

Measuring the Pulse of Prosperity: An Index of Economic Freedom Analysis

Team ID: LTVIP2025TMID48415

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GitHub:

<https://github.com/Dheerajgottumukkala/Measuring-the-Pulse-of-Prosperity-An-Index-of-Economic-Freedom-Analysis-LTVIP2025TMID48415/tree/main/project%20folder>

1. Introduction

1.1 Purpose

This document outlines the detailed functional specifications for the project “*Measuring the Pulse of Prosperity: An Index of Economic Freedom Analysis*.” The goal is to leverage data visualization and analytics tools to evaluate global economic freedom and its impact on prosperity. By utilizing Tableau dashboards integrated into a responsive web application, users will gain accessible insights into key economic indicators and trends across countries.

1.2 Scope

The project includes end-to-end data workflow — from data acquisition and preprocessing to advanced analysis and visualization. The core components include:

- Data cleaning and transformation
- Exploratory data analysis (EDA)
- Interactive Tableau dashboards
- Web-based deployment for global accessibility

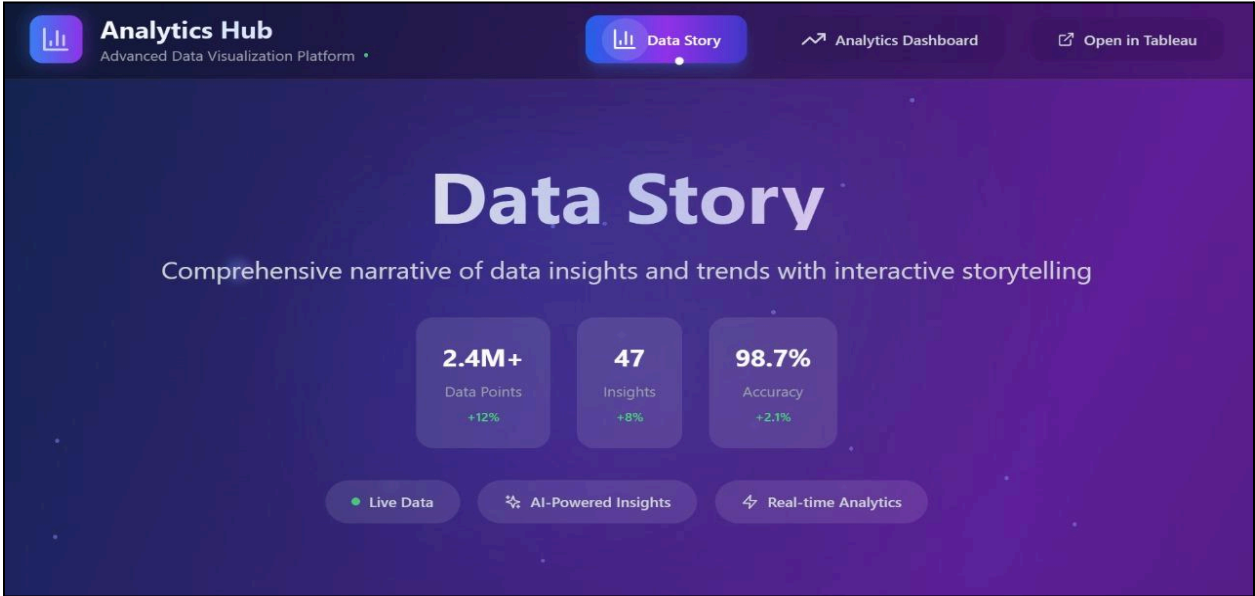
1.3 Definitions, Acronyms, and Abbreviations

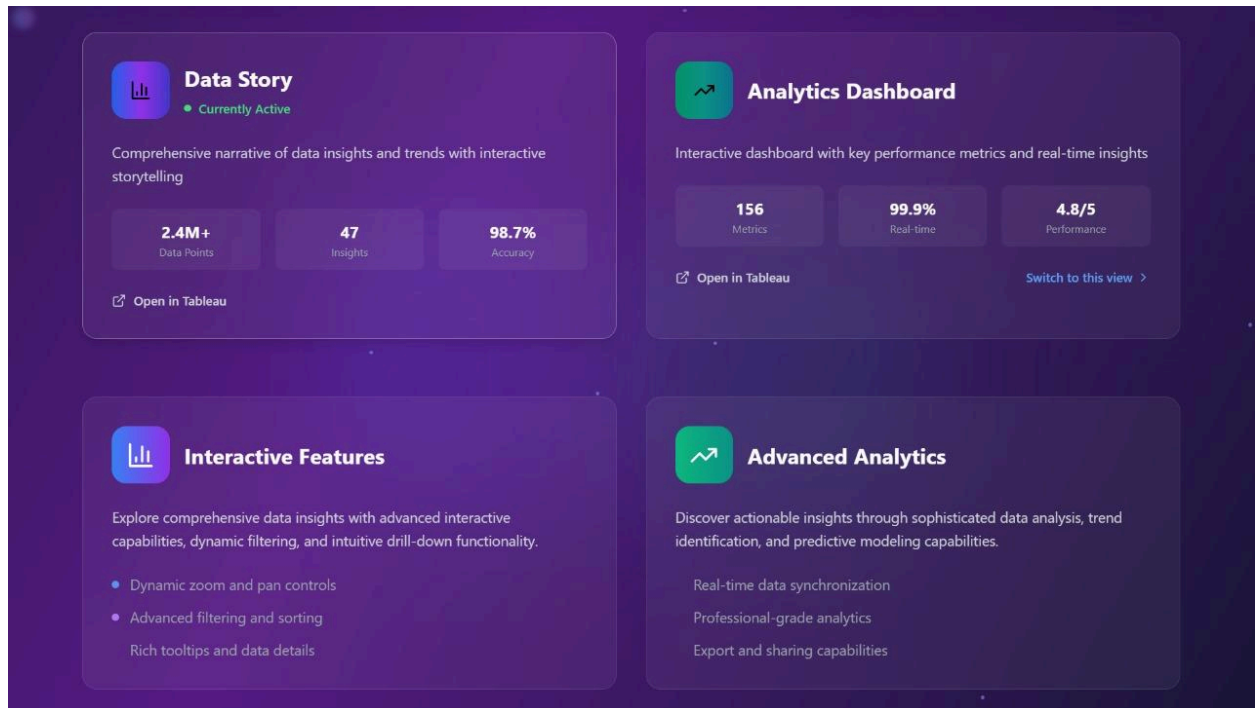
Term	Definition
FSD	Functional Specification Document
Tableau	A data visualization and business intelligence tool

GDP	Gross Domestic Product
PPP	Purchasing Power Parity
EDA	Exploratory Data Analysis

2. Problem Statement

Despite being a key driver of national development, economic freedom data is often underutilized due to lack of interactive, user-friendly tools. This project seeks to bridge this gap by creating a digital dashboard and analytical platform that enables policymakers, researchers, and the public to explore economic freedom and related indicators in an intuitive way.





