL

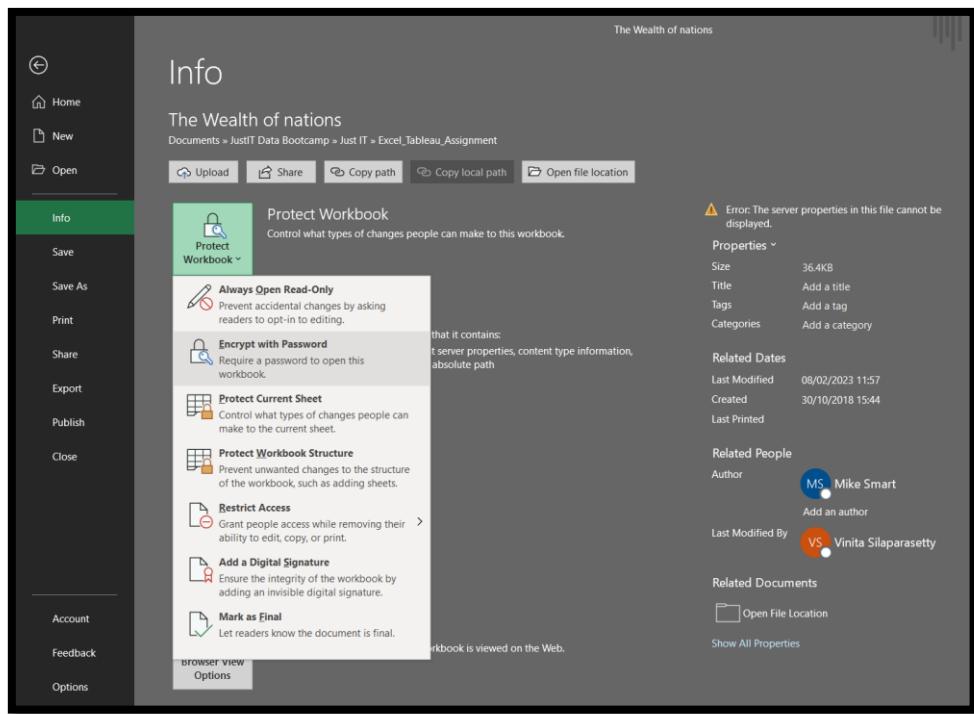
GDP TASKS

1. SET A PASSWORD To set a password to protect an Excel workbook:

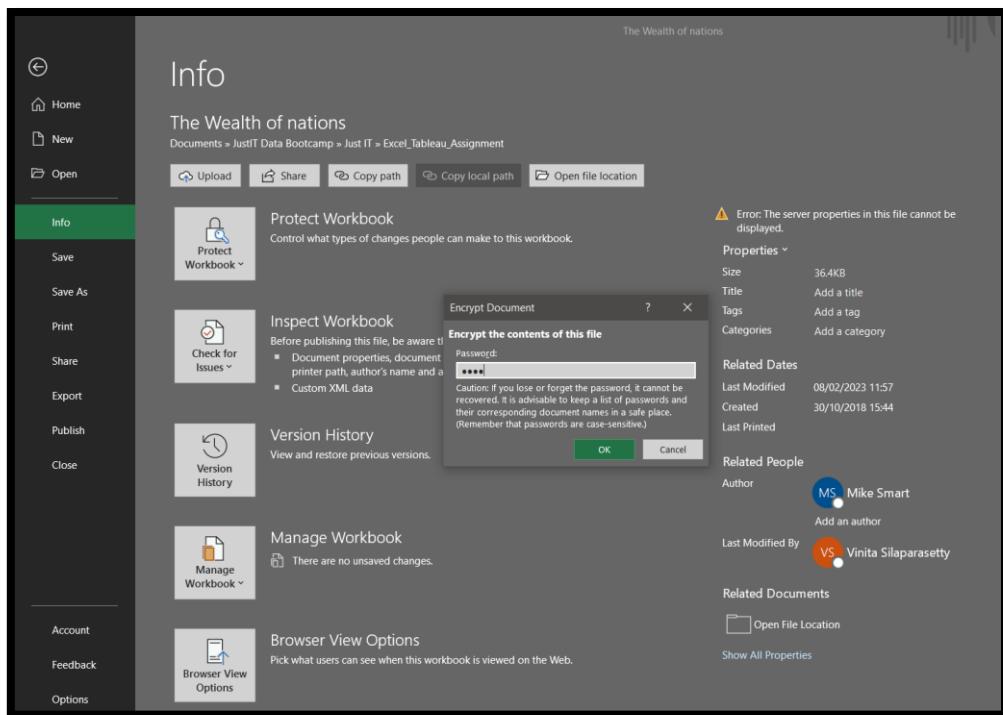
- Open the Excel workbook that you want to password protect.
- Go to the "File" menu and select "Info."



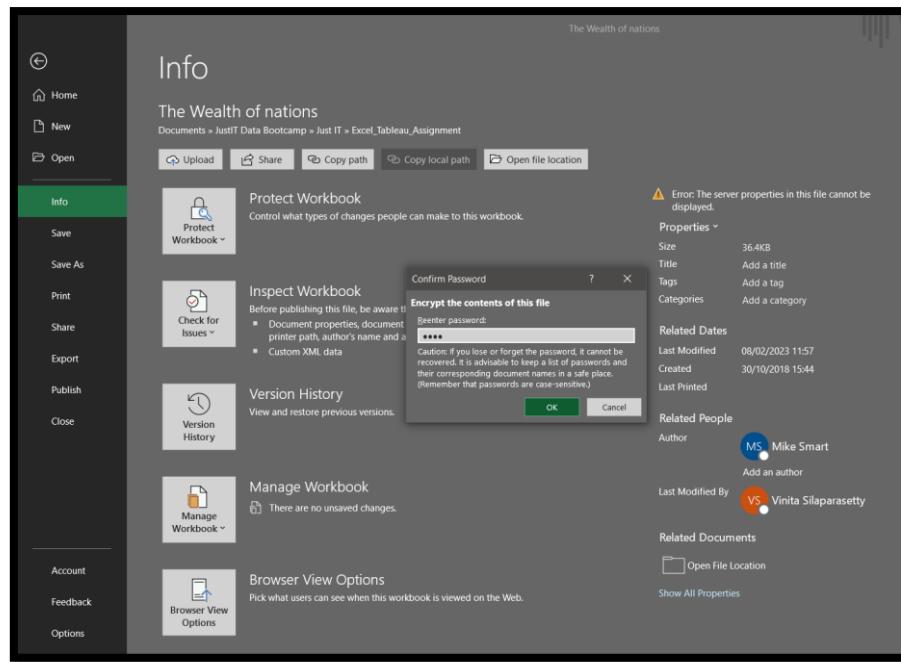
- Click on "Protect Workbook" and then select "Encrypt with Password."



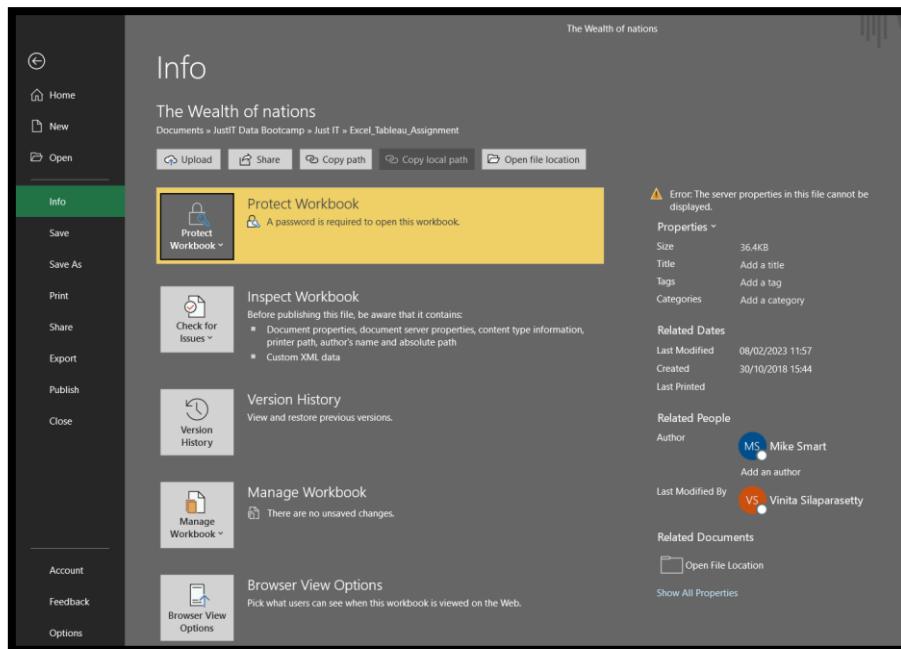
- In the "Encrypt Document" dialog box, type the password that you want to use to protect the workbook.



- Confirm the password by retyping it in the "Confirm Password" field.



- Click "OK" to save the password and encrypt the workbook.



- Save the workbook to apply the password protection.

From now on, when someone tries to open the workbook, they will be prompted to enter the password you set. If they enter the correct password, they will be able to access the workbook, otherwise, they will not be able to open it.

2. CHANGE CURRENCY TO GBP(£) To change the data to display in British Pound instead of US Dollars:

- To highlight a specific column, you can select the column by clicking on the letter at the top of the column.

A screenshot of Microsoft Excel showing a table titled "The Wealth of nations". The table has four columns: Rank, Country, GDP - per capita (PPP), and Year of Information. The "GDP - per capita (PPP)" column (C) is highlighted with a green background. The "Year of Information" column (D) is also highlighted with a green background. The "Country" column (B) is partially visible. The "Rank" column (A) contains numerical values from 1 to 29. The "GDP - per capita (PPP)" column contains monetary values such as \$190,513.00, \$180,367.00, etc. The "Year of Information" column contains years like 2019, 2018, 2019, etc. The "Country" column lists countries like Monaco, Liechtenstein, Macau, Luxembourg, Singapore, Qatar, Ireland, Isle of Man, Bermuda, Cayman Islands, Falkland Islands, Switzerland, United Arab Emirates, Norway, United States, Brunei, Gibraltar, Hong Kong, San Marino, Denmark, Netherlands, Jersey, Austria, Iceland, Germany, Sweden, Guernsey, and Belgium. The "Rank" column lists the rank of each country. The "GDP - per capita (PPP)" column is the one being highlighted.

Rank	Country	GDP - per capita (PPP)	Year of Information
1	Monaco	\$190,513.00	2019
2	Liechtenstein	\$180,367.00	2018
3	Macau	\$123,965.00	2019
4	Luxembourg	\$115,874.00	2020
5	Singapore	\$97,341.00	2019
6	Qatar	\$90,044.00	2019
7	Ireland	\$86,781.00	2019
8	Isle of Man	\$84,600.00	2014
9	Bermuda	\$81,798.00	2019
10	Cayman Islands	\$71,549.00	2018
11	Falkland Islands	\$70,800.00	2015
12	Switzerland	\$68,628.00	2019
13	United Arab Emirates	\$67,119.00	2019
14	Norway	\$63,633.00	2019
15	United States	\$62,530.00	2019
16	Brunei	\$62,100.00	2019
17	Gibraltar	\$61,700.00	2014
18	Hong Kong	\$59,848.00	2019
19	San Marino	\$59,439.00	2018
20	Denmark	\$57,804.00	2019
21	Netherlands	\$56,935.00	2019
22	Jersey	\$56,600.00	2016
23	Austria	\$56,188.00	2019
24	Iceland	\$55,874.00	2019
25	Germany	\$53,919.00	2019
26	Sweden	\$53,240.00	2019
27	Guernsey	\$52,500.00	2014
28	Belgium	\$51,934.00	2019

- To format data as British pounds, you can select the cells that you want to format and go to the "Home" tab. From there, click on the "Currency" button in the "Number" section and choose "£ English (United Kingdom)" from the list of available options. This will format the selected cells as currency with the British pound symbol (£) and the appropriate number of decimal places.

A screenshot of Microsoft Excel showing the same table as the previous image, but with the "GDP - per capita (PPP)" column (C) formatted as British pounds (£). The "Year of Information" column (D) is also highlighted with a green background. The "Country" column (B) is partially visible. The "Rank" column (A) contains numerical values from 1 to 29. The "GDP - per capita (PPP)" column contains monetary values such as £190,513.00, £180,367.00, etc. The "Year of Information" column contains years like 2019, 2018, 2019, etc. The "Country" column lists countries like Monaco, Liechtenstein, Macau, Luxembourg, Singapore, Qatar, Ireland, Isle of Man, Bermuda, Cayman Islands, Falkland Islands, Switzerland, United Arab Emirates, Norway, United States, Brunei, Gibraltar, Hong Kong, San Marino, Denmark, Netherlands, Jersey, Austria, Iceland, Germany, Sweden, Guernsey, and Belgium. The "Rank" column lists the rank of each country. The "GDP - per capita (PPP)" column is the one being formatted.

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3. **CONVERT SHEET INTO A TABLE** To convert the GDP sheet into a table, you can use the "Create Table" feature. This feature allows you to quickly format a range of data as a table and add additional functionality, such as sorting, filtering, and calculated columns. To convert a data range into a table:

- Go to the "Insert" tab on the ribbon.
- Click on the "Table" button in the "Tables" section.

The screenshot shows a Microsoft Excel spreadsheet titled "The Wealth of nations". The "Insert" tab is active in the ribbon. A table is selected, spanning from cell A1 to D29. The table has four columns: Rank, Country, GDP - per capita (PPP), and Year of Information. The first row contains the column headers. The data includes entries for Monaco, Liechtenstein, Macau, Luxembourg, Singapore, Qatar, Ireland, Isle of Man, Bermuda, Cayman Islands, Falkland Islands, Switzerland, United Arab Emirates, Norway, United States, Brunei, Gibraltar, Hong Kong, San Marino, Denmark, Netherlands, Jersey, Austria, Iceland, Germany, Sweden, Guernsey, and Belgium. The "Tables" icon in the ribbon is highlighted.

- A dialog box will appear. Make sure the range of cells you selected is highlighted with dashes (as shown below).
- Check the "My table has headers" checkbox if your data has headers.

The screenshot shows the same Excel spreadsheet as above, but with the "Create Table" dialog box open. The dialog box asks "Where is the data for your table?" and shows the range \$A\$1:\$D\$29. There is a checked checkbox labeled "My table has headers". The "OK" button is highlighted in blue.

- Click on the "OK" button.
- Excel will then format the selected range of cells as a table, adding header row formatting and colour banded rows for easier readability.

Rank	Country	GDP - per capita (PPP)	Year of Information
1	Monaco	£190,513.00	2019
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21	Denmark	£57,804.00	2019
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23	Jersey	£56,600.00	2016
24	Austria	£56,188.00	2019
25	Iceland	£55,874.00	2019
26	Germany	£53,919.00	2019
27	Sweden	£53,240.00	2019
28	Guernsey	£52,500.00	2014
29	Belgium	£51,934.00	2019

4. FILTER THE TABLE To filter the table to display only the information for 2019:

- Go to the "Drop Down" arrow of the "Year of Information" column and click it.

Rank	Country	GDP - per capita (PPP)	Year of Information
1	Monaco	£190,513.00	2019
2	Liechtenstein	£180,367.00	2019
3	Macau	£123,965.00	2019
4	Luxembourg	£115,874.00	2020
5	Singapore	£97,341.00	2019
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25	Iceland	£55,874.00	2019
26	Germany	£53,919.00	2019
27	Sweden	£53,240.00	2019
28	Guernsey	£52,500.00	2014
29	Belgium	£51,934.00	2019

- This will open the "Sort and Filter" menu for the selected column. Currently, it shows the data for all the years because all the years are selected.

The screenshot shows a Microsoft Excel spreadsheet titled "The Wealth of nations". The data is sorted by Rank and Country. The "Year of Information" column (D) has a dropdown arrow, which is currently expanded to show a filter menu. The menu includes options like "Sort Smallest to Largest", "Sort Largest to Smallest", "Sort by Color", "Sheet View", "Clear Filter From 'Year of Information'", "Filter by Color", "Number Filters", and a search bar. Below these are checkboxes for years from 2003 to 2016. The checkbox for "2019" is not checked, while others like "2003" and "2004" are checked. At the bottom of the menu are "OK" and "Cancel" buttons.

- Uncheck all the years except "2019" and click "OK".

This screenshot shows the same Excel spreadsheet and filter menu as the previous one, but with a different set of checked years. The "2006" checkbox is unchecked, while "2019" is checked. The other years from 2007 to 2018 are also present but not checked. The "OK" button is visible at the bottom of the filter menu.

- Now, the table only displays the information for year "2019". The "Filter" feature allows you to hide rows that do not meet a specified criterion and only display the rows that you want to see.

The screenshot shows a Microsoft Excel spreadsheet titled "The Wealth of nations". The table has four columns: Rank, Country, GDP - per capita (PPP), and Year of Information. The "Year of Information" column is sorted by value, with 2019 at the top. The rows are numbered from 1 to 41. The first few rows show data for Monaco, Macau, Singapore, Qatar, Ireland, Bermuda, Switzerland, United Arab Emirates, Norway, United States, Brunei, Hong Kong, Denmark, Netherlands, Austria, Iceland, Germany, Sweden, Belgium, Australia, Kuwait, Canada, Finland, Saudi Arabia, United Kingdom, France, Bahrain, and EU. The "GDP" tab is selected at the bottom.

