Project Report

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

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1. INTRODUCTION

1.1 Project Overview

Economic freedom plays a criΘcal role in determining a country's prosperity, compeΘΘveness, and the overall well-being of its ciΘzens. However, while numerous datasets and reports exist, there is a gap in interacΘve and comparaΘve tools that make this informaΘon accessible and acΘonable for diverse stakeholders.

This project aims to analyse and visualize the Index of Economic Freedom across mulΘple countries to provide insights into the relaΘonship between economic policies and naΘonal prosperity. Using staΘsΘcal analysis, data visualizaΘon techniques, and real-Θme filtering capabiliΘes, the plaŋorm enables policymakers, researchers, investors, and the general public to explore key economic indicators in an intuiΘve and meaningful way.

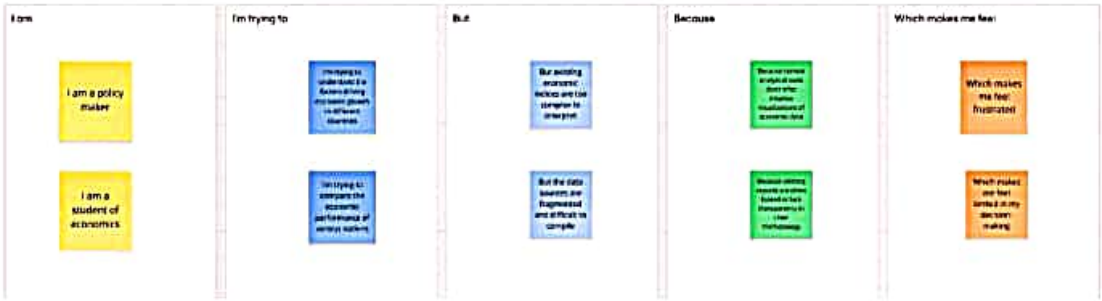
The soluΘon integrates data ingesΘon, processing, and visualizaΘon in a modular architecture, offering features like global freedom heatmaps, year-wise trends, top/boΣom ranked countries, and correlaΘon analysis with other socio-economic metrics like GDP and unemployment rates. This project bridges the 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 plaɳorm that enables the analysis and visualizaΘon of the Index of Economic Freedom across different countries and Θme periods. This iniΘaΘve seeks to empower policymakers, researchers, and investors by providing them with acΘonable insights into how economic freedom influences prosperity, governance, and development. By transforming complex datasets into interacΘve dashboards and comparaΘve tools, the project promotes informed decision-making, encourages transparency in economic policies, and supports academic and insΘtuΘonal research. UlΘmately, the soluΘon aspires to highlight global economic paΣerns and guide strategic reforms aimed at enhancing economic liberty and growth.

