



# World Happiness Report

Information Visualization 1º Project  
Iteration #2

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**Masters in Informatic Engineering**

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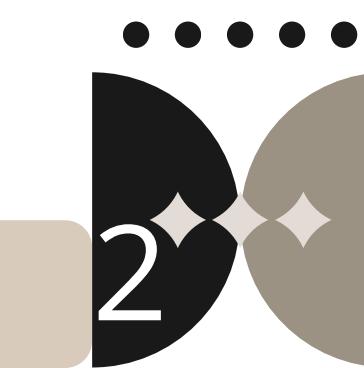
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# 01

# Phenomena

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# Introduction to WHR

- 1. Purpose of the Report:** Measures and compares happiness and well-being across countries.
- 2. Global Coverage:** Conducted in over 150 countries.
- 3. Quality of Life:** Evaluates diverse factors such as social support, health, freedom, and trust—not just economic data—to understand what influences happiness.
- 4. Significance:** A collaboration involving Gallup, Oxford's Wellbeing Research Centre, and the UN's Sustainable Development Solutions Network, aiming to foster policies that improve life satisfaction.



# Happiness Indicators

## Economic Stability

GDP per capita as a measure of financial security and economic well-being.

## Freedom of Choice

The perceived freedom individuals feel to make life decisions.

## Social Support

Strong social networks and the availability of support systems when needed.

## Generosity

The sense of community and willingness to help others, measured through charitable donations and acts.

## Life Expectancy

Health metrics reflecting the general health of the population, represented by life expectancy.

## Perceptions of Corruption

Trust in institutions and governance, with lower corruption contributing to higher happiness.

# 02

# Data Received

# Data Sources

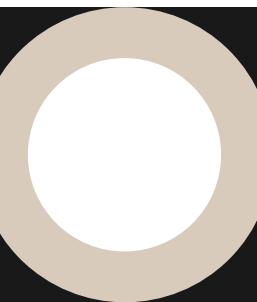
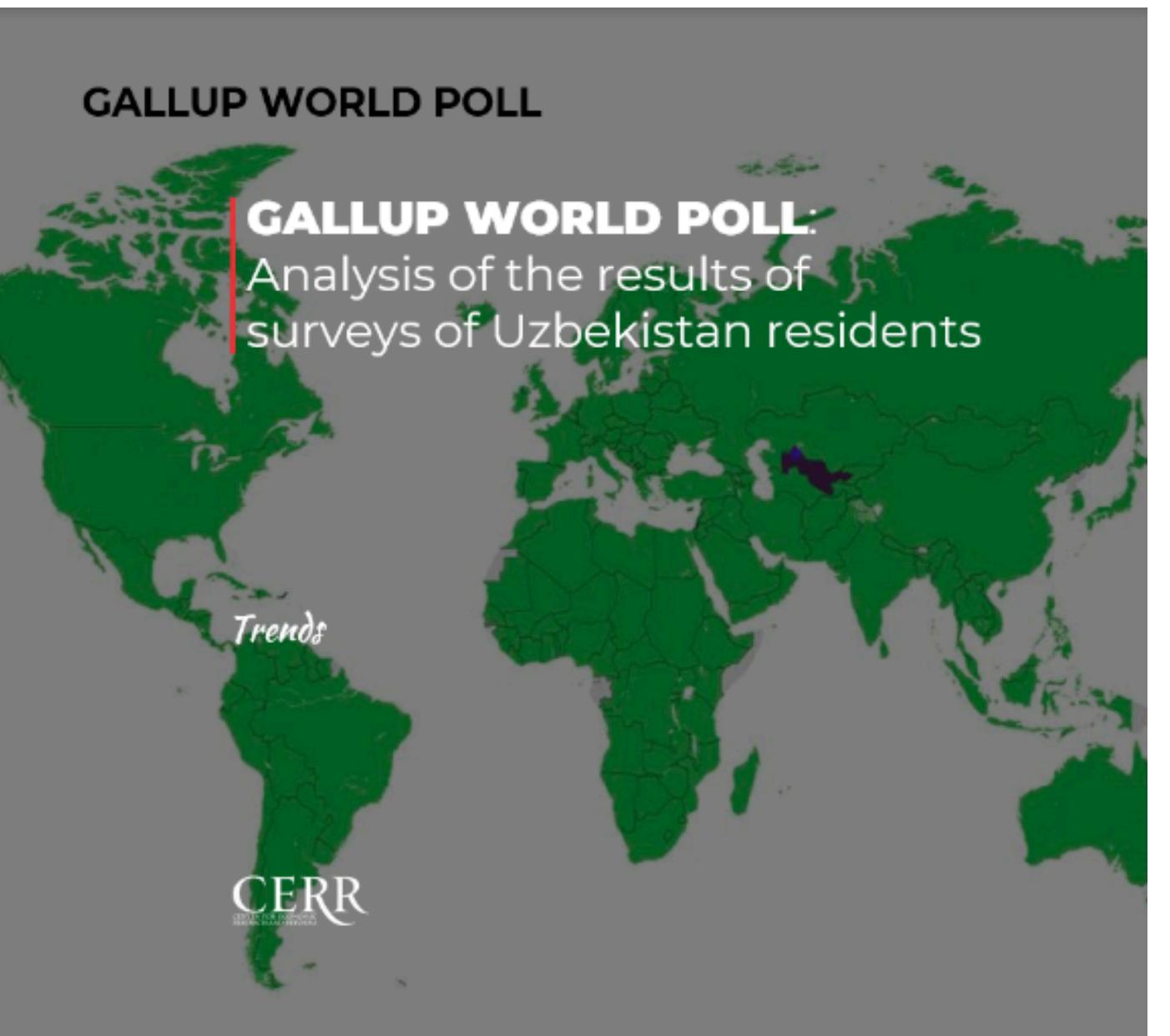
## Main Sources

In collaboration with organizations like the UN, data collected through the Gallup World Poll provides a broad perspective on global well-being.

## Methodology

Life satisfaction data is gathered using the Cantril Ladder, where respondents rate their lives on a scale from 0 (worst possible) to 10 (best possible). This question, along with others related to well-being, is used to calculate national happiness scores.

## 2.5k Entries



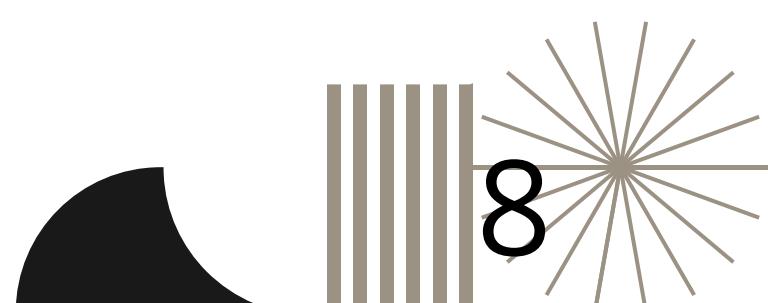
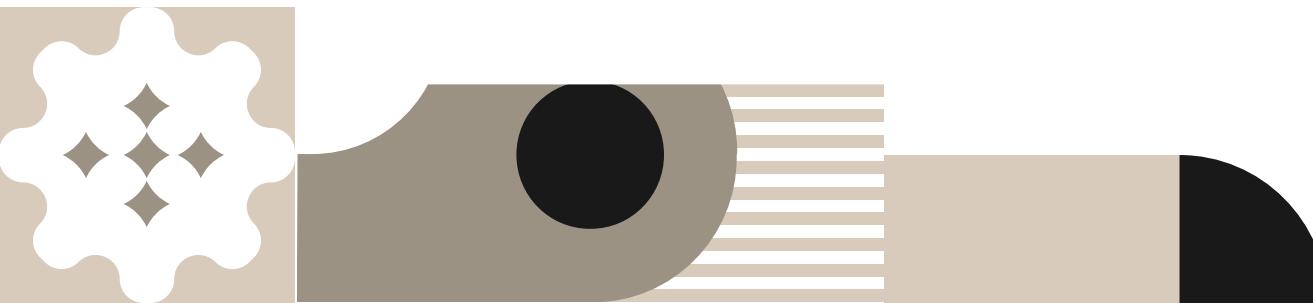
# Data Quality

## Reliability

- **Large Sample Sizes:** Data is collected from extensive, global samples through the Gallup World Poll, ensuring diverse representation.
- **Standardized Methodologies:** Consistent survey questions and sampling methods improve comparability across countries.
- **Trusted and Renowned Sources:** Data is sourced from reputable organizations, such as the World Bank and WHO, enhancing the findings' credibility and reliability.

## Limitations

- **Missing Data:** Some countries may have incomplete data or gaps for certain years, impacting longitudinal analyses.
- **Sparse Time Coverage:** For certain metrics, data may only be available for a few select years or widely spaced years (e.g., 2005, 2010, 2019).
- **Interpolation and Extrapolation:** Metrics such as Healthy Life Expectancy require interpolation for years without data, which, while useful, introduces estimation errors.



# 03

## User and Needs



# User and Need

## Target Audience

**Beneficiaries of Visualization:** Researchers, and the general public will benefit from accessing and interpreting the happiness data

## User Needs

**Data Visualization Goals:** Researchers seek quick comparisons, understanding correlations, and identifying trends in happiness metrics across countries to inform discussions and decisions in their projects

## Accessibility and Interactivity

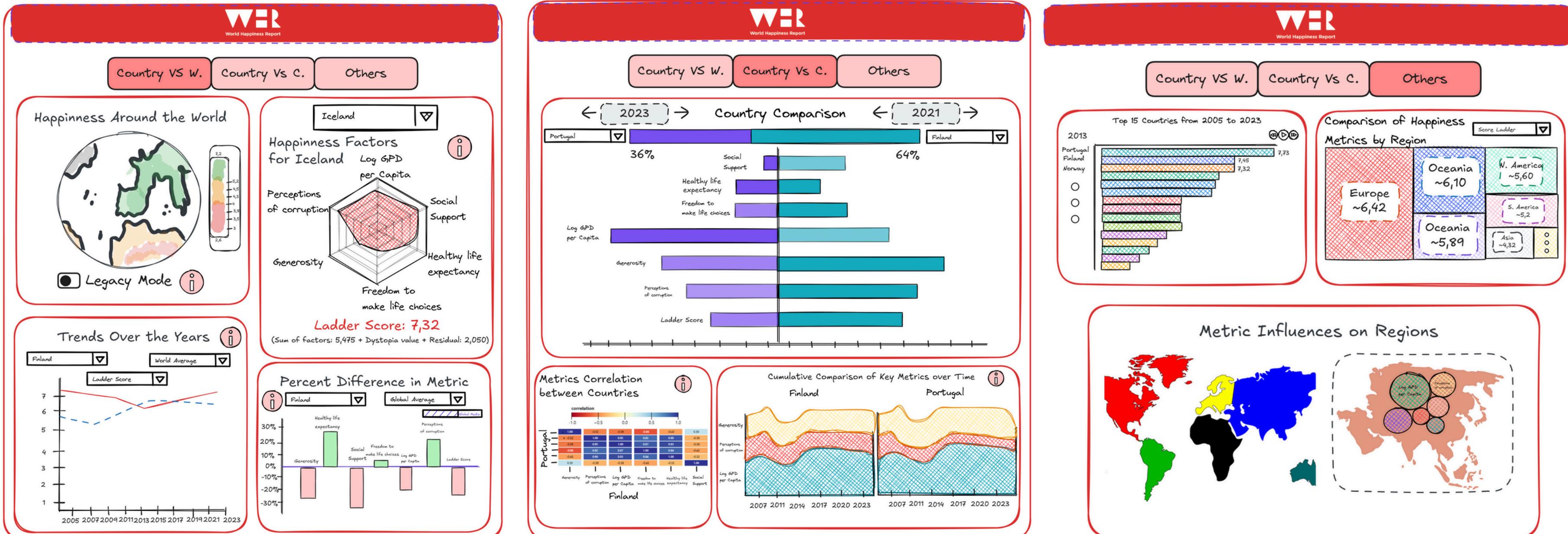
**Design Considerations:** Ensuring data visualizations are user-friendly and interactive is crucial. This includes intuitive interfaces, clear legends, and responsive features to enhance understanding for various audiences.