Rank	Country	GDP - per capita (PPP)	Year of Information
1	Monaco	£190,513.00	2019
4	Macau	£123,965.00	2019
6	Singapore	£97,341.00	2019
7	Qatar	£90,044.00	2019
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26	Germany	£53,919.00	2019
27	Sweden	£53,240.00	2019
29	Belgium	£51,934.00	2019
32	Australia	£49,854.00	2019
33	Kuwait	£49,854.00	2019
34	Canada	£49,031.00	2019
35	Finland	£48,668.00	2019
36	Saudi Arabia	£46,962.00	2019
37	United Kingdom	£46,659.00	2019
39	France	£46,184.00	2019
40	Bahrain	£45,011.00	2019
41	EU	£44,436.00	2019

5. CREATE A CHART To create a chart from a table:

- Highlight the table range to be included in the visualisation. In this case, "Rank", "Country" and "GDP" was selected.

The screenshot shows the same Microsoft Excel spreadsheet as the previous one, but with the "Rank", "Country", and "GDP" columns highlighted in blue. This indicates that these three columns have been selected for further processing, such as creating a chart.

Rank	Country	GDP - per capita (PPP)	Year of Information
1	Monaco	£190,513.00	2019
4	Macau	£123,965.00	2019
6	Singapore	£97,341.00	2019
7	Qatar	£90,044.00	2019
8	Ireland	£86,781.00	2019
10	Bermuda	£81,798.00	2019
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35	Finland	£48,668.00	2019
36	Saudi Arabia	£46,962.00	2019
37	United Kingdom	£46,659.00	2019
39	France	£46,184.00	2019
40	Bahrain	£45,011.00	2019
41	EU	£44,436.00	2019

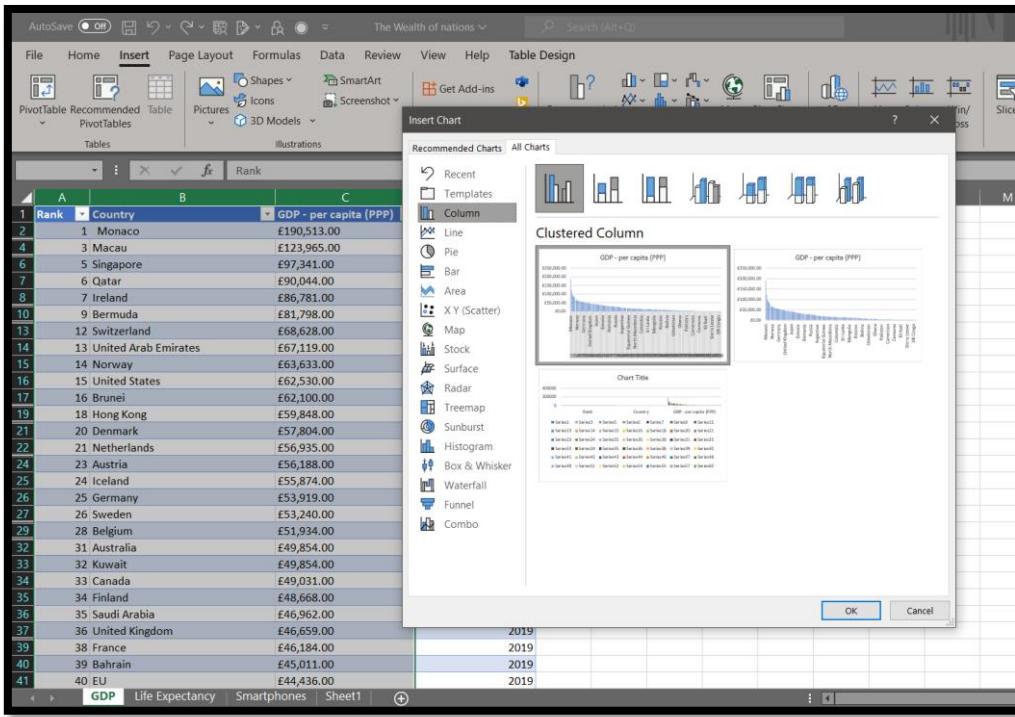
- Go to the "Insert" tab to select a chart type from the "Charts" section.
- Click on the "Recommended Charts" as shown below.

The screenshot shows a Microsoft Excel spreadsheet titled "The Wealth of nations". The ribbon is visible at the top with the "Insert" tab selected. In the "Charts" group of the ribbon, there is a button labeled "Recommended Charts". A callout box points to this button with the text: "Want us to recommend a good chart to showcase your data? Select data in your worksheet and click this button to get a customized set of charts that we think will fit best with your data." The main area of the screen displays a table with columns: Rank, Country, GDP - per capita (PPP), and Year of Information. The data includes Monaco at the top with a GDP of £190,513.00, followed by Macau, Singapore, Qatar, Ireland, and so on down to Bahrain and the EU at the bottom.

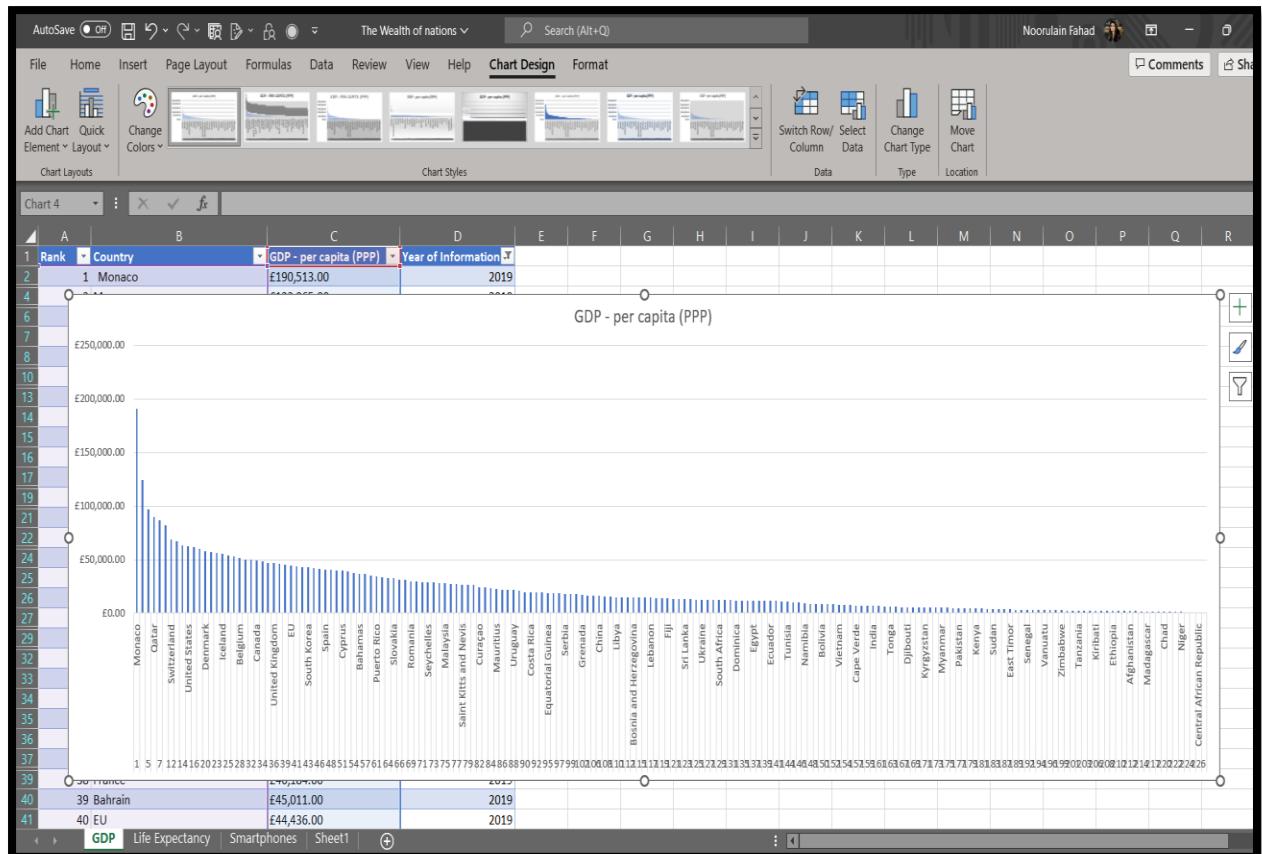
- This will present to you a list of the recommended charts for the selected data as shown below.

The screenshot shows the "Insert Chart" dialog box in Microsoft Excel. The "Recommended Charts" tab is selected. Inside the dialog, a Pareto chart is displayed with the title "Pareto". The chart shows blue bars representing data categories and an orange line representing the cumulative percentage. The x-axis categories are grouped into bins: (118, 157], (157, 196], (79, 118], (40, 79], [1, 40], and (196, 235]. The y-axis ranges from 0 to 40. A legend at the top right of the chart area says "Chart Title". Below the chart, a descriptive text states: "A Pareto chart plots the distribution of the data in descending order of frequency, with a cumulative line on a secondary axis as a percentage of the total." At the bottom right of the dialog, there are "OK" and "Cancel" buttons.

- You can also go to the "All Charts" tab on the tab and select the suitable chart of your choice. Make sure the chart type selected gives you "meaningful" insight into the data.



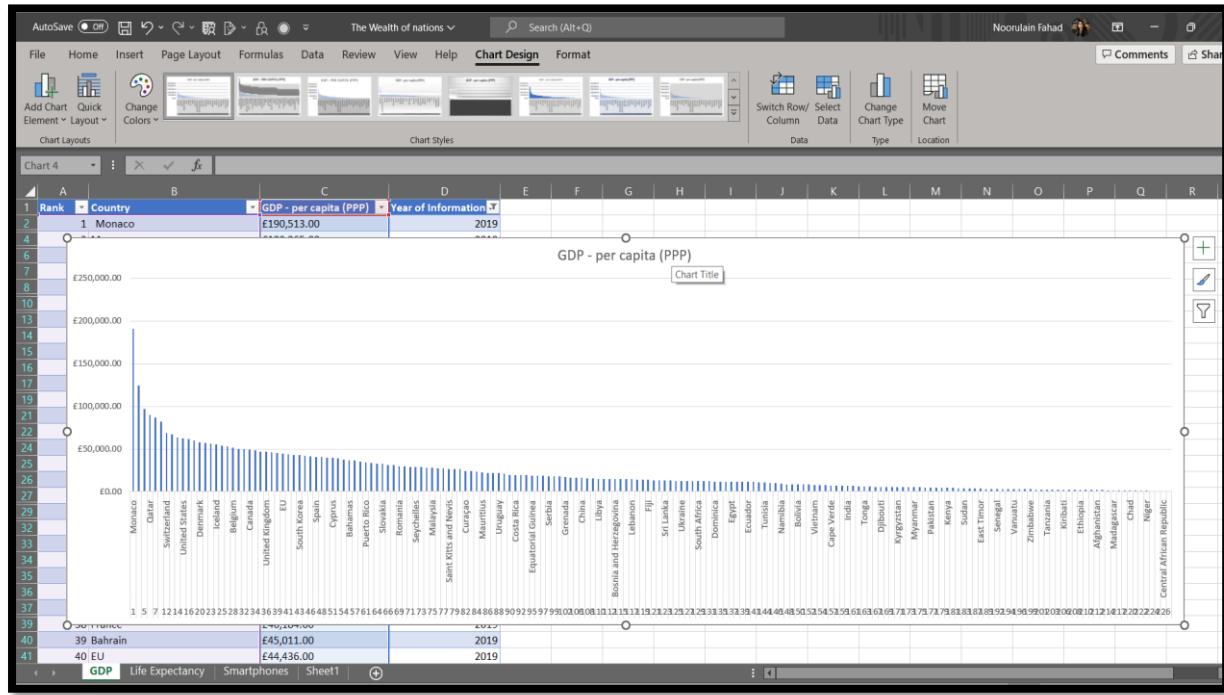
- After selecting the suitable chart, click "OK". In this case, "Histogram" chart was selected.



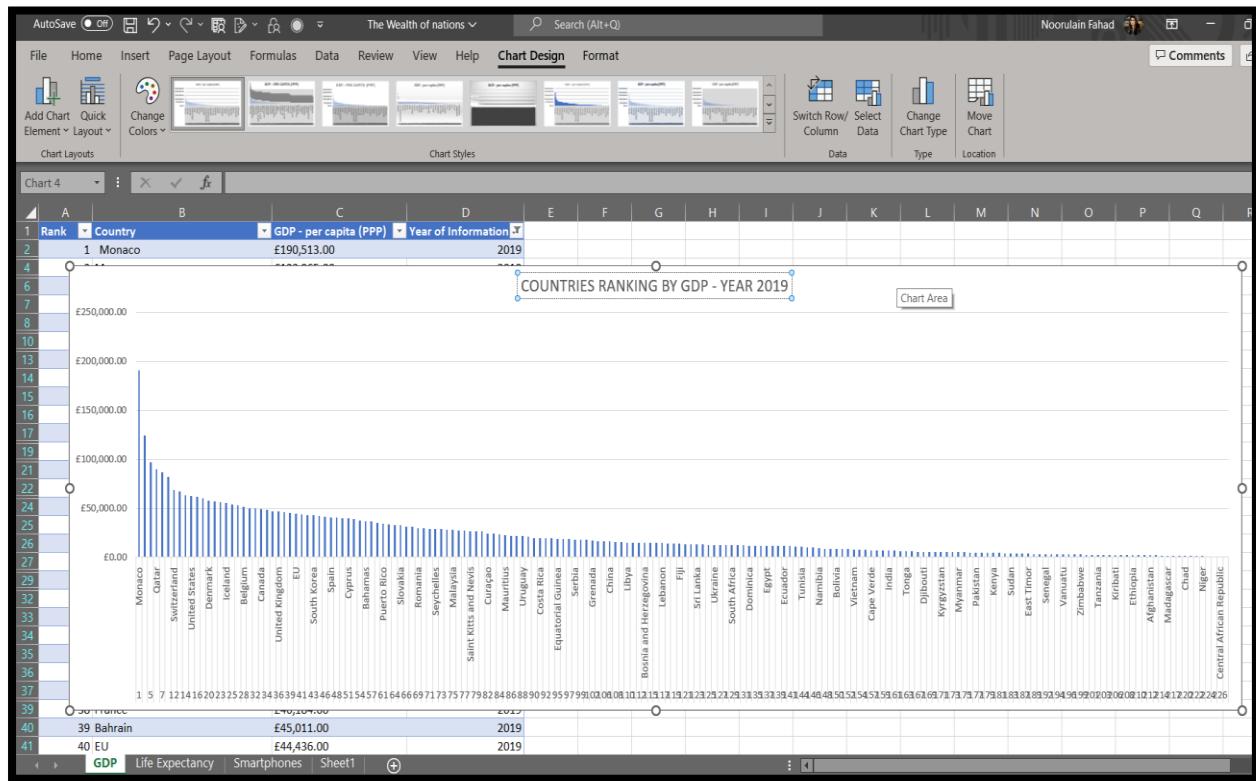
6. FORMATTING THE CHART

a) ADD A TITLE TO THE CHART To add a title to the chart:

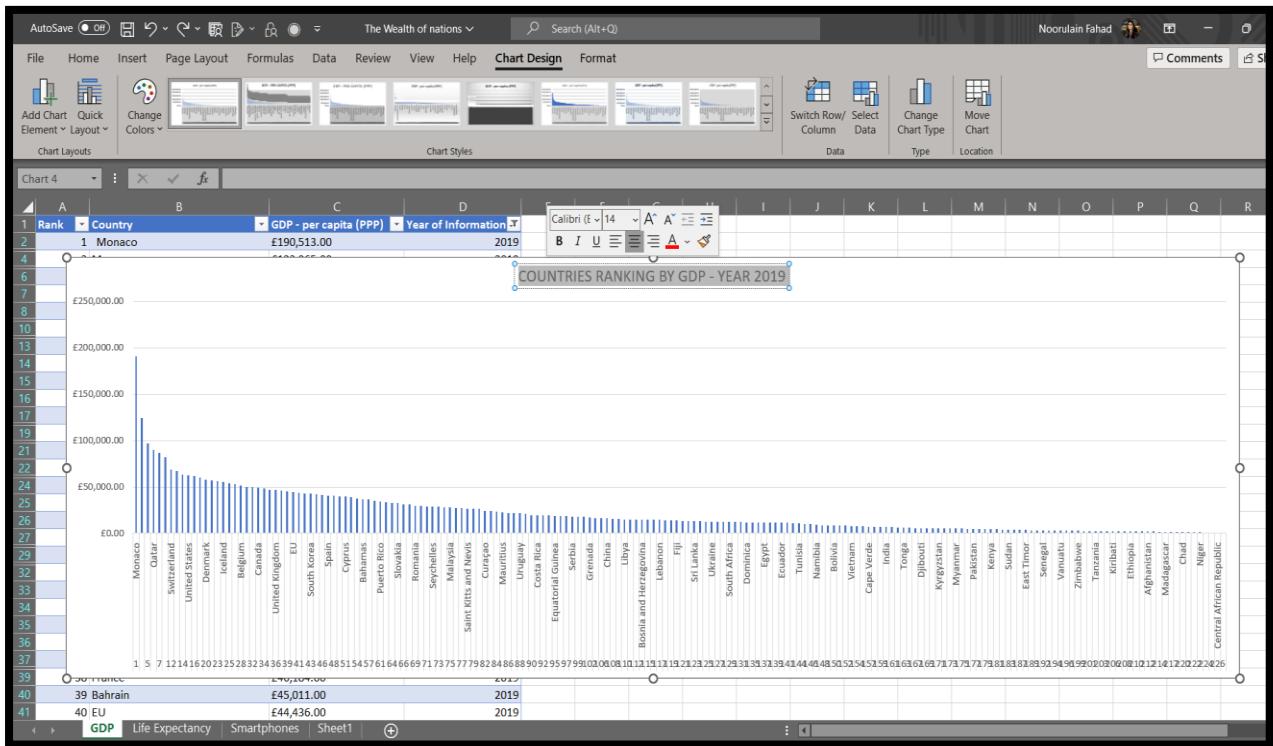
- Double click on the chart title as shown below.