2. IDEATION PHASE

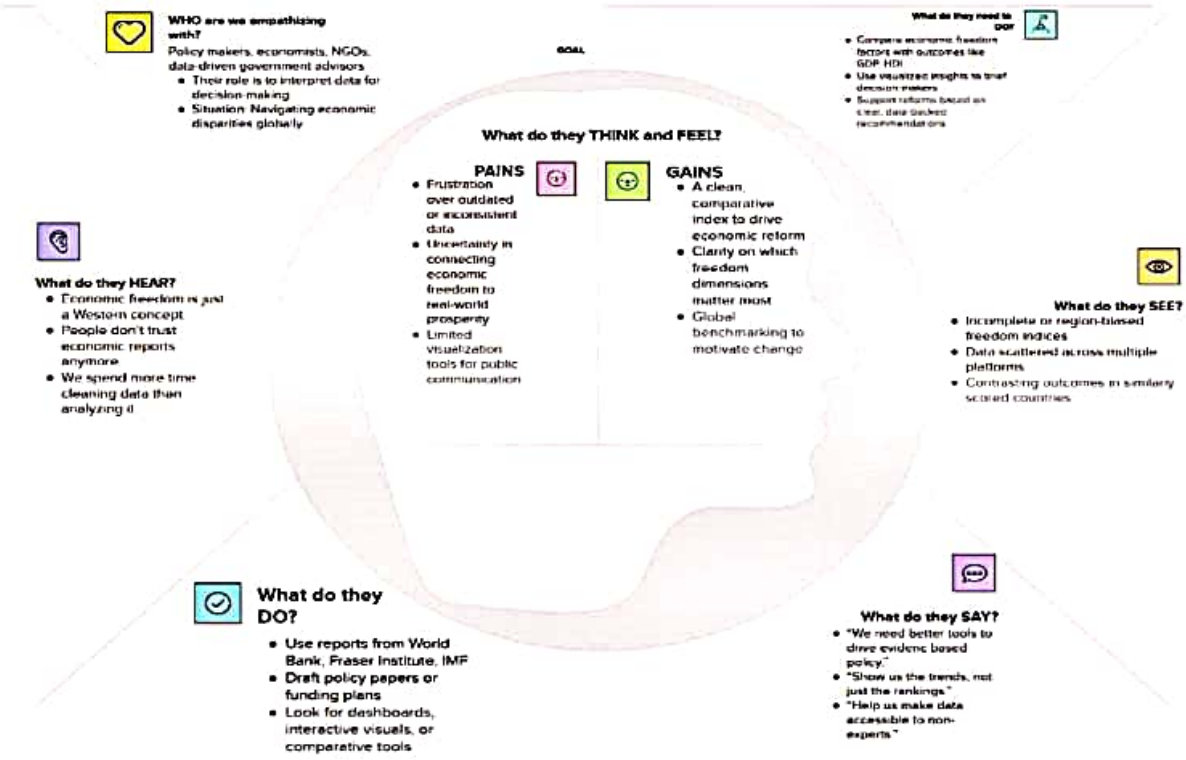
2.1 Problem Statement



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

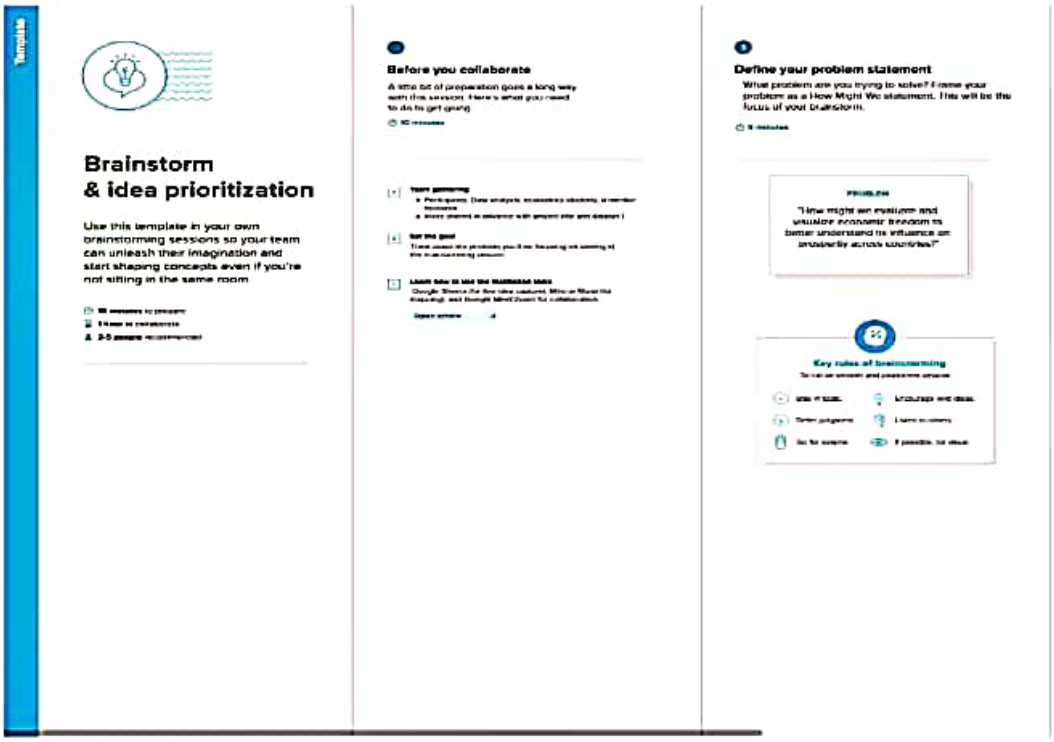
PS-1	a policymaker	understand the drivers of economic prosperity in different naƟons to formulate effecƟve policies.	exisƟng economic indices are oŌen too complex, lack Ɵmely updates.	there's a need for a comprehensive, easily digesƟble, and regularly updated index that integrates various dimensions of economic freedom.	frustrated and uncertain about the opƟmal policy choices.
PS-2	an economic researcher	idenƟfy clear correlaƟons between economic freedom and socioeconomic outcomes for academic analysis.	current data sources are fragmented, inconsistent, and difficult to compare across different countries and Ɵme 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 collecƟon and analysis, and limited in drawing robust conclusions.

2.2 Empathy Map Canvas

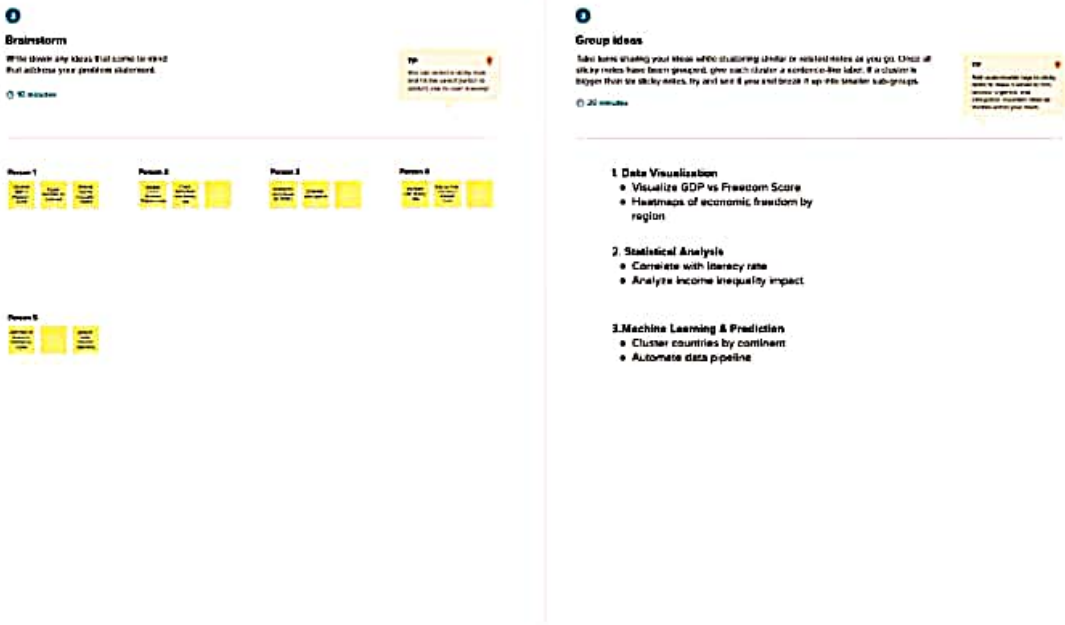


2.3 Brainstorming

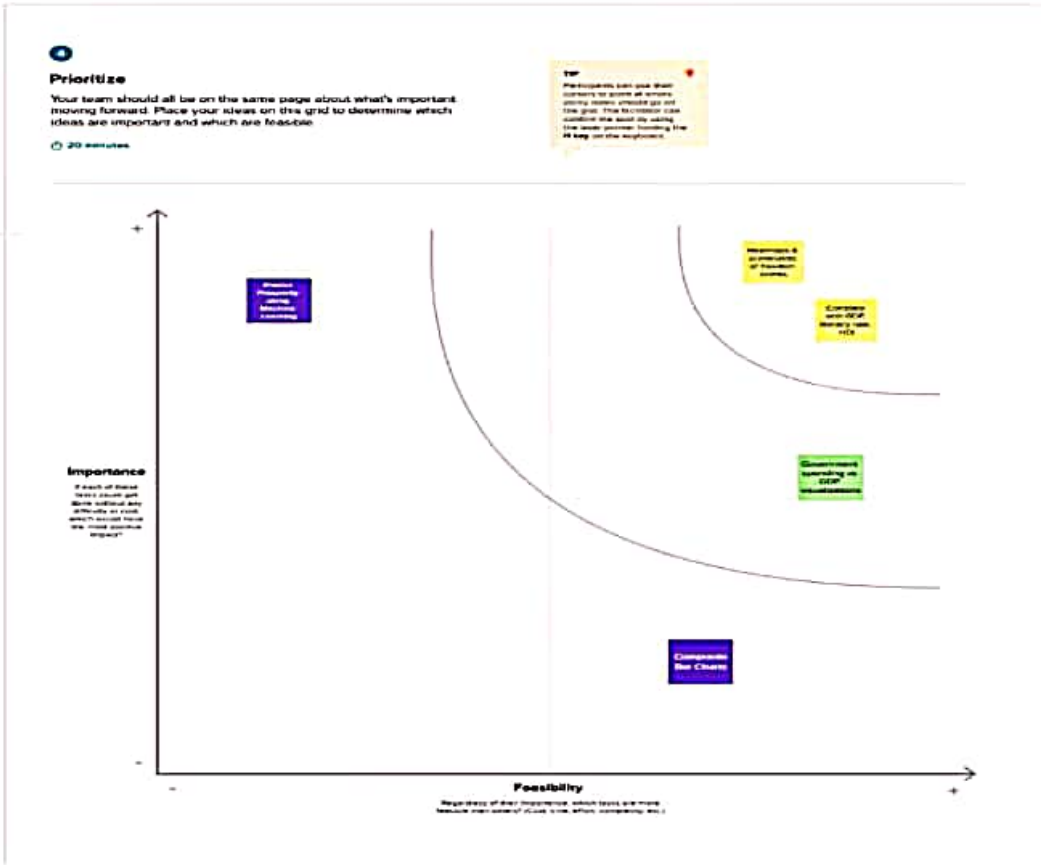
Step-1: Team Gathering, CollaboraƟon and Select the Problem Statement



Step-2: Brainstorm, Idea LisƟng and Grouping



Step-3: Idea PrioriƟzaƟon



3. REQUIREMENT ANALYSIS

3.1 Customer Journey map

Stage	AcƟons	Thoughts	Touchpoints	Pain Points
Discovery	Learns about the plaŋorm via seminar, academic circles, or reports.	"Is there a tool that shows how economic freedom affects prosperity?"	University portals, policy newsleΣers, GitHub, search engines	Lack of accessible and reliable visualizaƟon tools
Access	Visits the plaŋorm and browses the landing page.	"Is this data recent? Can I trust the source?"	Web interface, data source links (e.g., Heritage FoundaƟon)	Trust in data, understanding source credibility
InteracƟon	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 SoluΘon Requirement

FuncΘonal Requirements:

Following are the funcΘonalrequirements of the proposed soluΘon.