3. Objectives

- Import and process the `index_of_economic_freedom.csv` dataset.
- Perform comprehensive data cleaning and validation.
- Build meaningful, interactive Tableau visualizations.
- Embed the dashboard in a React-based web application.
- Extract and highlight actionable insights related to economic trends and prosperity.

4. Data Description

4.1 Data Source

- Source: *The Heritage Foundation – Index of Economic Freedom (2022 Edition)*
- License: Publicly available data for academic and non-commercial use

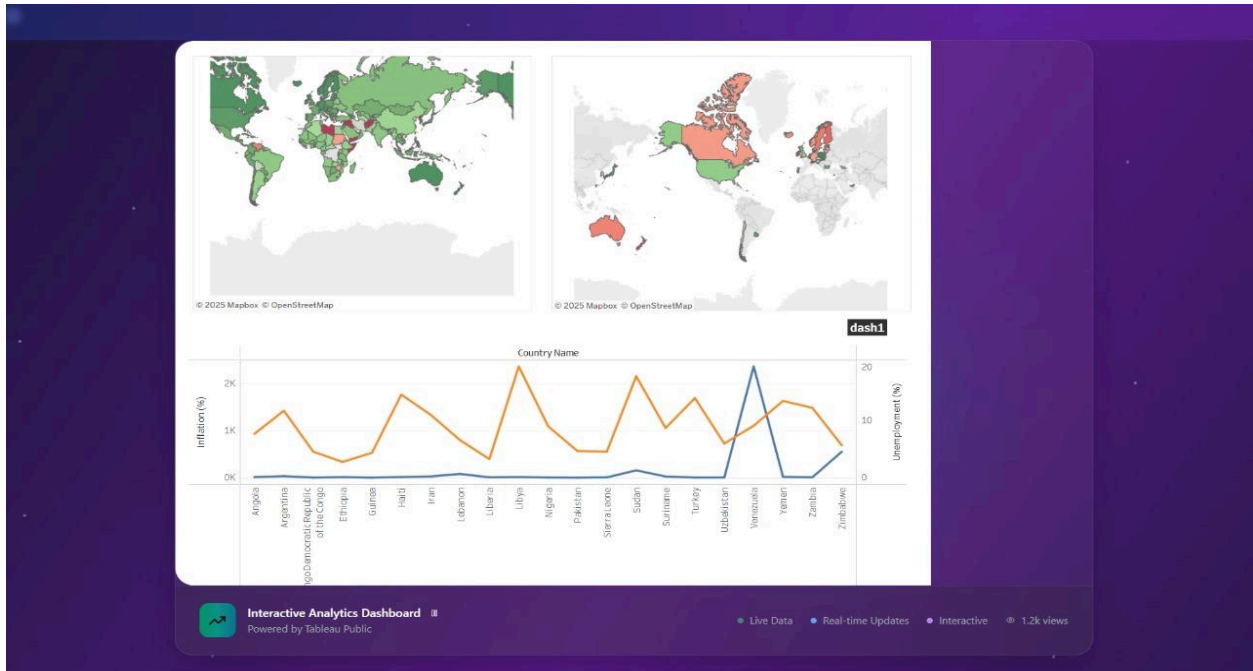
4.2 Data Fields

Field	Description
Country	Name of the country
Year	Year of measurement (2022)
Overall Score	Composite index score
Property Rights	Legal protection and ownership structure
Government Integrity	Transparency and anti-corruption
Judicial Effectiveness	Fairness and efficiency of legal processes

Country	id	Country Na	Region	World Rank	Region Ran	2022 Score	Property Ri	Judicial Effe	Government Tax	Burden Govt	Spend Fiscal	Health Business	Fr Labor Free	Monetary F	Trade Free	Investment
1		Afghanistan	Asia-Pacific	0	0	0	0	0	0	0	0	0	0	0	0	0
2		Albania	Europe	50	30	66.6	55.5	49.8	35.6	89.1	72.1	70.6	70.7	51.1	82	82.6
3		Algeria	Middle East	167	13	45.8	27.9	29.7	30.1	67.2	57.1	38.6	50	51.5	80.1	57.4
4		Angola	Sub-Sahara	139	29	52.6	39.8	25.3	20.6	86.6	86.4	80	37.6	53.9	61.2	70
5		Argentina	Americas	144	27	50.1	35.1	57.9	45.1	73.3	53	16.8	55.1	51	37.9	60.6
6		Armenia	Europe	58	34	65.3	50.4	33.1	50.8	86.9	78.9	75.5	64.9	47.2	77.5	73.6
7		Australia	Asia-Pacific	12	4	77.7	91.7	95.2	87	62.5	51.6	52	84.6	64.2	83.2	90
8		Austria	Europe	22	15	73.8	98.4	94.6	82.9	45.5	20.3	71.7	82.3	78.4	82.3	79.2
9		Azerbaijan	Europe	75	37	61.6	53.6	15.9	28.6	87.7	62.7	99.1	64.6	55.9	74.5	66.6
10		Bahamas	Americas	38	6	68.7	61.1	78.8	64.3	96.5	85.8	67.3	63.3	69.3	79.2	49
11		Bahrain	Middle East	74	4	62	65.9	27.4	41.6	99.9	65.5	0	60.2	54.9	81.1	83
12		Bangladesh	Asia-Pacific	137	29	52.7	36.3	28.1	22.2	82.6	93.2	54	55.6	36.6	70	63.8
13		Barbados	Americas	28	4	71.3	72.6	88.2	68.7	80.6	70.8	79.7	64.7	63.4	78.6	58.4
14		Belarus	Europe	135	45	53	34.5	15.5	43.7	93.3	56.7	95.3	54.5	46.8	70.2	75.6
15		Belgium	Europe	37	24	69.6	92.5	91.2	83.6	48.2	10.1	50.3	82.8	57.4	84.3	79.2
16		Belize	Americas	109	22	56.6	34.7	70.2	38.1	77	64.1	37.6	54	59.9	82.5	55.6
17		Benin	Sub-Sahara	81	6	61	44.3	55.3	40.3	68.4	91.6	83.4	47.7	59.6	80.4	61.4
18		Bhutan	Asia-Pacific	94	19	59.3	67.2	60.9	73.5	82.4	71.6	72.4	62.9	57.2	72.7	40.8
19		Bolivia	Americas	169	30	43	14.1	28.4	28.7	86	58.8	10.9	54.7	46.2	72.8	60.8
20		Bosnia and	Europe	68	36	63.4	49.2	37.2	33.4	94	46.2	95.9	66.6	60.2	84.9	68.8
21		Botswana	Sub-Sahara	61	3	64.8	74.2	70.1	61.4	87.4	59.8	19.2	56.7	61.6	75.4	77.2
22		Brazil	Americas	133	26	53.3	50.3	57.2	40	69.9	53.8	0.4	63.2	55.9	78.4	60
186		Brunei Daru	Asia-Pacific	62	9	64.8	67	51.6	61.1	90.8	68.1	20	72.4	75	72.3	84.6
23		Bulgaria	Europe	29	20	71	77.3	61.1	45.6	93.9	60.5	96.2	72.1	64.4	81.9	79.2
24		Burkina Fas	Sub-Sahara	100	13	58.3	47	36.3	41.4	81.8	82.3	66.1	41.9	61.6	75.6	61
25		Burma	Asia-Pacific	149	32	49.6	23.1	16.7	29.8	87.2	86.8	67.2	41.7	49.6	73.9	69.4
26		Burundi	Sub-Sahara	172	45	20.4	18.8	7.1	12.2	77.1	76.4	10.2	27.5	41.5	70.2	51

5. Data Cleaning

- **Null Values Handling:** Used column-wise strategies — mean/median imputation or row-wise removal based on importance.
- **Duplicate Removal:** Ensured uniqueness using a composite key (Country + Year).
- **Standardization:** Unified country names (e.g., U.S. → United States), removed outliers, and scaled numerical fields if necessary.
- **Data Type Fixing:** Ensured correct data types (float for scores, int for years, etc.).