# 04

## Visualization solution



# Low Fidelity Prototype



# visualizations

1. World Happiness Globe (2024)
2. Happiness Factors for Portugal (2024)
3. Trends Over the Years (2005-2024)
4. Comparison to Averages (2024)
5. Country Comparison (2005-2023)
6. Country Comparison (2024)
7. Metric Comparison Over The Years (2005-2023)
8. Top 15 Countries by Life Ladder Score (2005-2023)
9. Continent and Countries Ranking (2024)

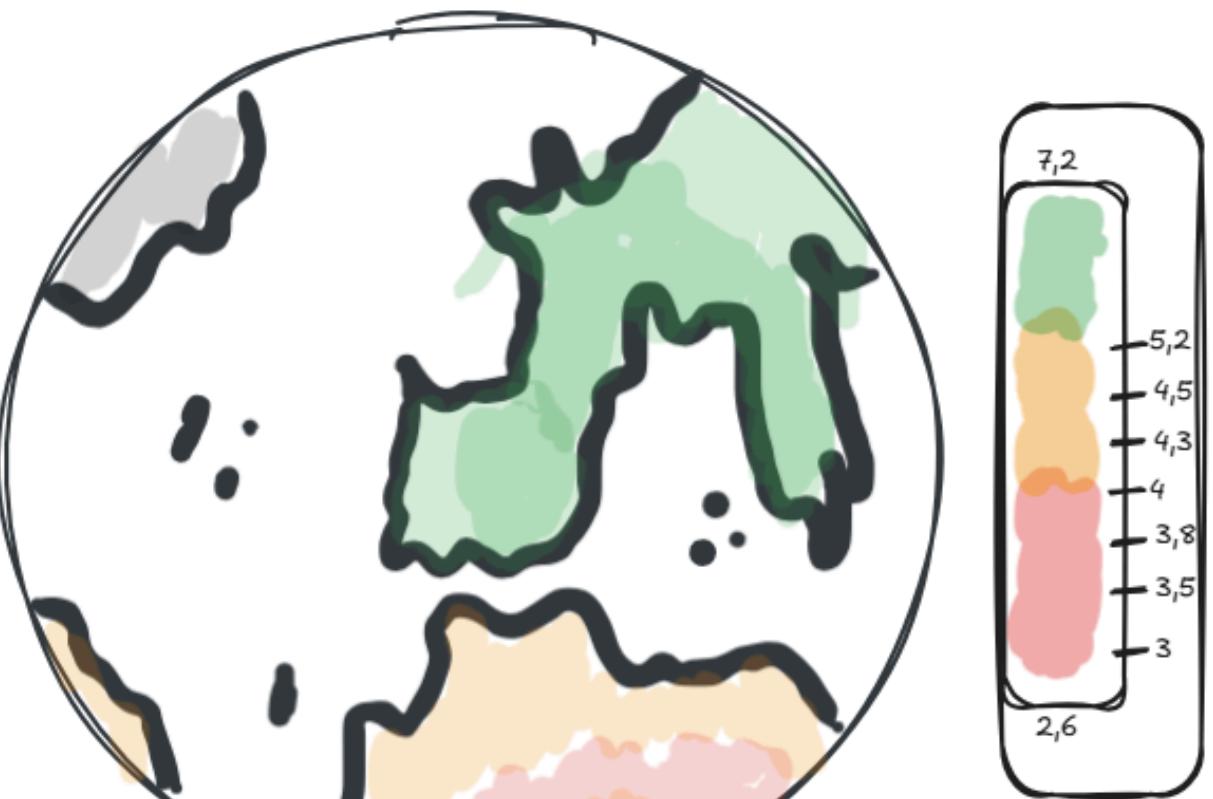
# Chart Selection #1

## World Happiness Globe (2024)

**Rationale:** The clickable globe is ideal for an intuitive, accessible view of global happiness distribution. It allows users to explore happiness scores by country and dive deeper into specific regional data.

**Insight:** Quickly identify the countries with the highest and lowest happiness scores and see the geographical distribution of well-being.

## Happiness Around the World



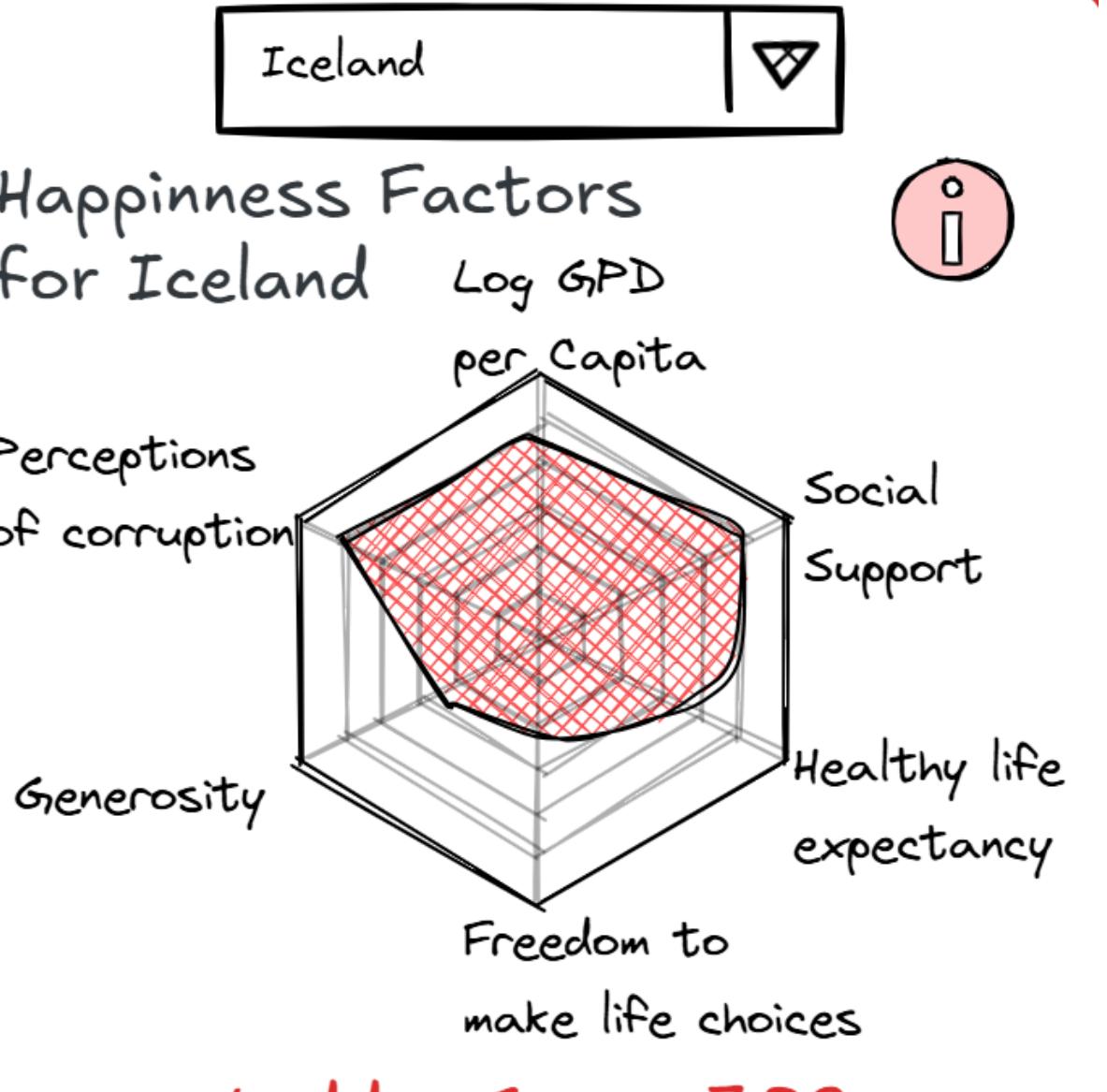
Legacy Mode

# Chart Selection #1

## Happiness Factors for Portugal 2024

**Rationale:** The radar chart effectively compares multiple metrics in a single visualization, highlighting each factor's relative importance to the final score.

**Insight:** Shows each metric's contribution to happiness in each country, making it easier to analyze strengths and weaknesses in well-being factors.



