Project Report

1. INTRODUCTION

1.1 Project Overview

This project analyzes the level of economic freedom across nations using the Index of Economic Freedom, published annually by The Heritage Foundation. It evaluates various countries based on 12 quantitative and qualitative factors grouped into four key pillars: Rule of Law, Government Size, Regulatory Efficiency, and Open Markets. Through data visualization in Tableau, this study reveals how economic freedom correlates with national prosperity, investment, labor dynamics, and fiscal health.

1.2 Purpose

The purpose of this project is to measure and visualize the dynamics of economic freedom globally to better understand what fosters national prosperity. By identifying and comparing the economic policies and outcomes across countries, this project aims to support policymakers, economists, and students in making informed decisions that uphold liberty, reduce poverty, and encourage free-market practices.

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2. IDEATION PHASE

2.1 Problem Statement

I am

Government policymakers, economists, researchers, data analysts, and development planners who need to evaluate how free and fair economies are across the globe. They often lack a clear, comparative, and interactive way to assess economic freedom across countries, regions, and over time.

I'm trying to

Understand the level of economic freedom in different countries.

Identify which nations are most and least economically free.

Analyze how freedom impacts GDP and development.

But

The data is hard to interpret from spreadsheets.

The information is scattered across multiple sources.

There is no interactive platform to explore insights.

Visual comparisons between countries are limited.

Because

1. The Heritage Index data is not interactive.
2. There's no built-in visualization or filtering.

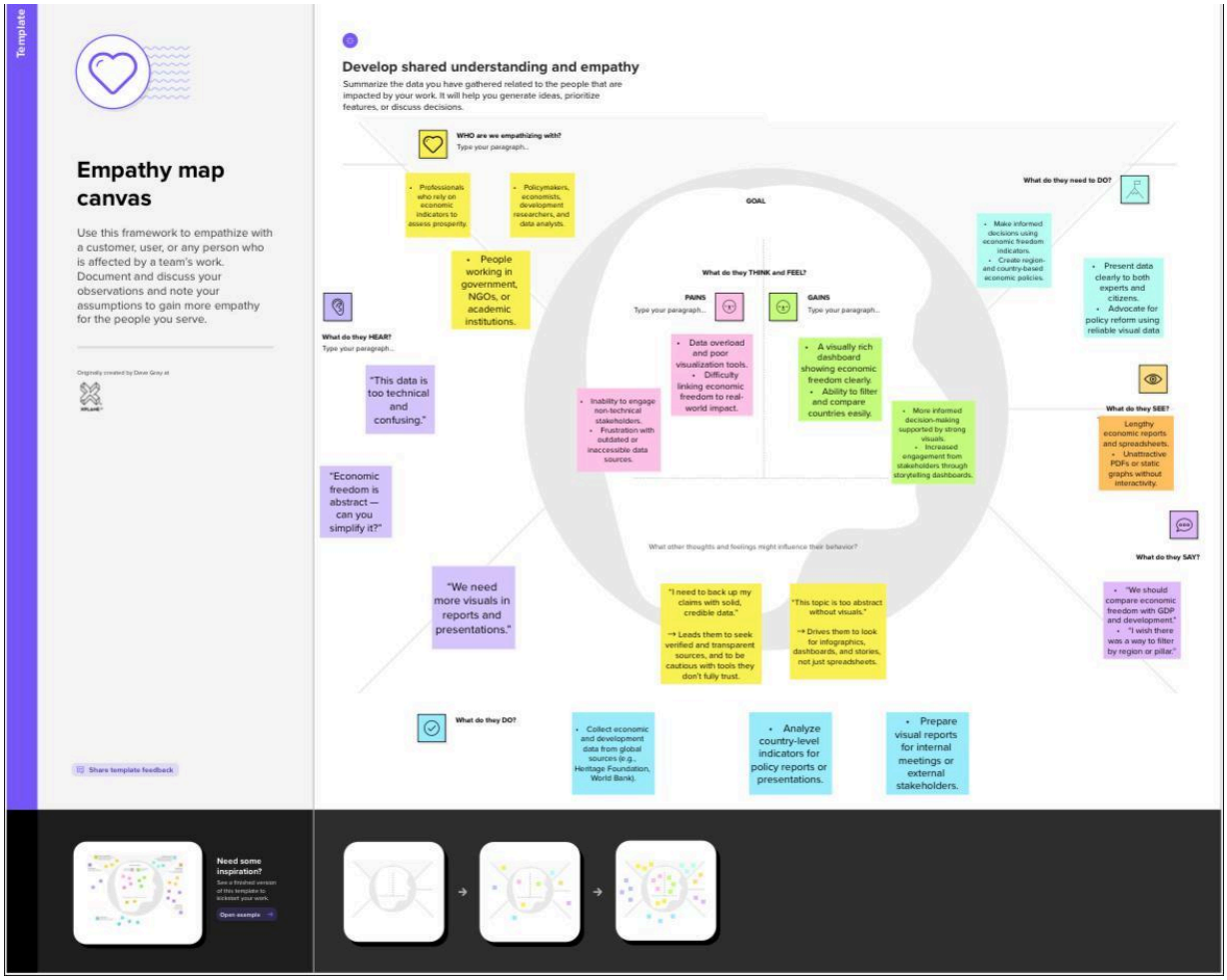
3. Complex indicators require contextual explanation.
4. Policymakers and citizens need simplified visuals.