6. System Features

6.1 Data Upload

- Users can upload CSV files via a web UI.
- File validation and schema checks are included.

6.2 Automated Data Cleaning

- Upon upload, a data-cleaning pipeline is executed to prepare the dataset for visualization.

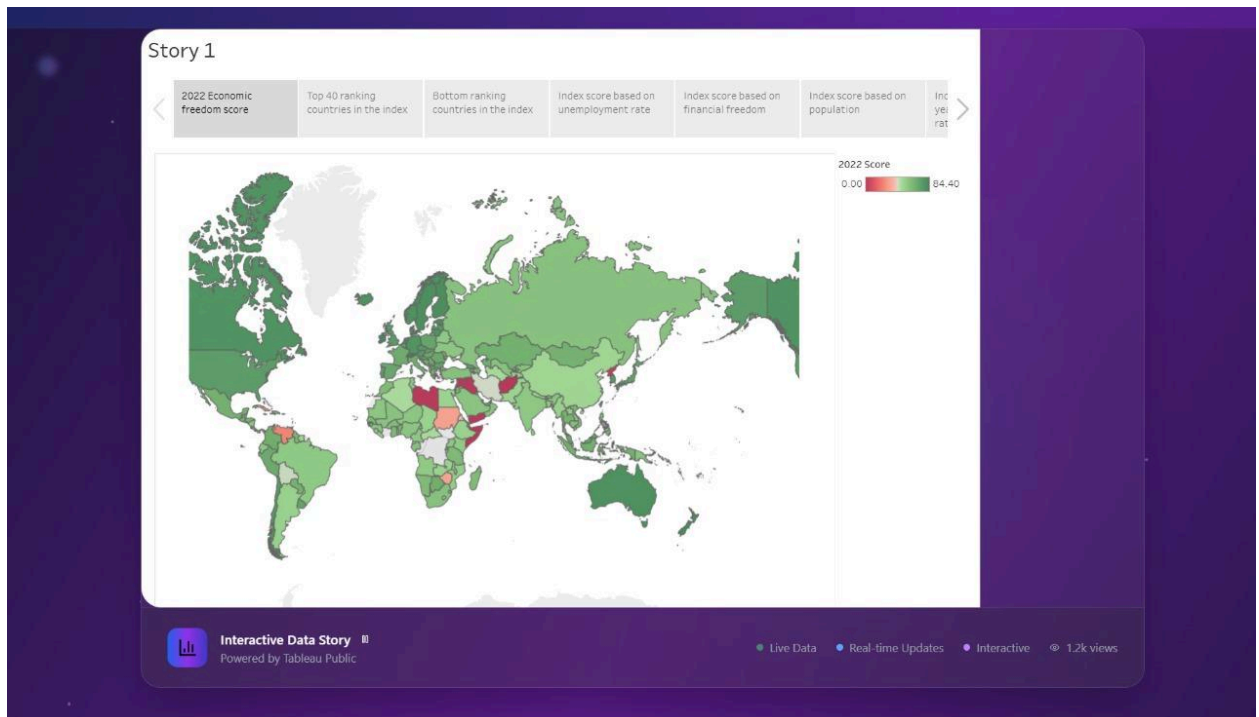
6.3 Interactive Dashboard

- The Tableau dashboard is embedded using an iFrame or Tableau JavaScript API.
- Users can interact with filters (e.g., country, region, year) to customize their view.

6.4 Insights & Reporting

- Key statistics are summarized in real-time as cards (e.g., highest GDP growth, lowest inflation).

- Downloadable report functionality (PDF/CSV export).



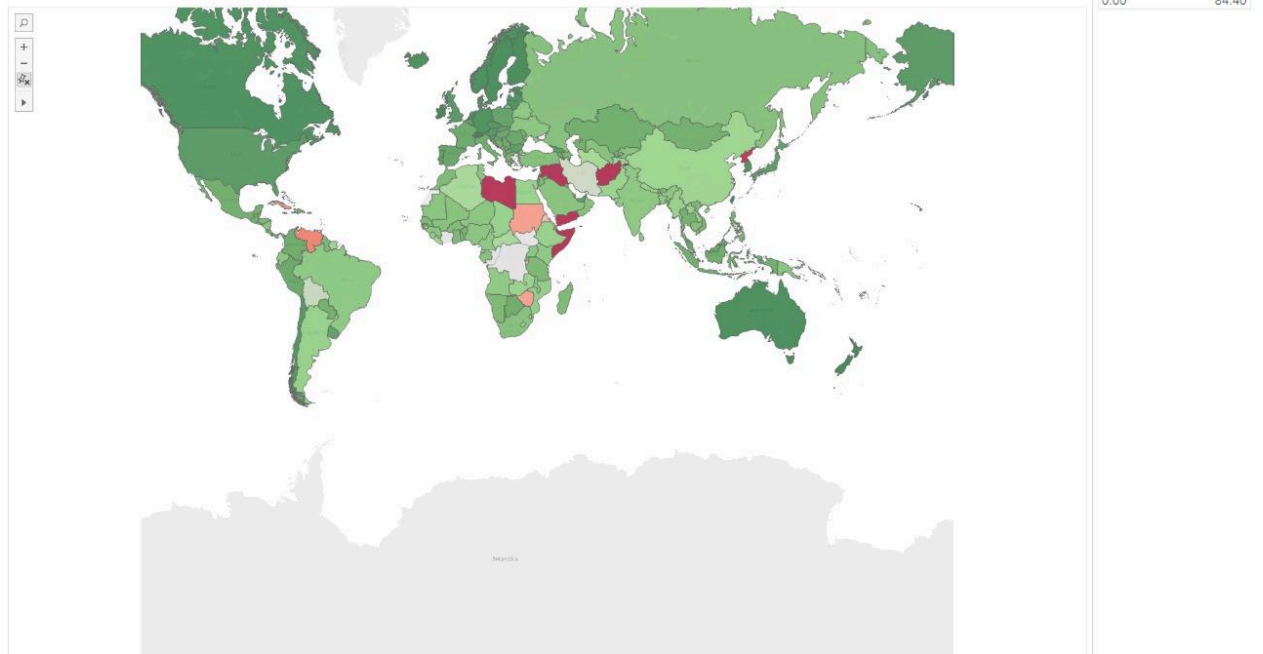
7. Data Visualizations & Insights

The following visualizations were created to reveal patterns and correlations in the dataset:

7.1 2022 Economic Freedom Score

- *Global heat map and ranked bar chart*
- Provides a bird's eye view of economic freedom globally.