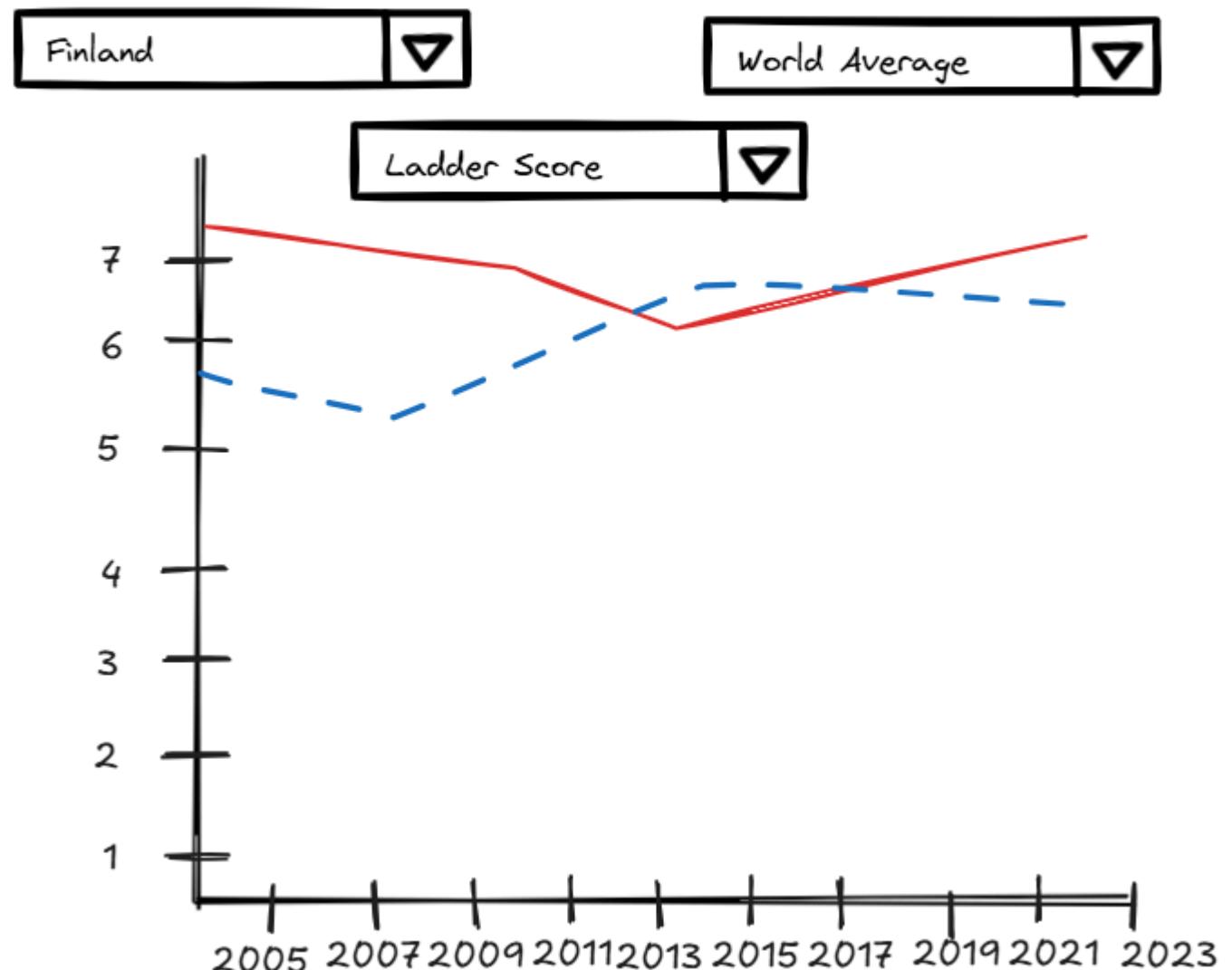
# Chart Selection #1

## Trends Over the Years (2005-2023)

**Rationale:** A line chart with comparisons to global, European, and other regional averages allows a temporal analysis of happiness metric changes. (2005-2023)

**Insight:** Identifies trends over the years and enables comparisons between a country's performance and global or regional standards.

Trends Over the Years 

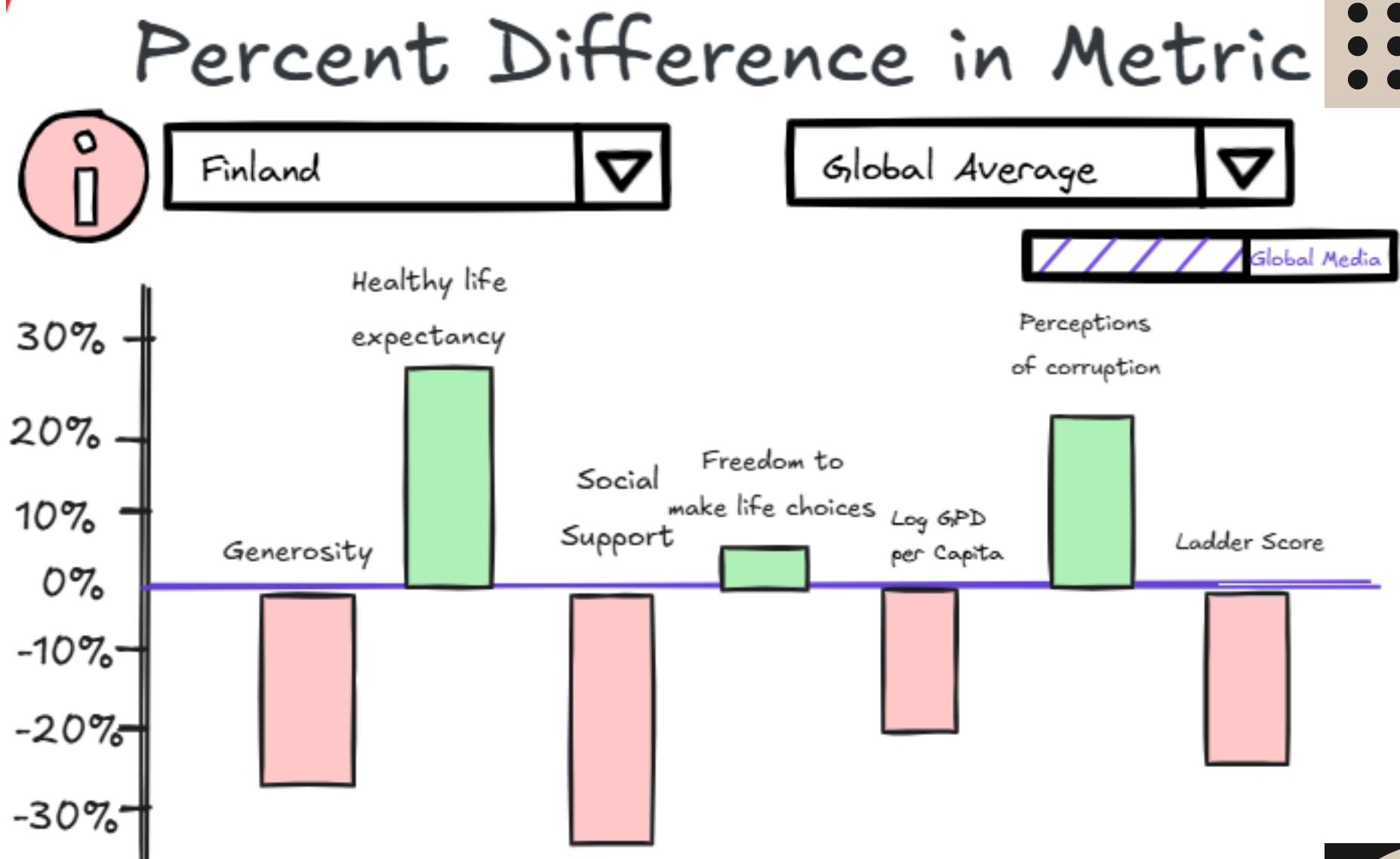


# Chart Selection #1

## Comparison to Averages (2024)

**Rationale:** A bar chart showing the percentage difference of each metric compared to the global or regional average helps visualize a country's performance in specific metrics.

**Insight:** Highlights areas where a country is above or below average, providing a more detailed analysis of strengths and areas for improvement.

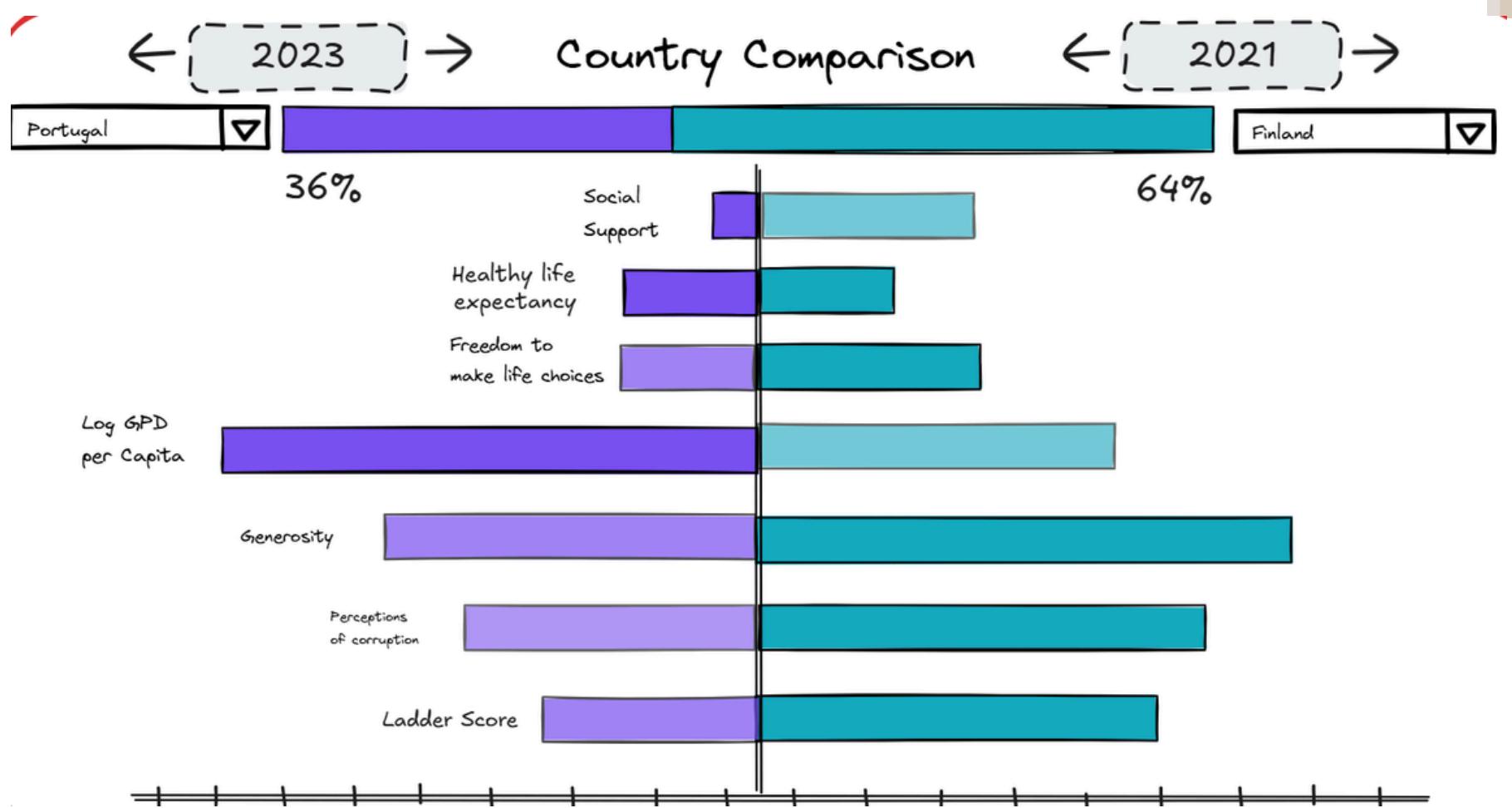


# Chart Selection #2

## Country Comparison (2005-2023)

**Rationale:** A symmetric bar chart allows for a direct comparison of each happiness metric between two countries, clearly visualizing which country scores higher or lower in specific areas.

