

Project Report

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

TeamID:LTVIP2025TMID34780

TeamLeader:

Makandar Rehab Khanam

Teammembers:

B vijaykumarreddy

Poojari Suguna

Shaik Sakiya Kouser

1. INTRODUCTION

1.1 ProjectOverview

Economic freedom plays a critical role in determining a country's prosperity, competitiveness, and the overall well-being of its citizens. However, while numerous datasets and reports exist, there is a gap in interactive and comparative tools that make this information accessible and actionable for diverse stakeholders.

This project aims to analyse and visualize the Index of Economic Freedom across multiple countries to provide insights into the relationship between economic policies and national prosperity. Using statistical analysis, data visualization techniques, and real-time filtering capabilities, the platform enables policymakers, researchers, investors, and the general public to explore key economic indicators in an intuitive and meaningful way.

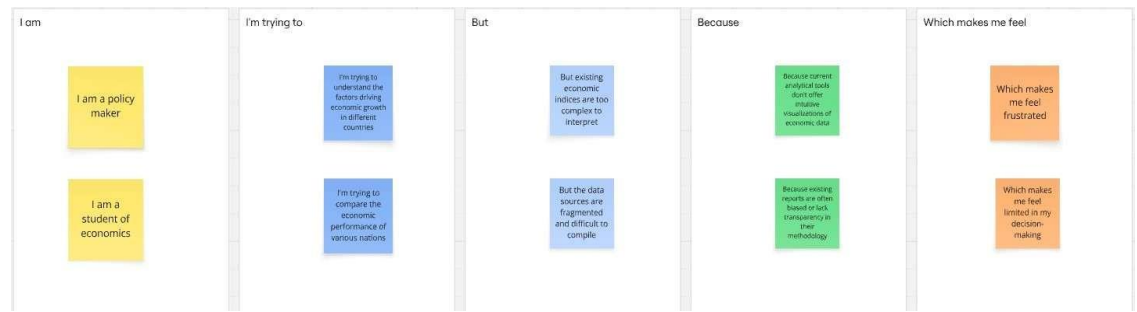
The solution integrates data ingestion, processing, and visualization in a modular architecture, offering features like global freedom heatmaps, year-wise trends, top/bottom ranked countries, and correlation analysis with other socio-economic metrics like GDP and unemployment rates. This project bridges the gap between raw data and informed decisionmaking through a transparent, scalable, and user-centric approach.

1.2 Purpose

The purpose of this project is to create an accessible, data-driven platform that enables the analysis and visualization of the Index of Economic Freedom across different countries and time periods. This initiative seeks to empower policymakers, researchers, and investors by providing them with actionable insights into how economic freedom influences prosperity, governance, and development. By transforming complex datasets into interactive dashboards and comparative tools, the project promotes informed decision-making, encourages transparency in economic policies, and supports academic and institutional research. Ultimately, the solution aspires to highlight global economic patterns and guide strategic reforms aimed at enhancing economic liberty and growth.

2. IDEATIONPHASE

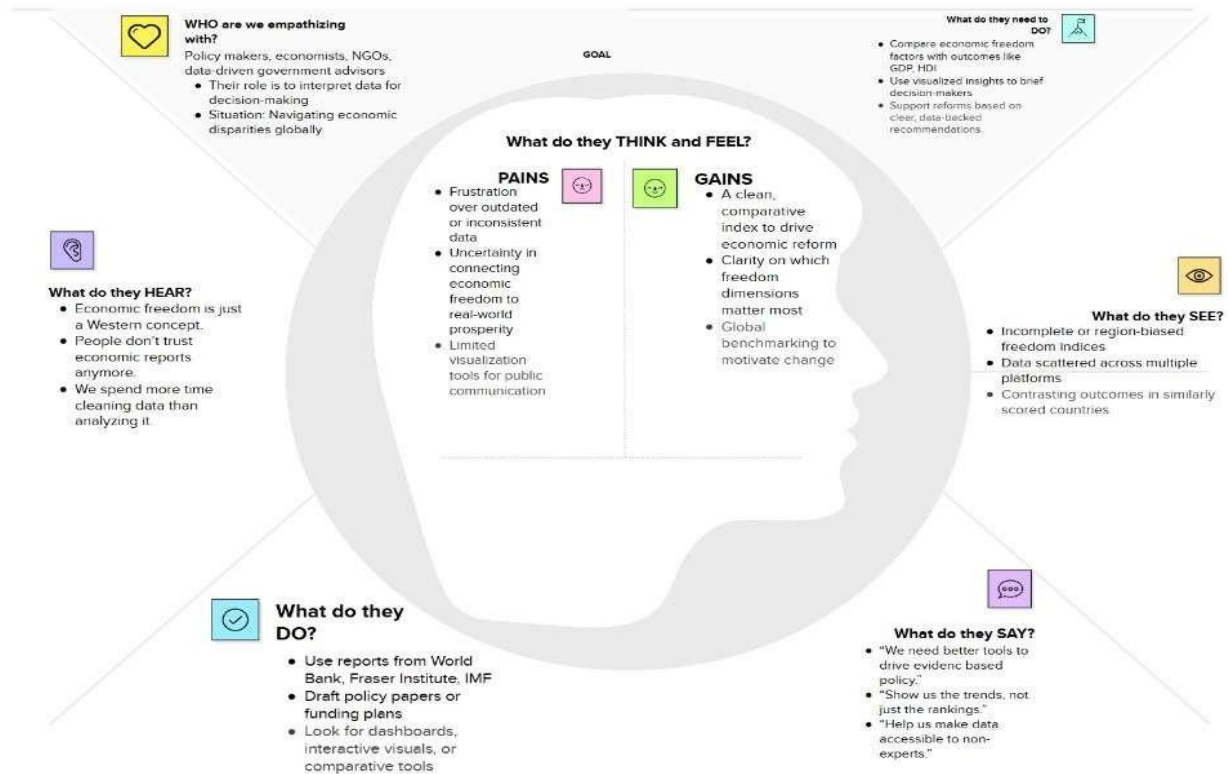
2.1 ProblemStatement



Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel

PS-1	a policy maker	understand the drivers of economic prosperity in different nations to formulate effective policies.	existing economic indices are often too complex, lack timely updates.	there's a need for a comprehensive, easily digestible, and regularly updated index that integrates various dimensions of economic freedom.	frustrated and uncertain about the optimal policy choices.
PS-2	an economic researcher	identify clear correlations between economic freedom and socioeconomic outcomes for academic analysis.	current data sources are fragmented, inconsistent, and difficult to compare across different countries and time periods.	there isn't a standardized, reliable, and easily accessible dataset that combines diverse indicators of economic freedom with relevant outcome variables.	overwhelmed by data collection and analysis, and limited in drawing robust conclusions.