FR No.	FuncΘonal Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User RegistraΘon	RegistraΘon through Form RegistraΘon through Gmail RegistraΘon through LinkedIn
FR-2	User ConfirmaΘon	ConfirmaΘon via Email ConfirmaΘon via OTP
FR-3	Data IngesΘon & Management	Upload Dataset (e.g., CSV, Excel, from external APIs) Data ValidaΘon and Cleaning Data Storage and OrganizaΘon (e.g., database)
FR-4	Economic Freedom Index CalculaΘon	Define and Configure Index Components Apply WeighΘng Schemes (configurable by user/admin) Calculate Composite Index Scores for countries/regions
FR-5	Data Analysis & VisualizaΘon	Generate InteracΘve Charts (e.g., Bar, Line, ScaΣer, Bubble) Create Geographic VisualizaΘons (e.g., Choropleth Maps) Provide Trend Analysis over Time Enable Comparison between Countries/Regions Display CorrelaΘon Matrices between indicators
FR-6	ReporΘng & Export	Generate Customizable Reports (e.g., PDF, HTML) Export Raw and Processed Data (e.g., CSV, Excel) Export VisualizaΘons (e.g., Image formats like PNG, JPEG)
FR-7	User AuthenΘcaΘon & AuthorizaΘon	User Login/Logout Role-based Access Control (e.g., Admin, Analyst, Viewer)
FR-8	Search & Filter FuncΘonality	Search by Country Name, Year, Index Component Filter Data by various criteria (e.g., region, income level)

Non-funcϴonal Requirements:

Following are the non-funcϴonalrequirements of the proposed soluϴon.

FR No.	Non-FuncϴonalRequirement	DescripϴOn
NFR-1	Usability	The system should have an intuiϴve and userfriendly interface, allowing users to easily navigate, interact with data, and interpret results without extensive training.
NFR-2	Security	The system must protect sensiϴve user data (if any) and ensure the integrity and confidenϴality of the economic data. This includes secure authenϴcaϴon, authorizaϴon, and protecϴon against unauthorized access or data breaches.
NFR-3	Reliability	The system should consistently perform its funcϴons accurately and without significant errors. Data calculaϴons, visualizaϴons, and report generaϴon should be reliable and repeatable.
NFR-4	Performance	The system should respond quickly to user requests, especially during data processing, index calculaϴon, and visualizaϴon generaϴon, even with large datasets. Data loading and rendering ϴmes should be minimal.
NFR-5	Availability	The system should be accessible to authorized users whenever needed, with minimal downϴme. This includes consideraϴons for server upϴme, 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 addiϴonal features without significant degradaϴon 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, calculaϴons, and visualizaϴons to reflect reliable economic insights.

3.3 Data Flow Diagram

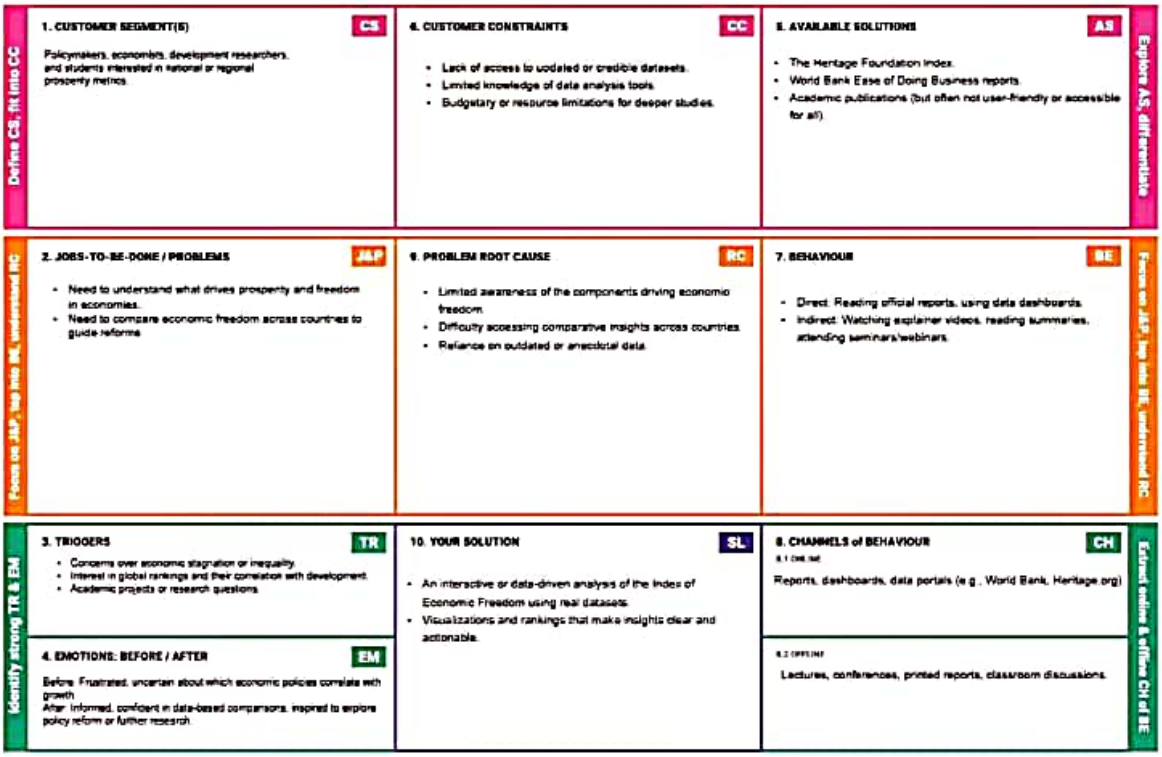
User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Policymaker	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.	The map correctly displays economic freedom scores, and I can identify regions visually.	High	Sprint-1
Economic Researcher	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.	I can apply filters for years and countries, and the data displayed updates accordingly.	High	Sprint-1
Investor	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.	The list of top and least ranked countries is accurate and easily accessible.	High	Sprint-1
User	Data Ingestion & Management	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 & 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.	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	As a User, I want to export visualizations (e.g., charts, maps) as image files, so	I can export displayed visualizations	Mediu m	Sprint-1
User Type	FunctionUser al Story RequiremNumb ent (Epic)er		User Story / Task	Accep tan c e criteria	Priorit y	Releas e
			that I can easily include them in presentations or reports.	as image files (e.g., PNG, JPEG).		
Administrat or	User Managem ent & Authorizati on	USN-7	As an Administrator, I want to manage user accounts and roles, so that I can access levels to sensitive data and functionalities.	Ican add, edit, and remove users, and assign.	High	Sprint-1