5. Most platforms don't combine all 12 freedom factors.
6. Comparative tools for analysis are missing

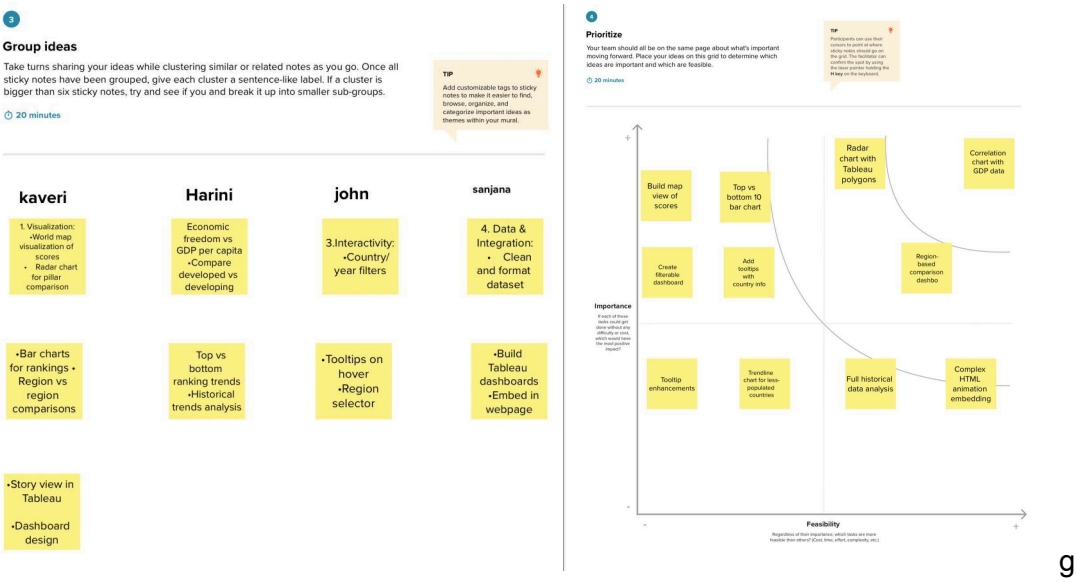
Which makes me feel

1. Frustrated that I can't present the data effectively.
2. Confused when trying to interpret scattered statistics.
3. Limited in how I can support policy recommendations.
4. Overwhelmed by the amount of disconnected information.
5. Concerned that valuable data isn't being used well.

