

10-09-2025

 **World Happiness Report – Key Variables & Calculation Methodology**

 **1. Log GDP per Capita**

• **Definition:**

Measures the economic output per person in a country, adjusted for population size and purchasing power parity (PPP).

• **Formula:**

Log GDP per capita = $\log(\text{GDP per capita in USD})$

• **Purpose:**

Applied logarithmic transformation reduces skewness in income distribution, improving linearity in statistical models.

 **2. Social Support**

• **Definition:**

Reflects the presence of strong interpersonal networks and perceived availability of help in times of need.

• **Calculation:**

Social Support Score = Fraction of respondents answering "Yes" to:

"If you were in trouble, do you have relatives or friends you can count on to help you whenever you need them?"

Range: 0 to 1



3. Healthy Life Expectancy at Birth

- **Definition:**

Average number of years a person is expected to live in full health.

- **Source:**

World Health Organization (WHO) life tables.

- **Unit:**

Years

- **Purpose:**

Serves as a proxy for public health and healthcare system quality, directly influencing subjective well-being.



4. Freedom to Make Life Choices

- **Definition:**

People's perception of autonomy in decision-making regarding life paths (career, residence, etc.).

- **Calculation:**

Average self-reported score on a 0–10 scale in response to:

"Are you satisfied with your freedom to choose what you do with your life?"



5. Generosity

- **Definition:**

Measures the propensity of individuals to engage in charitable activities or help strangers.

- **Calculation:**

Generosity Score = Fraction of respondents reporting charitable donations or volunteering, normalized between 0 and 1.



6. Perceptions of Corruption

- **Definition:**

Extent to which citizens perceive corruption in government and business.

- **Calculation:**

Perception of Corruption Score =
1 – (Fraction of respondents answering "Yes" to "Is corruption widespread?")

- **Interpretation:**

Higher score → Lower perceived corruption →
Greater trust in institutions.

⊕ Final Happiness Score Calculation (Cantril Ladder Model)

- **Survey Question:**

"On a scale from 0 (worst possible life) to 10 (best possible life), where do you stand today?"

- **Linear Regression Model Formula:**

Happiness Score = $a_0 + a_1 \times \text{Log GDP per capita}$
 $+ a_2 \times \text{Social Support} + a_3 \times \text{Healthy Life Expectancy}$
 $+ a_4 \times \text{Freedom} + a_5 \times \text{Generosity} + a_6 \times \text{Perceptions of Corruption} + \epsilon$

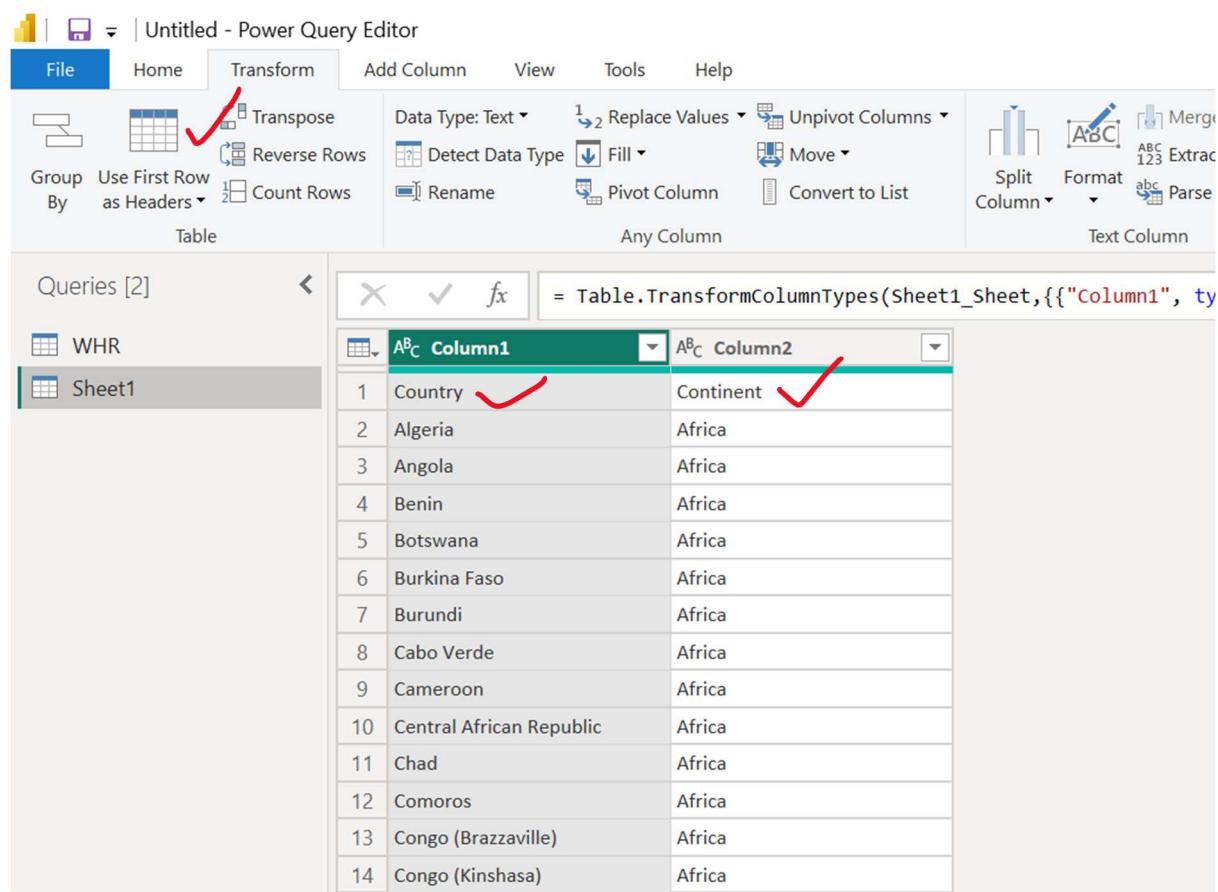
Where:

- a_0 = Intercept
- $a_1 - a_6$ = Coefficients estimated by OLS regression using Gallup World Poll and official statistics
- ϵ = Error term capturing unexplained variance

Creating Relationship Between Tables :

For making Continent Scatter plot we need another table to load which contains continent and country.

Before loading that table we need to do some changes so we take this to power query.



The screenshot shows the Power Query Editor interface. The ribbon is visible with tabs like File, Home, Transform, Add Column, View, Tools, and Help. The 'Home' tab is selected. In the 'Transform' section of the ribbon, the 'Transpose' button is highlighted with a red checkmark. The main area shows a table with two columns: 'Column1' and 'Column2'. The first row of the table is labeled 'Country' and 'Continent' respectively, both of which are also highlighted with red checkmarks. The table contains 14 rows of data, all from the 'Africa' continent. The formula bar at the top shows a transformation step: `= Table.TransformColumnTypes(Sheet1_Sheet,{{"Column1", "ty`. The 'Queries [2]' pane on the left shows two entries: 'WHR' and 'Sheet1', with 'Sheet1' currently selected.

	Column1	Column2
1	Country	Continent
2	Algeria	Africa
3	Angola	Africa
4	Benin	Africa
5	Botswana	Africa
6	Burkina Faso	Africa
7	Burundi	Africa
8	Cabo Verde	Africa
9	Cameroon	Africa
10	Central African Republic	Africa
11	Chad	Africa
12	Comoros	Africa
13	Congo (Brazzaville)	Africa
14	Congo (Kinshasa)	Africa

Here the header name is column 1 and column 2 ,and we have to make country and continent as header So , we choose the “**Use First Row as Headers**” option.

The screenshot shows the Power Query Editor interface. The ribbon tabs include File, Home, Transform, Add Column, View, Tools, and Help. Under the Transform tab, there are various tools like Group By, Use First Row as Headers, Transpose, Reverse Rows, Count Rows, Data Type, Replace Values, Unpivot Columns, Detect Data Type, Fill, Move, Rename, Pivot Column, Convert to List, Split Column, and Form. The main area displays a table with two columns: 'Country' and 'Continent'. The table has five rows with data: Algeria, Africa; Angola, Africa; Benin, Africa; Botswana, Africa; Burkina Faso, Africa.

Now we got Country and continent as headers. Then we applied and close the power query.

After loading that data we add the data category to country and continent.

Then we have to create relation between these two tables this will do in model view. By using country.