4. PROJECT DESIGN

4.1 Problem SoluΘonFit



4.2 Proposed SoluƟon

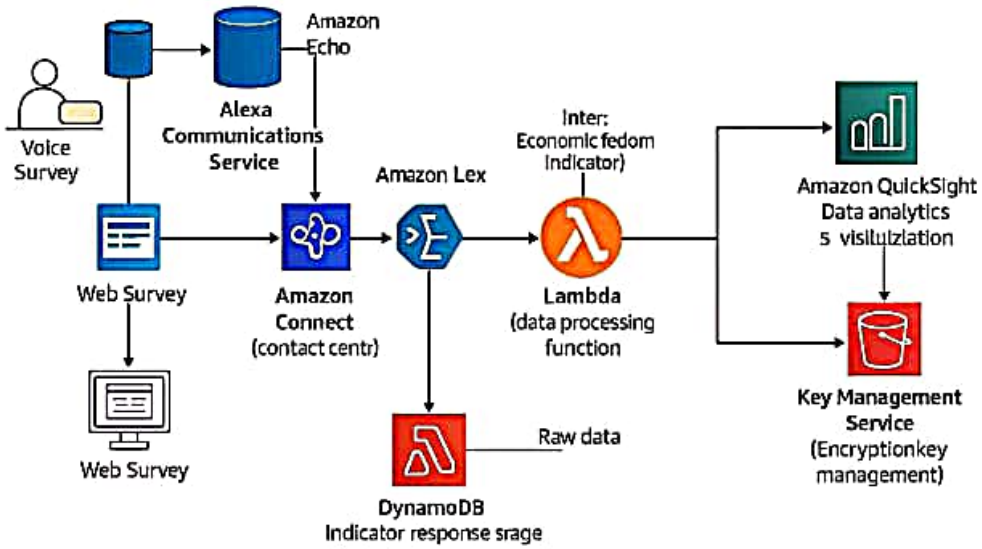
Proposed SoluƟon Template:

Projectteam shall fillthe following informaƟon in the proposed soluƟon template

S.No.	Parameter	DescripƟon
1.	Problem Statement (Problem to be solved)	Despite the availability of macroeconomic data, policymakers and researchers lack a clear, accessible method to evaluate how economic freedom correlates with prosperity.
2.	Idea / SoluƟon descripƟon	The project analyses the Economic Freedom Index using data visualizaƟon and comparaƟve analysis tools. It offers clear dashboards, insights, and recommendaƟons across countries
3.	Novelty / Uniqueness	While reports exist, this soluƟon provides an interacƟve, comparaƟve, and visually rich plaƞorm combining mulƟple data dimensions useful for academia and policy
4.	Social Impact / Customer SaƟsfacƟon	Informed ciƟzens, beΣer policy decisions, and transparency in economic governance. This tool helps idenƟfy reforms needed to enhance freedom and economic performance.
5.	Business Model (Revenue Model)	Can be offered as a freemium tool for students/researchers, with advanced insights and country reports available via subscripƟon for insƟtuƟons, think tanks, or NGOs.
6.	Scalability of the SoluƟon	Can be extended to include regional/state-level indices, Ɵme-series trends, or integraƟon with other indicators (e.g., Human Development Index, CorrupƟon PercepƟon Index).

4.3 SoluƟon Architecture

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



5. PROJECT PLANNING & SCHEDULING

5.1ProjectPlanning

Sp rin t	F un ctio n al Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority
Sprint-1	DataAnalysis & 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:

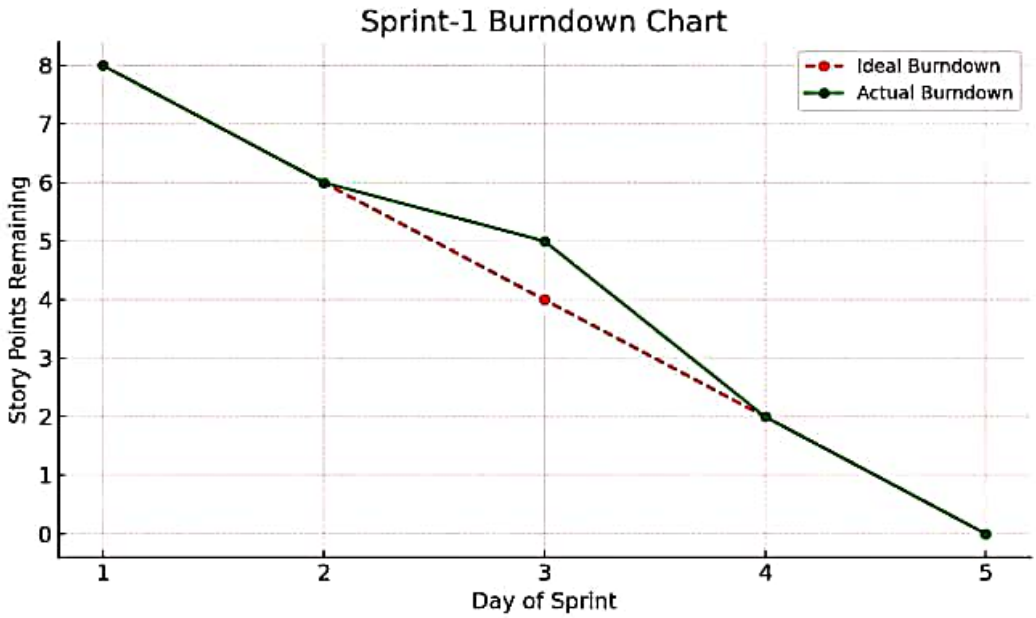
Sp rin t	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	6	5 Days	16 June 2025	21June 2025	6	21 June 2025
Sprint-2	7	5 Days	21June 2025	25 June 2025	7	25 June 2025
Sprint-3	7	5 Days	25 June 2025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

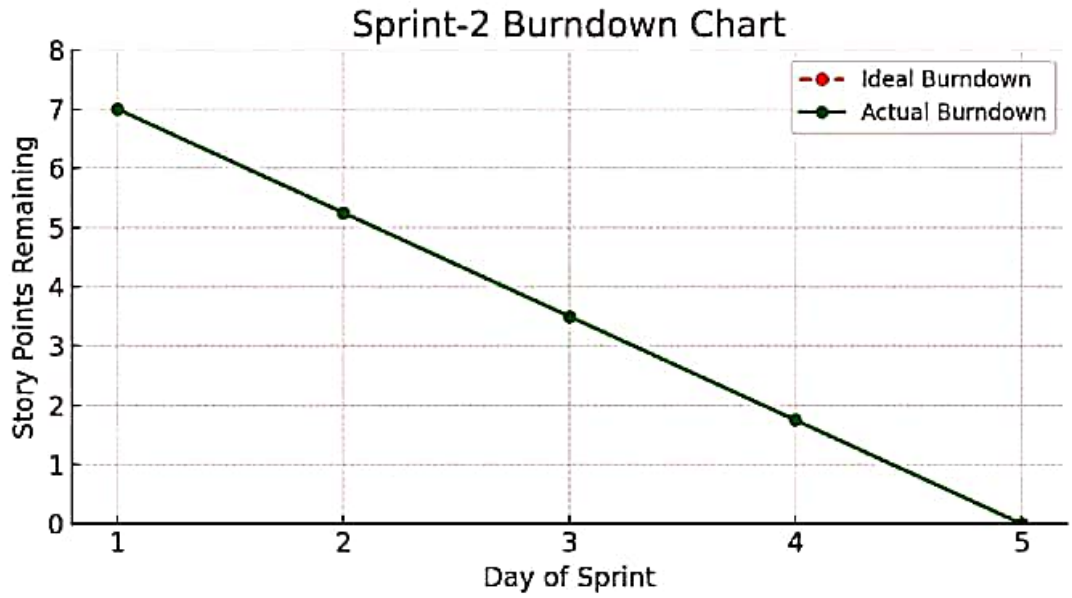
Velocity:

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 = sprint duraϴon/velocity =15/10=1.5

Burndown Chart:





6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance TesΘng

Model Performance TesΘng:

Projectteam shallfill the following informaΘon in model performance tesΘng template.