**Insight:** This chart provides an immediate view of how specific happiness metrics differ between the two countries, highlighting cultural, economic, or social factors that may contribute to variations in well-being



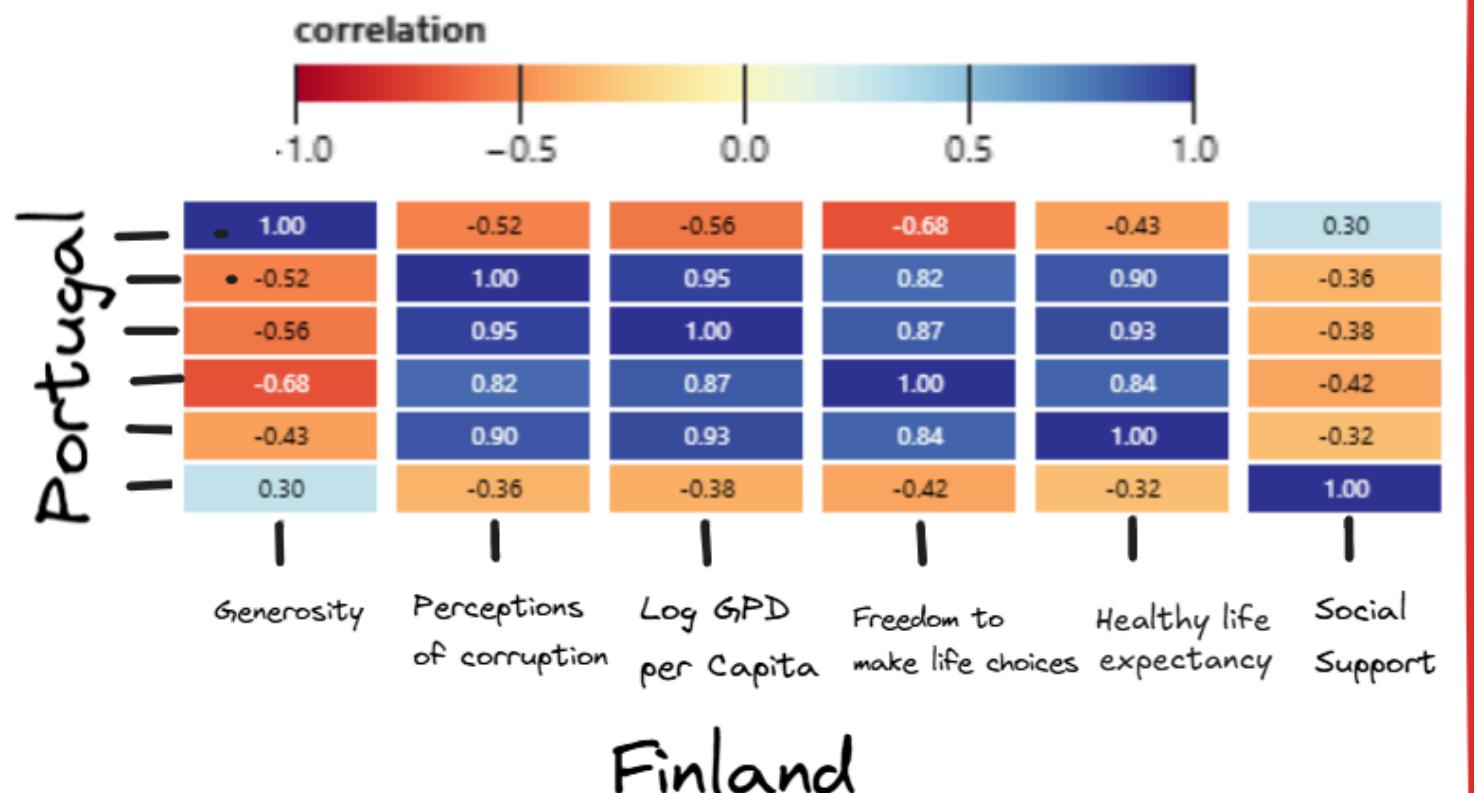
# Chart Selection #2

## Country Comparison (2024)

**Rationale:** A correlation heatmap highlights how each metric aligns between the selected countries, providing a view of structural similarities or divergences.

**Insight:** This chart shows which well-being factors are most aligned between the two nations, offering insights into whether high-happiness countries share common characteristics or patterns.

Metrics Correlation  
between Countries

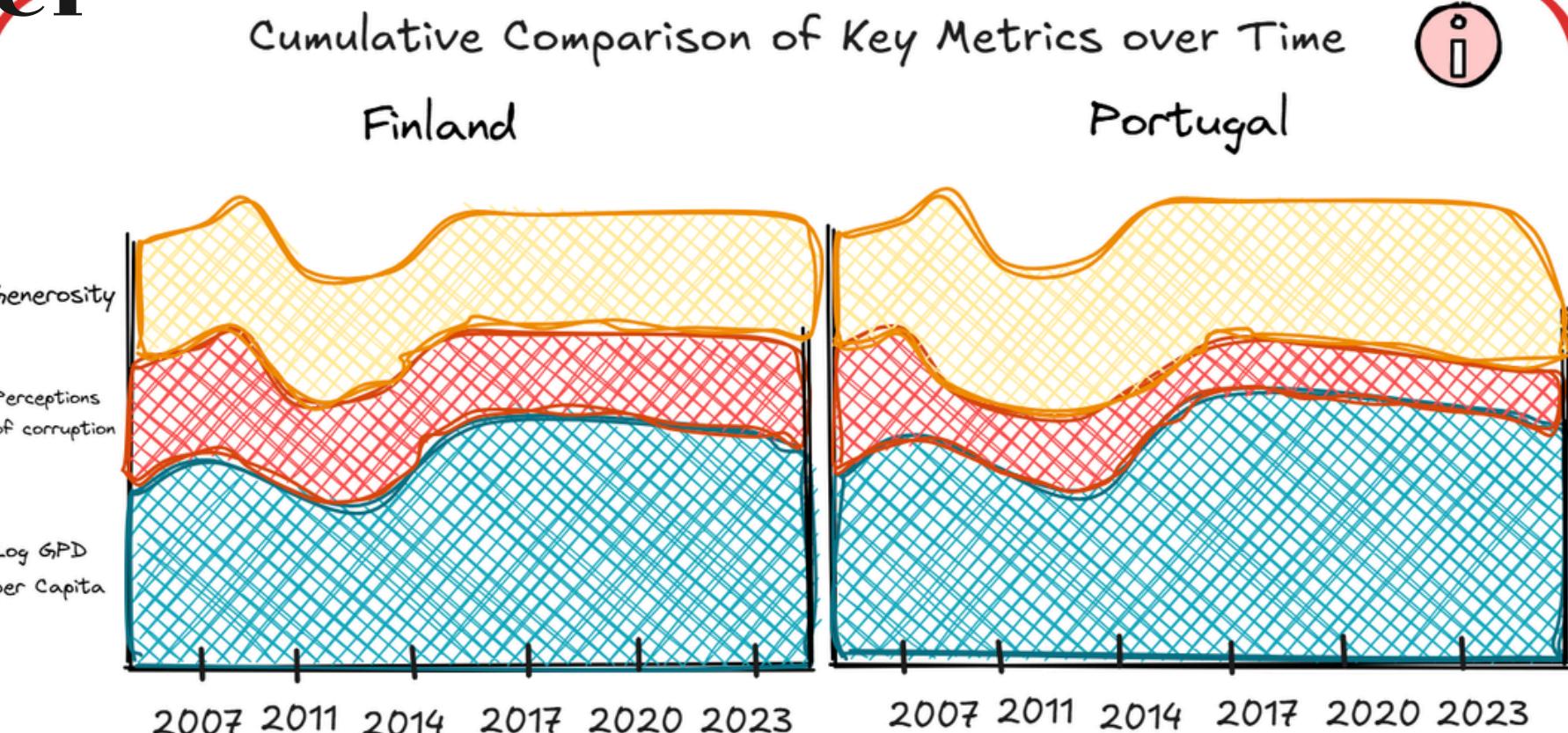


# Chart Selection #2

## Metric Comparison Over The Years (2005-2023)

**Rationale:** An area chart can compare cumulative changes in key happiness metrics (e.g., Social Support, Freedom to Make Choices) over time, illustrating the overall trend and growth or decline in these factors for both countries.

**Insight:** This visualization shows whether certain well-being factors are improving, declining, or remaining stable over time, and how the trends compare between the two countries.