The screenshot shows the Power BI Model View. It displays two tables: 'WHR' and 'Continent'. The 'WHR' table has columns for Country or region, Dystopia + residual, Freedom to make life choices, Generosity, Healthy life expectancy, Log GDP per capita, Overall rank, Perceptions of corruption, Score, and a Collapsible section. The 'Continent' table has columns for Continent and Country. A callout box with a red arrow points from the 'Country or region' dropdown in the 'WHR' table to the 'Country' column in the 'Continent' table. The callout box contains the text: "By Pasting that Country or region in WHR. In to Country of Continent will get one new window called 'New Relationship'." Another red arrow points from the 'Country' column in the 'Continent' table to the 'Country' column in the 'WHR' table. The 'Relationships' pane on the right shows the relationship settings: Cardinality (One to one (1:1)), Table (Continent), Column (Country), Make this relationship active (Yes), Cross-filter direction (Both), and buttons for Apply changes and Open relationship editor.

New relationship

Select tables and columns that are related.

From table

WHR

Country or re...	Dystopia + re...	Freedom to ...	Generosity	Healthy life e...	Log GDP per ...	Overall ran...
Finland	1.782	0.986	0.11	0.824	1.749	1
Denmark	1.535	0.955	0.15	0.82	1.825	2
Iceland	1.659	0.971	0.201	0.873	1.799	3

To table

Continent

Continent	Country
Africa	Algeria
Africa	Angola
Africa	Benin

Cardinality

One to one (1:1)

Cross-filter direction

Both

Make this relationship active

Assume referential integrity

Save

Cancel

In both country is selected and click on save.

After that it will save like this and relation is created between the tables.

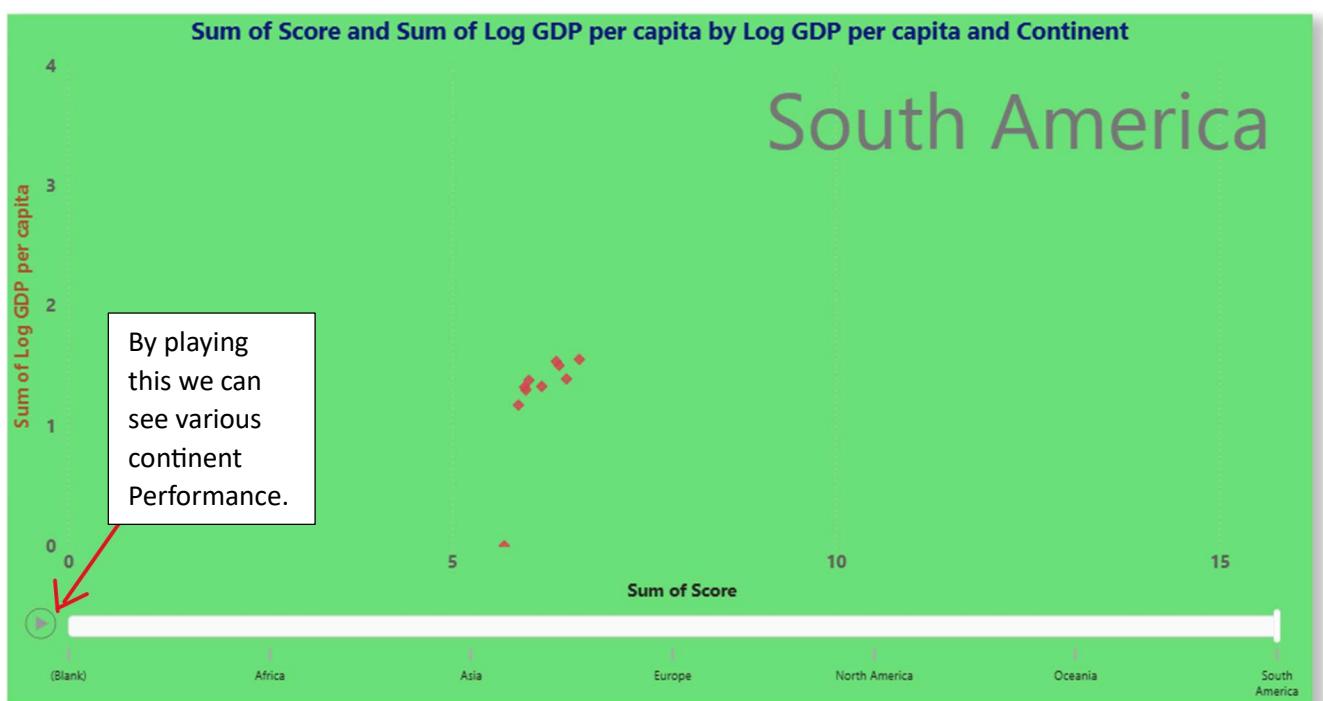
The screenshot shows the Power BI Relationships pane. On the left, there are two tables: 'WHR' and 'Continent'. The 'WHR' table has columns: Dystopia + residual, Freedom to make life choices, Generosity, Healthy life expectancy, Log GDP per capita, Overall rank, and Perceptions of corruption. The 'Continent' table has columns: Continent and Country. A relationship is being defined between the 'Country or region' column in the 'WHR' table and the 'Country' column in the 'Continent' table. The relationship properties are set to 'One to one (1:1)' and 'Both' for cross-filter direction. The 'Make this relationship active' checkbox is checked. A red arrow points from the text above to the 'Relationship' section in the Properties pane. The 'Properties' pane also shows the 'Cardinality' and 'Cross-filter direction' settings.