S.No.	Parameter	Screenshot / Values

1.	Data Rendered	The dashboard renders comprehensive country-level economic data including: - Economic Score/Index - Country ID and Country Name - 5-Year GDP Growth Rate - Business Freedom, Corporate Tax Rate (%), FDI Inflow (Millions), Financial Freedom, Fiscal Health, GDP (Billions), GDP Growth Rate (%), GDP per Capita (PPP), Government Integrity, Government Expenditure (%) of GDP, Government Spending, Income Tax Rate (%), InflaƟon (%), Index of PopulaƟon, Unemployment (%). -The data appears to cover mulƟple years, showing trends and comparisons across a wide range of countries

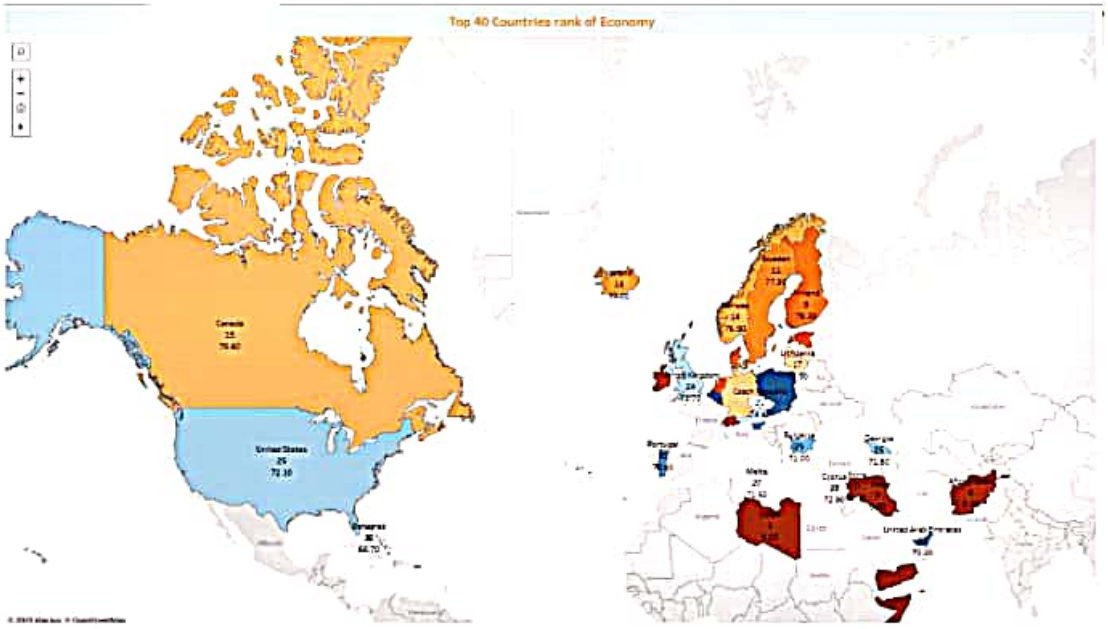
2.	Data Preprocessing	Preprocessing likely involved: - Data Cleaning: Handling missing values, correcƟng inconsistencies, and standardizing country names. - Data TransformaƟon: AggregaƟng data to specific years or regions, potenƟally calculaƟng the composite Economic Freedom Index from its consƟtuent components. - Geographic Data PreparaƟon: Ensuring country names are recognized by Tableau for mapping. - Feature Engineering: CreaƟng calculated fields such as "5 Year GDP Growth Rate" or specific "Economic Score" components if not directly present in the raw data.
3.	UƟlizaƟon of Filters	The dashboard extensively uses filters and interacƟve elements: - Country Name Filter: Allows users to select specific countries for focused analysis. - Measures Filter: To select different economic indicators (e.g., InflaƟon, Unemployment, GDP) for visualizaƟon and correlaƟon. - Year Slider/Filter: To change the year for which the data is displayed on the map and other charts. - InteracƟve Map SelecƟon: Clicking on countries on the map appears to filter other related views

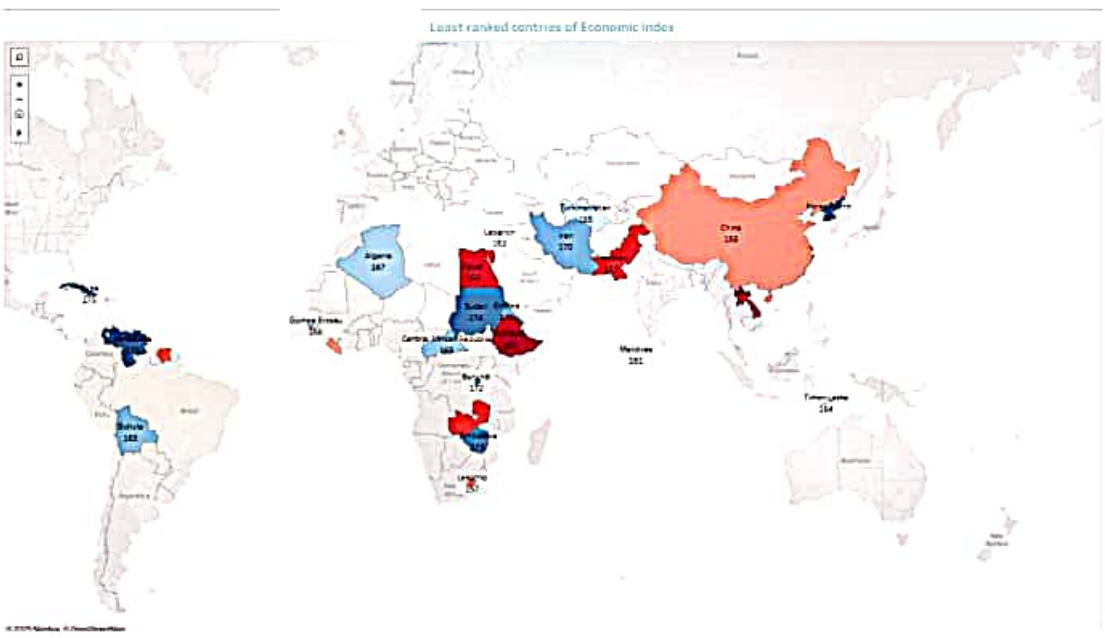
4.	CalculaƟon fields Used	Based on the metrics and visualizaƟons, the following calculated fields are likely used: - Economic Score/Index: A composite score derived from various sub-indicators of economic freedom. - 5 Year GDP Growth Rate: Likely a calculaƟon based on GDP values over a five-year period. - 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	No of VisualizaƟons / Graphs – The primary dashboard ("Dashboard 1" / "Global Rankings & Financial Freedom Impact Dashboard") contains at least 5 disƟnct visualizaƟons/secƟons
		- Choropleth Map (e.g., "Visualizing Economic Freedom and Instability Around the World") - CorrelaƟon Chart (e.g., "CorrelaƟon of Countries Based on InflaƟon & Unemployment") - Horizontal Bar Chart (e.g., "Index of PopulaƟon") - "Insights Overview" Text Box - "Top 40 Countries rank of Economy" bar/map chart -"Countries Less Than 25 of Economy Index" (potenƟally a tree map or similar chart)