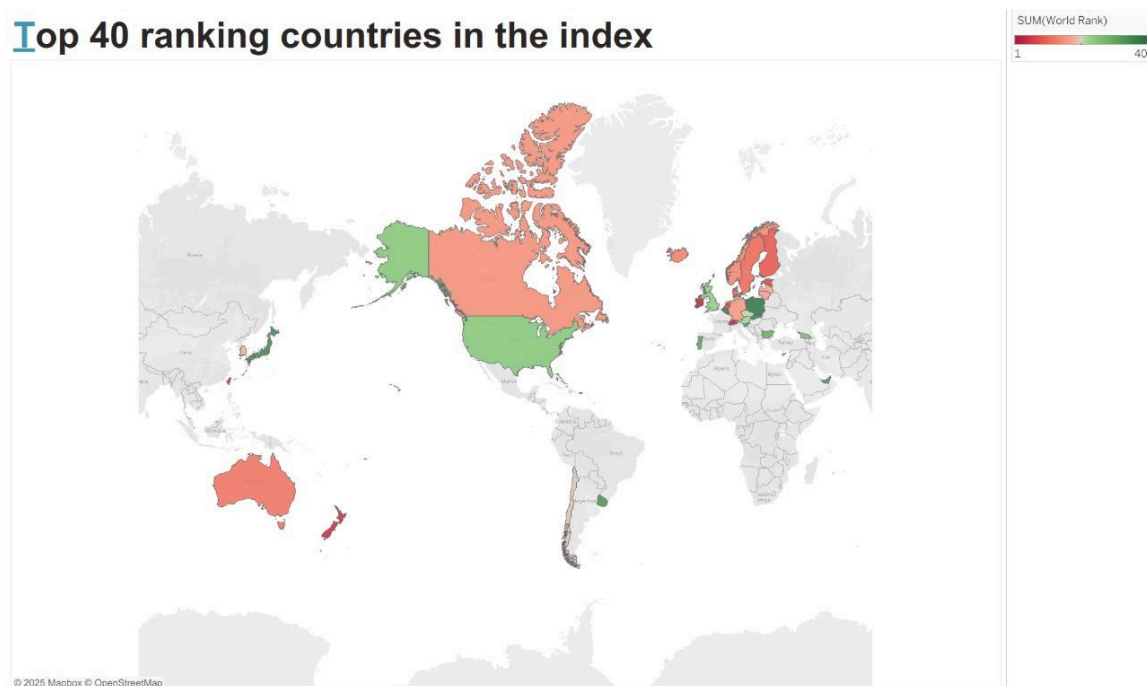
2022 Economic freedom score



7.2 Top 40 Ranking Countries in the Index

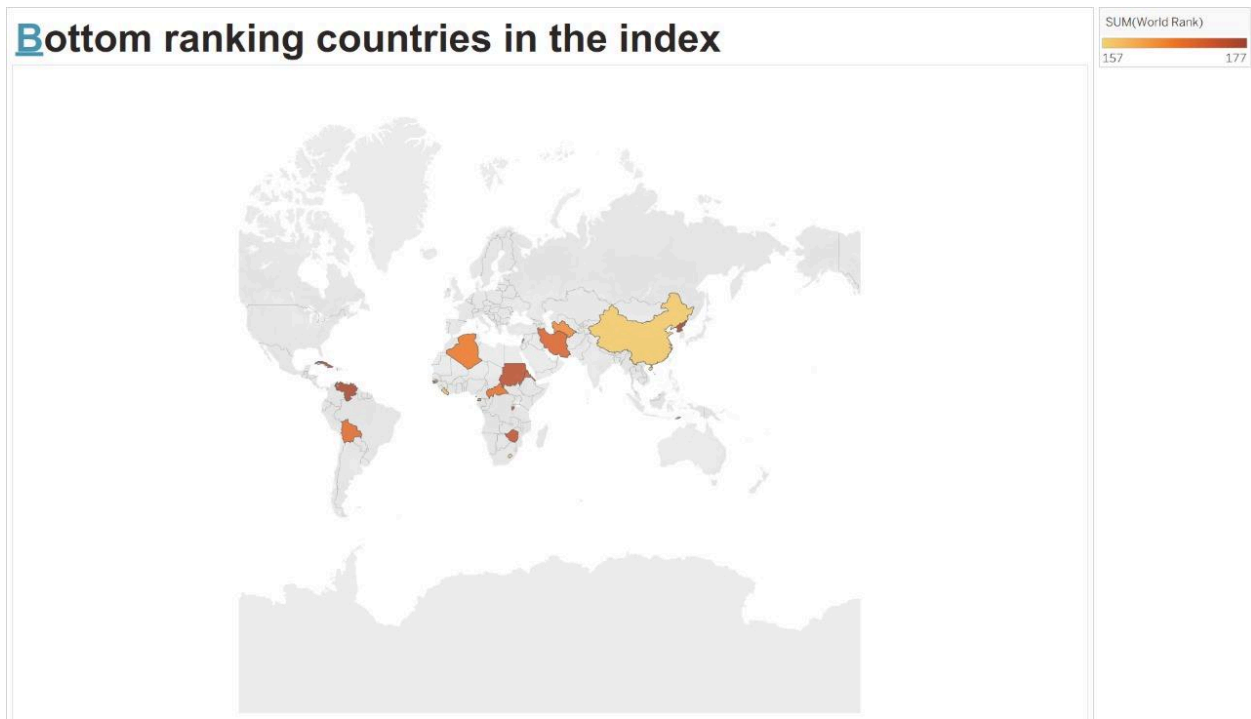
- Horizontal bar chart of top 40 countries by economic freedom.