- Type in the chart title.

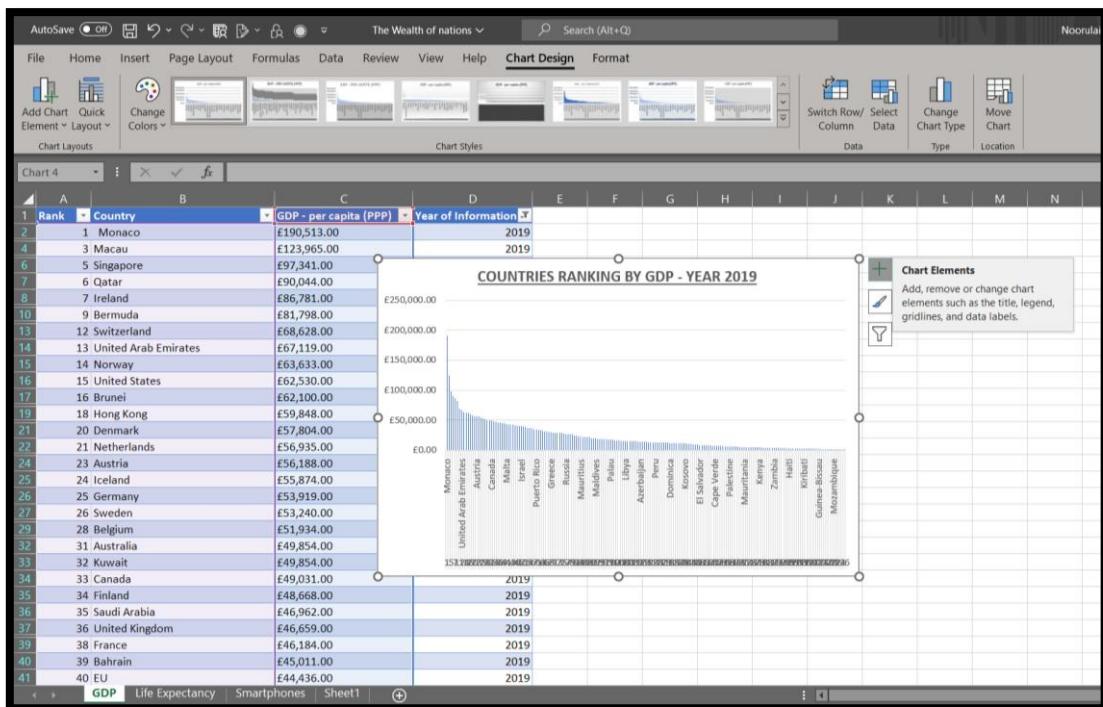


- You can also highlight the chart title and change its font and colour as shown below.

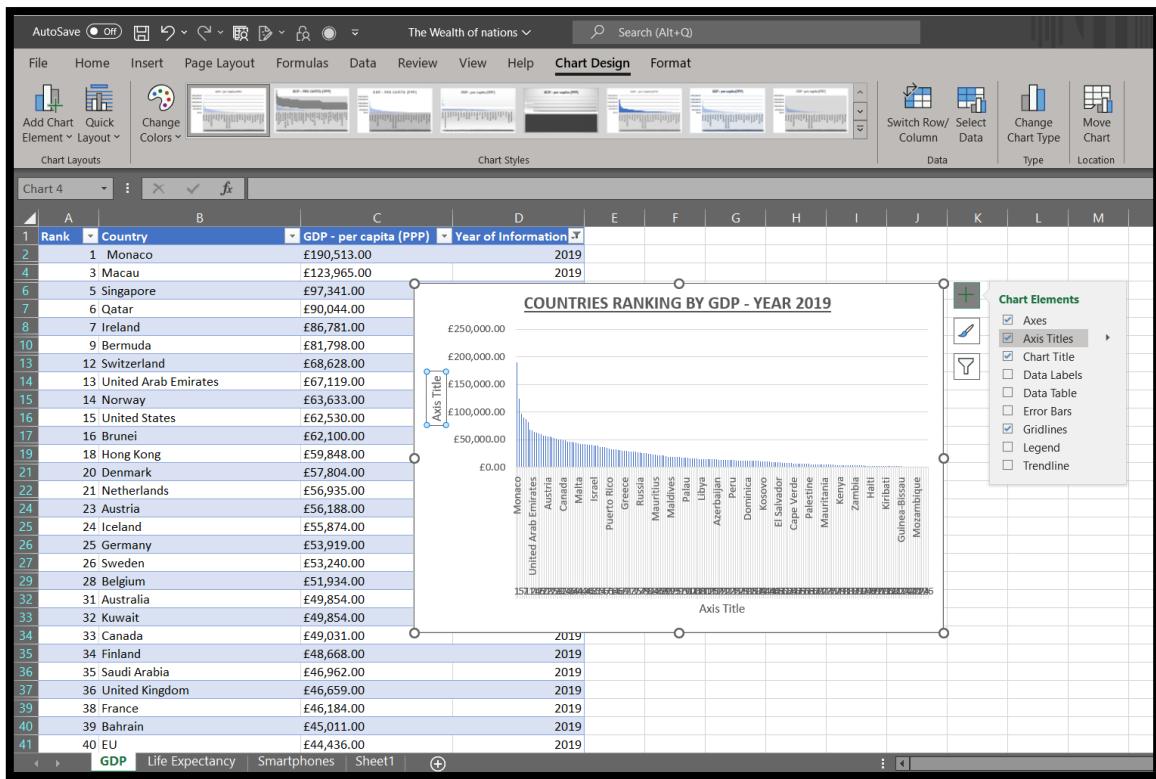


b) ADD X AND Y AXIS LABELS To add X and Y Axis labels:

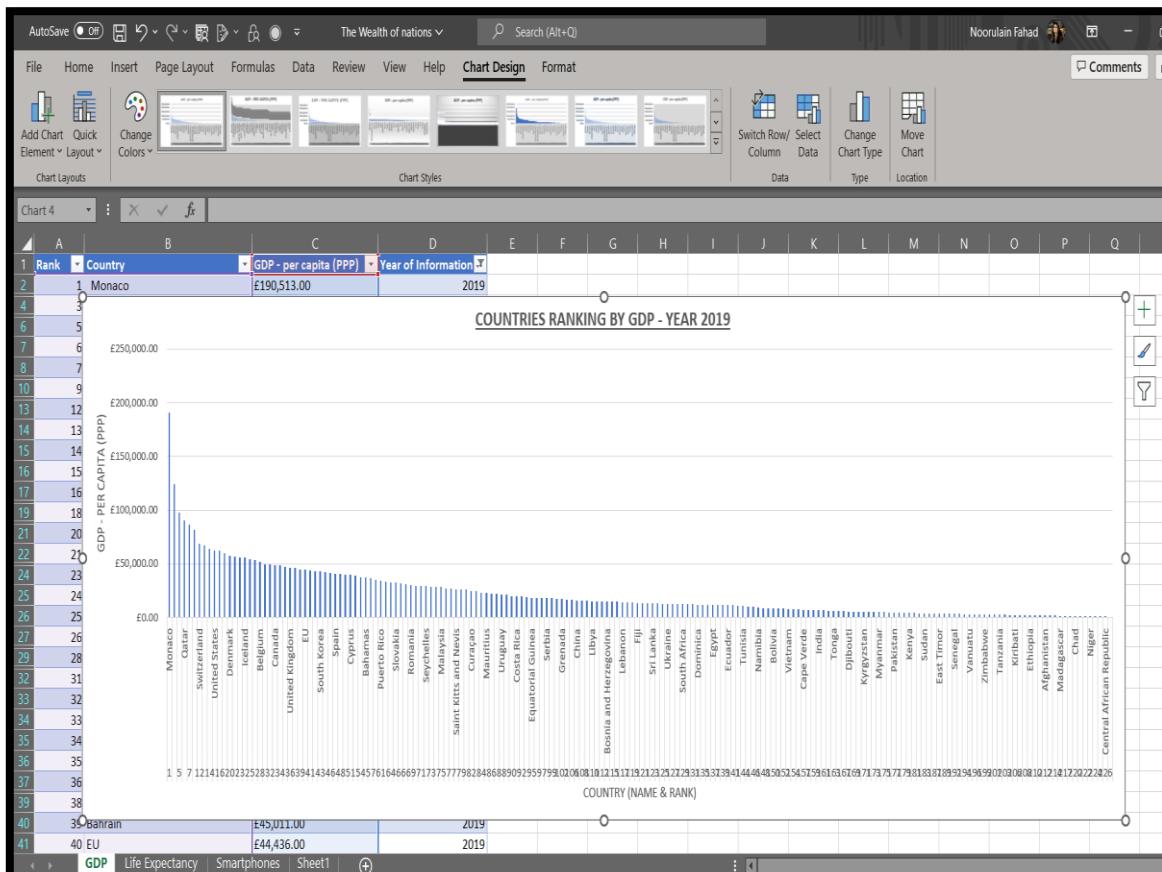
- Click on the chart and then select the "+" sign on top right of the chart.



- From the menu, check "Axis Titles".



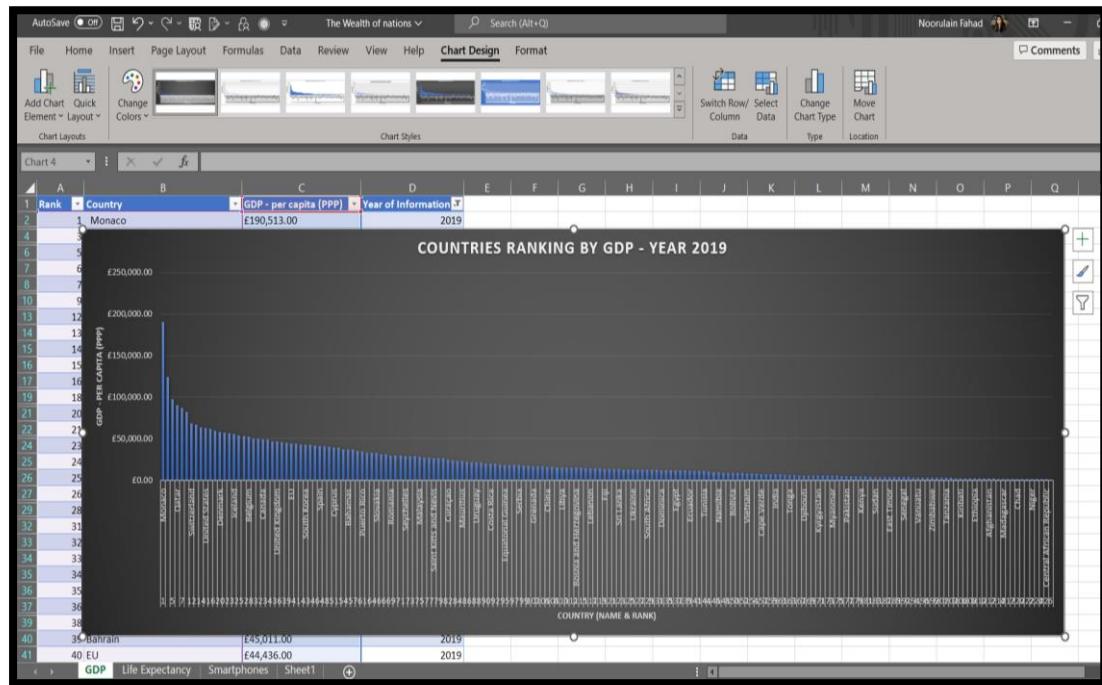
- Now edit the axis titles in the same way as the chart title, by double clicking on it.



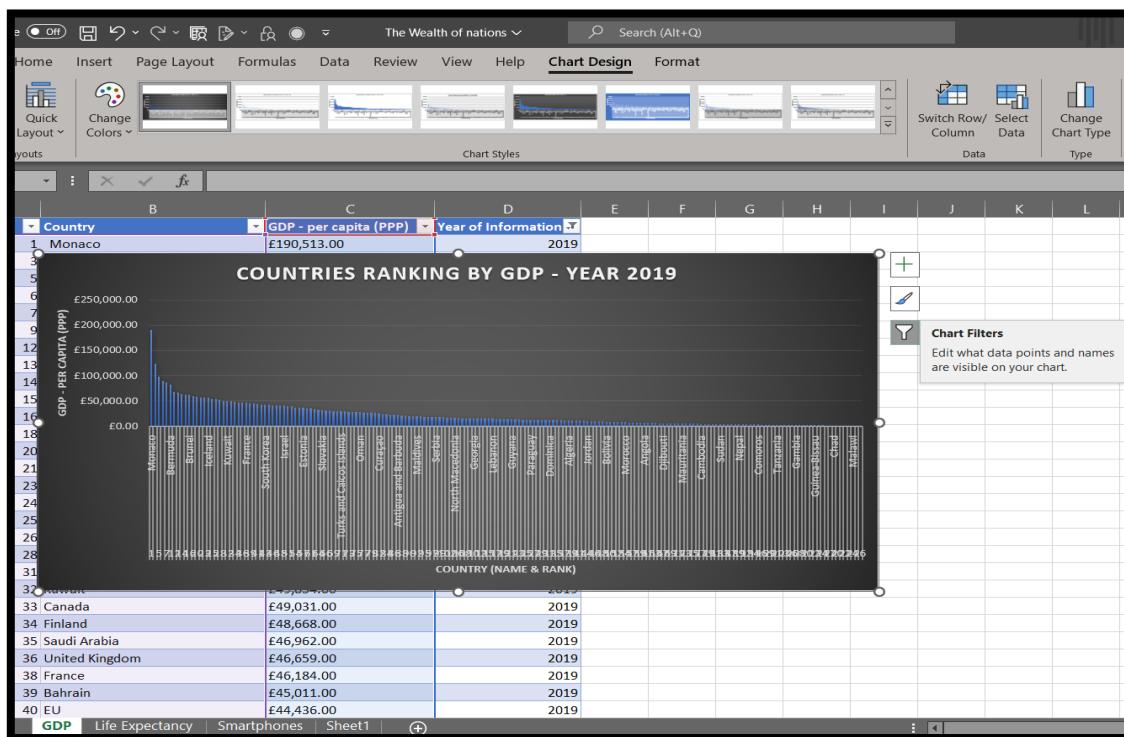
- The chart will now display the axis titles on X and Y axis respectively.

c) **ADDITIONAL FORMATTING** To make the chart more visually appealing, we can change the background colour, text colour, add data labels and apply additional formatting:

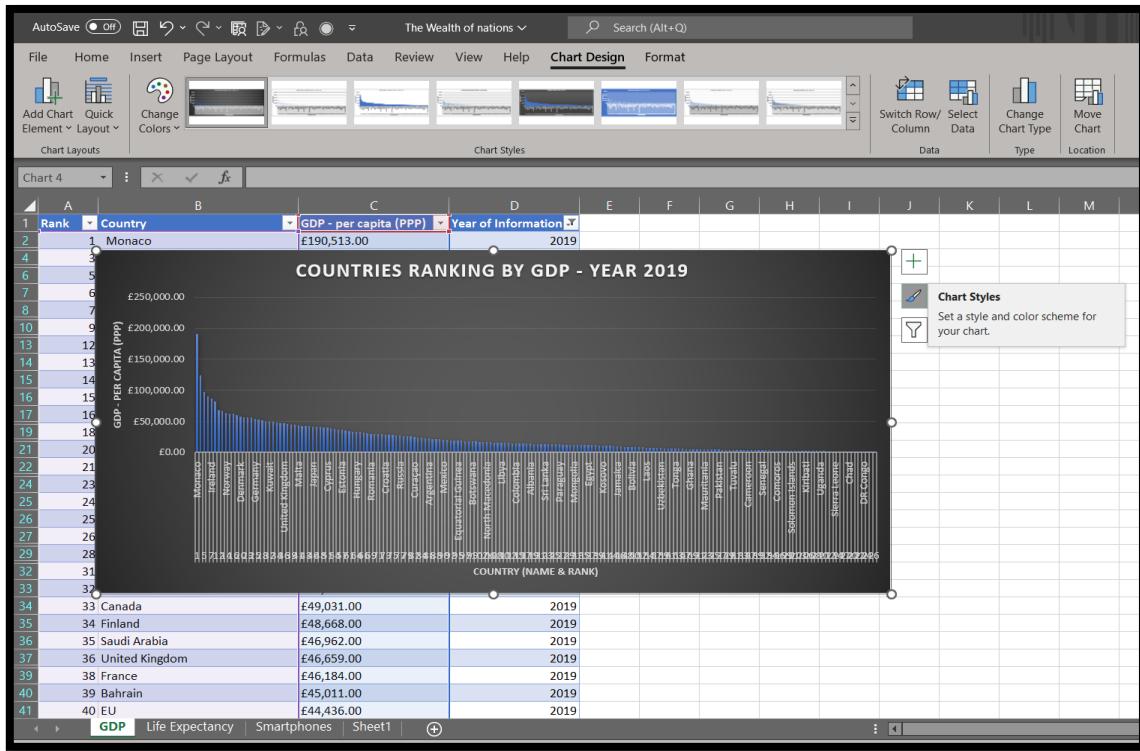
- Go to the Chart Design tab on the top and change the design (background, colour) of the chart as shown below.