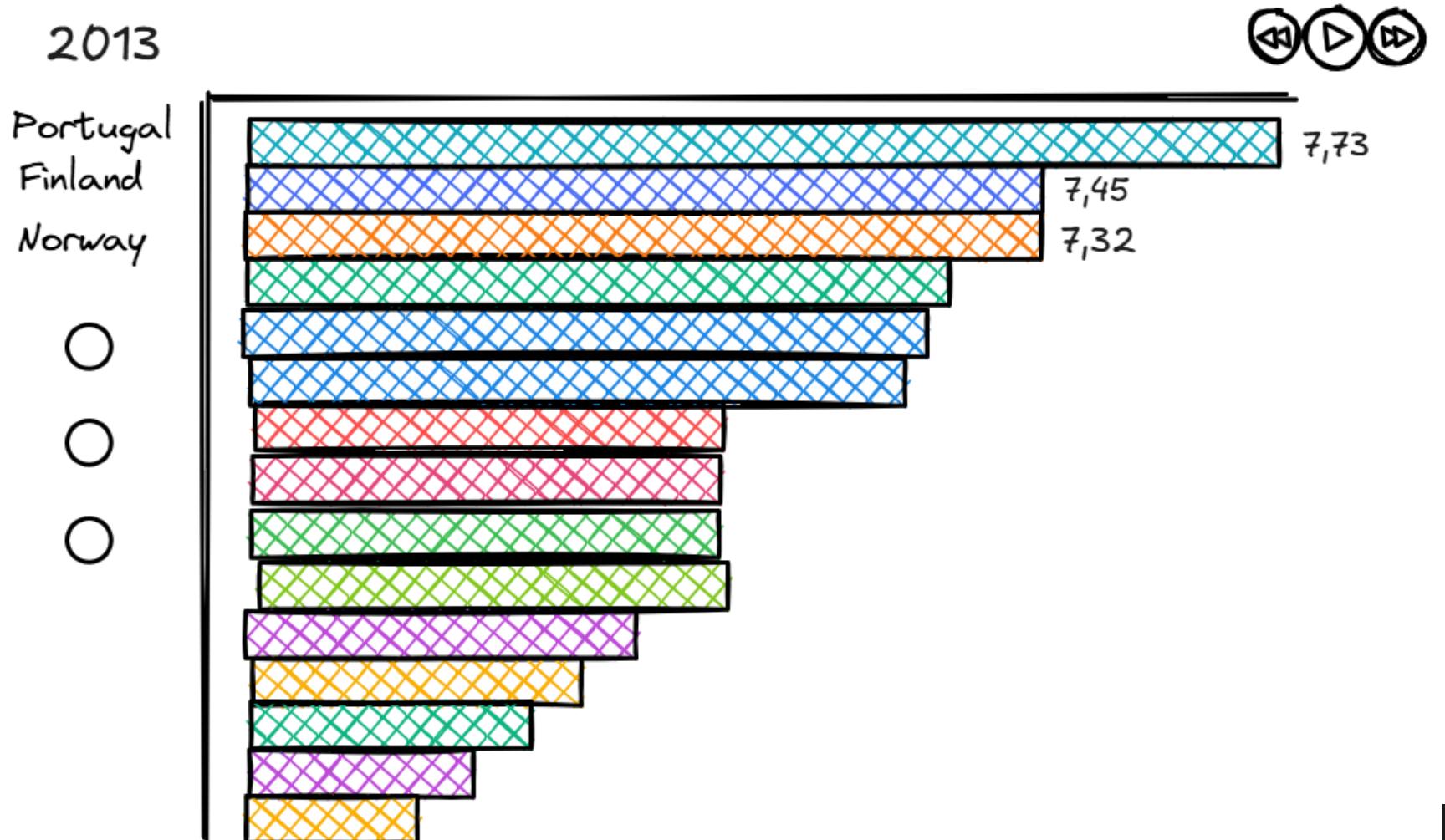
# Chart Selection #3

## Top 15 Countries by Life Ladder Score (2005-2023)

**Rationale:** This visualization highlights how the happiness rankings of countries evolve over time, offering an engaging way to visualize trends and shifts in global well-being.

**Insight:** Provides a dynamic view of how certain countries have risen or fallen in happiness rankings over nearly two decades, helping identify key moments of change and long-term trends in well-being

Top 15 Countries from 2005 to 2023

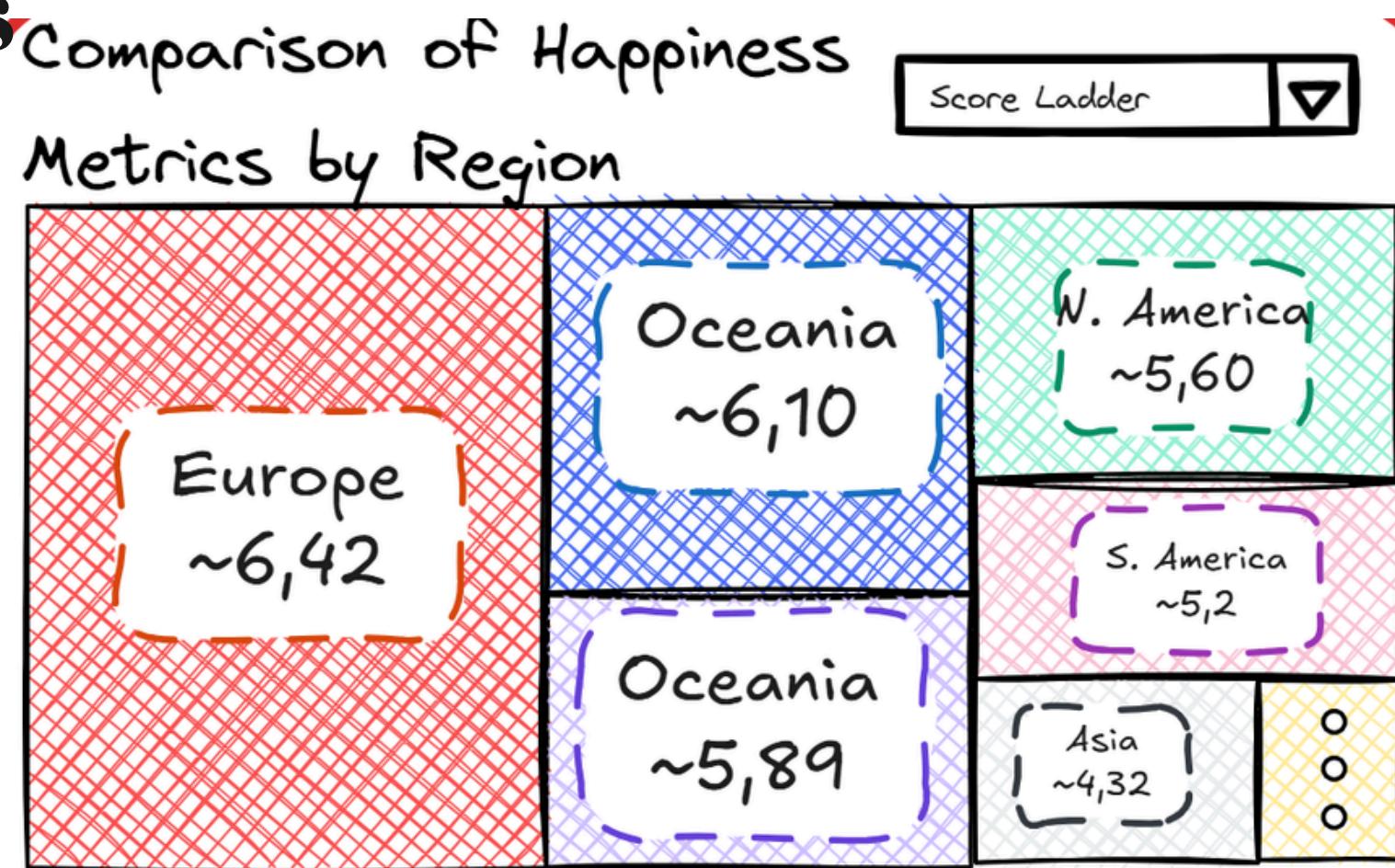


# Chart Selection #3

## Continent and Countries Ranking 2024

**Rationale:** This visualization highlights regional patterns in happiness metrics, allowing users to quickly identify which regions and countries excel or lag in specific well-being factors.

**Insight:** Answers questions about regional strengths and weaknesses, showing if certain regions consistently rank higher in specific metrics, such as Social Support in Nordic countries or lower Perception of Corruption in Western Europe.

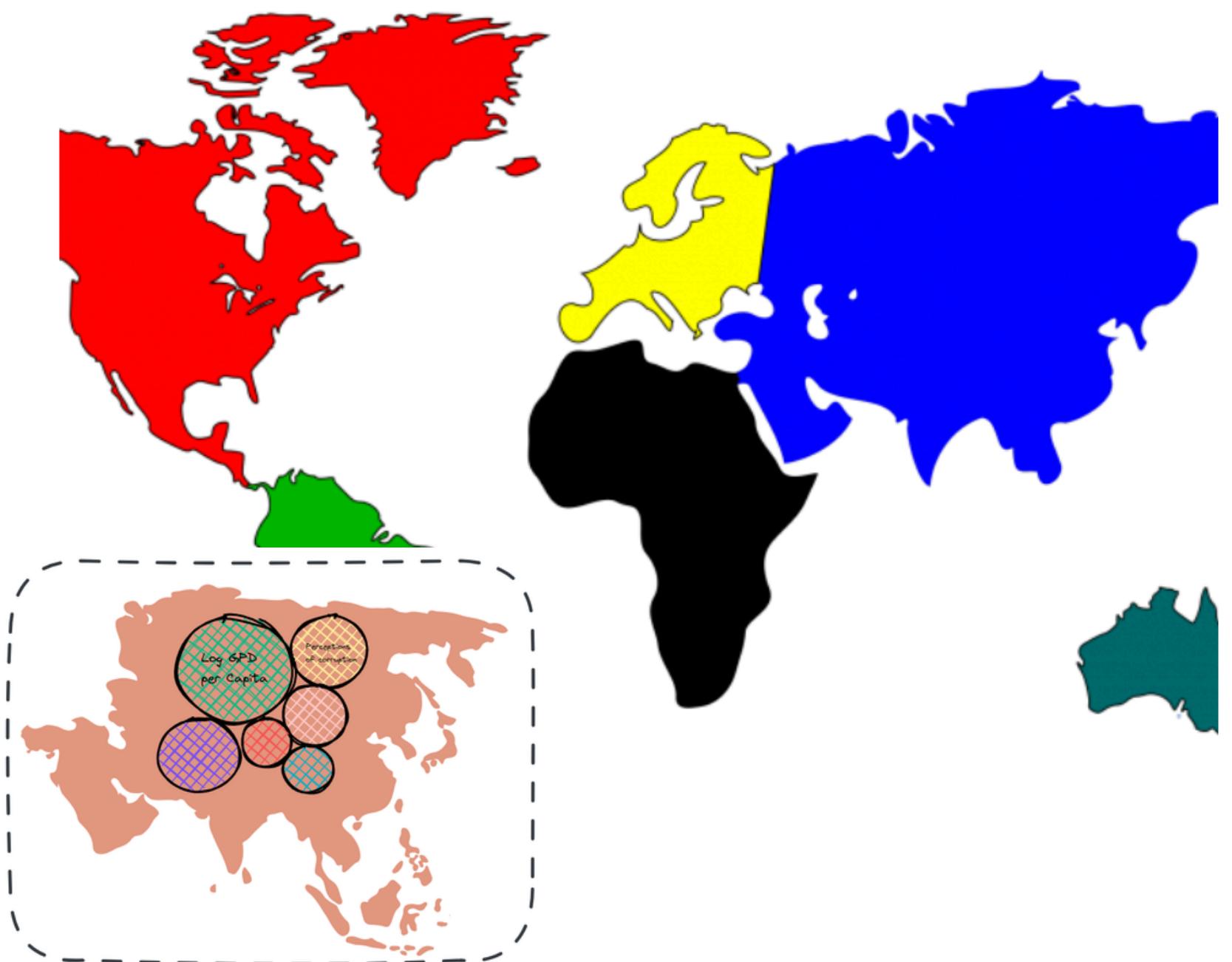


# Chart Selection #3

## Metric Impacts in Continents

**Rationale:** This visualization provides a seamless experience that combines geographic and metric-based data. Users can explore how different factors contribute to happiness in various regions of the world, all within the same interactive environment

**Insight:** This chart answers the question: How do happiness metrics vary by region, and which metrics have the greatest influence on happiness in specific parts of the world



# LFP User Evaluation

**Task 1** - Go to the Around the World Tab. Identify a country with a significantly lower happiness score compared to its neighbors.