2.2 EmpathyMapCanvas



2.3 Brainstorming

Step-1: Team Gathering, Collaboration and Select the Problem Statement

Template



Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

⌚ 10 minutes to prepare
⌚ 1 hour to collaborate
👤 2-5 people recommended

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

⌚ 10 minutes

- A Team gathering**
 - Participants: Data analysts, economics students, a mentor/ facilitator
 - Invite shared in advance with project title and dataset!
- B Set the goal**

Think about the problem you'll be focusing on solving in the brainstorming session.
- C Learn how to use the facilitation tools**

Google Sheets (for live idea capture), Miro or Mural (for mapping), and Google Meet/Zoom for collaboration.

[Open article](#) →

1 Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

⌚ 5 minutes

PROBLEM

"How might we evaluate and visualize economic freedom to better understand its influence on prosperity across countries?"

Key rules of brainstorming

To run an smooth and productive session:

🗨️ Stay in topic.

🗨️ Defier judgement

🗨️ Go for volume.

💡 Encourage wild ideas.

👂 Listen to others.

🗨️ If possible, be visual.

Step-2:Brainstorm,IdeaListingandGrouping

2 Brainstorm

Write down any ideas that come to mind that address your problem statement.

⌚ 10 minutes

TIP

You can select a sticky note and hit the pencil (switch to select) over to start drawing!

Person 1

- Visualize GDP vs. Freedom Score
- Heatmaps of economic freedom by region

Person 2

- Cluster countries by continent
- Automate data pipeline

Person 3

- Correlate with literacy rate
- Analyze income inequality impact

Person 4

- Visualize GDP vs. Freedom Score
- Heatmaps of economic freedom by region

Person 5

- Cluster countries by continent
- Automate data pipeline

3 Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

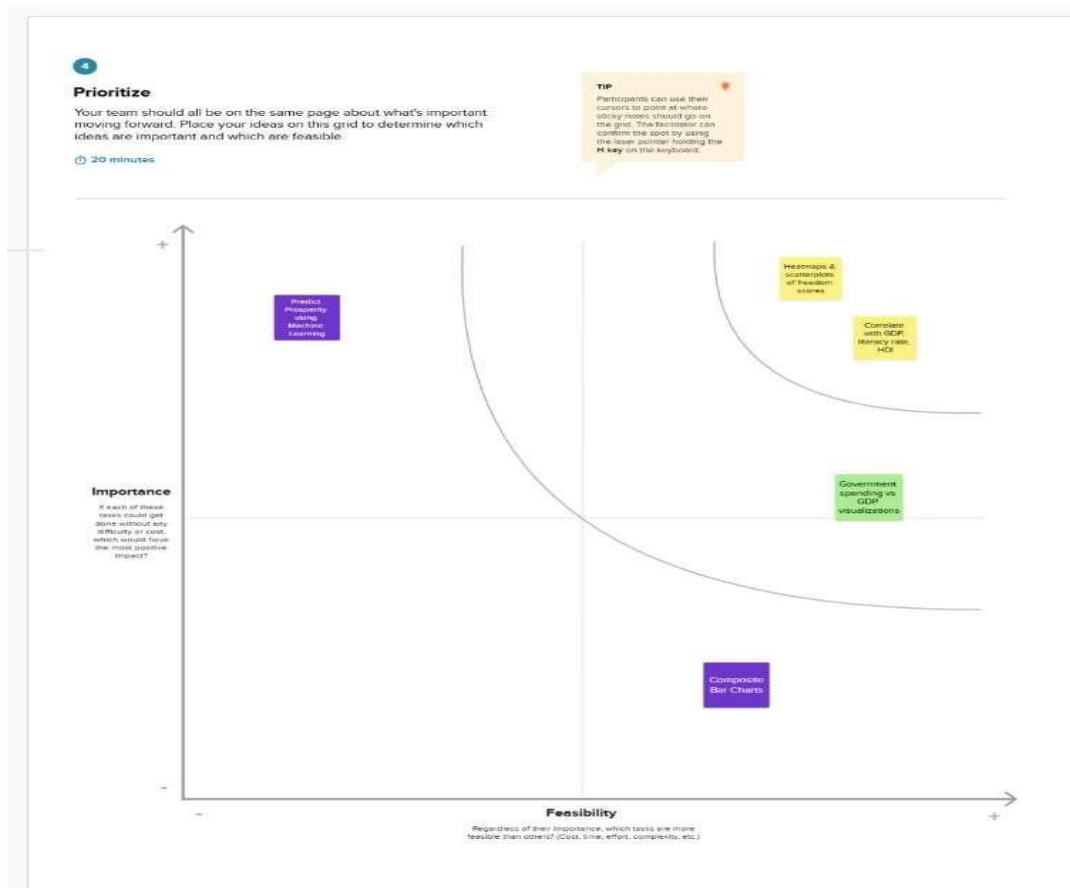
⌚ 20 minutes

TIP

Add sub-headers help to sticky notes to make it easier to find, browse, organize, and categorize important ideas as themes within your mural.

- 1. Data Visualization**
 - Visualize GDP vs Freedom Score
 - Heatmaps of economic freedom by region
- 2. Statistical Analysis**
 - Correlate with literacy rate
 - Analyze income inequality impact
- 3. Machine Learning & Prediction**
 - Cluster countries by continent
 - Automate data pipeline

Step-3:IdeaPrioritization



3. REQUIREMENT ANALYSIS

3.1 Customer Journey map

Stage	Actions	Thoughts	Touchpoints	Pain Points
Discovery	Learns about the platform via seminar, academic circles, or reports.	"Is there a tool that shows how economic freedom affects prosperity?"	University portals, policy newsletters, GitHub, search engines	Lack of accessible and reliable visualization tools
Access	Visits the platform and browses the landing page.	"Is this data recent? Can I trust the source?"	Web interface, data source links (e.g., Heritage Foundation)	Trust in data, understanding source credibility
Interaction	Filters data by year/country, views heatmaps and rankings.	"I want to compare my country with others or across years."	Dashboard, filtering tools, charts, dropdown selectors	Trust in data, understanding source credibility

3.2 SolutionRequirement

FunctionalRequirements:

Followingarethefunctionalrequirementsoftheproposedsolution.