2.2 Empathy Map Canvas



2.3 Brainstorming



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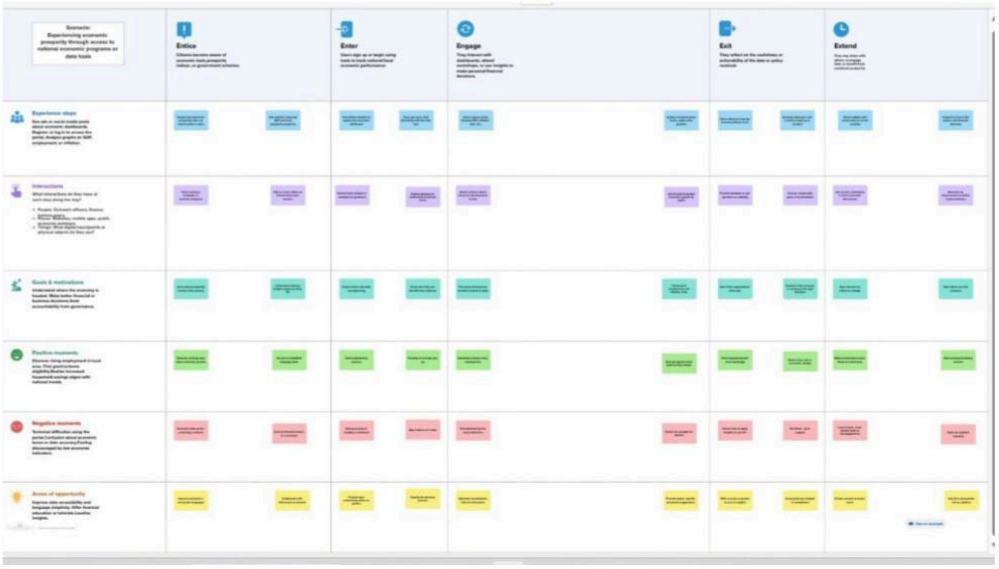
3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map



3.2 Solution Requirement

Project Design Phase-II
Solution Requirements (Functional & Non-functional)

Date	27 Jun 2025
Team ID	LTVIP2025TMII61416
Project Name	Measuring the pulse of prosperity: An index of economic Freedom Analysis
Maximum Marks	4 Marks

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Dashboard Visualization	Country-wise economic freedom score visualization Pillar-wise radar and bar chart comparison Region & income group filters Interactive story walkthrough
FR-4	Data Management & Export	MySQL database integration Live connection to Tableau Export visual reports in PDF/CSV

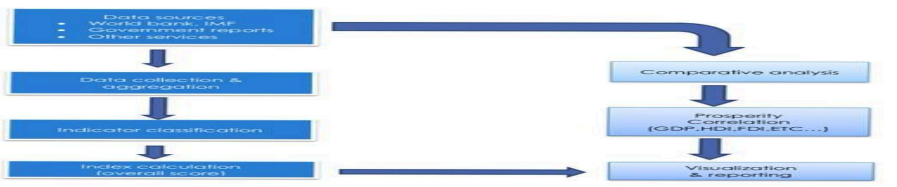
Non-functional Requirements:

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

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Simple UI for students, analysts, and policymakers to explore data without technical skills
NFR-2	**Security**	Secure backend access and protection for data exports
NFR-3	**Reliability**	Dashboards consistently load without crashing or misbehaving
NFR-4	**Performance**	Visuals and filters respond within 2 seconds under normal network and device usage
NFR-5	**Availability**	Accessible 24/7 on Tableau Public or embedded in the project's webpage
NFR-6	**Scalability**	New countries, indicators, or years of data can be added easily without redesigning the system