Top 40 ranking countries in the index



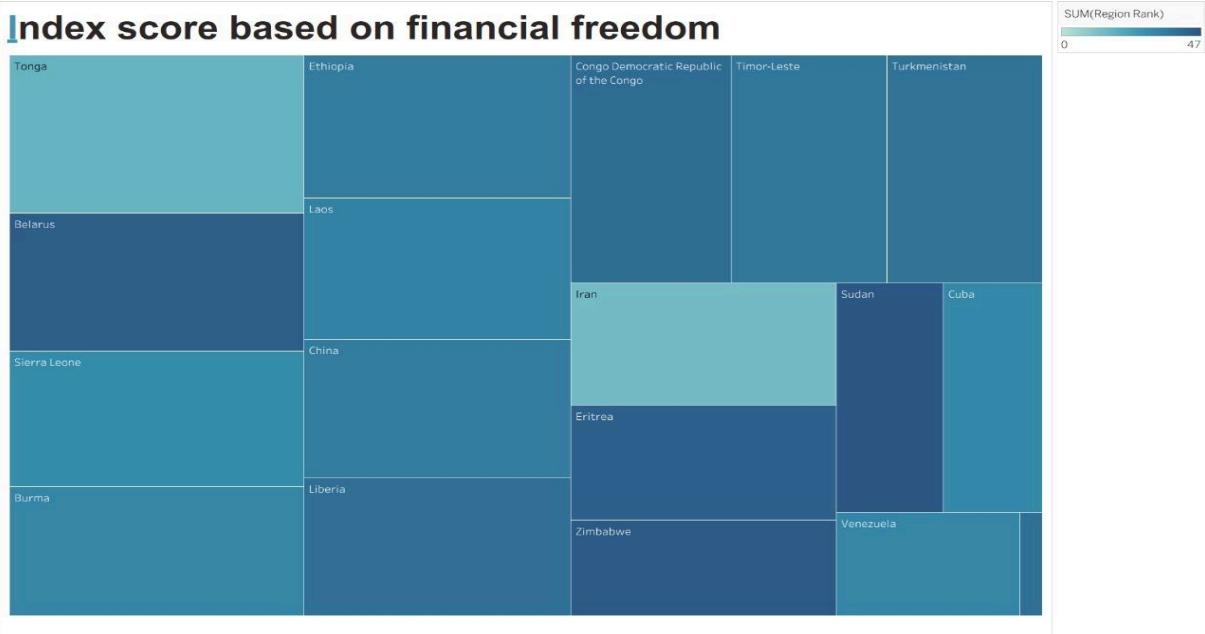
7.3 Bottom Ranking Countries in the Index

- Similar chart showcasing the lowest 20–30 nations in economic freedom.



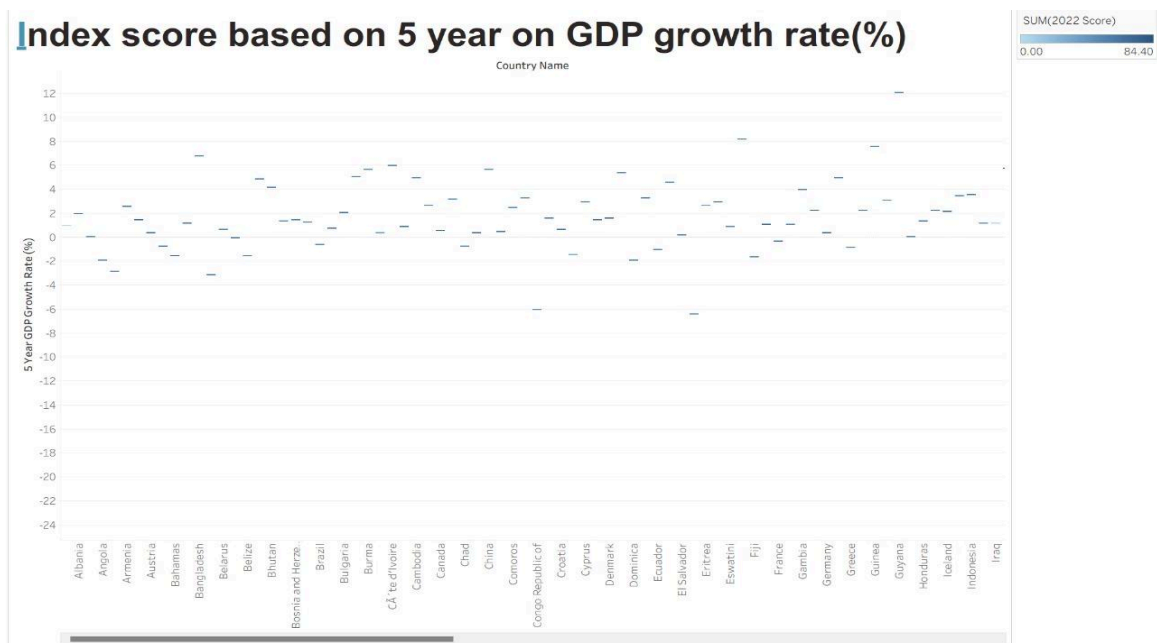
7.4 Economic Freedom vs. Financial Freedom

- Comparative chart highlighting how financial systems correlate with general economic liberty.



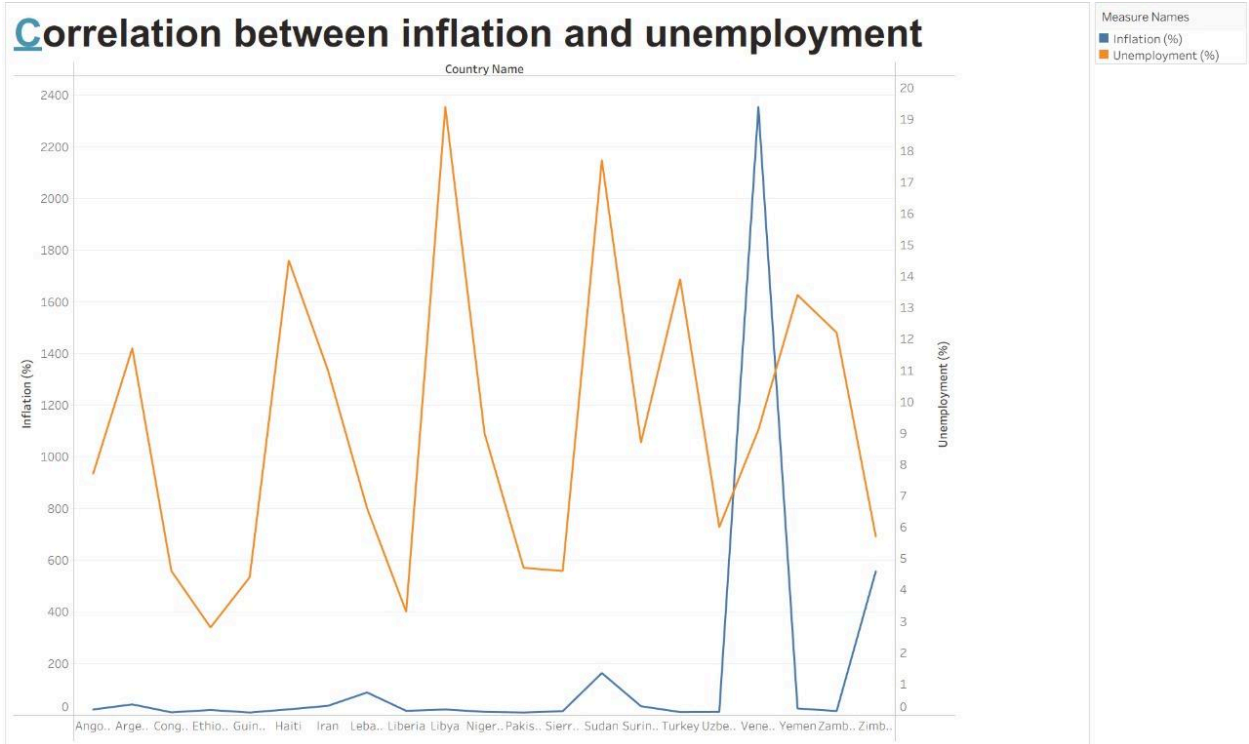
7.5 Economic Freedom vs. 5-Year GDP Growth Rate

- Helps infer long-term growth patterns related to freedom indices.