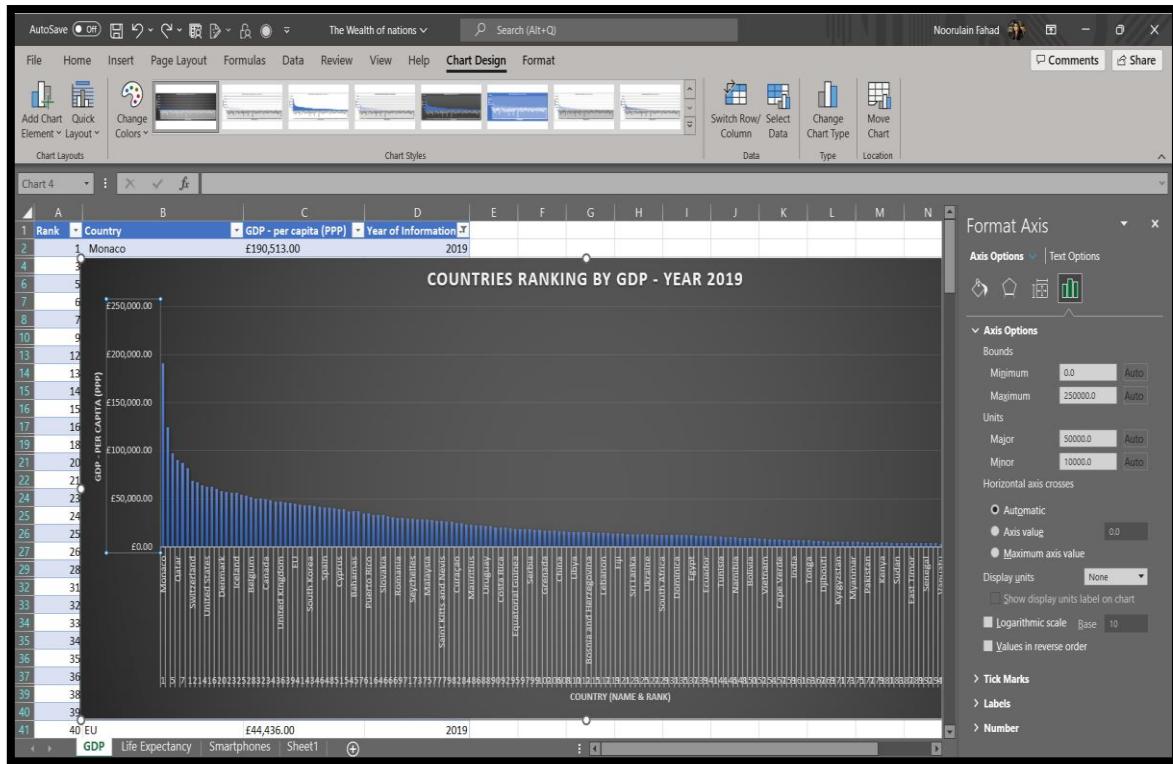
- Click on the chart and select the Filter icon on the top right of the chart. This allows us to specify what information to be displayed on the chart.



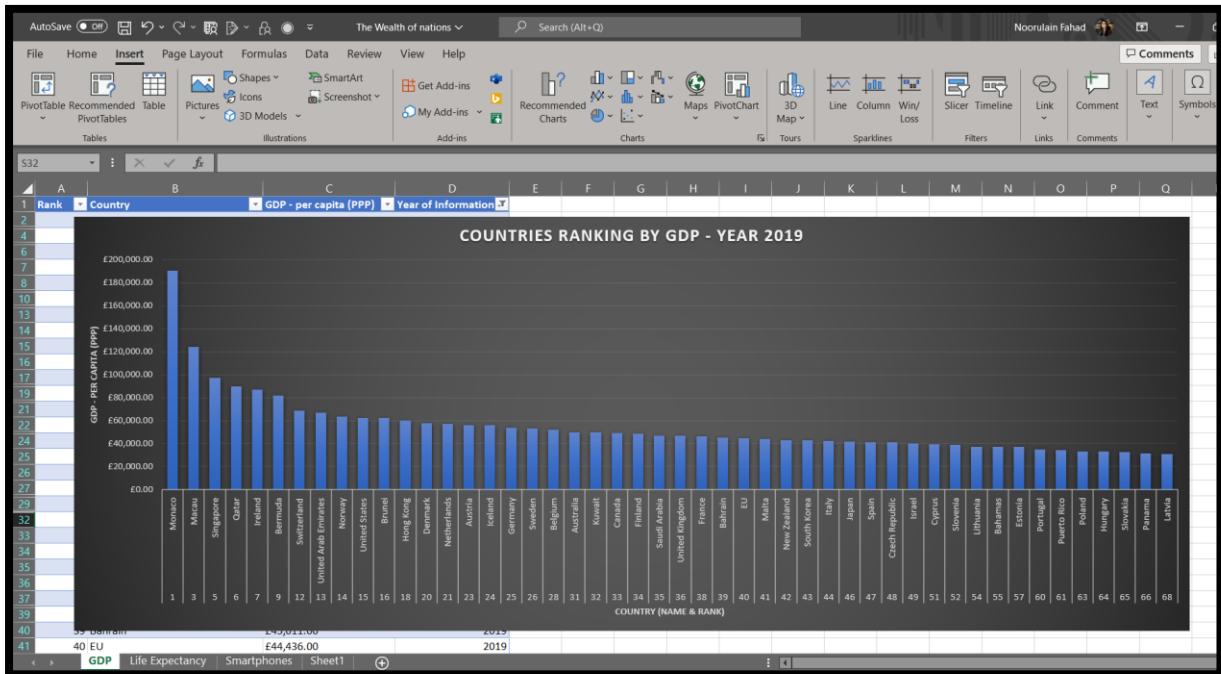
- Click on the chart and select the paint brush icon on the top right of the chart. This allows us to change style and colour palette of the chart.



- The axis values can be changed by double clicking on the axis.



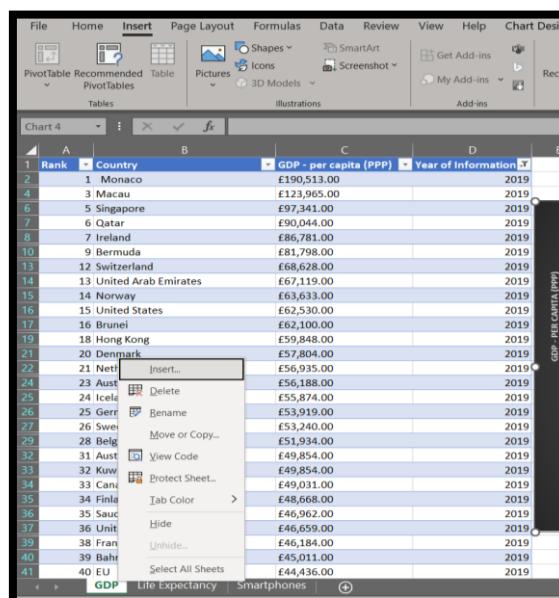
- Finally, to make the chart more readable and less cluttered, I filtered the chart to display countries with a GDP of more than £30,000.

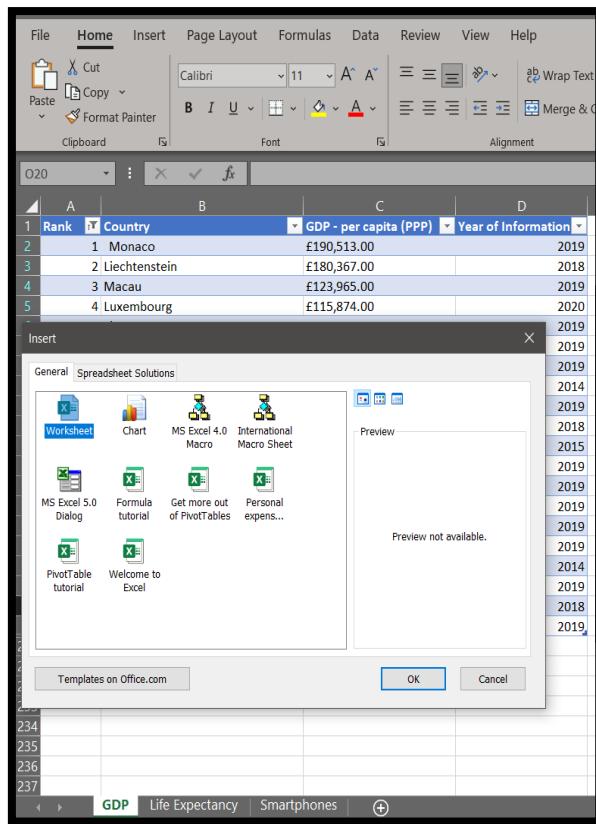


7. MOVE CHART TO NEW SHEET TAB

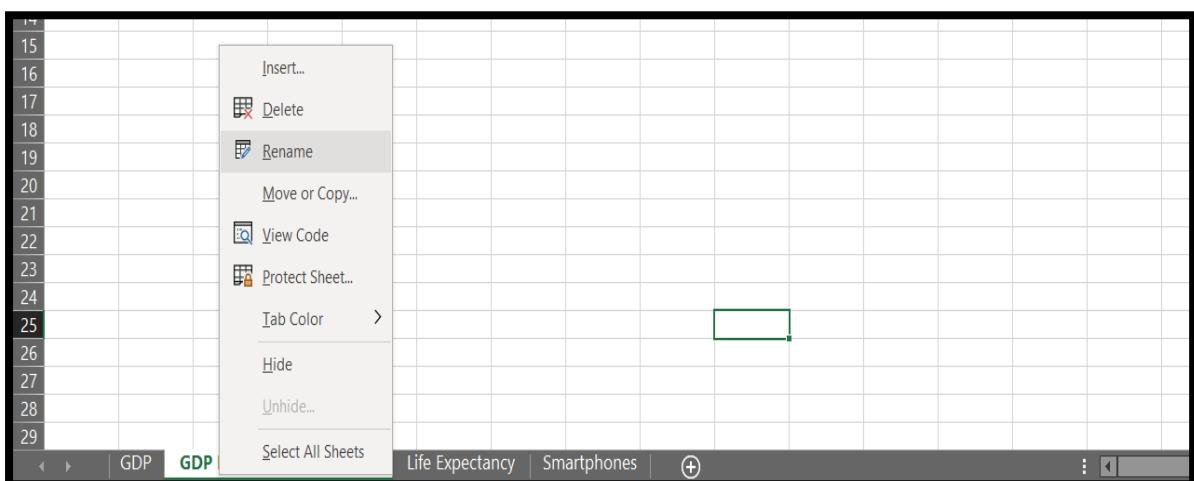
To create a chart from a table:

- Start by creating a new sheet for the chart to be pasted in. To add a new sheet, click on the "+" on the bottom pane or "Right-click" on the GDP sheet tab and click "insert". Then click on new worksheet and click "OK".

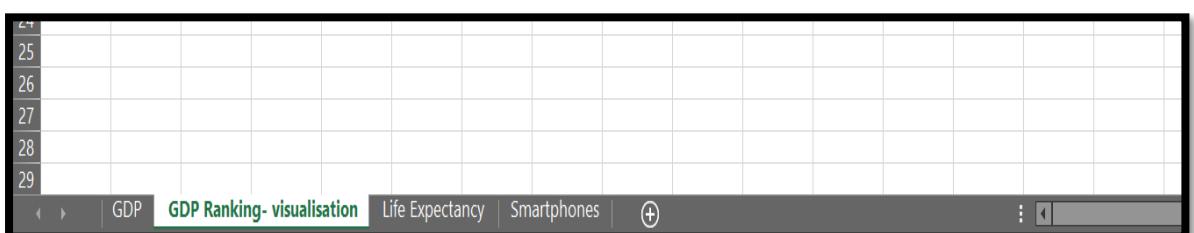




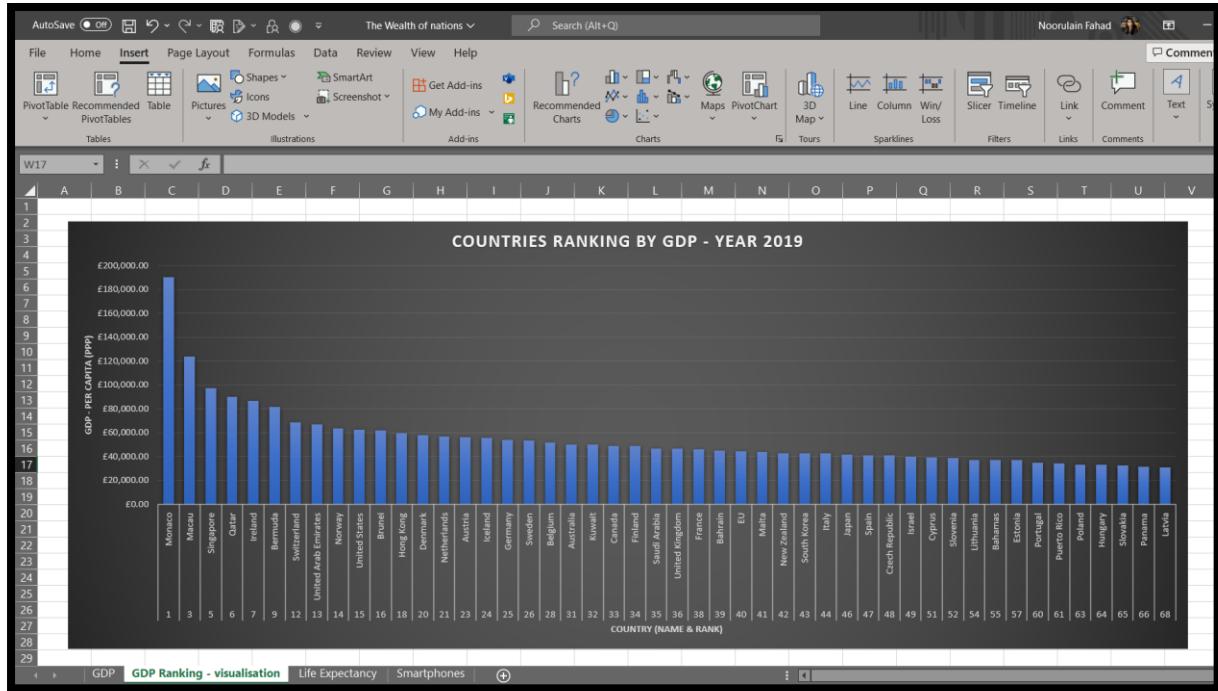
- A new sheet named Sheet1 is created. To label the sheet with a suitable name, Right-click on Sheet1 tab, and click rename.



- Add the new name and press Enter. Now the tab will display the new name for the sheet.



- Now select the chart in the GDP sheet by clicking on it and press "Ctrl + X" to cut the chart. Press "Ctrl + V" to paste the chart in the new sheet.



- The clustered column chart is now moved to the new sheet name GDP Ranking – visualisation.

8. SORT THE TABLE To sort the table to display the "Top 20" highest ranking countries :

- Go to the "Home" tab and click on the "Sort & Filter" drop down.

The sorted table shows the following data:

GDP - per capita [PPP]	Year of Information
£190,513.00	2019
£123,965.00	2019
£97,341.00	2019
£90,044.00	2019
£86,781.00	2019
£81,798.00	2019
£68,628.00	2019
£67,119.00	2019
£63,633.00	2019
£62,530.00	2019
£62,100.00	2019
£59,848.00	2019
£57,804.00	2019
£56,935.00	2019
£56,188.00	2019
£55,874.00	2019
£53,919.00	2019
£53,240.00	2019
£51,934.00	2019
£49,854.00	2019
£49,854.00	2019
£49,031.00	2019
£48,668.00	2019
£46,962.00	2019
£46,659.00	2019
£46,184.00	2019
£45,011.00	2019
£44,436.00	2019

- Now click on "Custom Sort" to specify the column to sort.

The screenshot shows a Microsoft Excel spreadsheet titled "The Wealth of nations". A table is selected with columns labeled "GDP - per capita (PPP)" and "Year of information". The "Custom Sort" dialog box is open, showing the instruction "Choose more options, such as sorting by multiple columns or rows, and case-sensitive sorts." Below the dialog, the "Sort by" dropdown is set to "Rank" and the "Order" dropdown is set to "A to Z".

- Drop down the "Sort by" tab and select Rank also specify "Smallest to Largest" in the "Order" drop down. Click "OK".

The screenshot shows the same Microsoft Excel spreadsheet with the "Sort" dialog box open. The "Sort by" dropdown is set to "Rank" and the "Order" dropdown is set to "A to Z". The "Sort On" dropdown is set to "Cell values". The "Sort" dialog also includes "Add Level", "Delete Level", "Copy Level", and "Options..." buttons, and a checkbox for "My data has headers".

The screenshot shows a Microsoft Excel spreadsheet titled "The Wealth of nations". The table contains data for 41 countries, with columns for Rank, Country, GDP - per capita (PPP), and Year of Information. A "Sort" dialog box is overlaid on the spreadsheet, with the "Sort by" field set to "Rank" and the "Order" field set to "Smallest to Largest".