FRNo.	FunctionalRequirement(Epic)	SubRequirement(Story/Sub-Task)
FR-1	UserRegistration	RegistrationthroughForm RegistrationthroughGmail RegistrationthroughLinkedIn
FR-2	UserConfirmation	ConfirmationviaEmail ConfirmationviaOTP
FR-3	DataIngestion&Management	UploadDataset(e.g.,CSV,Excel,fromexternalAPIs) Data Validation and Cleaning DataStorageandOrganization(e.g.,database)
FR-4	EconomicFreedomIndex Calculation	DefineandConfigureIndexComponents ApplyWeightingSchemes(configurablebyuser/admin) CalculateCompositeIndexScoresforcountries/regions
FR-5	DataAnalysis&Visualization	GenerateInteractiveCharts(e.g.,Bar,Line,Scatter, Bubble) CreateGeographicVisualizations(e.g.,ChoroplethMaps) Provide Trend Analysis over Time Enable Comparison betweenCountries/Regions DisplayCorrelationMatricesbetweenindicators
FR-6	Reporting&Export	GenerateCustomizableReports(e.g.,PDF,HTML) ExportRawandProcessedData(e.g.,CSV,Excel) ExportVisualizations(e.g.,ImageformatslikePNG,JPEG)
FR-7	UserAuthentication& Authorization	UserLogin/Logout Role-basedAccessControl(e.g.,Admin,Analyst,Viewer)
FR-8	Search&FilterFunctionality	SearchbyCountryName,Year,IndexComponent FilterDataby variouscriteria(e.g.,region,incomelevel)

Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

FRNo.	Non-Functional Requirement	Description
NFR-1	Usability	The system should have an intuitive and user-friendly interface, allowing users to easily navigate, interact with data, and interpret results without extensive training.
NFR-2	Security	The system must protect sensitive user data (if any) and ensure the integrity and confidentiality of the economic data. This includes secure authentication, authorization, and protection against unauthorized access or data breaches.
NFR-3	Reliability	The system should consistently perform its functions accurately and without significant errors. Data calculations, visualizations, and report generation should be reliable and repeatable.
NFR-4	Performance	The system should respond quickly to user requests, especially during data processing, index calculation, and visualization generation, even with large datasets. Data loading and rendering times should be minimal.
NFR-5	Availability	The system should be accessible to authorized users whenever needed, with minimal downtime. This includes considerations for server uptime, data accessibility, and disaster recovery.
NFR-6	Scalability	The system should be able to handle an increasing amount of data (e.g., more countries, more years, new indicators), a growing number of concurrent users, and additional features without significant degradation in performance.
NFR-7	Maintainability	The system's codebase and architecture should be well-documented, modular, and easy to modify or extend to accommodate future enhancements or bug fixes.
NFR-8	Data Accuracy	The system must ensure the highest level of accuracy for all ingested data, calculations, and visualizations to reflect reliable economic insights.

3.3 DataFlowDiagram

UserStories

UserType	Function al Requirem ent(Epic)	User Story Numb er	UserStory/Task	Acceptance criteria	Priorit y	Releas e
Policymaker	Data Analysis& Visualizati on	USN-1	Asa Policymaker, I want to view a world map showing economic freedom scores by country, so that I can quickly identify regions with high or low economic prosperity and potential policy impact areas.	The map correctly displays economic freedom scores, and I can identify regions visually.	High	Sprint-1
Economic Researcher	Data Analysis& Visualizati on	USN-2	As an Economic Researcher, I want to filter economic data by specific years and countries, so that I can conduct in-depth analysis on historical trends and compare performance across different nations.	I can apply filters for years and countries, and the data displayed updates accordingly.	High	Sprint-1
Investor	Data Analysis& Visualizati on	USN-3	As an Investor, I want to see the top 40 and least ranked countries based on their economic index, so that I can identify potential investment opportunities or risks in various markets.	The list of top and least ranked countries is accurate and easily accessible.	High	Sprint-1
User	Data Ingestion & Managem ent	USN-4	As a User, I want to upload new economic datasets (e.g., CSV, Excel), so that I can incorporate the latest information into the analysis and update the index.	I can successfully upload a dataset, and its data is visible in the system.	Medium	Sprint-2
Economic Researcher	Data Analysis& Visualizati on	USN-5	As an Economic Researcher, I want to view correlations between economic freedom and indicators like unemployment rate and GDP growth, so that I can understand the multifaceted impacts of economic policies.	The system generates a report with selected criteria, and I can download it in my desired format (e.g., PDF).	High	Sprint-2

User	Reporting & Export	USN-6	AsaUser,Iwanttoexport visualizations(e.g.,charts, maps) as image files, so	I can export displayed visualizations	Medium	Sprint-1
UserType	Functional Requirement(Epic)	User Story Number	UserStory/Task	Acceptance criteria	Priority	Release
			that I can easily include them in presentations or reports.	as image files (e.g., PNG, JPEG).		
Administrator	User Management & Authorization	USN-7	As an Administrator, I want to manage user accounts and roles, so that I can access levels to sensitive data and functionalities.	I can add, edit, and remove users, and assign.	High	Sprint-1

4. PROJECT DESIGN

4.1 Problem Solution Fit

Define CS, fit into CC	1. CUSTOMER SEGMENT(S) CS Policymakers, economists, development researchers, and students interested in national or regional prosperity metrics.	6. CUSTOMER CONSTRAINTS CC <ul style="list-style-type: none"> Lack of access to updated or credible datasets. Limited knowledge of data analysis tools. Budgetary or resource limitations for deeper studies. 	5. AVAILABLE SOLUTIONS AS <ul style="list-style-type: none"> The Heritage Foundation Index. World Bank Ease of Doing Business reports. Academic publications (but often not user-friendly or accessible for all). 	Explore AS, differentiate
	2. JOBS-TO-BE-DONE / PROBLEMS J&P <ul style="list-style-type: none"> Need to understand what drives prosperity and freedom in economies. Need to compare economic freedom across countries to guide reforms 	9. PROBLEM ROOT CAUSE RC <ul style="list-style-type: none"> Limited awareness of the components driving economic freedom. Difficulty accessing comparative insights across countries. Reliance on outdated or anecdotal data. 	7. BEHAVIOUR BE <ul style="list-style-type: none"> Direct: Reading official reports, using data dashboards. Indirect: Watching explainer videos, reading summaries, attending seminars/webinars. 	
Identify strong TR & EM	3. TRIGGERS TR <ul style="list-style-type: none"> Concerns over economic stagnation or inequality. Interest in global rankings and their correlation with development. Academic projects or research questions. 	10. YOUR SOLUTION SL <ul style="list-style-type: none"> An interactive or data-driven analysis of the Index of Economic Freedom using real datasets. Visualizations and rankings that make insights clear and actionable. 	8. CHANNELS OF BEHAVIOUR CH 8.1 ONLINE Reports, dashboards, data portals (e.g., World Bank, Heritage.org). 8.2 OFFLINE Lectures, conferences, printed reports, classroom discussions.	Extract online & offline CH of BE
	4. EMOTIONS: BEFORE / AFTER EM Before: Frustrated, uncertain about which economic policies correlate with growth. After: Informed, confident in data-based comparisons, inspired to explore policy reform or further research.			