3.3 Data Flow Diagram

User Type	Functional requirement	User story number	user story/task	Acceptance criteria	priority	release
Data analyst	Ingest and clean economic data from multiple global sources	US001	As a data analyst, I want to collect and preprocess raw data from World Bank and IMF sources	Data is successfully pulled, cleaned, and formatted from each source	HIGH	Release 1
economist	Classify data indicators for analysis	US002	As an economist, I want to categorize economic indicators into defined domains like regulatory efficiency	Indicators are correctly grouped and mapped into relevant categories	HIGH	Release 1
Data scientist	Compute the economic freedom index	US003	As a data scientist, I want to normalize data and calculate a composite economic freedom index	Index score is correctly calculated and validated for each country	HIGH	Release 2
Policy researcher	Compare economic freedom across countries	US004	As a policy researcher, I want to compare countries' index to identify patterns	Report allows side-by-side comparisons with filters for region and year	MEDIUM	Release 2
advisor	Correlate index with other prosperity indicators	US005	As an advisor, I want to analyze correlations between index score and GDP, HDI, and FDI	Correlation matrices and graphs are generated and statistically verified	MEDIUM	Release 3
Stake holder	Visualize findings and generate reports	US006	As a stakeholder, I want to see visual reports to inform economic strategy	dashboard and reports are available in visual formats (charts, graphs, downloadable)	HIGH	Release 3



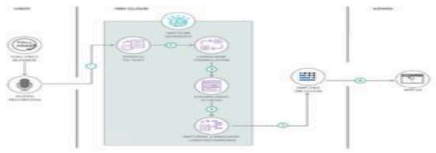
3.4 Technology Stack

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2

Example: Order processing during pandemics for offline mode

Reference: https://developer.ibm.com/patterns/ai-powered-backend-system-for-order-processing-during-pandemics/



Guidelines:

Include all the processes (As an application logic / Technology Block)
Provide infrastructural demarcation (Local / Cloud)
Indicate external interfaces (third party API's etc.)
Indicate Data Storage components / services
Indicate interface to machine learning models (if applicable)

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Web-based interface embedded with Tableau dashboard	HTML, CSS, JavaScript
2.	Application Logic-1	Data preprocessing & cleaning for freedom index	Java / Python
3.	Application Logic-2	Database design & connection setup	MySQL
4.	Application Logic-3	Tableau dashboard setup & interactivity	Tableau Desktop / Tableau Public
5.	Database	Structured economic data storage	MySQL
6.	Cloud Database	Optionally use cloud DB or Tableau Public data sources	Tableau Public Cloud
7.	File Storage	Project files, raw datasets (CSV, Excel)	Local File System / Google Drive
8.	External API-1	Optional GDP/HDI data from World Bank or IMF	World Bank API (optional)
9.	External API-2	**Country flags, map visuals**	REST Countries API
10.	Machine Learning Model	Not applicable	N/A
11.	Infrastructure (Server / Cloud)	Local for dev; Tableau Public for production visualization	Local Machine, Tableau Cloud

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Python for data cleaning; MySQL; Tableau Public for sharing visuals	Python, Pandas, MySQL, Tableau
2.	Security Implementations	Tableau Public restricts edit access; no PII stored	Tableau Permissions, CSV-only
3.	Scalable Architecture	Easily scalable by uploading more datasets or connecting to live DB	Tableau Cloud, Modular Dashboards
4.	Availability	Dashboard hosted 24/7 via Tableau Public; no downtime expected	Tableau Public hosting
5.	Performance	Lightweight dashboard; low request rate; static visual filters	Optimized Tableau workbook

References:

https://c4model.com/
https://developer.ibm.com/patterns/online-order-processing-system-during-pandemic/
https://www.ibm.com/cloud/architecture
https://aws.amazon.com/architecture
https://medium.com/the-internal-startup/how-to-draw-useful-technical-architecture-diagrams-2d20c9fda90d