Rank	Country	GDP - per capita (PPP)	Year of Information
1	Monaco	£190,513.00	2019
2	Macau	£123,965.00	
3	Singapore	£97,341.00	
4	Qatar	£90,044.00	
5	Ireland	£86,781.00	
6	Bermuda	£81,798.00	
7	Switzerland	£68,628.00	
8	United Arab Emirates	£67,119.00	
9	Norway	£63,633.00	
10	United States	£62,530.00	
11	Brunei	£62,100.00	
12	Hong Kong	£59,848.00	
13	Denmark	£57,804.00	
14	Netherlands	£56,935.00	
15	Austria	£56,188.00	
16	Iceland	£55,874.00	2019
17	Germany	£53,919.00	2019
18	Sweden	£53,240.00	2019
19	Belgium	£51,934.00	2019
20	Australia	£49,854.00	2019
21	Kuwait	£49,854.00	2019
22	Canada	£49,031.00	2019
23	Finland	£48,668.00	2019
24	Saudi Arabia	£46,962.00	2019
25	United Kingdom	£46,659.00	2019
26	France	£46,184.00	2019
27	Bahrain	£45,011.00	2019
28	EU	£44,436.00	2019

- Now, the table displays Rank column in ascending order (Smallest to Largest). To filter out the Top 20 highest ranking countries, go to the "Drop Down" arrow of the "Rank" column and click it. This will open the "Sort and Filter" menu for the selected column. Currently, it shows the data for all the ranks. Uncheck all the values except "1" to "20" and click "OK".

The screenshot shows the same Microsoft Excel spreadsheet with the "Rank" column filtered. Only rows 1 through 20 are visible, while rows 21 through 41 are grayed out. The filter dropdown for the "Rank" column shows checkboxes for rows 1 through 20, indicating they are selected.

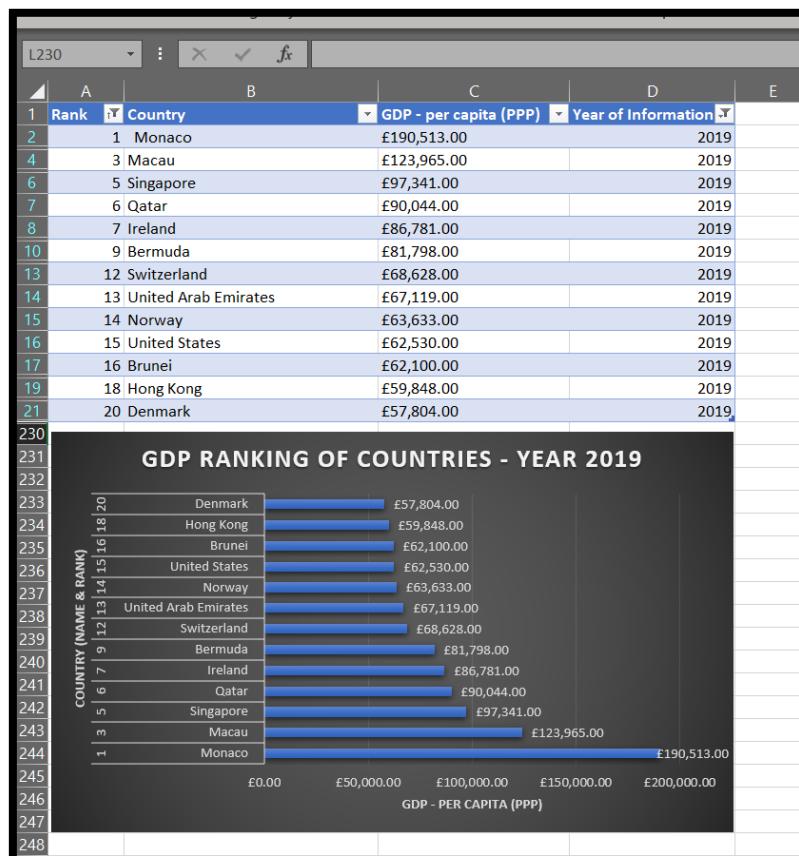
Rank	Country	GDP - per capita (PPP)	Year of Information
1	Monaco	£190,513.00	2019
2	Macau	£123,965.00	2019
3	Singapore	£97,341.00	2019
4	Qatar	£90,044.00	2019
5	Ireland	£86,781.00	2019
6	Bermuda	£81,798.00	2019
7	Switzerland	£68,628.00	2019
8	United Arab Emirates	£67,119.00	2019
9	Norway	£63,633.00	2019
10	United States	£62,530.00	2019
11	Brunei	£62,100.00	2019
12	Hong Kong	£59,848.00	2019
13	Denmark	£57,804.00	2019
14	Netherlands	£56,935.00	2019
15	Austria	£56,188.00	2019
16	Iceland	£55,874.00	2019
17	Germany	£53,919.00	2019
18	Sweden	£53,240.00	2019
19	Belgium	£51,934.00	2019
20	Australia	£49,854.00	2019
21	Kuwait	£49,854.00	2019
22	Canada	£49,031.00	2019
23	Finland	£48,668.00	2019
24	Saudi Arabia	£46,962.00	2019
25	United Kingdom	£46,659.00	2019
26	France	£46,184.00	2019
27	Bahrain	£45,011.00	2019
28	EU	£44,436.00	2019

- Now, the table only displays the "Top 20" highest ranking countries in the top to bottom order.

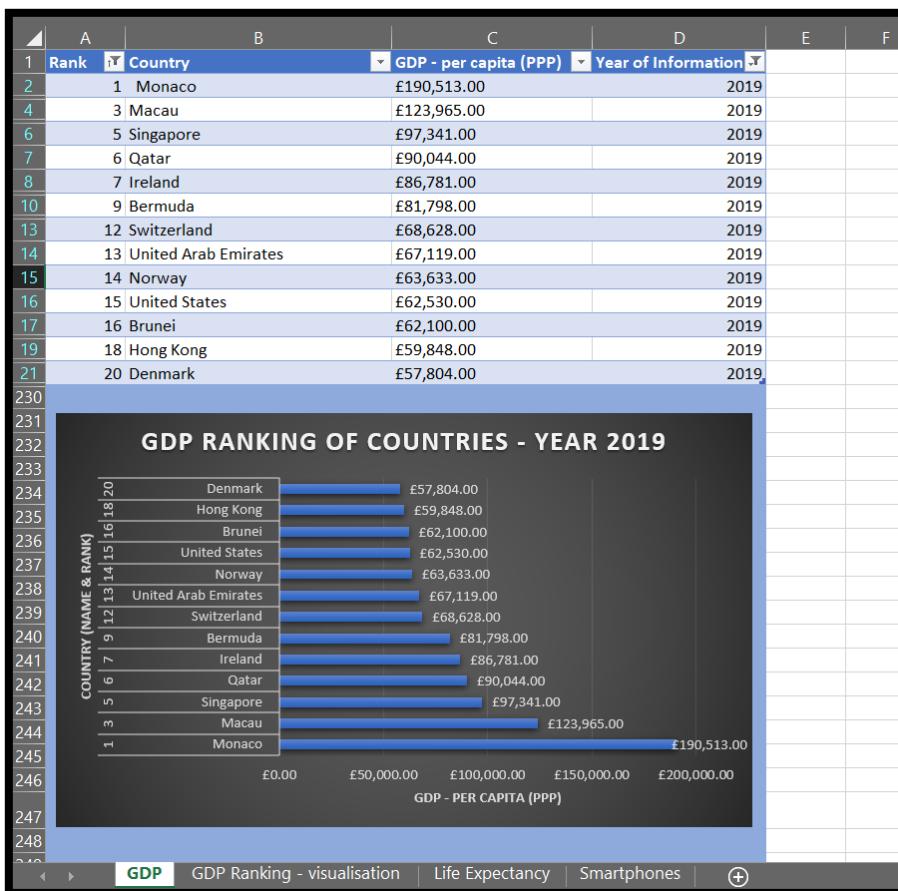
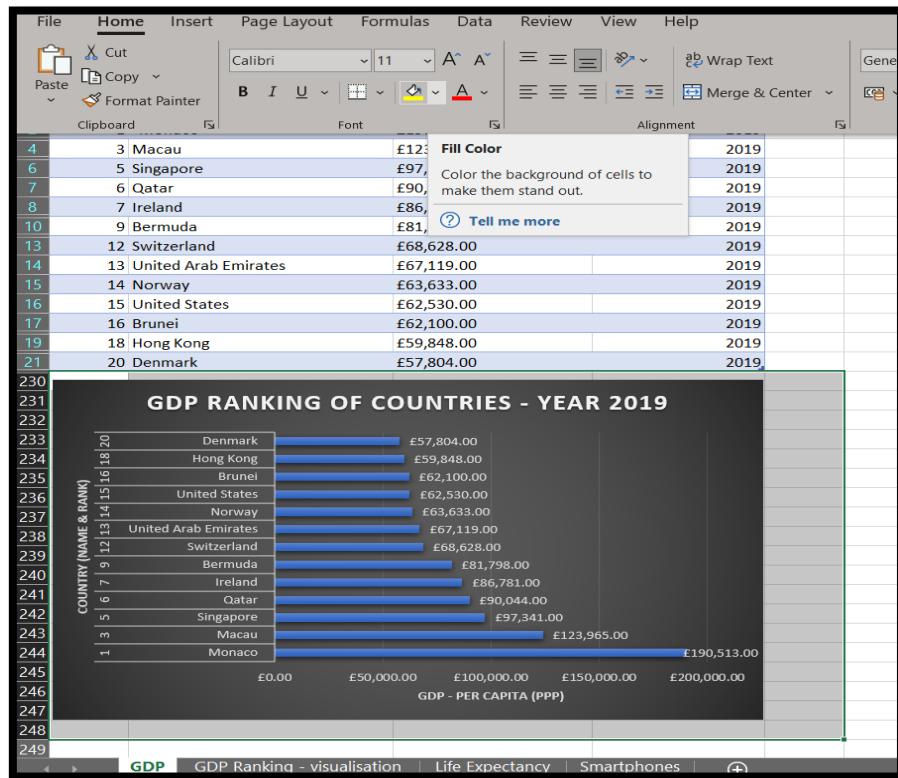
A screenshot of a Microsoft Word document titled "The Wealth of nations". The table has four columns: Rank, Country, GDP - per capita (PPP), and Year of Information. The data shows the top 20 countries by GDP per capita in 2019, with Monaco at the top and Denmark at the bottom.

Rank	Country	GDP - per capita (PPP)	Year of Information
1	Monaco	£190,513.00	2019
2	Macau	£123,965.00	2019
4	Singapore	£97,341.00	2019
6	Qatar	£90,044.00	2019
7	Ireland	£86,781.00	2019
10	Bermuda	£81,798.00	2019
12	Switzerland	£68,628.00	2019
13	United Arab Emirates	£67,119.00	2019
14	Norway	£63,633.00	2019
15	United States	£62,530.00	2019
16	Brunei	£62,100.00	2019
17	Hong Kong	£59,848.00	2019
19	Denmark	£57,804.00	2019
20			

9. **BAR CHART** To create a bar chart from the table, select the columns Rank, Country and GDP and follow all the steps explained earlier to create a chart and select bar chart. Move the chart underneath the table, as shown below.

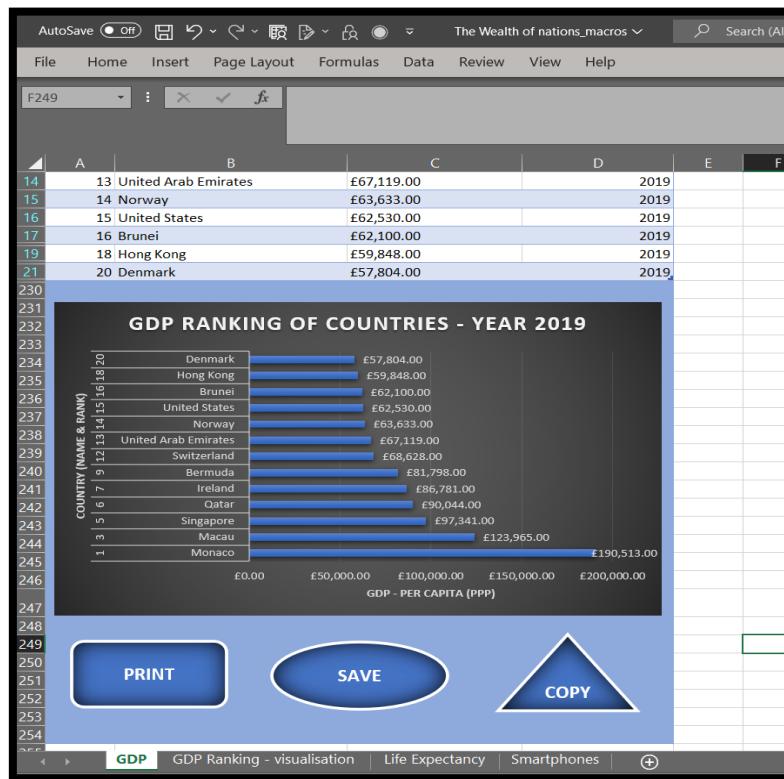


10. BACKGROUND COLOUR To colour the background, highlight the area underneath the table and then click on fill colour icon to select a colour.

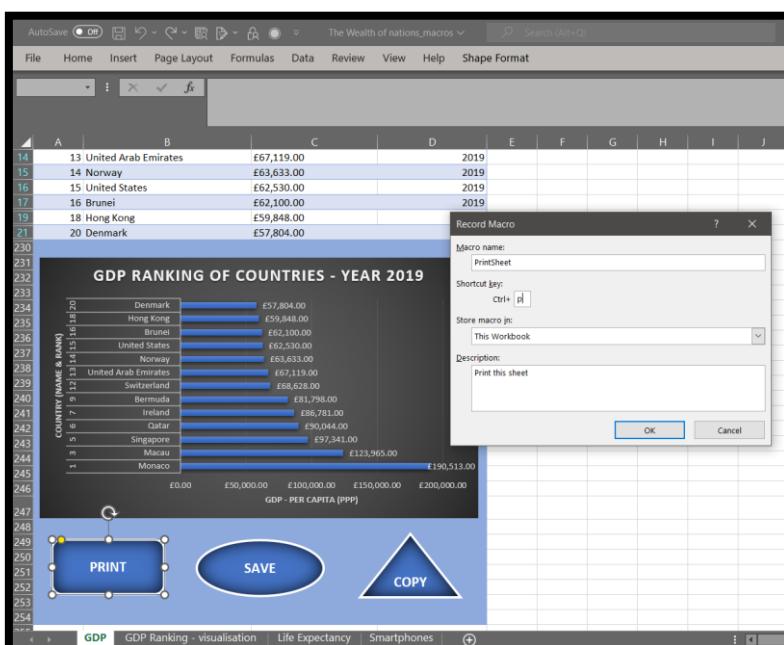


11. CREATE MACROS In MS Excel, Macros are a set of recorded actions that can be played back to automate repetitive tasks. A macro can perform a wide range of tasks in Excel, from copying and pasting data to formatting cells and creating charts. Macros are recorded in a programming language called Visual Basic for Applications (VBA). To create three macro buttons (Print, Save and Copy the sheet):

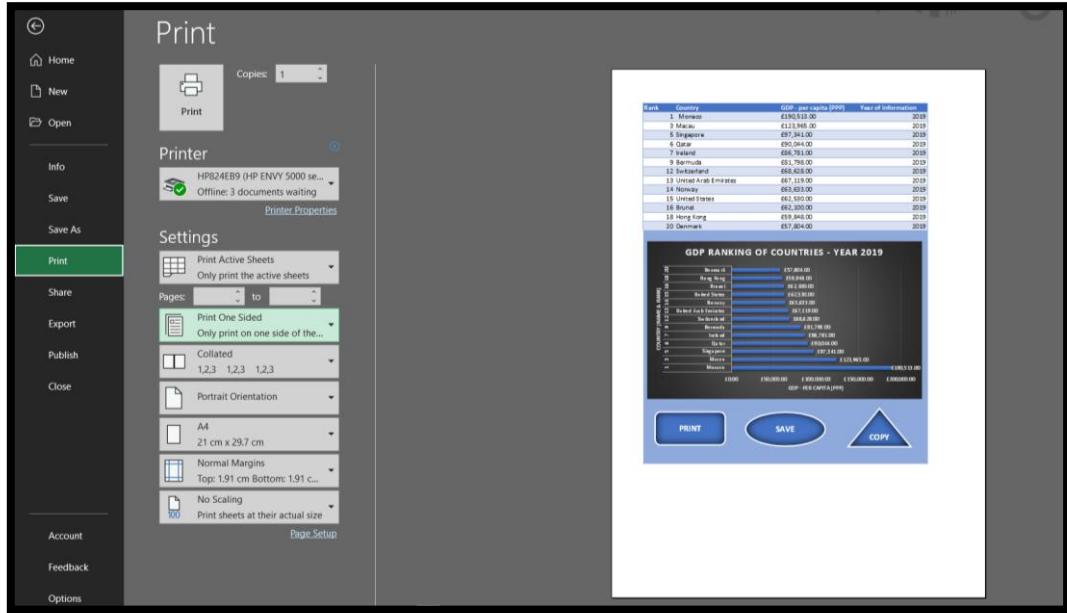
- Start by inserting three shapes for the buttons as shown below.