**Task 2** - Analyze the factors influencing happiness in Iceland. Identify metric(s) that stand out as having the least contribution to the overall score.

**Task 3** - Analyze Finland's happiness trend over the last 8 years. Compare it to the Global Average during this period.

**Task 4** - Compare Portugal to the European average using the chart. Identify which metrics Portugal surpasses the Global average.

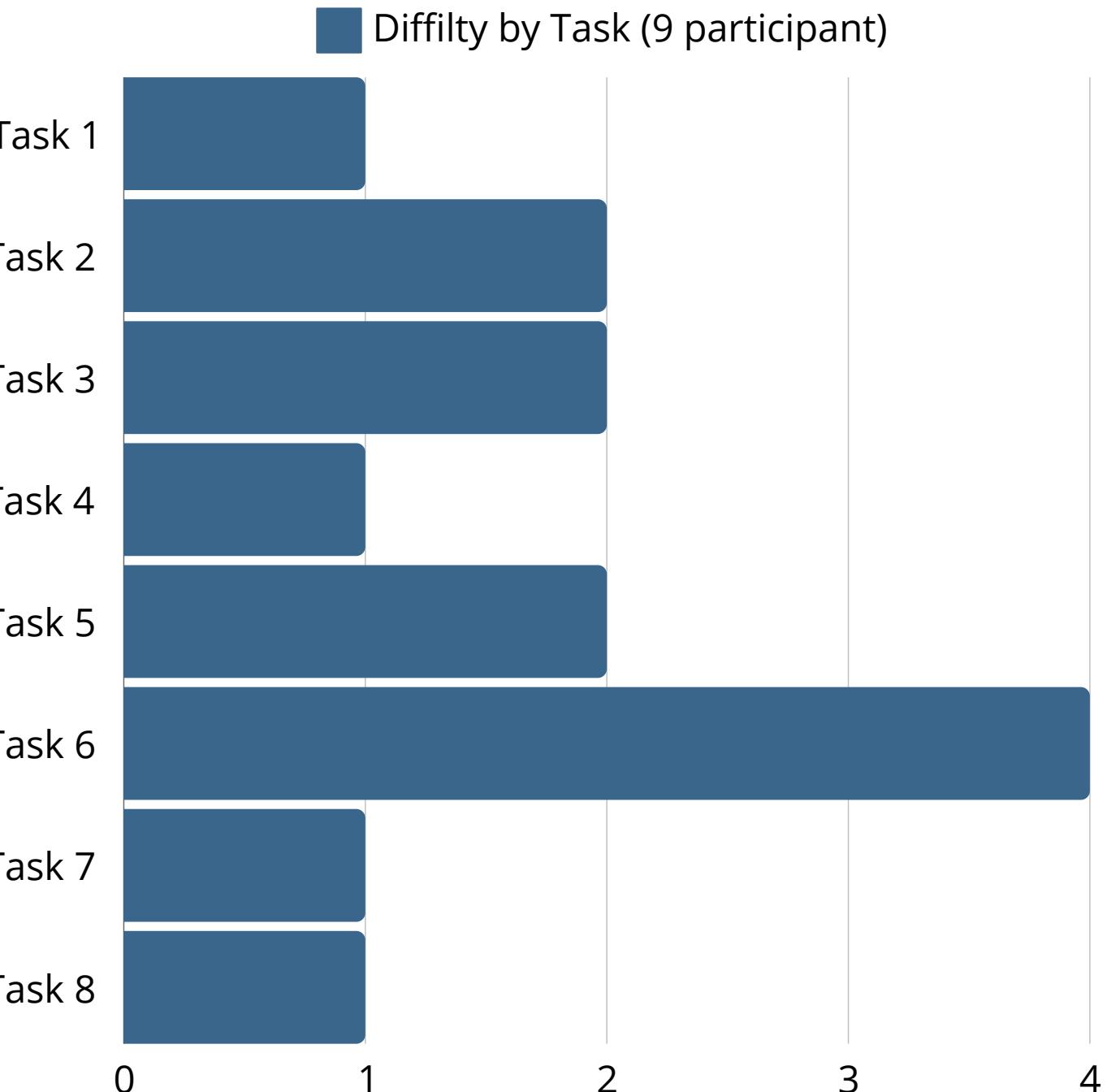
**Task 5** - Go to the Country vs Country Tab. Compare Portugal to Finland. Identify which metrics Portugal surpass Finland.

**Task 6** - Select Denmark as the second country for comparison in Heatmap Chart. Identify which metrics are similar in both countries.

**Task 7** - Go to Others Tab. Identify which Countries are in the top 3 in 2013.

**Task 8** - Explore the continents and their countries in terms of Healthy Life Expectancy at Birth. Identify the top Continent in Ladder Score.

<https://forms.gle/5TG6cjzjZGAVxYX49>



# Functional Prototype

05



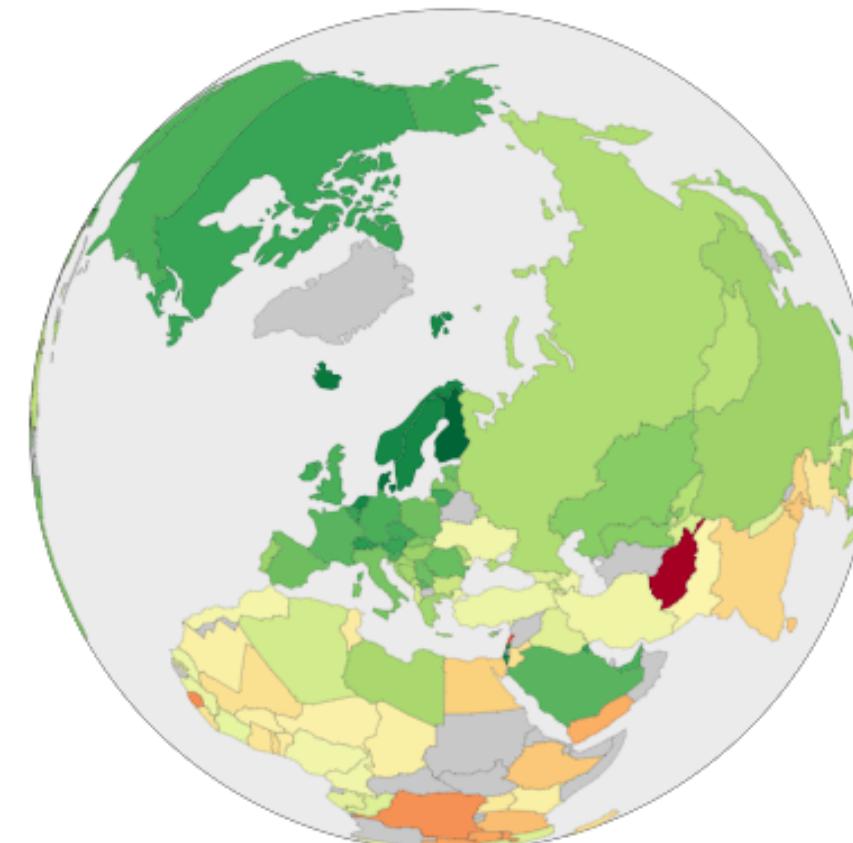
Around the World

Country VS Country

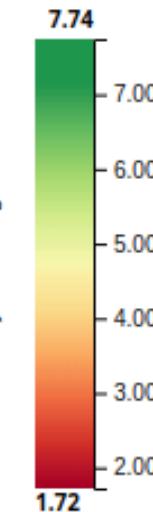
Others

## World Happiness Map 2024

What does this mean?



Average Life Evaluation  
(3-year average)



Legacy Mode ?

## Trends Over the Years (2005-2023)

What does this mean?

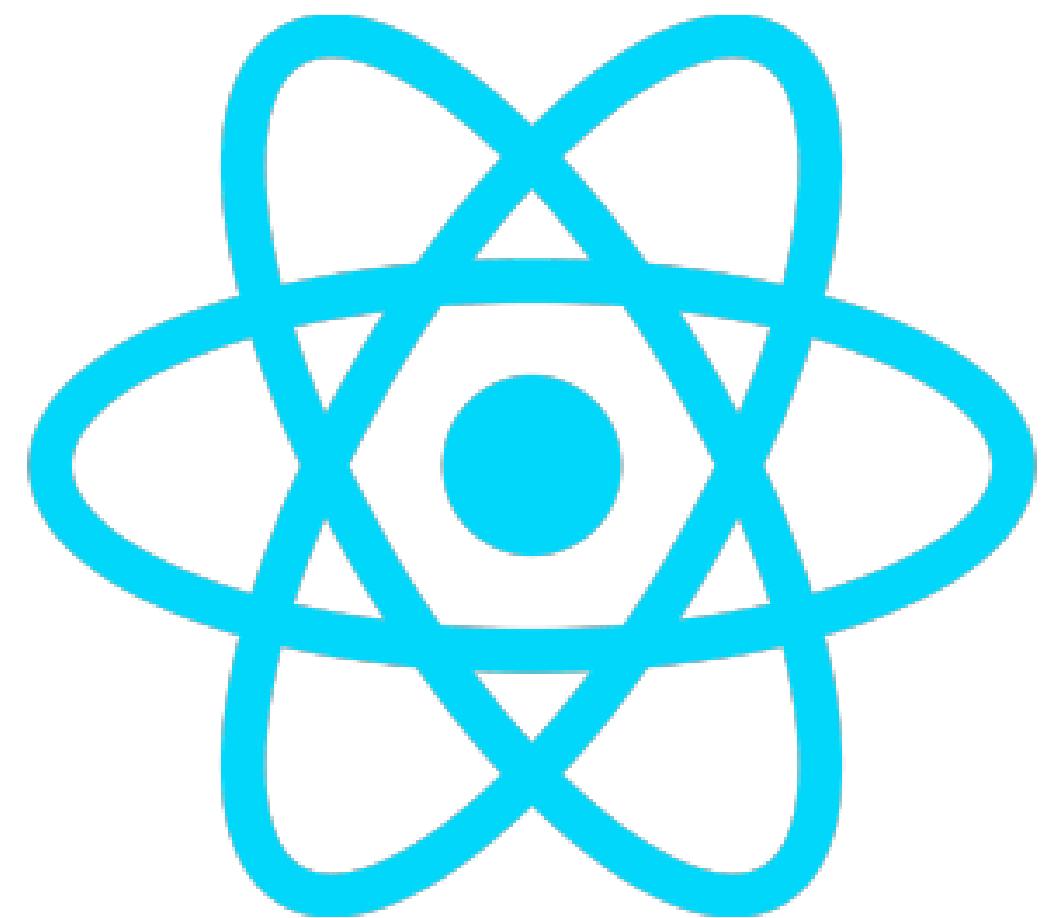
Disclaimer: This comparison is based on data from 156 countries over multiple years, which may result in some discrepancies compared to the Comparison to Averages 2024 chart.