Play Axis :

The screenshot shows a configuration interface for a data visualization tool. On the left, under 'Values', 'Log GDP per capita' is selected for the Y-axis. Under 'X Axis', 'Sum of Score' is selected. In the center, 'Y Axis' is set to 'Sum of Log GDP per c...', and 'Legend' is set to 'Add data fields here'. On the right, 'Play Axis' is checked with a red checkmark, and 'Continent' is selected for it. Below that, 'Toolips' and 'Add data fields here' are listed.

Play axis will enable when there are Sum values are presented.

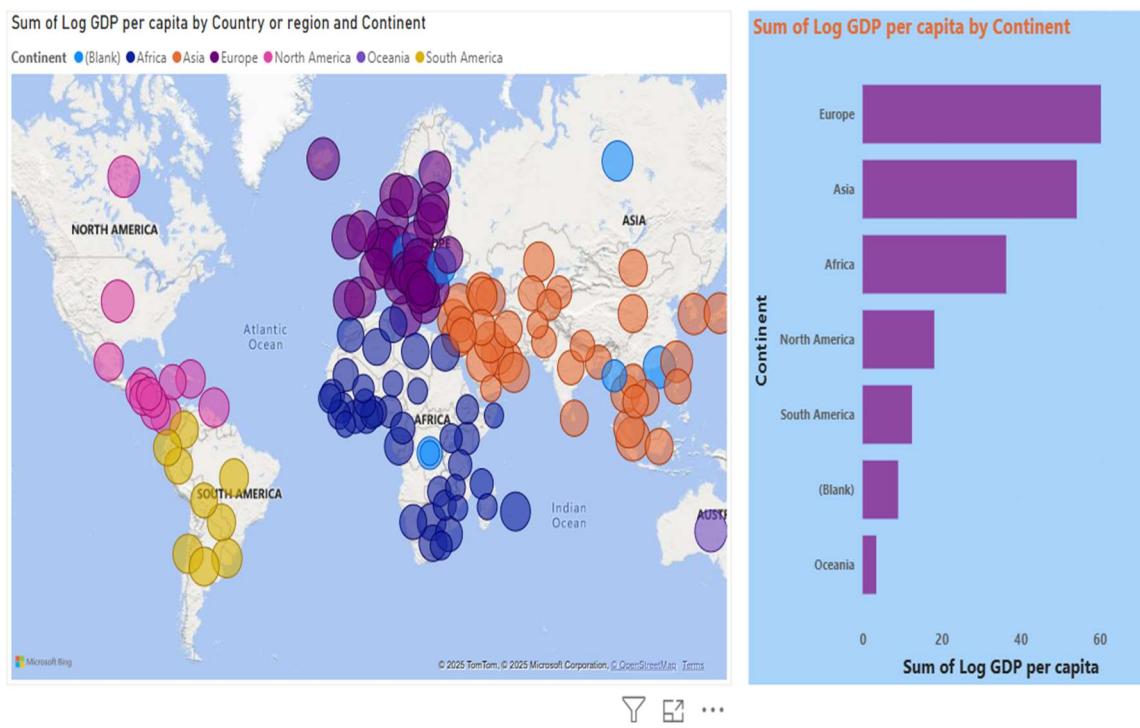
And we given continent (categorical value) to the Play axis.