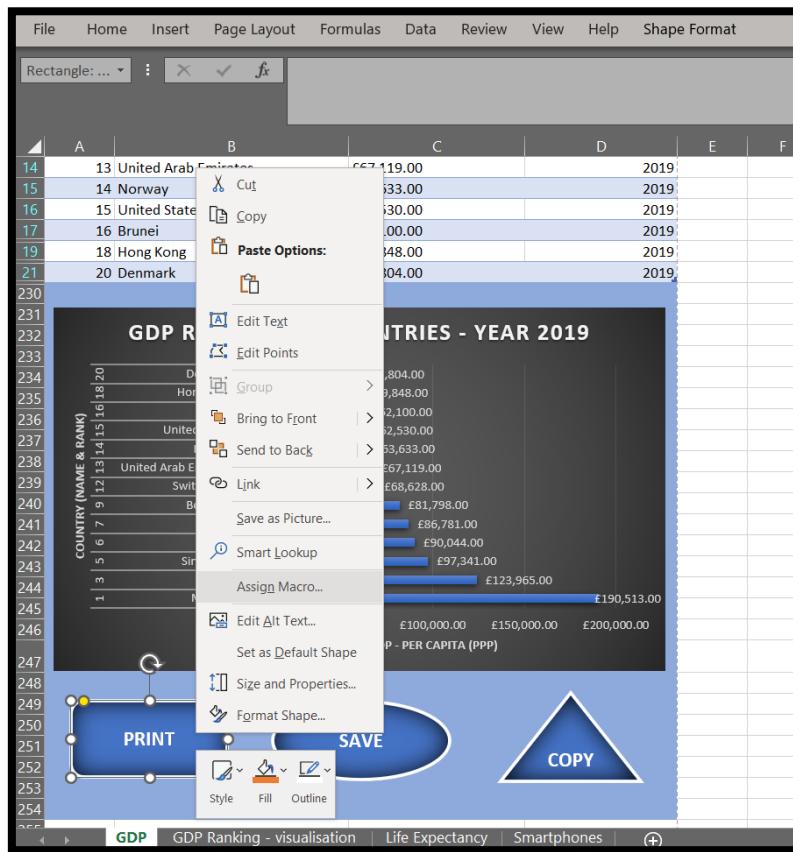
- Go to the "View" tab and select "Macros".



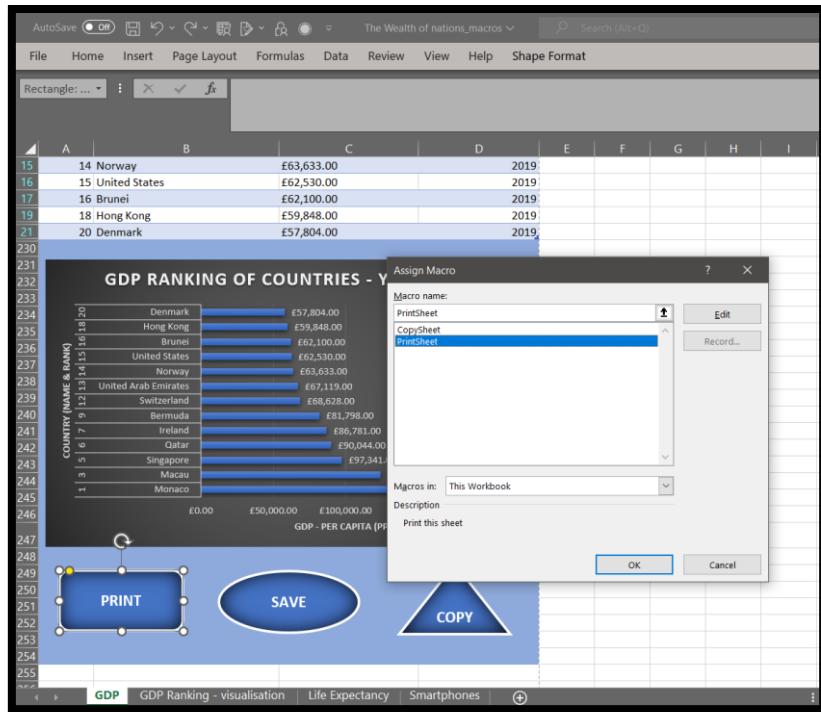
- Click on the "Record Macro" button. In the "Record Macro" dialog box, give your macro a name and choose a location to store it. Click "OK" to start recording the macro. Perform the actions that you want the macro to perform(Print in this case). Go to the "View" tab and select "Macros" again. Click on the "Stop Recording" button to stop recording the macro.



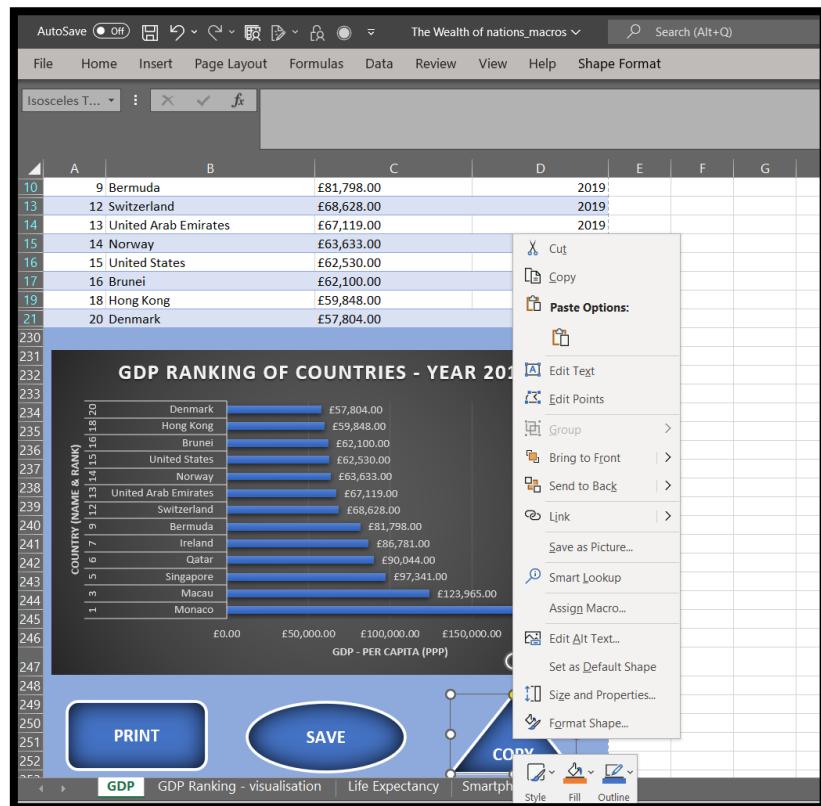
- To assign the macro to the PRINT button, right-click on the shape and click on assign macro.



- To assign the macro to the PRINT button, right-click on the shape and click on assign macro. Select the PrintSheet macro and click OK. Now when you select the area and click on the Print button, print command will run.

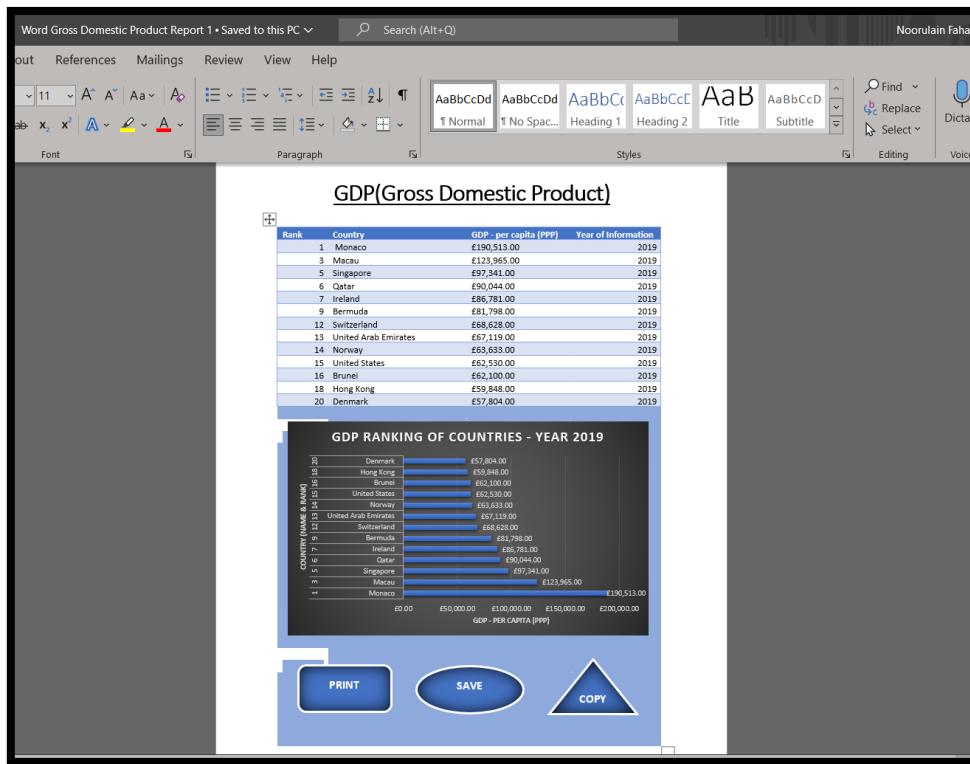


- Repeat the above steps to record and assign the SAVE and COPY macros. Please note that after creating the macros, you must save the files as Excel Macro-Enabled Workbook (*.xlsm)

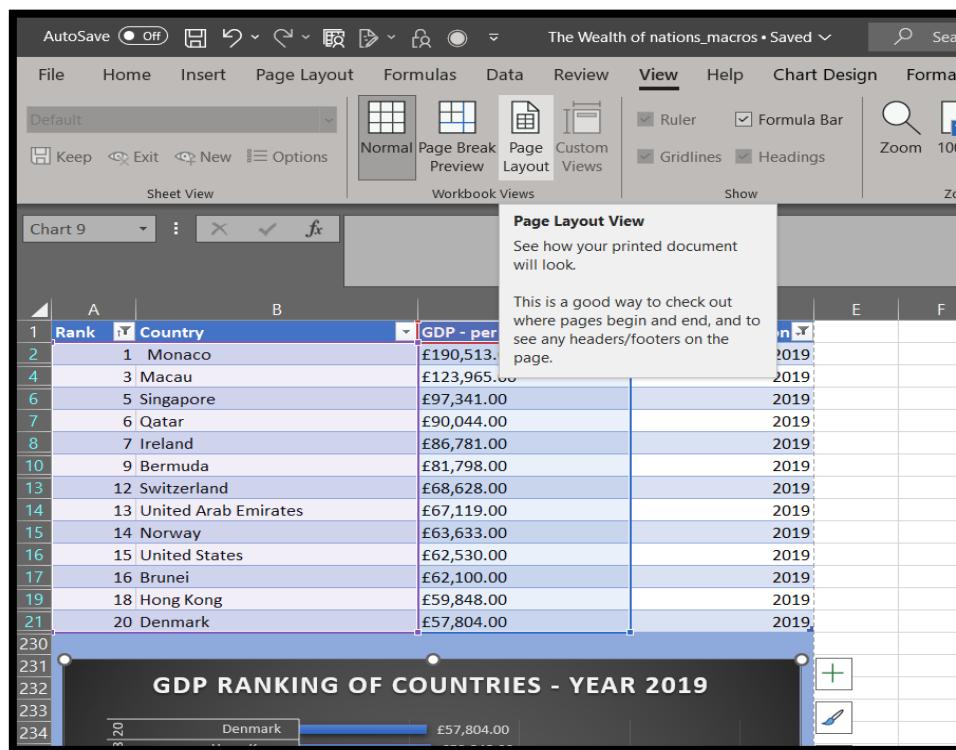


12. USE COPY MACRO BUTTON Click on the copy macro button, it will highlight and copy the data. Now you can paste it into your new Word document.

13. SAVE WORD DOCUMENT Save the word document as "Word Gross Domestic Product Report 1".



14. ADD HEADER AND FOOTER Click on the view and then Page Layout in the Workbook views section.



TASK – 2 : TABLEAU

In this task, "The Wealth of Nations" data is visualised in the Tableau. There are three sets of data to consider which are GDP, Life expectancy at birth and Smartphone users in different countries around the world.

IMPORT DATA

Open Tableau public and click on "Microsoft Excel" in "To the File" header under the "Connect" section. Select the required file and click Open. This will import the Excel workbook in the Tableau.

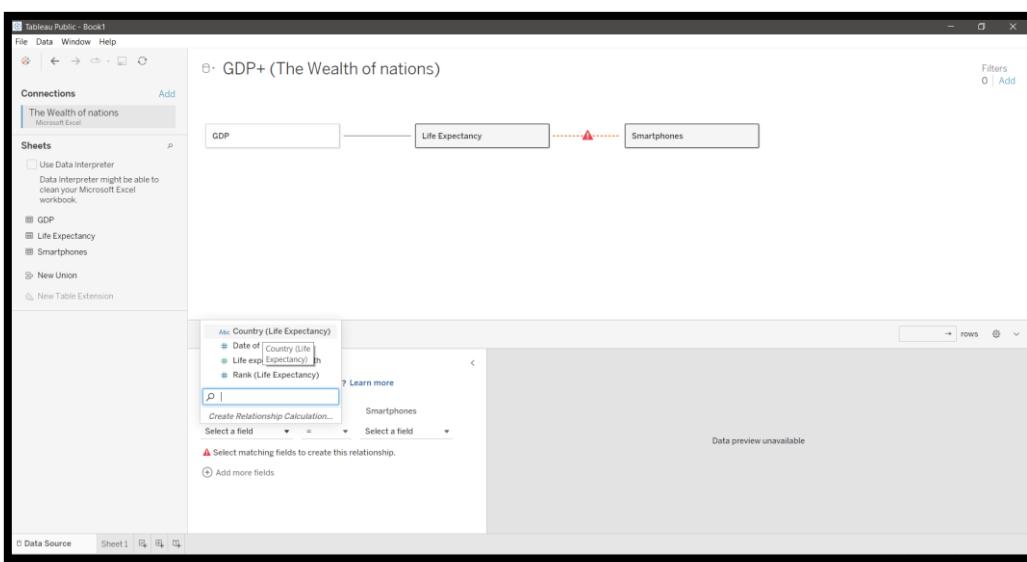
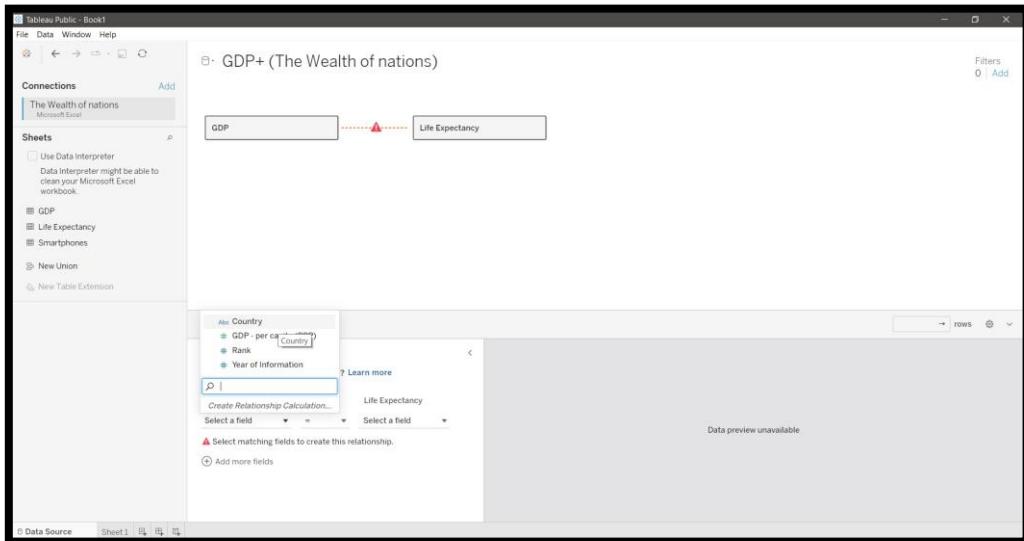
SET RELATIONSHIPS

Setting a relationship in Tableau is a way to link two or more tables based on common fields between them. It helps us to create analyses and visualizations that use data from multiple tables. There are two types of relationships in Tableau:

One-to-One (1:1) Relationships: In a one-to-one relationship, each record in one table is associated with exactly one record in another table. For example, you might have a table of customers and a table of orders, where each customer is associated with a unique order.

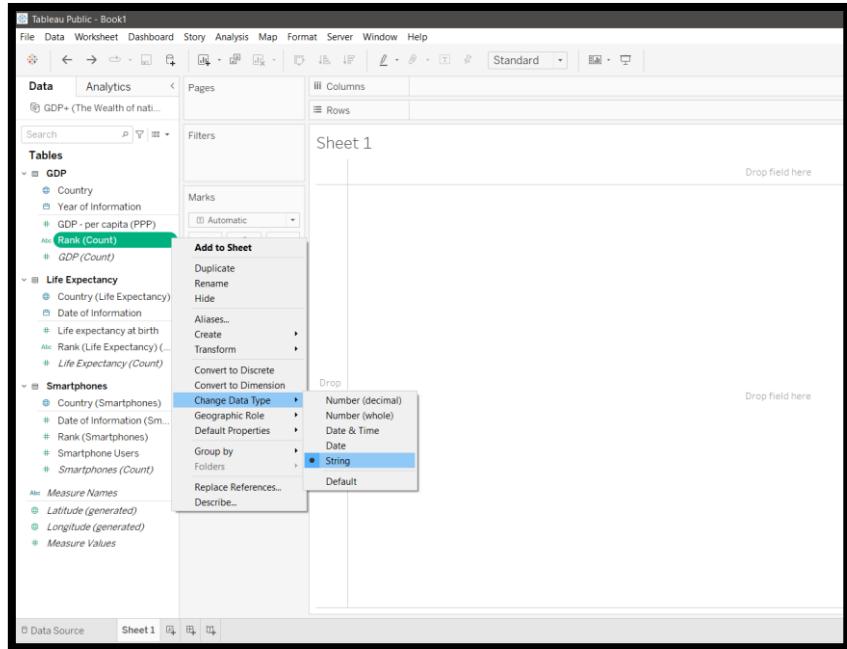
One-to-Many (1:N) Relationships: In a one-to-many relationship, one record in one table is associated with multiple records in another table. For example, you might have a table of customers and a table of orders, where each customer is associated with multiple orders.