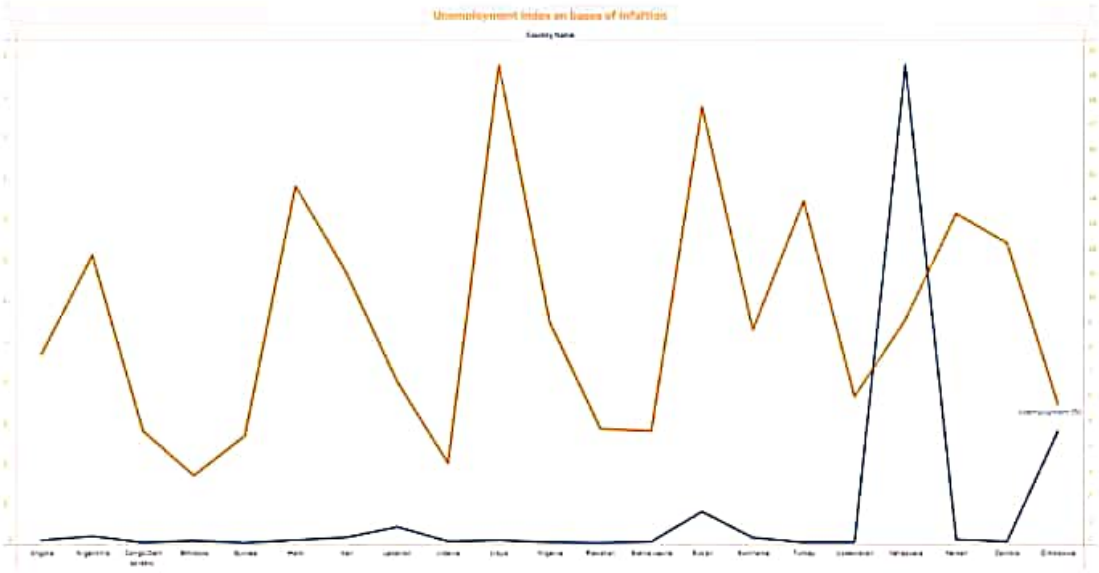
6	Story Design	No of VisualizaƟons / Graphs – The "Story" secƟon ("Journey Through the 2002 Global Economy") explicitly shows 5 story points/pages, each potenƟally containing one or more visualizaƟons: - Story Point 1: World Map of Economic Score. - Story Point 2: Top 40 Countries Rank. - Story Point 3: Least Ranked Countries. - Story Point 4: CorrelaƟon of Countries Based on InflaƟon & Unemployment. - Story Point 5: Index of PopulaƟon. - Story Point 6: Financial Freedom of Countries. - Story Point 7: Index of 5 yrs GDP Rate.