CT : Scatter chart

Insights : The chart highlights South America, showing that most countries in the continent fall within a moderate range for both life satisfaction scores and economic prosperity (measured by log GDP per capita). The red diamond clusters between a score of around 5–6 and log GDP per capita values of about 1–2 suggest that South American nations share relatively similar levels of well-being and income, without extreme highs or lows. This indicates that while the region does not reach the higher prosperity and happiness levels seen in Europe or North America, it also performs better than regions with lower averages, such as parts of Africa. Overall, South America demonstrates a steady balance of economic conditions and life satisfaction, reflecting consistency across its countries.

Normal Map :

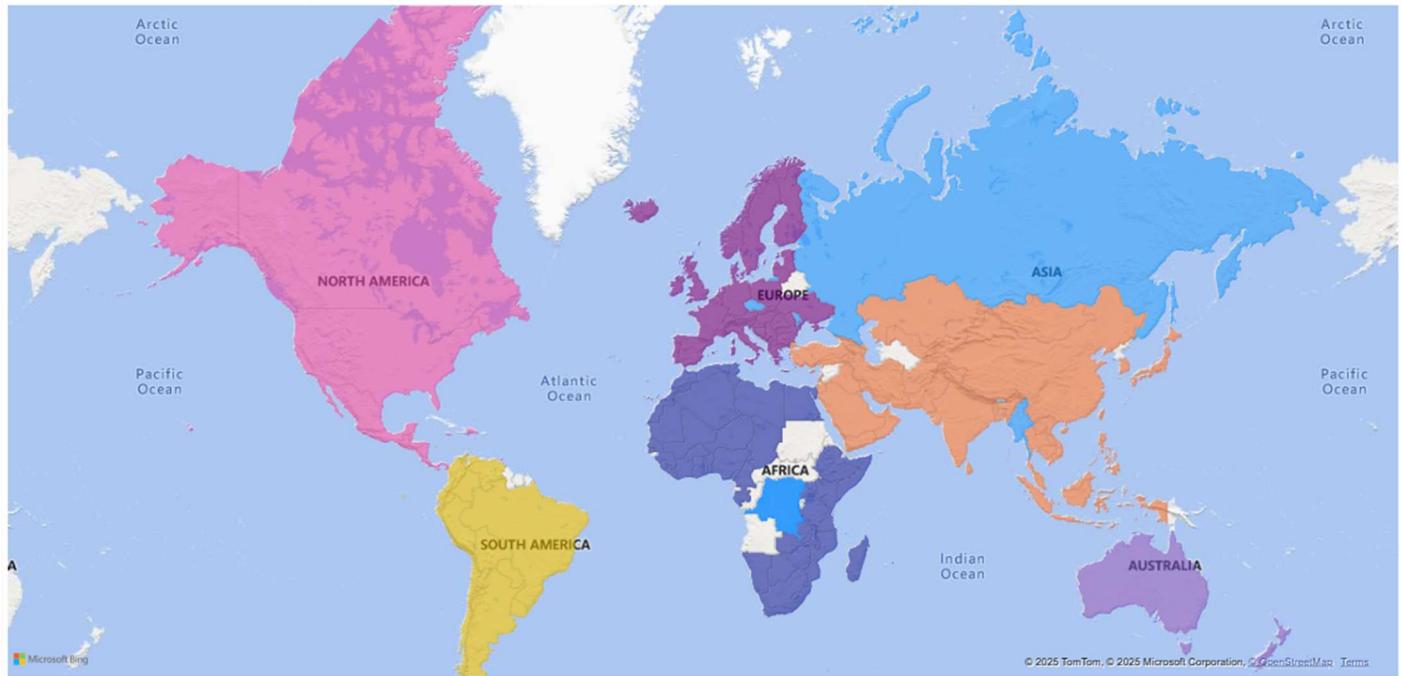


Here bubble option is there for analysing in bubble we given Log GDP value.

Filled Map :

Country or region and Continent

Continent ● (Blank) ● Africa ● Asia ● Europe ● North America ● Oceania ● South America



If we want to see how much area is covered we will go with this filled map. In filled map we cant able to represent the numerical value.

When we are representing map with a numerical data then go with normal map.