Once you have connected to the data sources, you can create a relationship by dragging a field from one table onto a field in another table. Tableau will then prompt you to specify the type of relationship you want to create. In present scenario, we have three tables(sheets) and common field between them is the Country.



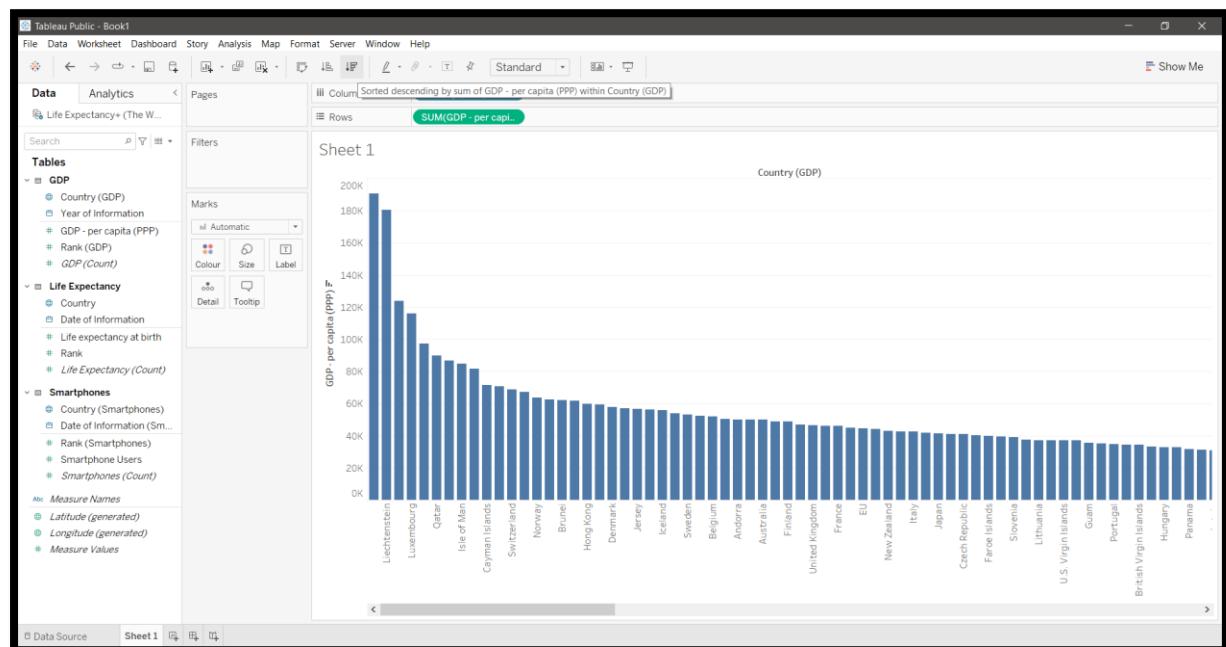
CHECK DATA TYPES

After setting the relationships, check the data types of all the fields in the table. Checking data types in Tableau is an important step in the data preparation process that helps to ensure the accuracy, performance, and consistency of the data and analysis.

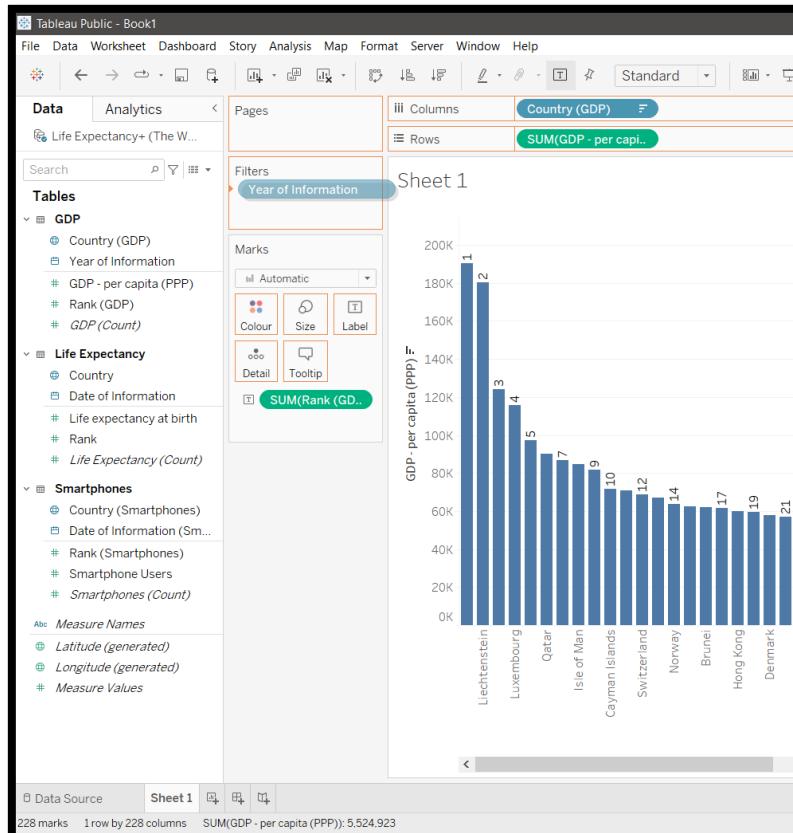
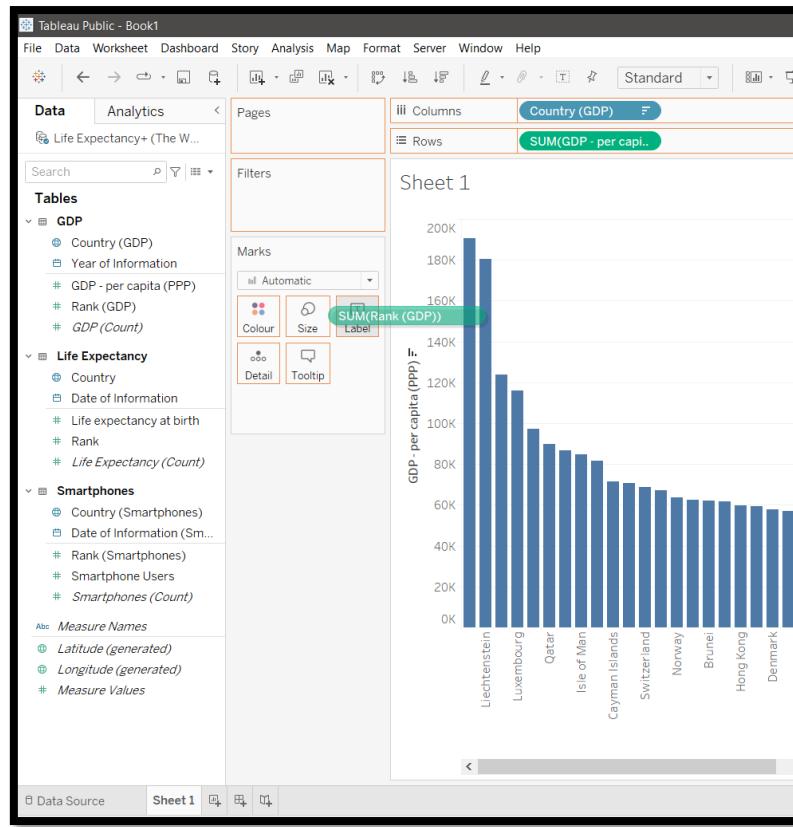


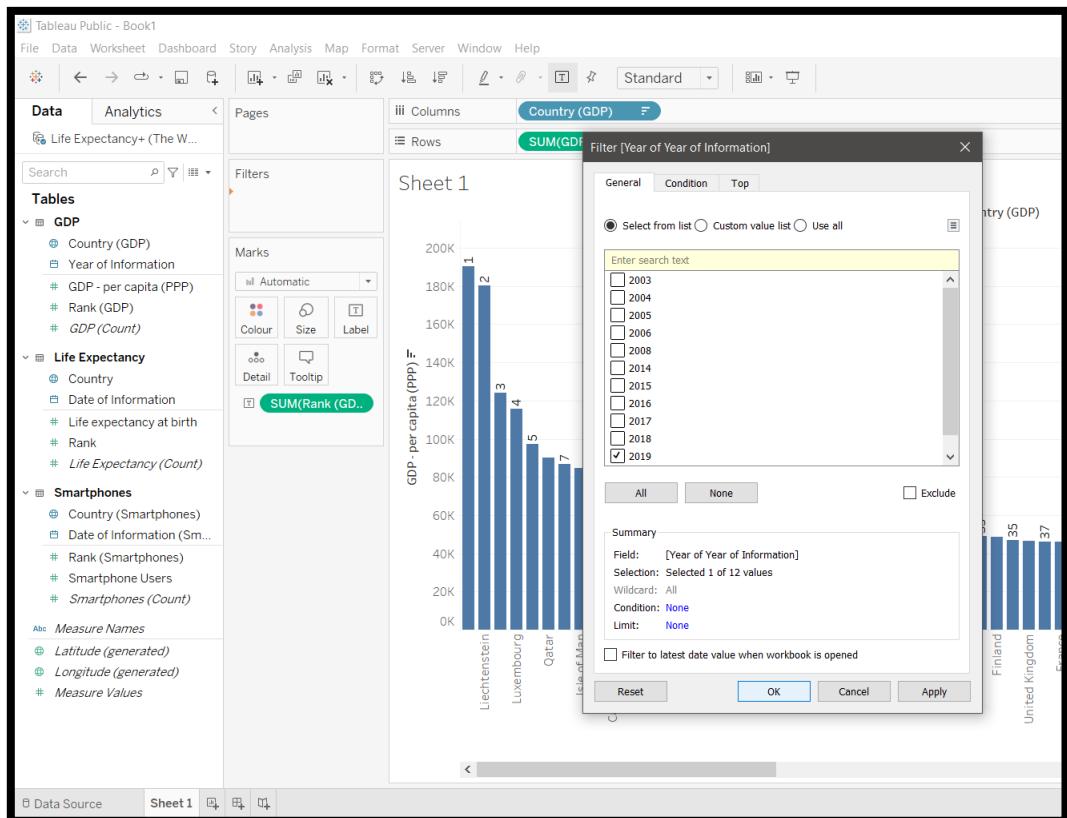
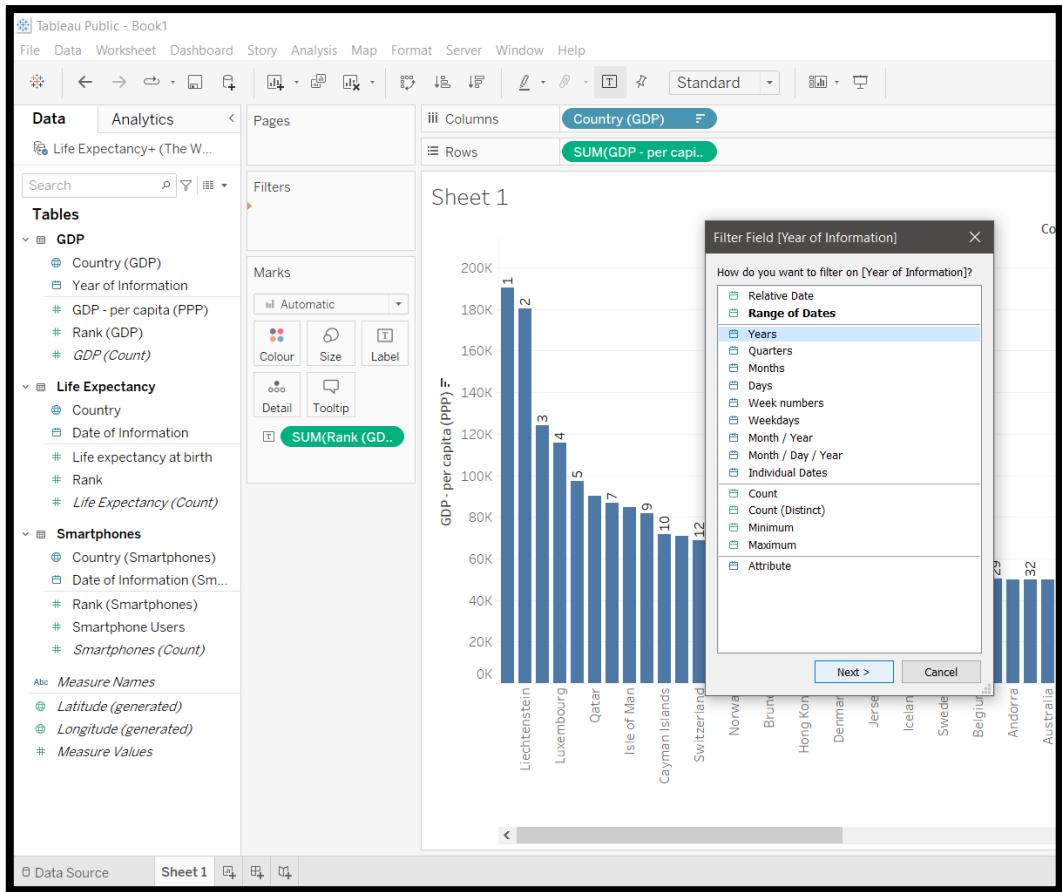
BUILD CHARTS

After checking that all the fields have been assigned appropriate data types, we can build charts. To start building a visualisation, you can drag and drop the required field to columns and rows.

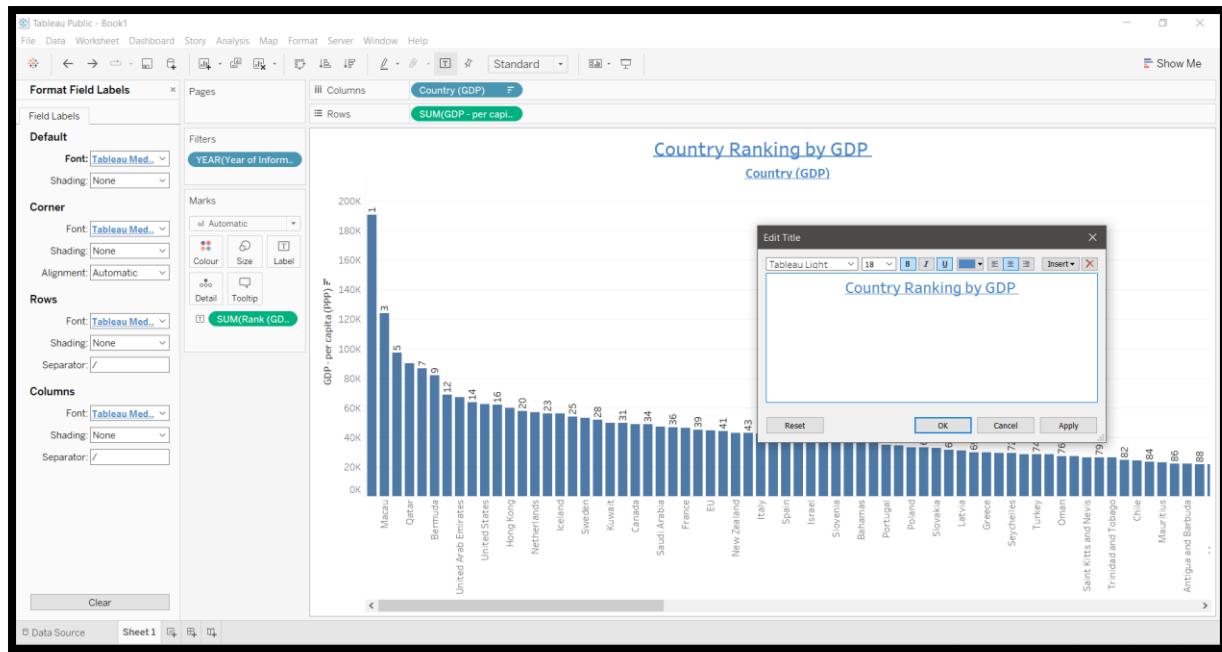


After building the chart, you can add labels, filters and colour attributes to your chart to make it more visually appealing and more understandable for the stakeholders.