4.2 ProposedSolution

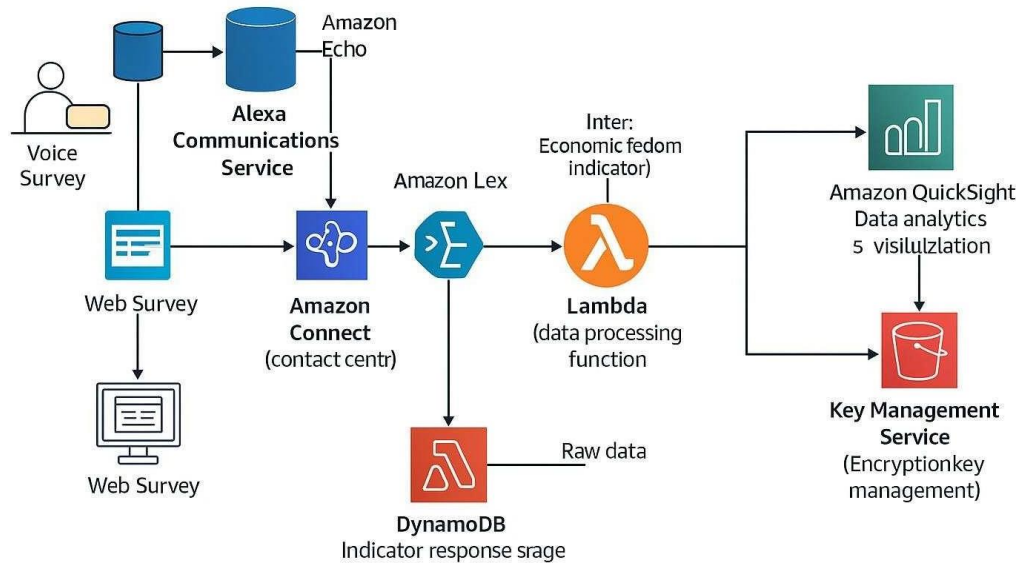
ProposedSolutionTemplate:

Projectteamshallfillthefollowinginformationintheproposedsolutiontemplate

S.No.	Parameter	Description
1.	ProblemStatement(Problemtobe solved)	Despitetheavailabilityofmacroeconomicdata, policymakers and researchers lack a clear, accessible method to evaluate how economic freedom correlates with prosperity.
2.	Idea/Solutiondescription	The project analyses the Economic Freedom Index using data visualization andcomparative analysis tools. It offers clear dashboards, insights, and recommendations across countries
3.	Novelty/Uniqueness	Whilereportsexist,thissolutionprovidesan interactive, comparative, and visually rich platform combining multiple data dimensions useful for academia and policy
4.	SocialImpact/CustomerSatisfaction	Informed citizens, better policy decisions, and transparencyineconomicgovernance.This tool helps identify reforms needed to enhance freedom and economic performance.
5.	BusinessModel(RevenueModel)	Can be offered as a freemium tool for students/researchers,withadvanced insights andcountryreportsavailableviasubscription for institutions, think tanks, or NGOs.
6.	Scalabilityofthe Solution	Canbeextendedtoincluderegional/state-level indices,time-seriestrends,orintegrationwith other indicators (e.g., Human Development Index, Corruption Perception Index).

4.3 SolutionArchitecture

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



5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Sprint	Functional Requirement (Epic)	User Story Number	User Story/Task	Story Points	Priority
Sprint-1	Data Analysis & Visualization	USN-1	As a Policymaker, I want to view a world map showing economic freedom scores by country, so that I can quickly identify regions with high or low economic prosperity and potential policy impact areas.	2	High
Sprint-1	Data Analysis & Visualization	USN-2	As an Economic Researcher, I want to filter economic data by specific years and countries, so that I can conduct in-depth analysis on historical trends and compare performance across different nations.	2	High
Sprint-1	Data Analysis & Visualization	USN-3	As an Investor, I want to see the top 40 and least ranked countries based on their economic index, so that I can identify potential investment opportunities or risks in various markets.	2	High
Sprint-2	Data Ingestion & Management	USN-4	As a User, I want to upload new economic datasets (e.g., CSV, Excel), so that I can incorporate	3	Medium

			the latest information into the analysis and update the index		
Sprint-2	Data Analysis & Visualization	USN-5	As an Economic Researcher, I want to view correlations between economic freedom and indicators like unemployment rate and GDP growth, so that I can understand the multifaceted impacts of economic policies.	4	High
Sprint-3	Reporting & Export	USN-6	As a User, I want to export visualizations (e.g., charts, maps) as image files, so that I can easily include them in presentations or reports.	4	Medium
Sprint-3	User Management & Authorization	USN-7	As an Administrator, I want to manage user accounts and roles, so that I can access levels to sensitive data and functionalities.	3	High

Project Tracker, Velocity & Burndown Chart:

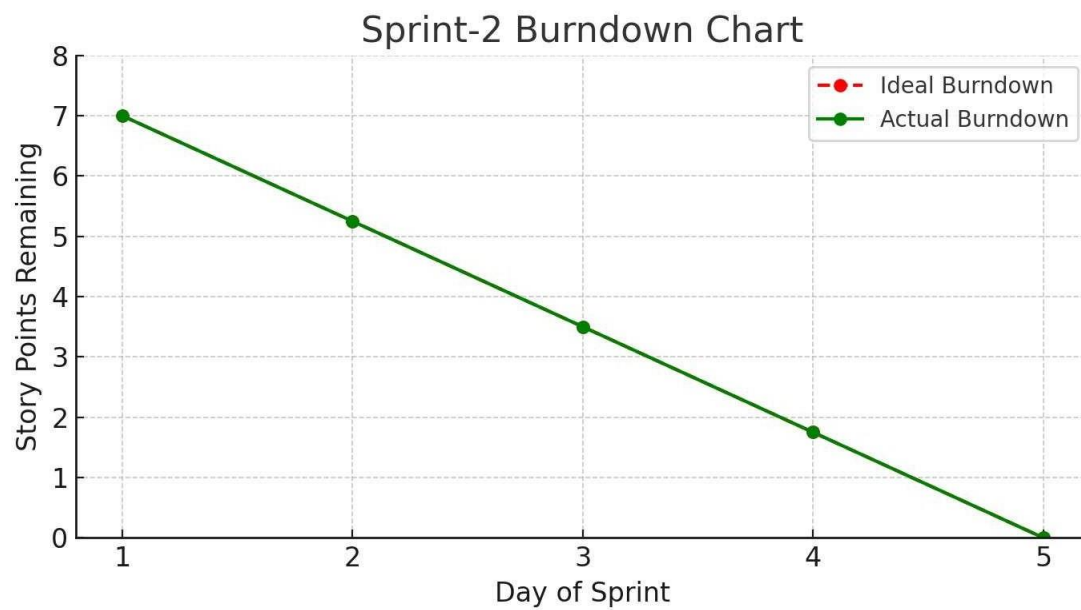
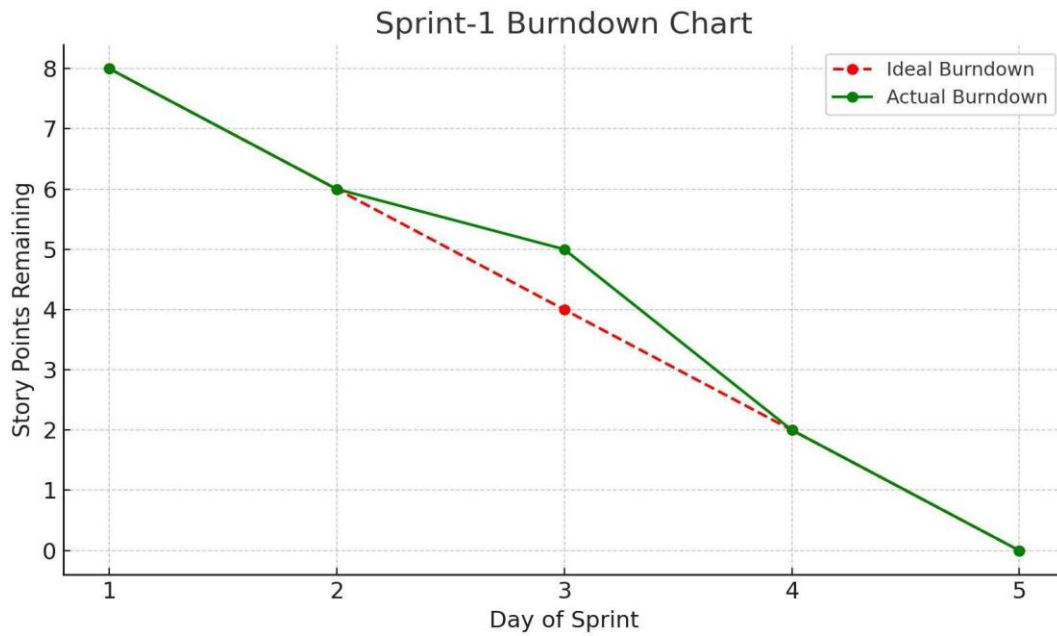
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	6	5 Days	16 June 2025	21 June 2025	6	21 June 2025
Sprint-2	7	5 Days	21 June 2025	25 June 2025	7	25 June 2025
Sprint-3	7	5 Days	25 June 2025	30 June 2025		

Velocity:

Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

$$AV = \text{sprint duration} / \text{velocity} = 15 / 10 = 1.5$$

Burndown Chart:



6. FUNCTIONALANDPERFORMANCETESTING

6.1 PerformanceTesting

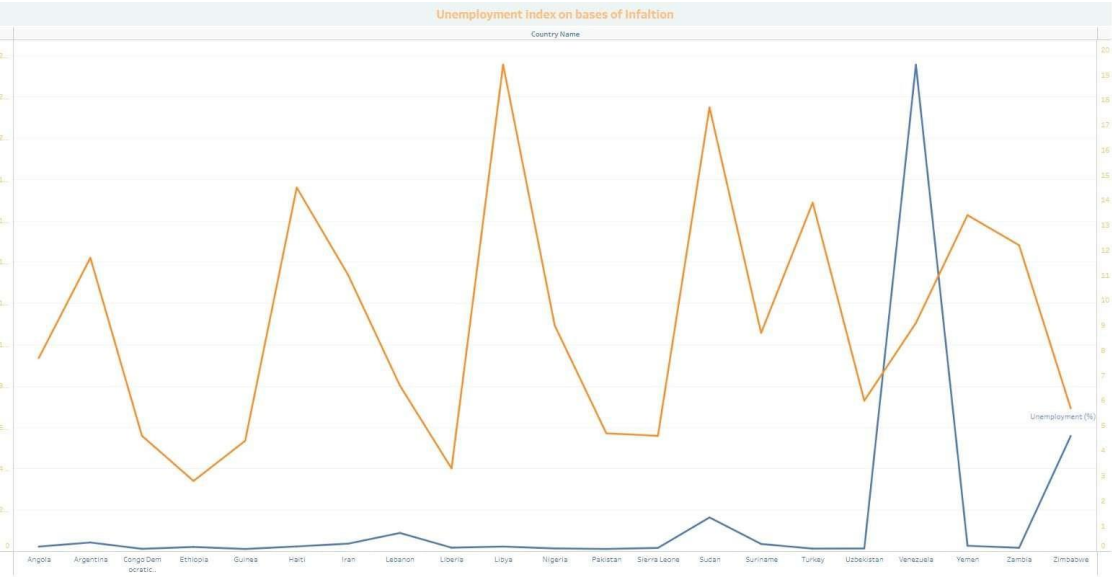
ModelPerformanceTesting:

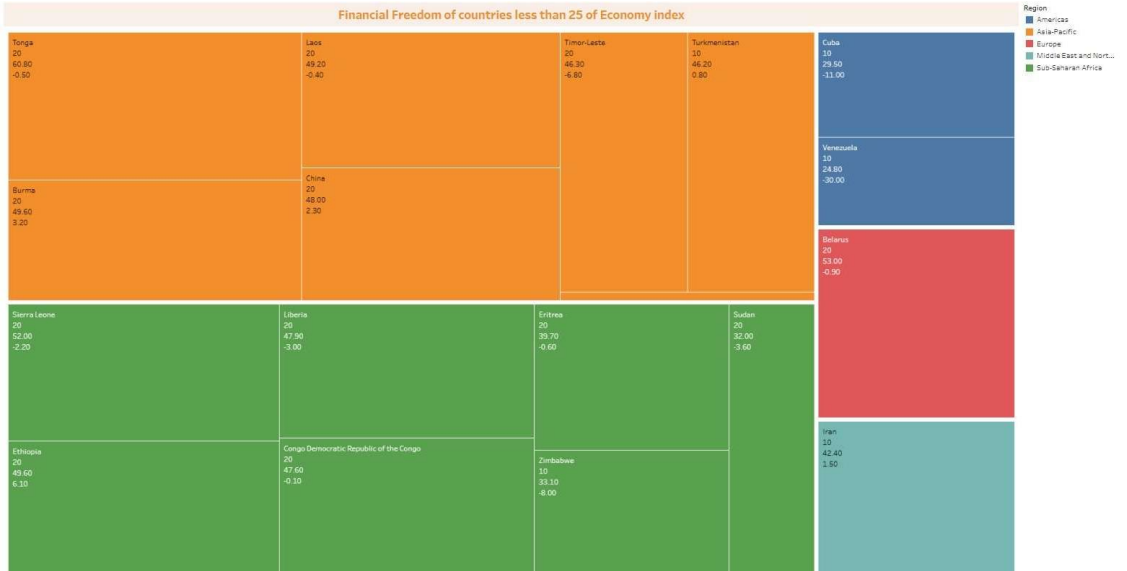
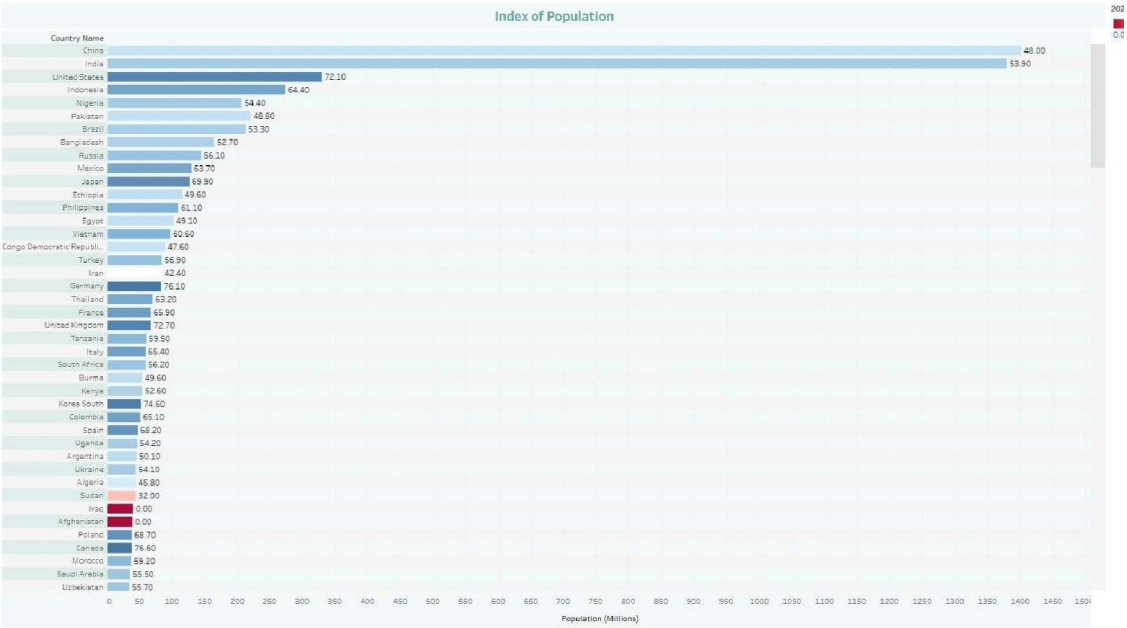
Projectteamshallfillthefollowinginformationinmodelperformancetestingtemplate.

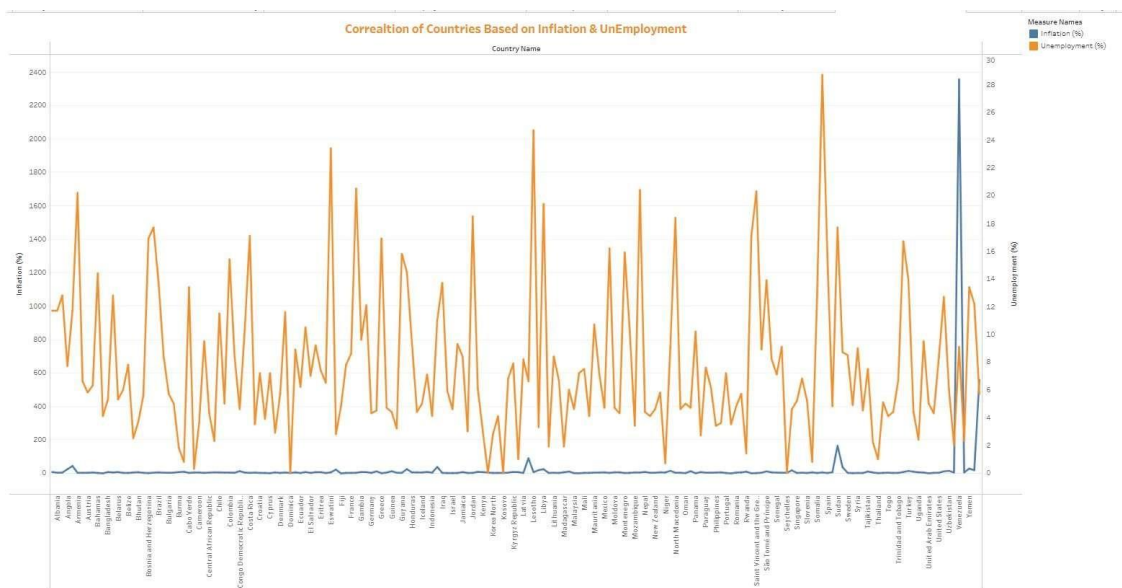
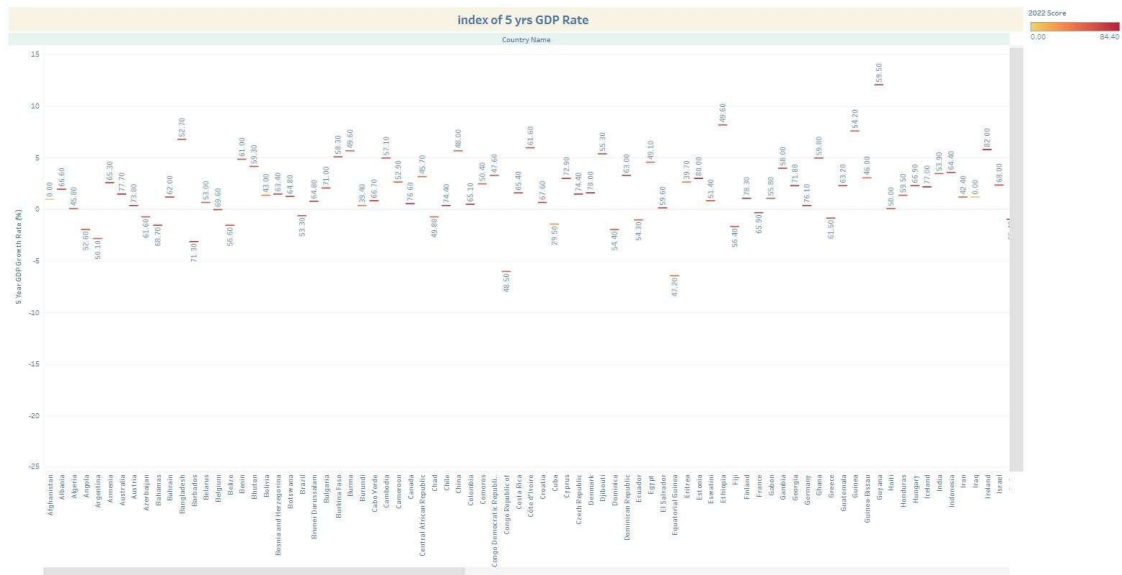
S.No.	Parameter	Screenshot/Values
-------	-----------	-------------------