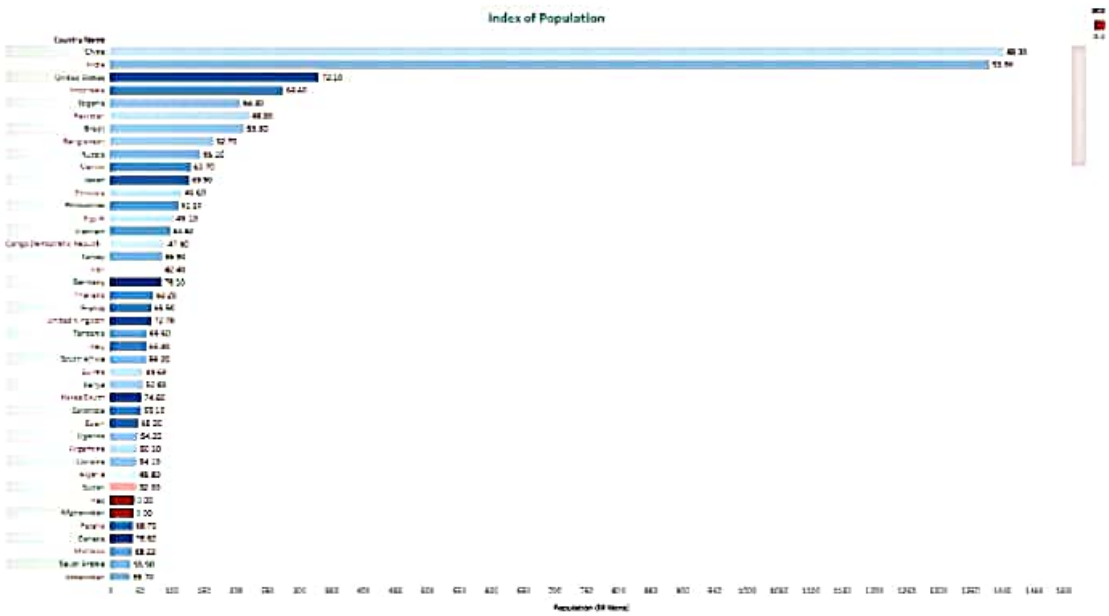
7. RESULTS

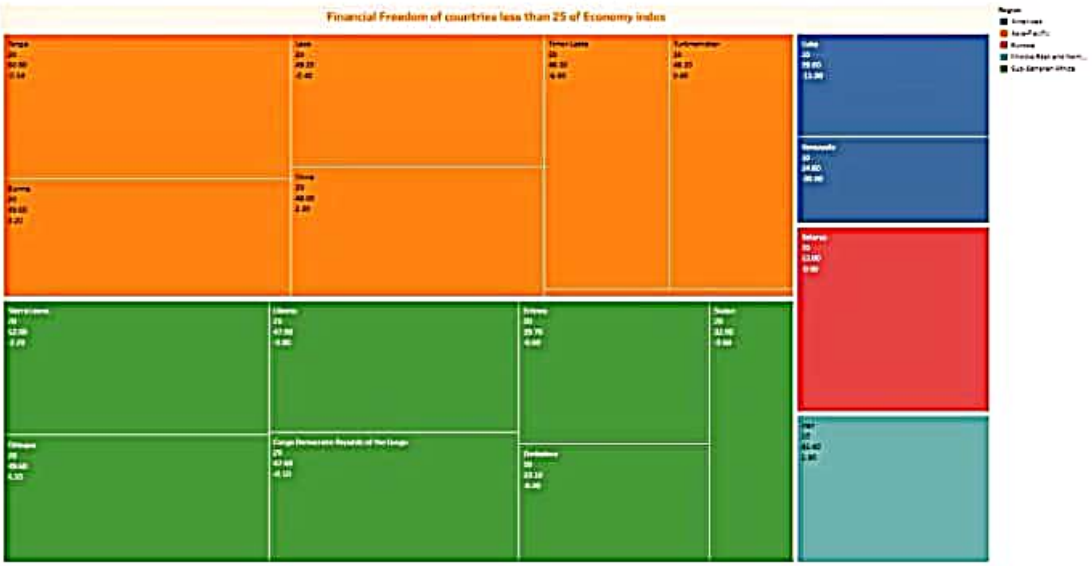
7.1 Output Screenshots

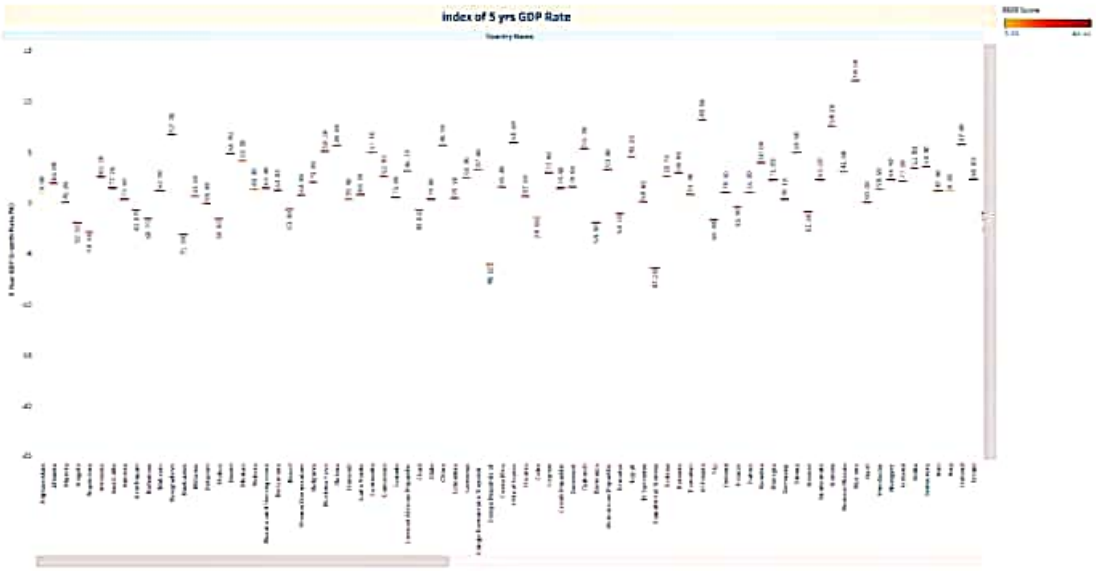

Top 40 Countries rank of Economy

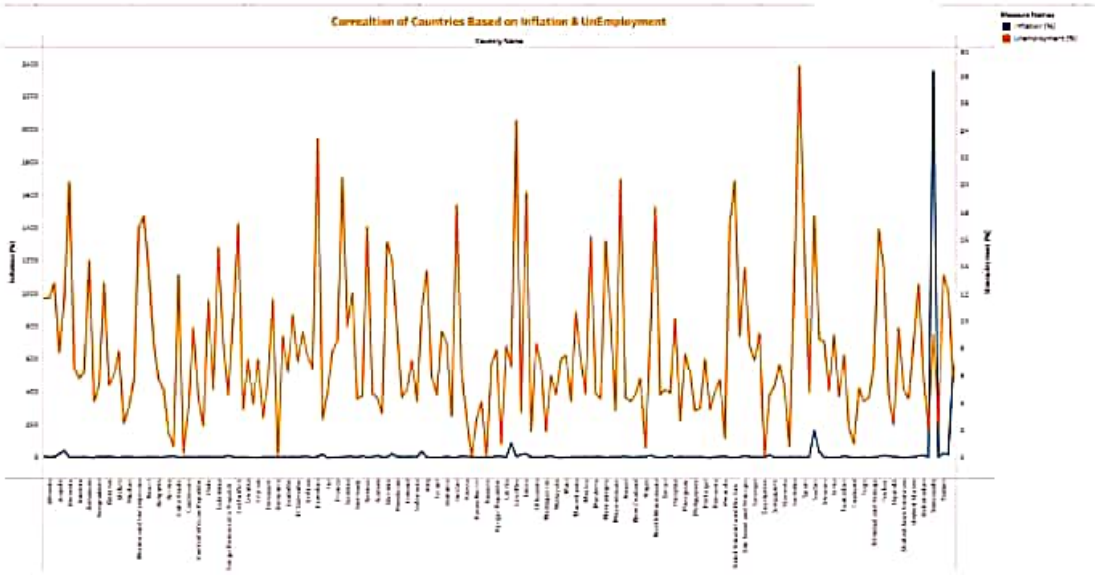

Least ranked contries of Economic index


Unemployment index on bases of inflation


Index of Population
Country Name
China
India
United States
Indonesia
Nigeria
Pakistan
Brazil
Bangladesh
Russia
Mexico
Japan
Ethiopia
Philippines
Egypt
Vietnam
Congo, Democratic Republic of the
Turkey
Iran
Germany
Thailand
France
United Kingdom
Tanzania
Italy
South Africa
Burma
Kenya
United States
Colombia
Spain
Uganda
Argentina
Ukraine
Algeria
Sudan
Iraq
Afghanistan
Poland
Canada
Morocco
Saudi Arabia
Uzbekistan
Population (10 Years)


Financial Freedom of countries less than 25 of Economy index
Region
Asia-Pacific
Europe
Middle East and North...
Sub-Saharan Africa


Index of 5 yrs GDP Rate

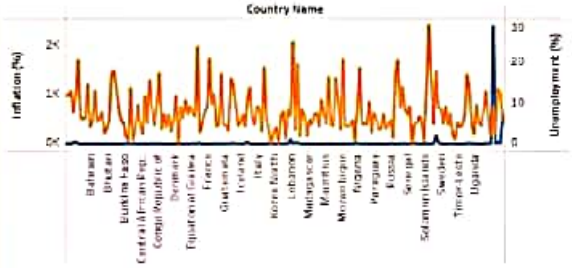

Correaltion of Countries Based on Inflation & UnEmployment

Visualizing Economic Freedom and Instability Around the World

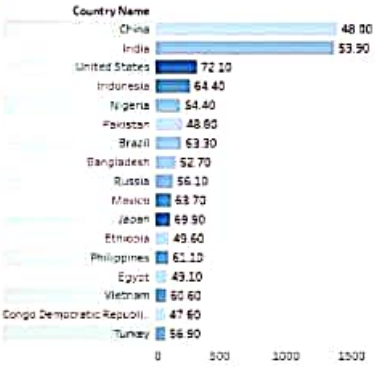
KEY DASBO...

Country wise 2002 Economic score

Correaltion of Countries Based on Inflation & UnEmployment



Index of Population



Least ranked contries of Economic index

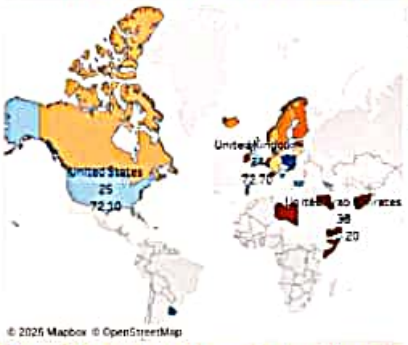
INSIGHTS OVERVIEW :

- 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.