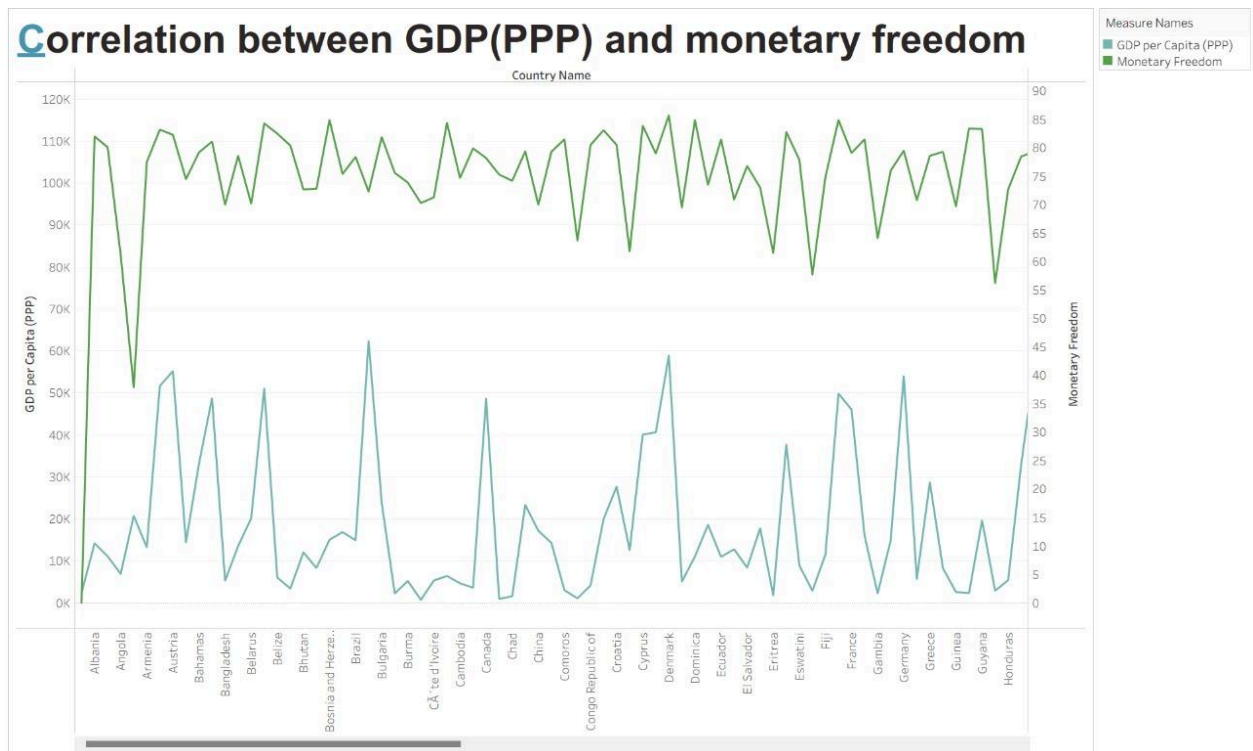
7.6 Correlation: Inflation vs. Unemployment

- Scatter plot showcasing classic Phillips Curve dynamics.



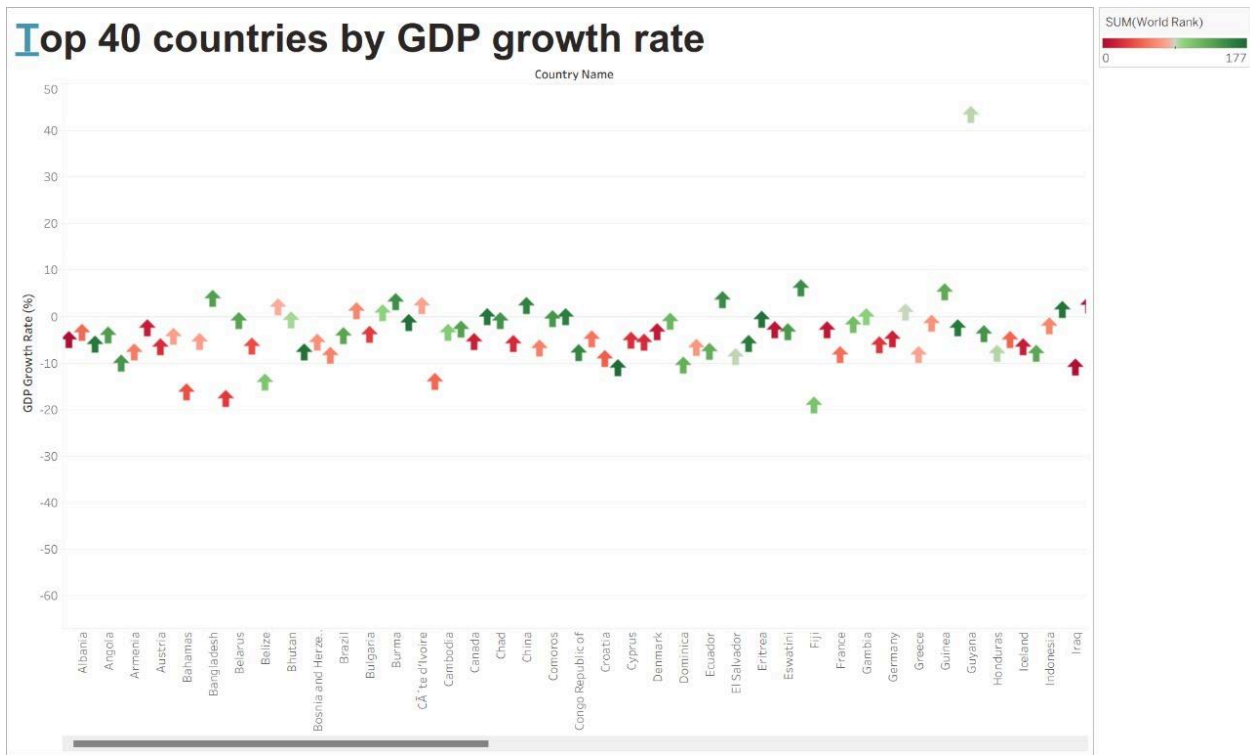
7.7 Correlation: GDP (PPP) vs. Monetary Freedom

- Reveals how monetary independence may influence purchasing power.



7.8 Top 40 Countries by GDP Growth

- Focus on countries excelling in sustained economic expansion.



Key Insights

- Nations with higher economic freedom generally exhibit stronger GDP growth and macroeconomic stability.
- Financial freedom is often a leading indicator of broader economic independence.
- Larger countries (e.g., India, China) show diverse trends, indicating that population isn't always correlated with freedom or growth.
- Inflation and unemployment rates tend to stabilize in countries with higher economic freedom scores.