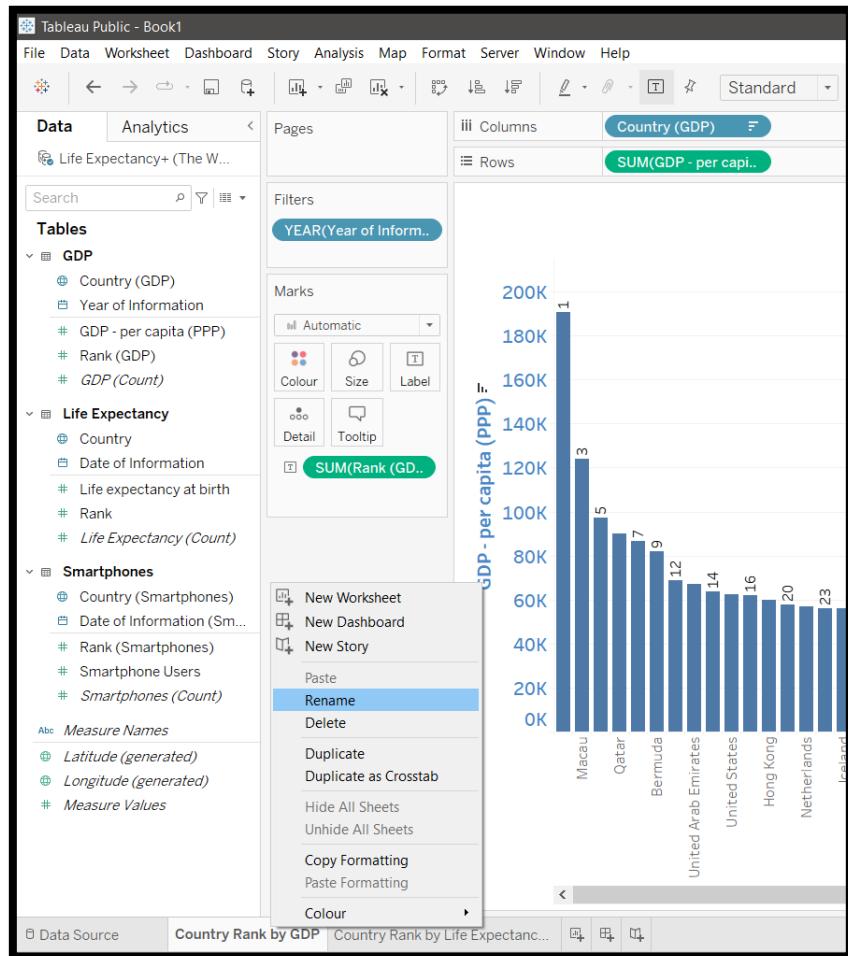




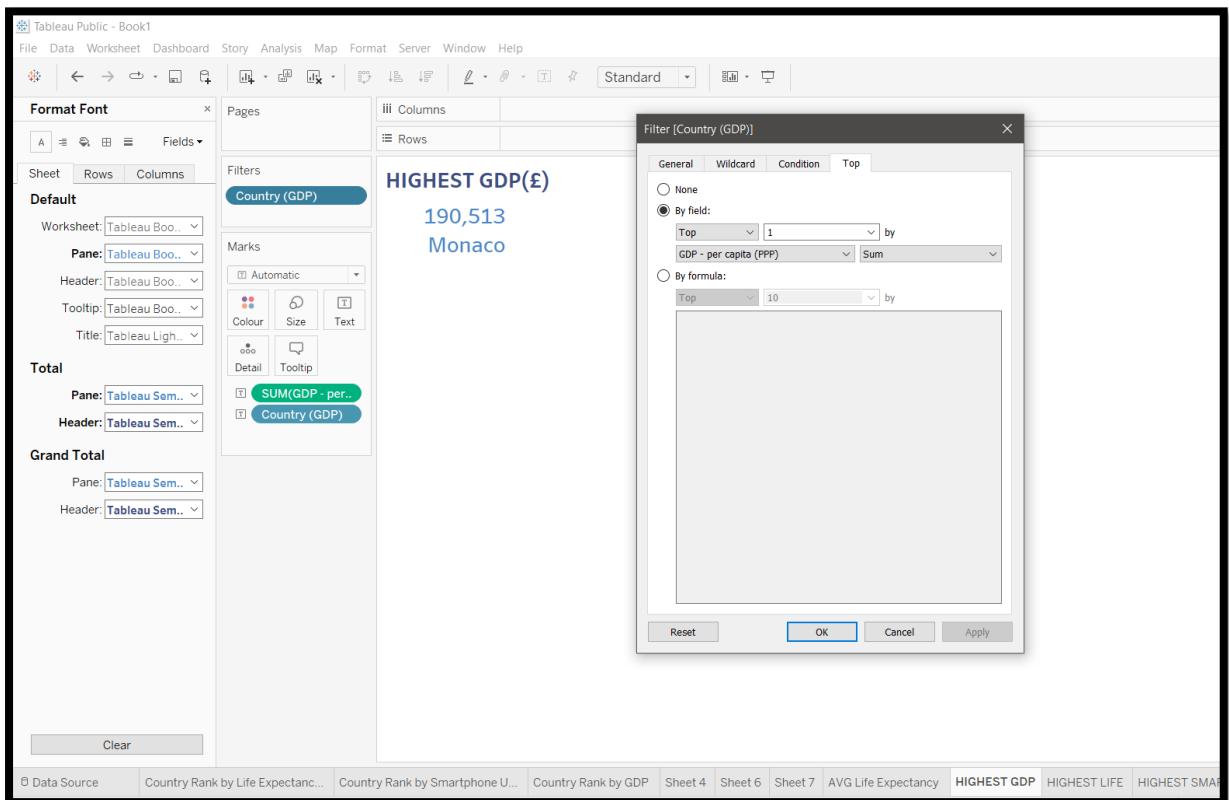
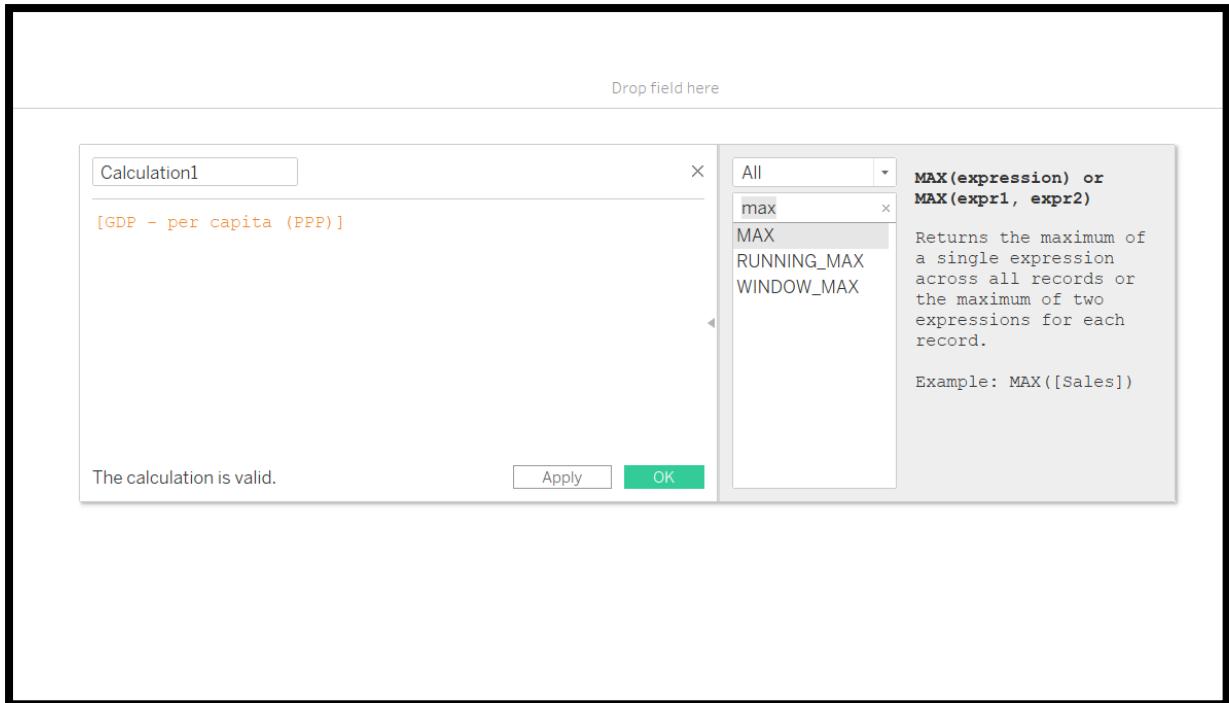
You can also add, hide or edit the chart labels, axis labels as shown below.



To rename the sheet with an appropriate name, right click on Sheet 1 and enter the new name as shown below.



To highlight important findings (max, min, avg) from the dataset, you can use the filter or calculated value and display it on a card. Both methods are shown below.



BUILD DASHBOARD

Once you have completed building all your individual charts, click on the bottom pane to create new dashboard. Now you can double click on the chart that you want to display on your dashboard. To make your chart more readable to the users, make sure that all the elements are aligned in a proper arrangement. Once you have properly formatted one of the charts, you can copy and paste the same formatting to the rest of the charts to make the process more efficient and also keep the formatting uniform throughout the dashboard. For this project, client asked for a colour-blind friendly dashboard. The dashboard shown below has been created following the visual guidelines and principles outlined for colour-blind individuals.



Once your dashboard is finalised, you can publish it to the Tableau public by saving it to Tableau Public online as shown below.

Tableau Public - Best of the World_GDP, Life Expectancy and Tech

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Dashboard Layout Device Preview Device type Default

TOP 20

COUNTRIES WITH HIGHEST GDP(£)

Country	GDP (£)
Monaco	190,513
Macau	123,965
Singapore	90,044
Qatar	81,798
Ireland	81,798
Bermuda	81,798
Switzerland	81,798
United Arab Emirates	81,798
Norway	81,798
United States	81,798
Brunei	81,798

HIGHEST GDP(£)

190,513 Monaco

COUNTRIES WITH HIGHEST SMARTPHONE USERS

Country	Smartphone Users
China	1,598,36
India	1,281,97
Indonesia	385,57
United States	327,57
Brazil	284,20
Russia	256,11
Nigeria	167,37
Bangladesh	165,61
Pakistan	165,40
Japan	146,64
Germany	107,00

COUNTRIES WITH HIGHEST LIFE EXPECTANCY

Country	Life Expectancy
Hong Kong	84.9
Spain	83.5
Israel	83.0
South Korea	83.0
Sweden	82.8
France	82.7
Japan	84.6
Australia	83.4
Malta	82.5
Ireland	82.3
Canada	82.4
New Zealand	82.3
Norway	82.4
Iceland	83.0
Singapore	83.6
Turkey	82.9
France	82.7

Save Workbook to Tableau Public

Publishing this workbook will make it available on the Tableau Public website. Make sure it doesn't contain private or confidential information.

OK Save Workbook Title Best of the World: GDP, Life Expectancy and Tech Cancel

Smartphone - per capita (PPP) for each Country. The data is filtered on Rank, which ranges from 1 to 20. Country and Life expectancy are measured in years.

Count.. F Count.. F

Horizontal Vertical Text Image Web Page Data Story Tiled Floating Show dashboard title

Data Source GDP Country Rank by Life Expectanc... TREE MAP GDP MAP-GDP HIGHEST GDP HIGHEST LIFE HIGHEST SMARTPHONE USERS GDP Table Smartphone Users T...

The dashboard is then published on Tableau Public online where you can add details about your viz to add more description about the viz, edit the dashboard using Tableau desktop, download it or change the privacy settings.

Meeting in Meeting in Posit Cloud RStudio D... Best of the ...

Using your Tableau login information. To learn more, please check out our blog.

GDP, Life Expectancy and Tech

Edit

HIGHEST GDP(£)

#####

HIGHEST LIFE EXPECTANCY

#####

HIGHEST SMARTPHONE USERS

#####

COUNTRIES WITH HIGHEST LIFE EXPECTANCY

Country	Life Expectancy
Hong Kong	84.9
Spain	83.5
Israel	83.0
South Korea	83.0
Sweden	82.8
France	82.7
Japan	84.6
Australia	83.4
Malta	82.5
Ireland	82.3
Canada	82.4
New Zealand	82.3
Norway	82.4
Iceland	83.0
Singapore	83.6
Turkey	82.9
France	82.7

<https://public.tableau.com/app/profile/noorulain.fahad/viz/BestoftheWorldGDPLifeExpectancyandTech/TOP20GDPLIFETECH>

Smartphone Users for each Country. The data is filtered on Rank, which ranges from 1 to 20.

Country and Life expectancy at birth. The data is filtered on Rank, which ranges from 1 to 20.

Edit Details

Title (required)
Best of the World: GDP, Life Expectancy and Tech

Give your viz a descriptive title.

Viz description
Top 20 ranking countries by GDP - per capita (£), Life Expectancy at birth and Total number of smartphone users. Please click on bottom right to view in full screen mode.

Tell the community about your viz. Try using hashtags like #MakeoverMonday and #IronViz.

Inspiration
<https://>

Add a link to give credit to the Tableau Public viz or author that inspired you.

External link
<https://>

Is this viz published on another site? Add that link here.

You can share your viz with others using the share button in bottom right and using the link.

Qatar 90,044
Ireland 86,781
Bermuda 81,798
Switzerland 68,628
United Arab Emirates 67,119

OK 50K 100K 150K

GDP - per capita (PPP)

COUNTRIES WITH HIGHEST LIFE EXPECTANCY

Rank	Country	Life Expectancy
1	Hong Kong	83.5
2	Spain	83.5
3	Israel	83.0
4	South Korea	83.0
5	Sweden	82.8
6	France	82.7
7	Australia	83.4
8	Malta	82.5
9	Ireland	82.3
10	Italy	83.4
11	Canada	82.4
12	Singapore	83.6
13	Iceland	83.0
14	Norway	82.4
15	New Zealand	82.3
16	Greece	82.2

COUNTRIES WITH HIGHEST SMARTPHONE USE

Rank	Country	Smartphone Users
1	China	1,598,366
2	India	1,281,976
3	Indonesia	385,577
4	United States	327,577
5	Brazil	284,201
6	Russia	256,119
7	Nigeria	167,371
8	Bangladesh	165,611
9	Pakistan	165,401
10	Japan	146,641

Smartphone Users for each Country. The data is filtered on Rank, which ranges from 1 to 20.

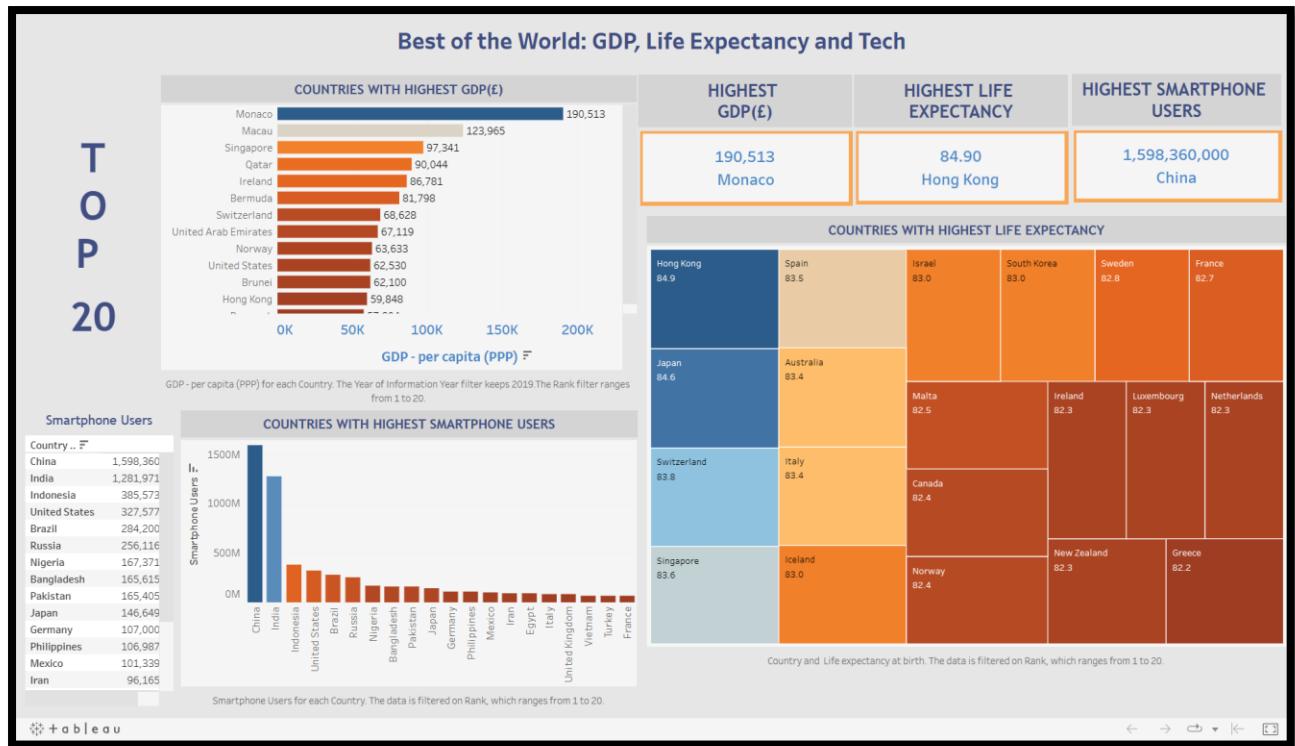
Country and Life expectancy at birth. The data is filtered on Rank, which ranges from 1 to 20.

Details

Top 20 ranking countries by GDP - per capita (£), Life Expectancy at birth and Total number of smartphone users. Please click on bottom right to view in full screen mode.

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The final dashboard for the dataset is shown below. It gives insight into the Top 20 countries according to GDP, Life expectancy at birth and the number of smartphone users.



REFLECTIVE

This project has helped me to utilise my knowledge of MS Excel and Tableau to clean, analyse and visualise the dataset. I found it highly interesting and useful to create macros to automate the repetitive tasks. I particularly enjoyed using calculated fields and different filters to analyse data using Tableau public. It gave me insights into dataset which didn't make much sense to begin with. Also researching and reading up on making the work more accessible for users of different abilities was thought provoking and remarkable for me. The possibilities of how we can use Excel and Tableau to analyse and visualise data are endless, and I will continue to carry on my learning journey.