Finland

Global Average

Life Ladder

# Technologies



React



D3

# Zuk and Carpendale's (2006) heuristics

## 1. Consider people with color blindness

- **Analysis:** Current visualizations do not account for users with color vision deficiencies, potentially causing accessibility issues.

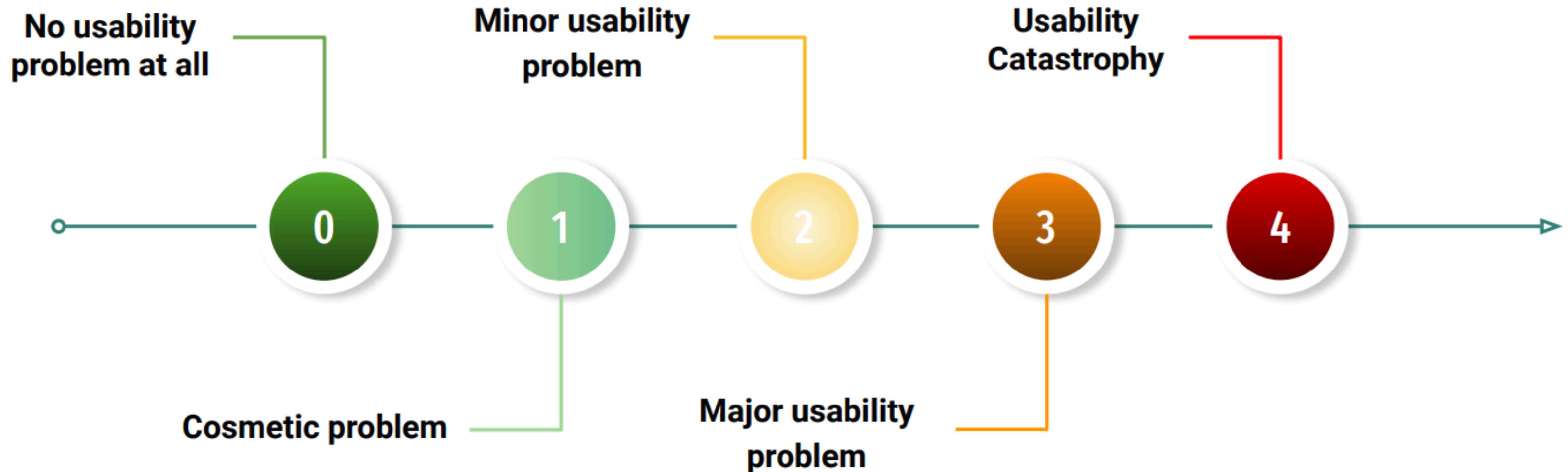
## 2. Integrate text whenever relevant

- **Analysis:** Many charts lack contextual annotations or descriptive labels, which makes interpreting the data harder for non-expert users.

## 3. Local contrast affects color & gray perception

- **Analysis:** Adequate contrast is maintained, but some gradient palettes could make subtle differences harder to perceive, particularly in maps or charts with small variations.

# Jakob Nielsen's 10 Usability Heuristics



# Jakob Nielsen's 10 Usability Heuristics

## 2. Error prevention (Severity 2)

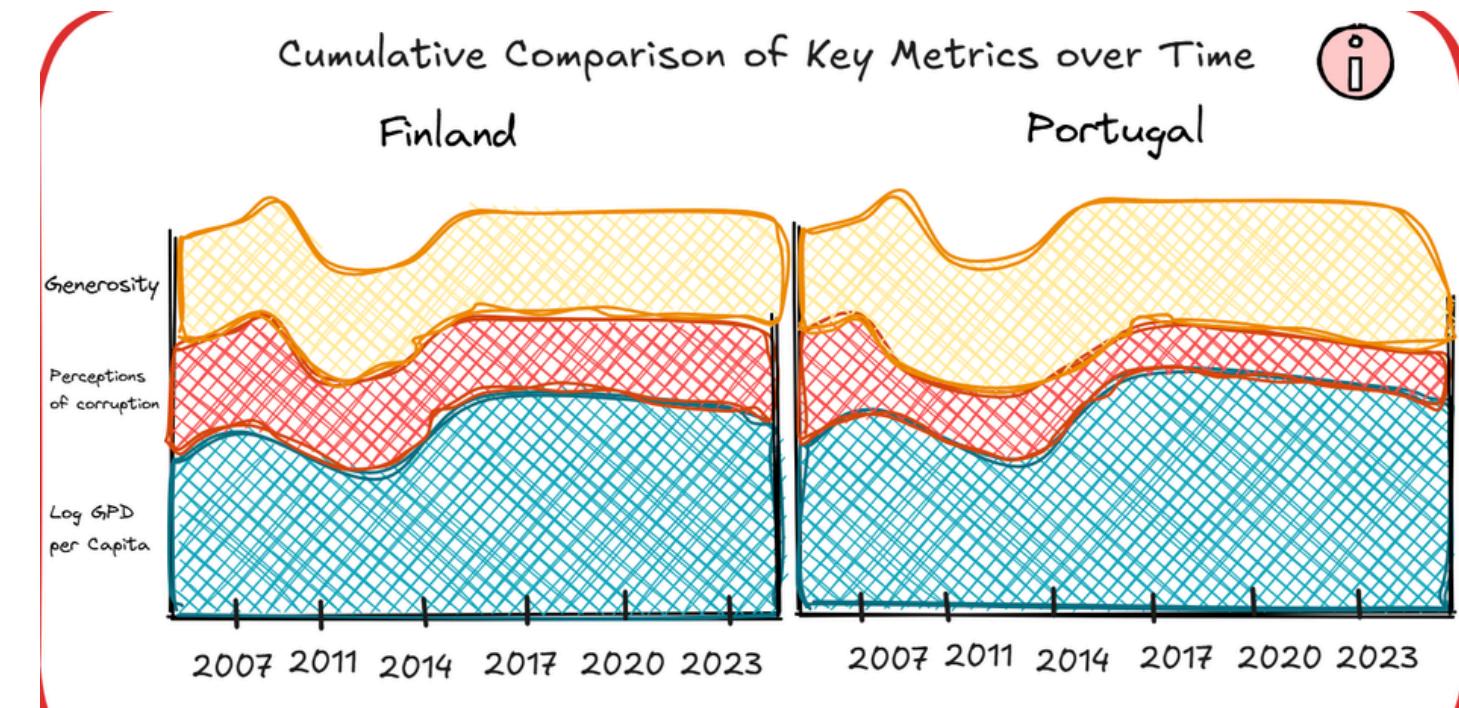
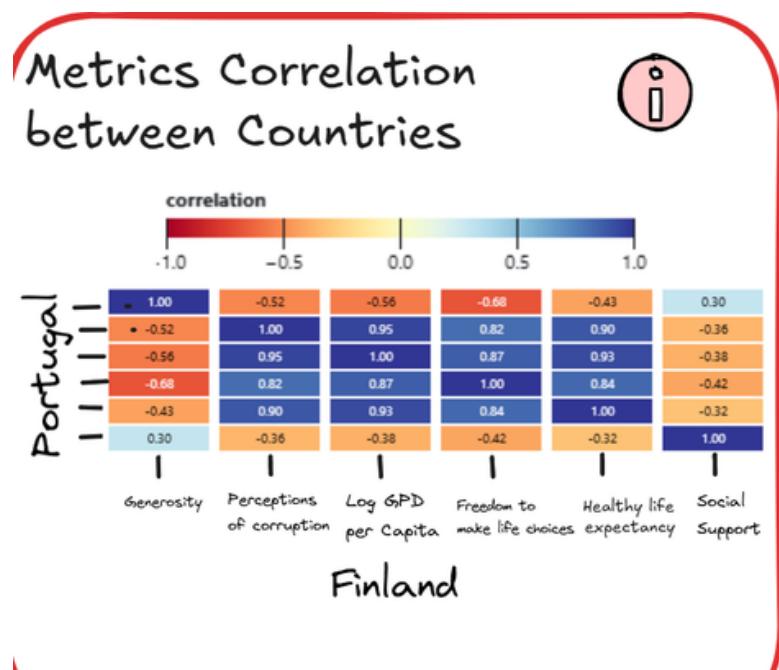
- **Analysis:** Issues such as resetting selections (Country vs Country).
- **Recommendation:** Ensure persistent selection states for dropdowns and filters to prevent users from having to repeat their choices, minimizing frustration and improving overall usability.

## 3. Aesthetic and minimalist design (Severity 2)

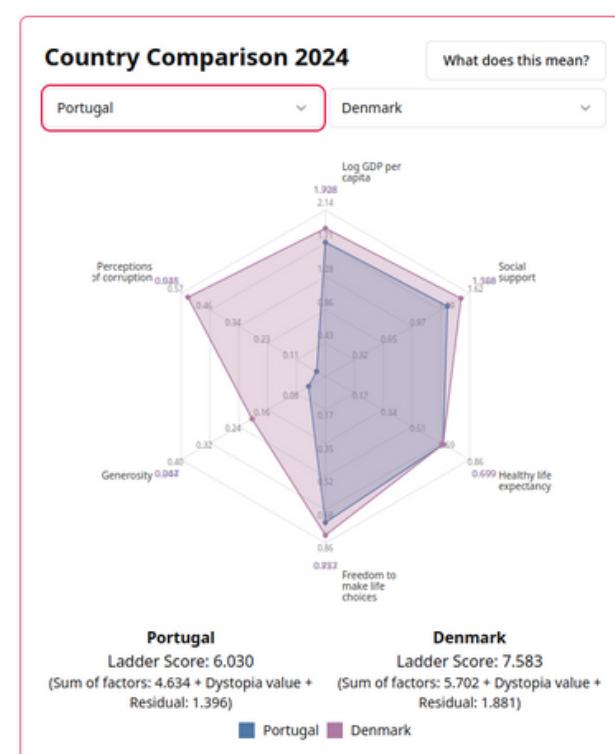
- **Analysis:** While the design is minimalist, the small and poorly visible labels compromise accessibility and user understanding.
- **Recommendation:** Ensure labels are prominent enough without overloading the interface, maintaining a balance between aesthetics and functionality.