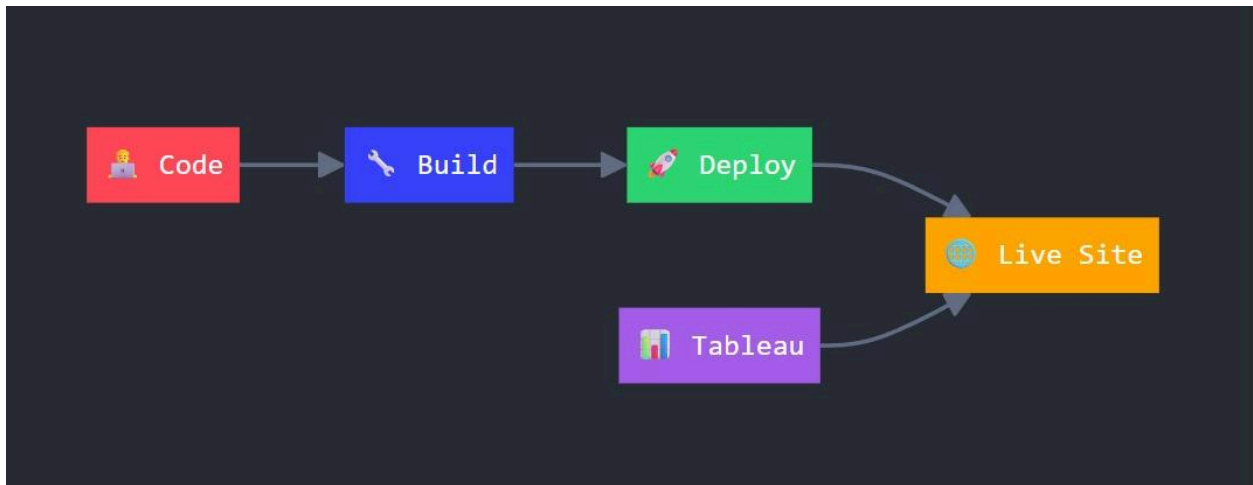
8. Non-Functional Requirements

Requirement	Description
Performance	Dashboards should load in under 5 seconds on stable internet.
Usability	Clean, intuitive interface suitable for technical and non-technical users.
Responsiveness	Fully functional across devices (desktop, tablet, mobile).

Security	All uploaded datasets are encrypted and not stored permanently.
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9. Integration

- **Front-end:** React-based interface with modern UI/UX best practices
- **Back-end:** Tableau Public integration using embed code or API
- **Deployment:** Hosted on platforms like Vercel, Netlify, or AWS



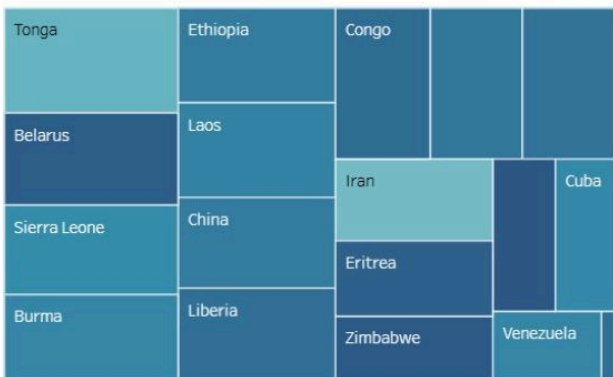
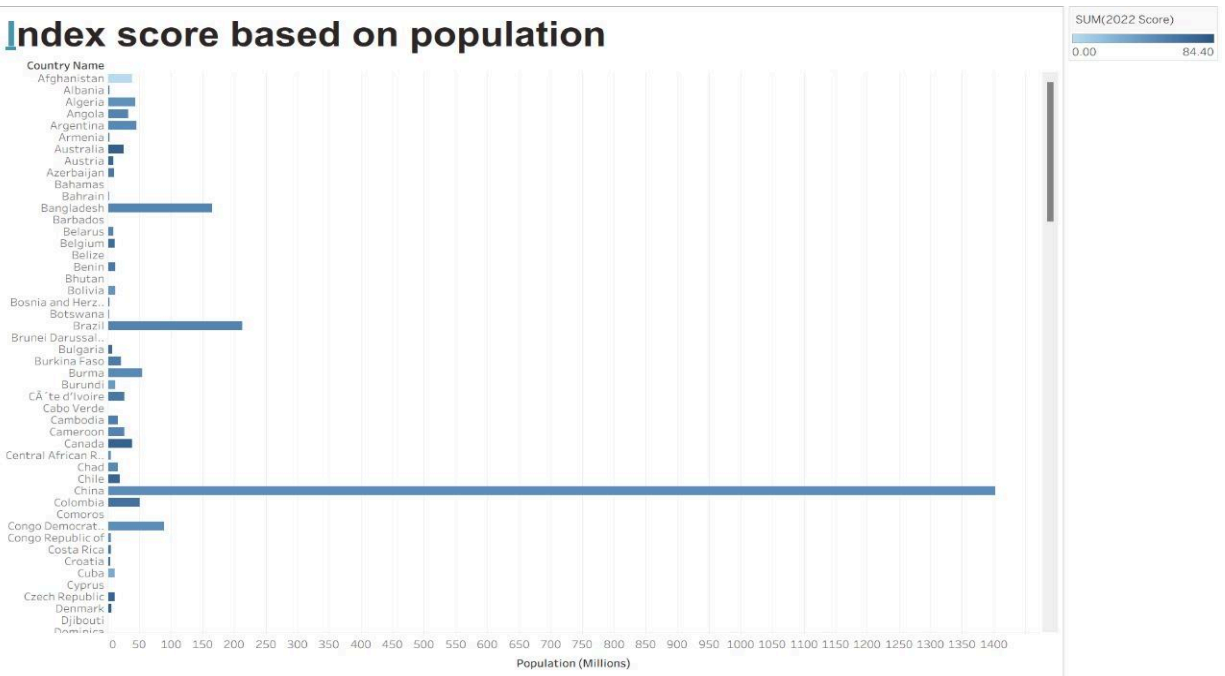
10. Conclusion

This project highlights how economic freedom influences prosperity through data-driven storytelling. By combining robust datasets with powerful visualizations, it allows stakeholders to explore economic indicators and uncover regional and global trends with ease.