1.	DataRendered	<p>The dashboard renders comprehensive country-level economic data including:</p> <ul style="list-style-type: none"> - EconomicScore/Index - CountryIDandCountryName - 5-YearGDPGrowthRate - Business Freedom, Corporate Tax Rate (%), FDI Inflow (Millions),FinancialFreedom,FiscalHealth, GDP (Billions), GDP Growth Rate (%), GDP per Capita (PPP), Government Integrity,GovernmentExpenditure(%ofGDP,Government Spending, Income Tax Rate (%), Inflation (%), Index of Population, Unemployment (%). -Thedataappearstocovermultipleyears,showingtrends and comparisons across a wide range of countries
2.	DataPreprocessing	<p>Preprocessinglikelyinvolved:</p> <ul style="list-style-type: none"> - DataCleaning:Handlingmissingvalues,correcting inconsistencies, and standardizing country names. - DataTransformation:Aggregatingdatatospecific years or regions, potentially calculating the composite EconomicFreedomIndexfromitsconstituentcomponents. - Geographic Data Preparation: Ensuring country names are recognized by Tableau for mapping. - FeatureEngineering:Creatingcalculatedfieldssuch as "5 Year GDP GrowthRate" or specific "Economic Score" components if not directly present in the raw data.
3.	UtilizationofFilters	<p>Thedashboardextensivelyusesfiltersandinteractive elements:</p> <ul style="list-style-type: none"> - CountryNameFilter:Allowsuserstoselectspecific countries for focused analysis. - MeasuresFilter:Toselectdifferenteconomic indicators (e.g., Inflation, Unemployment, GDP) for visualization and correlation. - YearSlider/Filter:Tochangetheyearforwhichthe data is displayed on the map and other charts. - InteractiveMapSelection:Clickingoncountrieson the map appears to filter other related views

4.	Calculation fields Used	<p>Based on the metrics and visualizations, the following calculated fields are likely used:</p> <ul style="list-style-type: none"> - Economic Score/Index: A composite score derived from various sub-indicators of economic freedom. - 5 Year GDP Growth Rate: Likely a calculation based on GDP values over a five-year period. - Rankings: Calculated fields to determine and display the "Top 40 countries rank of Economy" and "Least ranked countries of economic index." - Region Groupings: Possibly a calculated field to group countries into broader regions for high-level analysis.
5.	Dashboard design	<p>No of Visualizations/Graphs –</p> <p>The primary dashboard ("Dashboard 1" / "Global Rankings & Financial Freedom Impact Dashboard") contains at least 5 distinct visualizations/sections</p>
		<ul style="list-style-type: none"> - Choropleth Map (e.g., "Visualizing Economic Freedom and Instability Around the World") - Correlation Chart (e.g., "Correlation of Countries Based on Inflation & Unemployment") - Horizontal Bar Chart (e.g., "Index of Population") - "Insights Overview" Text Box - "Top 40 Countries rank of Economy" bar/map chart - "Countries Less Than 25 of Economy Index" (potentially a tree map or similar chart)







Visualizing Economic Freedom and Instability Around the World

NXT DASBO...

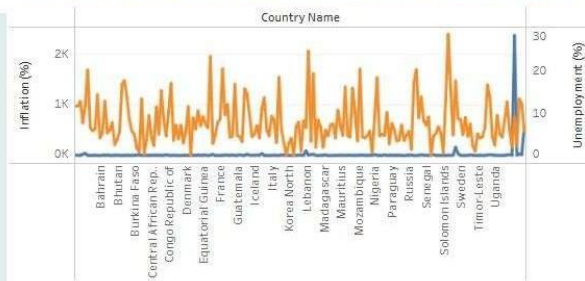
Country wise 2002 Economic score



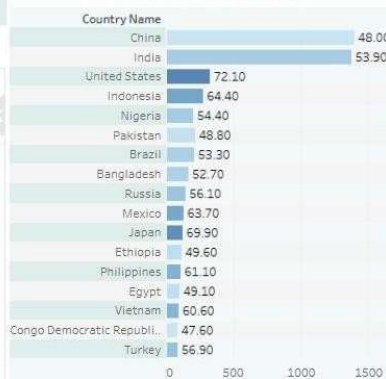
Least ranked contries of Economic index



Correlation of Countries Based on Inflation & UnEmployment



Index of Population



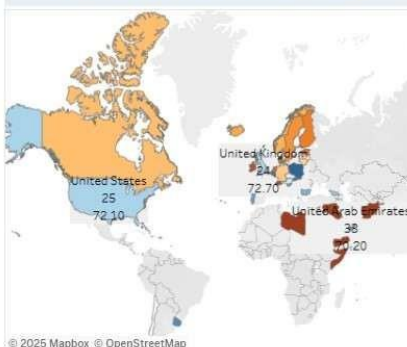
INSIGHTS OVERVIEW :

- Countries like the United States, Sweden, and Australia scored high in economic freedom and stability.
- Venezuela, Algeria, and Central African Republic show poor economic index scores due to high inflation and unemployment rates.
- China, India, and the U.S. lead in population, influencing their economic impact and policy priorities.