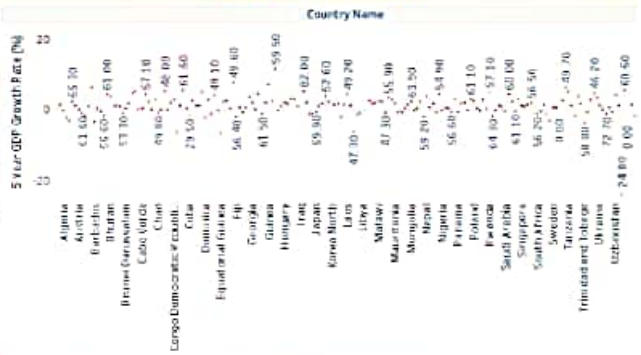
Global Rankings & Financial Freedom Impact Dashboard

TO STORY

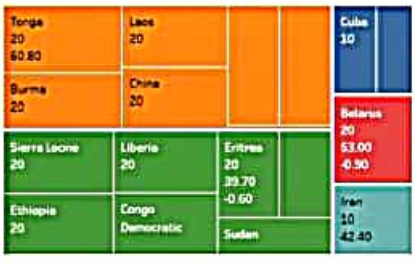
Top 40 Countries rank of Economy



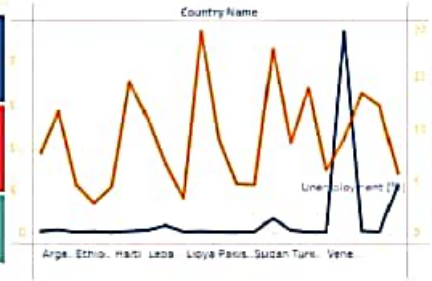
index of 5 yrs GDP Rate



Financial Freedom of countries less than 25 of Economy index

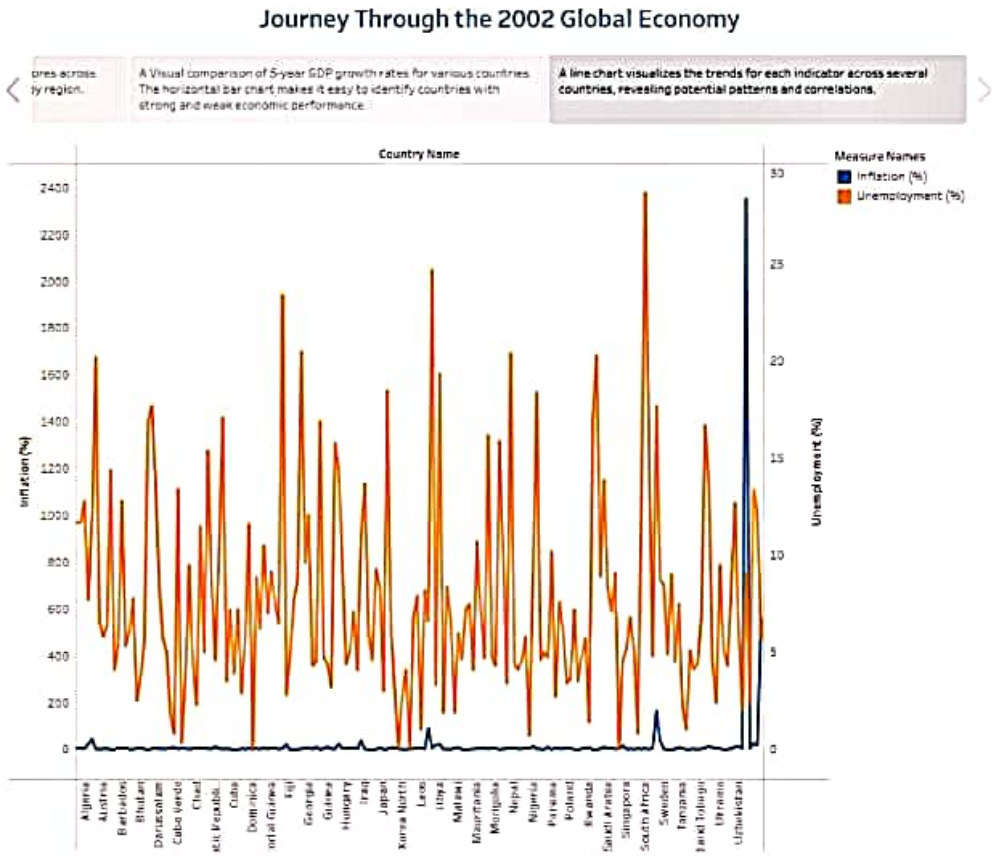


Unemployment index on bases of Infaltion



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.



8. ADVANTAGES & DISADVANTAGES

Advantages

1. Data-Driven Insights

   Empowers users to make informed decisions using real-Θme, evidence-based economic indicators.

2. InteracΘve VisualizaΘon

   User-friendly dashboards allow for filtering by year, country, and economic subindices, making analysis accessible to non-technical users.

3. MulΘ-Stakeholder UΘlity

   Useful to policymakers, researchers, investors, and students alike, each gaining insights specific to their objecΘves.

4. Customizable & Scalable

   The modular architecture allows easy integraΘon of new datasets, indicators, or visualizaΘon layers.

5. Open-Source & Cost-Efficient
   Built using open-source tools like Python, Plotly, and Streamlit, reducing development and deployment costs.

Disadvantages

1. Data Source Dependency
   The analysis is limited to the scope and accuracy of available datasets like those from the Heritage FoundaΘon or World Bank.
2. Limited Real-Time Updates
   Economic freedom indices are not updated frequently, which may affect relevance for real-Θme policy decisions.
3. Technical Barriers for Non-Digital Users
   Despite being user-friendly, some stakeholders without digital literacy may find the plaɳorm less accessible.
4. Infrastructure LimitaΘons
   HosΘng and processing large datasets or high user traffic could require scaling the cloud infrastructure, leading to addiΘonal costs.

9. CONCLUSION:

The project "Measuring the Pulse of Prosperity: An Index of Economic Freedom Analysis" successfully demonstrates the power of data analyΘcs and visualizaΘon in transforming staΘc economic data into meaningful, acΘonable insights. By leveraging open-source tools and interacΘve dashboards, the plaɳorm bridges the gap between complex economic indicators and userfriendly interpretaΘon.

This soluΘon empowers policymakers, researchers, and investors to explore global economic trends, idenΘfy policy gaps, and make evidence-based decisions. The integraΘon of filtering, correlaΘon analysis, and exportable visualizaΘons enhances the usability and adaptability of the system across various domains.

Through this iniΘaΘve, we've laid a scalable foundaΘon for deeper exploraΘon of how economic freedom shapes prosperity—enabling smarter governance, more informed investment, and a clearer understanding of global economic landscapes.

10. FUTURE SCOPE

- IntegraΘon of Real-Time Economic Indicators
  Future versions of the plaŋorm can incorporate APIs for real-Θme data (e.g., GDP updates, inflaΘon, 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 ForecasΘng
  ImplemenΘng predicΘve models can help forecast future economic freedom scores or prosperity indicators based on historical paΣerns and current inputs.
- User PersonalizaΘon and NoΘficaΘons
  Future iteraΘons could allow user accounts with saved filters, email alerts for new reports, or policy shiŌs relevant to selected countries.

11. APPENDIX

Dataset Link:

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

GitHub & ProjectDemo Link:

Project Demo Link:

https://drive.google.com/file/d/1mPyklU0Re_wQskX8pLeGzyymVJfxZ2q/view?usp=sharing