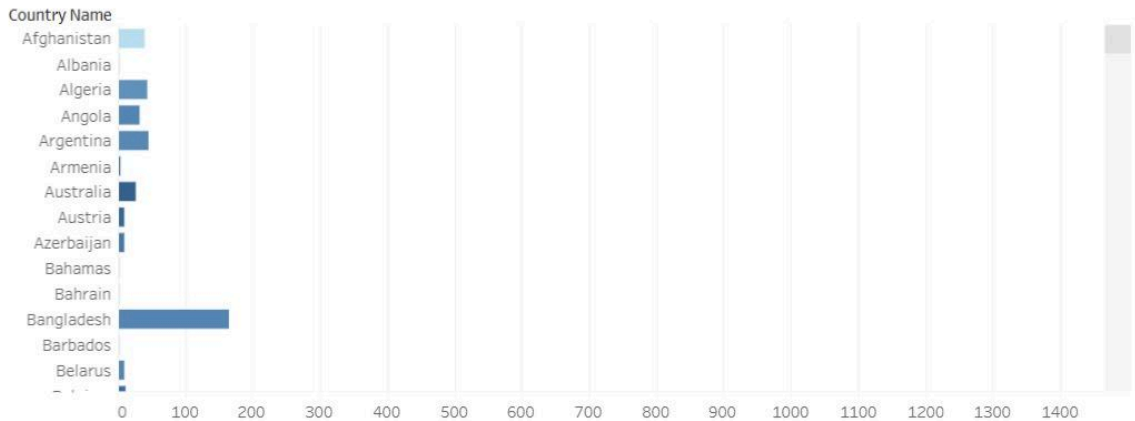
The system supports further enhancements such as real-time updates, additional years of data, and machine learning for predictive analytics.

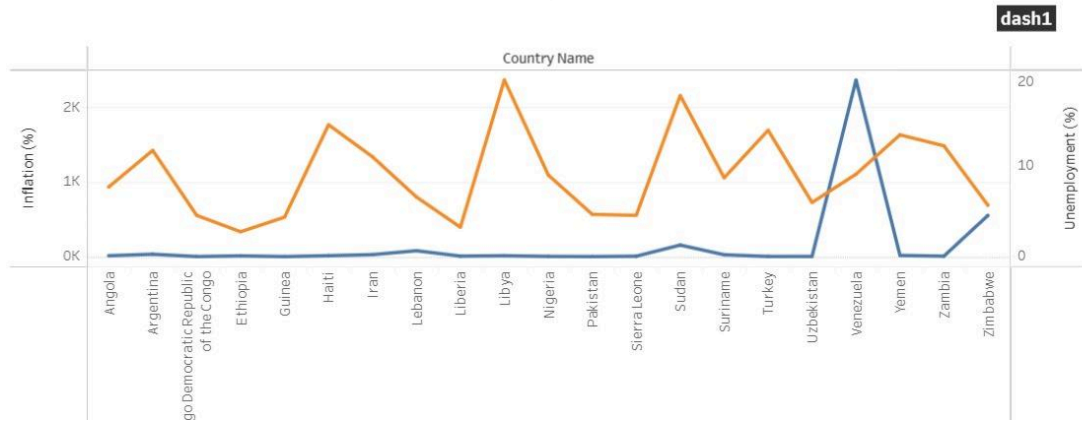
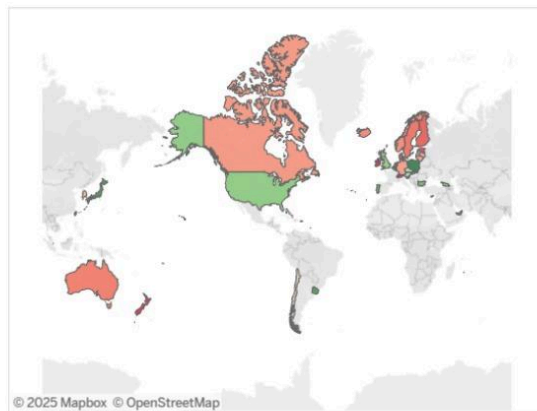
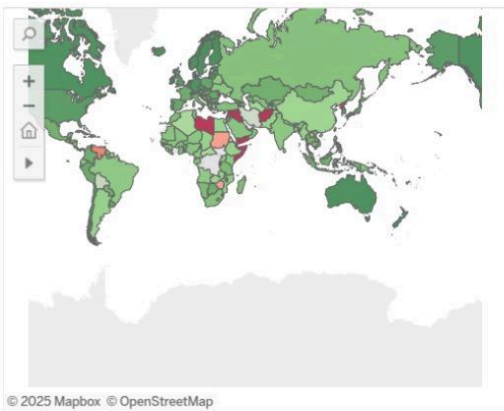
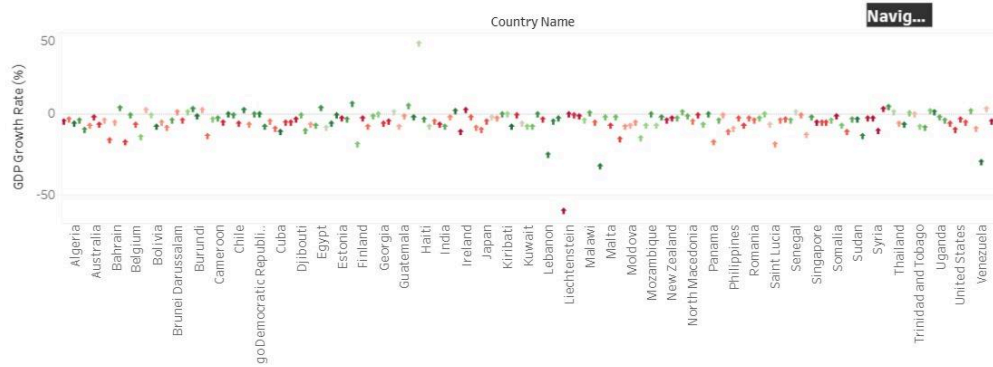
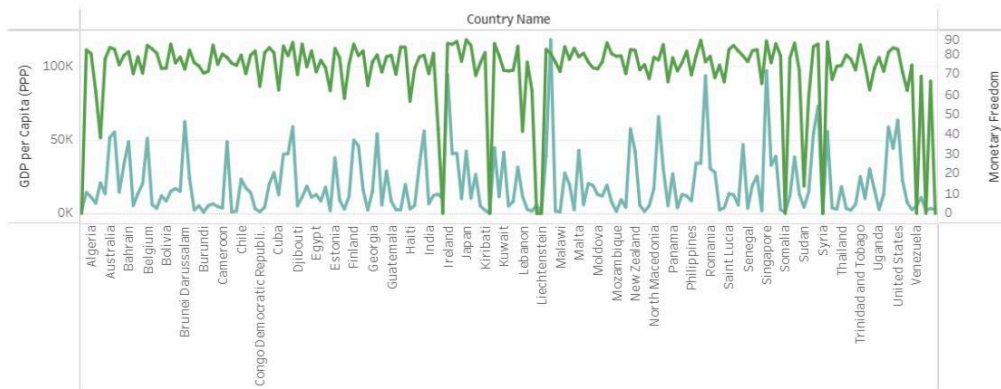
11. Appendix

11.1 Screenshots



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11.2 Data Dictionary

Field	Description	Data Type
Overall Score	Composite score of economic freedom	Float
Tax Burden	Measurement of tax load	Float

11.3 References

- The Heritage Foundation – *Index of Economic Freedom (2022)*
- World Bank – *GDP & Macroeconomic Indicators*