# Implementation Changes

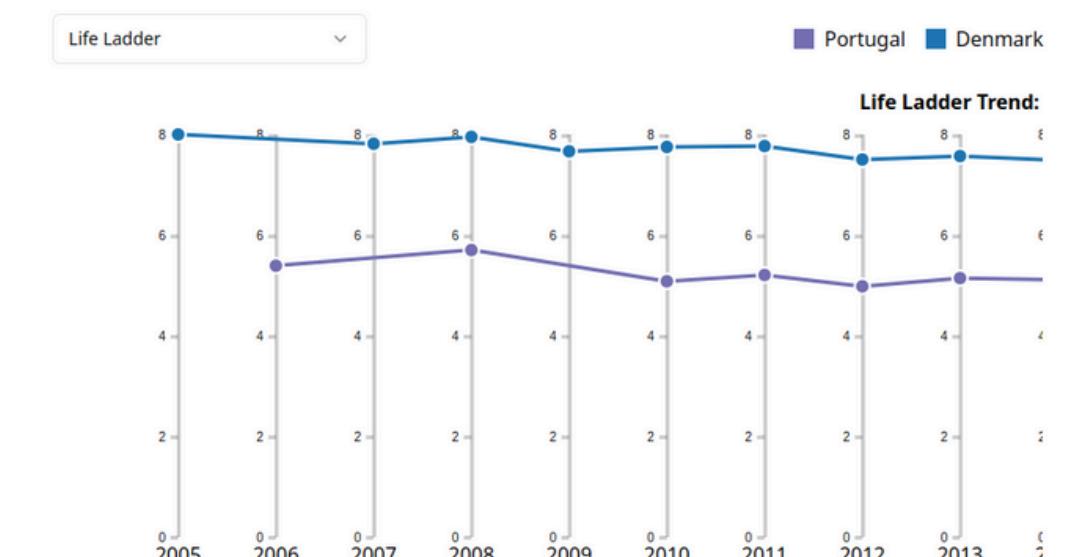
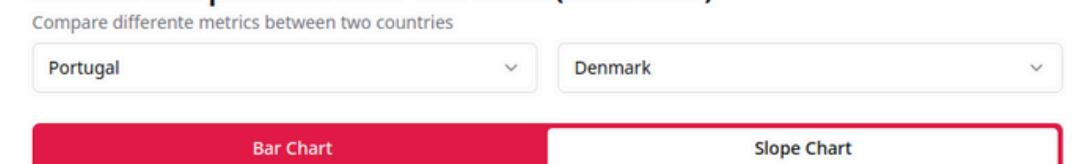
Before



After



Metrics Comparasion Over The Years (2005-2023)



# System Usability Scale (SUS)

- We asked colleagues to explore our application and fill in the questionnaire;
- We had 8 participants answering the questionnaire;
- The average SUS score value was  $87.125 > 68$  (Average Score)

## VI First Project - Usability Test

### Procedure

The participants will perform a set of predefined tasks using a web application to explore and visualize data. During the experiment, data will be collected regarding their demographic profile and their comments and difficulties on performing the tasks and using the application, overall.

### Duration

The experiment will last between 5 and 15 minutes.

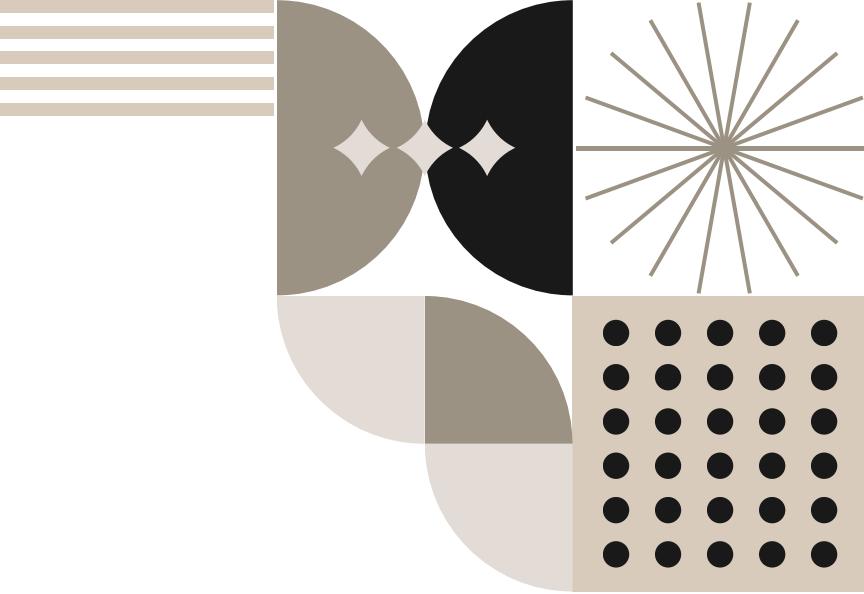
### Risks for the participant

There are no risks to the participant.

### Benefits for the participant

The participants will have the opportunity to learn how a usability test is designed and performed.

# Users Feedback Examples



## **Others Tab**

- Allow users to see the top 15 countries for a given year without pressing play.
- Continent selection resets when changing the metric—this should remain persistent.

## **Country vs Country**

- Selecting years (e.g., 2006) is tedious—add direct input instead of arrows.
- Changing the second country resets the year—this is frustrating.

## **Around the World**

- Strong first impression;
- “What does this mean?” is a great addition.

## **General**

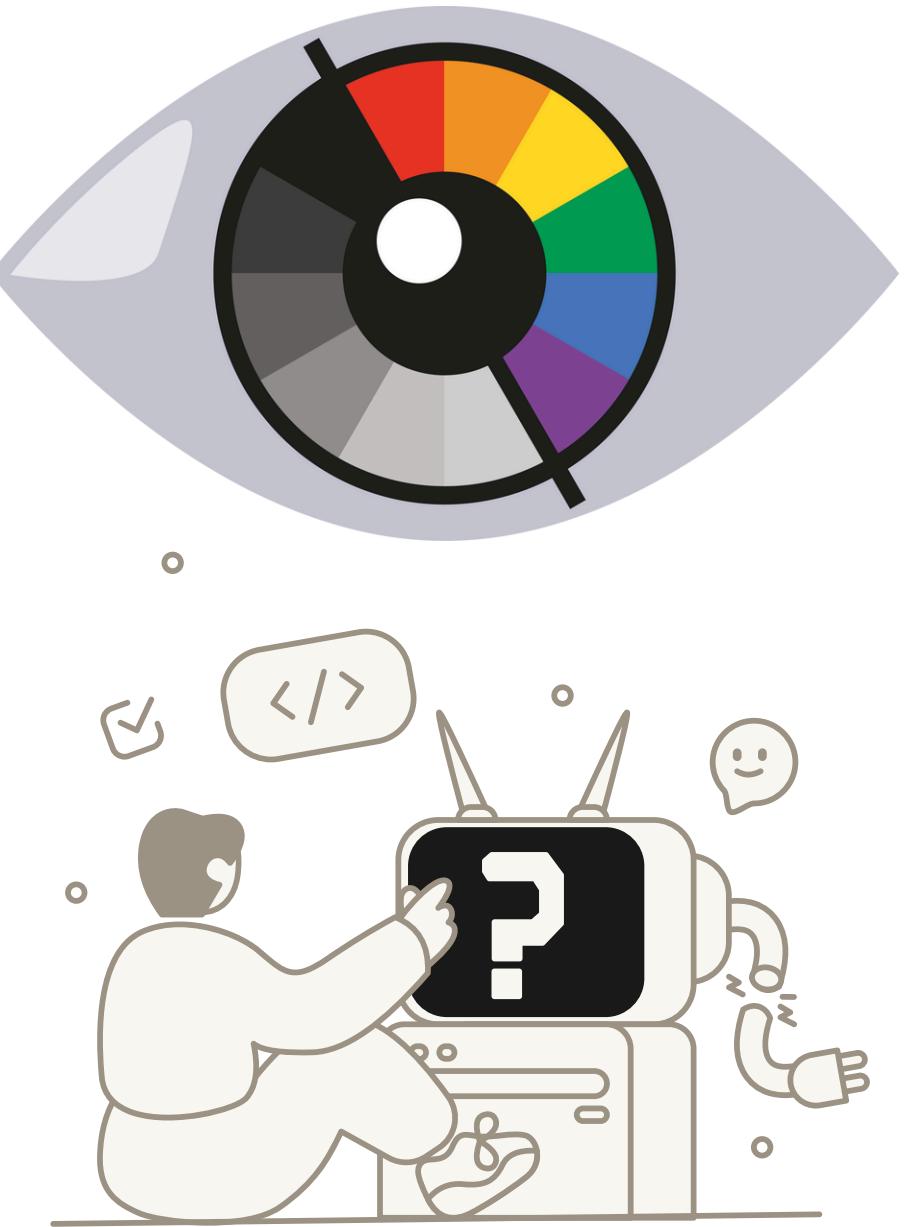
- Navbar should remain static to avoid disorientation when scrolling.

# Functional Prototype: Demo

<https://mei-vi-p1-ds1.pages.dev>

# Functional Prototype: Future Work

- **Improve Accessibility:** Develop a colorblind-friendly palette to ensure inclusivity for users with visual impairments (e.g., red-green colorblindness).
- **Error Handling:** Implement user-friendly error messages to help users recognize, diagnose, and recover from issues (e.g., data loading failures or invalid selections).
- **Search Selects:** Implement an input search option to facilitate the user's choice of the desired country



# Conclusions from Data

- Afghanistan tends to decrease happiness between 2008 and 2021 - War in Afghanistan
- Happiness drops considerably in Afghanistan in 2022 - Return of the Taliban government in Afghanistan
- Portugal falls in happiness between 2010 and 2015, below the European average - Troika
- Descent of happiness in Ukraine in 2022 - Russian attack
- Descent of happiness in Israel in 2023 - Hamas attack
- The Nordic countries have a happiness index considerably higher than the European average

# Thanks!

Do you have any questions?

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# Resources

Helliwell, J. F., Layard, R., Sachs, J. D., De Neve, J.-E., Aknin, L. B., & Wang, S. (Eds.). (2024). World Happiness Report 2024. University of Oxford: Wellbeing Research Centre.

D3 gallery / D3

<https://abqualidade.org.br/avaliacao-do-indice-de-felicidade/>