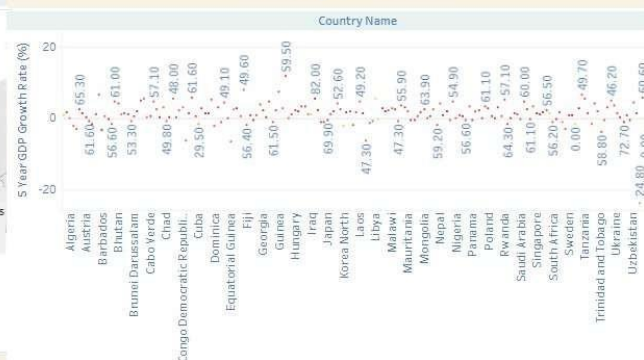
Global Rankings & Financial Freedom Impact Dashboard

TO STORY

Top 40 Countries rank of Economy



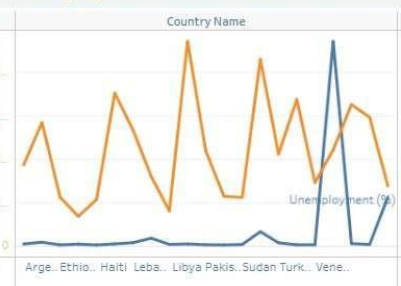
index of 5 yrs GDP Rate



Financial Freedom of countries less than 25 of Economy index



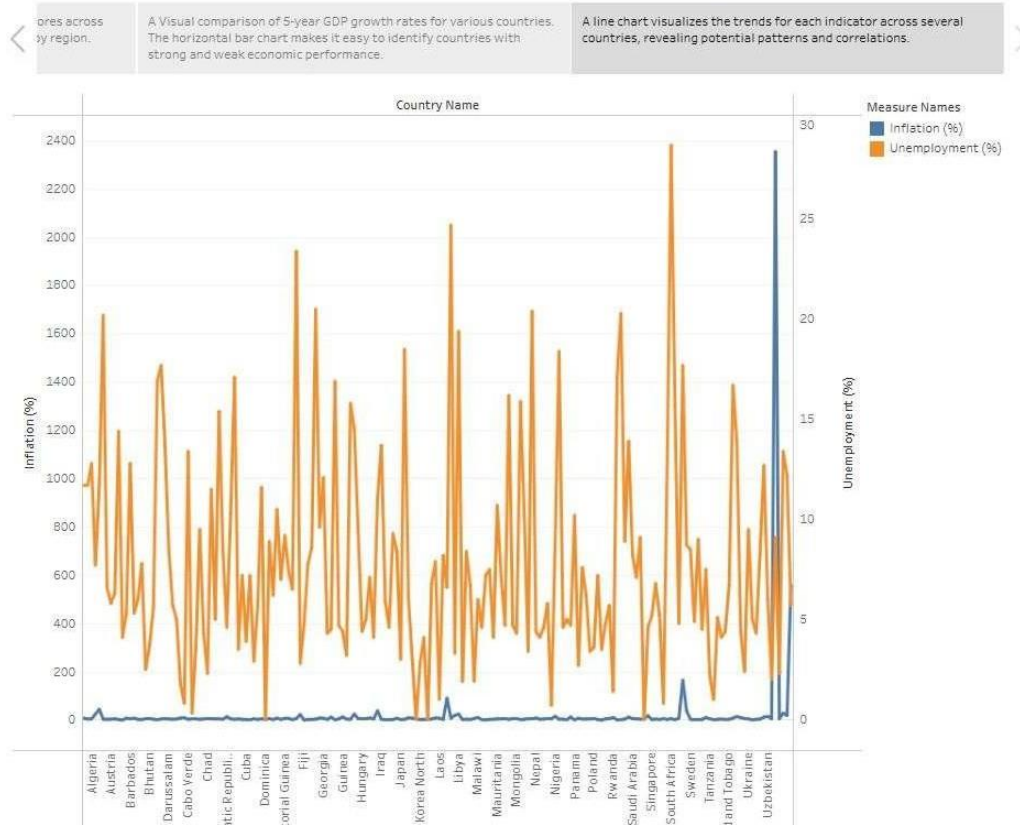
Unemployment index on bases of Inflation



INSIGHTS OVERVIEW :

- Top 40 countries are identified by economic index, with higher rankings seen in North America and parts of Europe and Asia.
- 5-year GDP growth trends reveal uneven growth - some nations show strong improvement, while others face economic slowdown.
- Inflation and unemployment trends show strong interdependency, especially in countries with economic instability.

Journey Through the 2002 Global Economy



8. ADVANTAGES&DISADVANTAGES

Advantages

- Data-Driven Insights**
 Empowers users to make informed decisions using real-time, evidence-based economic indicators.
- Interactive Visualization**
 User-friendly dashboards allow for filtering by year, country, and economic subindices, making analysis accessible to non-technical users.
- Multi-Stakeholder Utility**
 Useful to policymakers, researchers, investors, and students alike, each gaining insights specific to their objectives.
- Customizable & Scalable**
 The modular architecture allows easy integration of new datasets, indicators, or visualization layers.

5. **Open-Source&Cost-Efficient**

Built using open-source tools like Python, Plotly, and Streamlit, reducing development and deployment costs.

Disadvantages

1. **DataSourceDependency**

The analysis is limited to the scope and accuracy of available datasets like those from the Heritage Foundation or World Bank.

2. **LimitedReal-TimeUpdates**

Economic freedom indices are not updated frequently, which may affect relevance for real-time policy decisions.

3. **TechnicalBarriersforNon-DigitalUsers**

Despite being user-friendly, some stakeholders without digital literacy may find the platform less accessible.

4. **InfrastructureLimitations**

Hosting and processing large datasets or high user traffic could require scaling the cloud infrastructure, leading to additional costs.

9. CONCLUSION:

The project “Measuring the Pulse of Prosperity: An Index of Economic Freedom Analysis” successfully demonstrates the power of data analytics and visualization in transforming static economic data into meaningful, actionable insights. By leveraging open-source tools and interactive dashboards, the platform bridges the gap between complex economic indicators and userfriendly interpretation.

This solutionempowers policymakers,researchers,andinvestors toexplore global economic trends, identify policy gaps, and make evidence-based decisions. The integration of filtering, correlation analysis, and exportable visualizations enhances the usability and adaptability of the system across various domains.

Through this initiative, we’ve laid a scalablefoundation for deeper exploration of how economic freedom shapes prosperity—enabling smarter governance, more informed investment, and a clearer understanding of global economic landscapes.

10. FUTURESCOPE

- Integration of Real-Time Economic Indicators
Future versions of the platform can incorporate APIs for real-time data (e.g., GDP updates, inflation, employment) to enhance the system's relevance for ongoing policy and market analysis.
- Expanded Dataset Coverage
The project can be extended to include regional/state-level data, enabling microeconomic analysis within countries and more localized policymaking insights.
- Machine Learning-Based Forecasting
Implementing predictive models can help forecast future economic freedom scores or prosperity indicators based on historical patterns and current inputs.
- User Personalization and Notifications
Future iterations could allow user accounts with saved filters, email alerts for new reports, or policy shifts relevant to selected countries.

11. APPENDIX

Dataset Link:

<https://drive.google.com/file/d/1EBIa1LtM3Ni2Uh3nekLB6wt3263Q3NeX/view>

GitHub & Project Demo Link:

Project Demo Link:

https://drive.google.com/file/d/1mPykltU0Re_wQskX8pLeGzyymVJfxZ2q/view?usp=sharing