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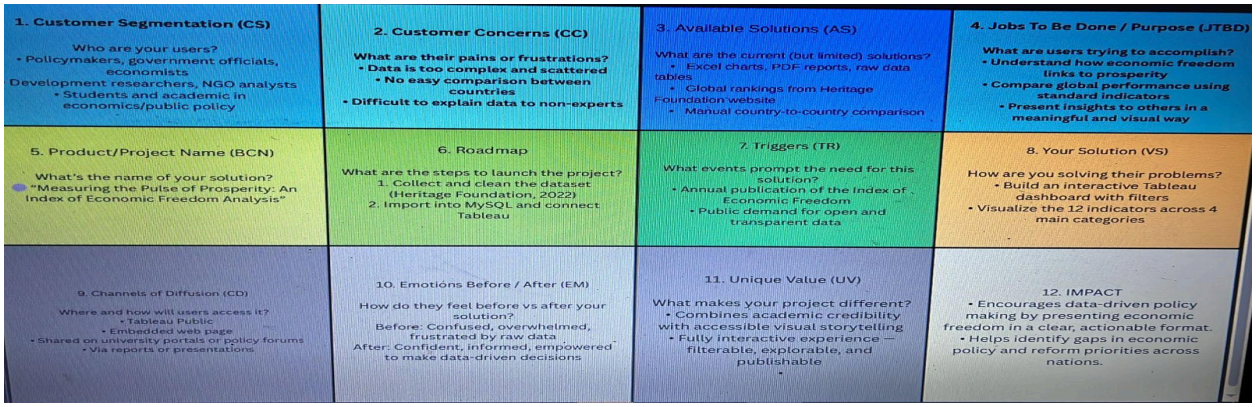
4. PROJECT DESIGN

4.1 Problem-Solution Fit



4.2 Proposed Solution

Proposed Solution Template:

Project team shall fill the following information in the proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Many citizens, policymakers, and stakeholders lack clarity and insights into how economic freedom impacts prosperity and social development. Without measurable indicators, it is difficult to design evidence-based reforms or compare economic progress between nations.
2.	Idea / Solution description	Our project proposes to analyze and visualize the **Index of Economic Freedom** data using Tableau. By integrating multiple economic indicators—such as property rights, tax burden, fiscal health, labor freedom, and trade openness—we aim to create an interactive dashboard that allows users to explore country-wise and factor-wise economic freedom rankings, trends, and patterns.
3.	Novelty / Uniqueness	Unlike traditional static reports, our project transforms complex economic data into **interactive, visually appealing dashboards** using Tableau, allowing real-time filtering and exploration. The inclusion of comparative visuals and multi-year tracking makes it user-friendly and useful for decision-makers, educators, and researchers alike.
4.	Social Impact / Customer Satisfaction	By promoting transparency and accessibility of economic data, our project empowers citizens, civil society, and institutions to demand accountability and evidence-based governance. The dashboard fosters public awareness of economic freedom as a driver of prosperity and highlights areas for improvement, potentially influencing public policy positively.
5.	Business Model (Revenue Model)	This is primarily a non-commercial, academic and civic engagement initiative. However, if extended, the platform can collaborate with think tanks, universities, or government departments for subscriptions, workshops, or premium analysis services. It also opens the door for policy consulting or integration with economic planning tools.
6.	Scalability of the Solution	The model is highly scalable—new indicators, countries, or years of data can be added seamlessly. It can also be replicated for state-level analysis within countries or expanded to measure sector-specific economic freedom (like agriculture, industry, etc.) using similar visualization frameworks.

4.3 Solution Architecture

Component	Details
objective	To analyze the levels economic freedom globally and identify correlations with prosperity indicators
Data Source	Heritage Foundation' 2022 Index of Econo Freedom.
Key Indicators	Rule of Law, Government Size, Regulatory Efficiency and Open Markets - each comprising 3 sub-factors.
Tools & Techniques	Data Cleaning (Excel Visualization (Tablea Power BI), Analysis (Python or Excel tatistical Tools).
Expected Output	Visual dashboards a comparative insights into economic freedc by country/region wi rankings and trend interpretations.
End User / Stakeholder	Policy makers, Economists, Busines Analysts, and Acade Researchers.

5. PROJECT PLANNING & SCHEDULING

Product Backlog, Sprint Schedule, and Estimation (4 Marks)

Use the below template to create product backlog and sprint schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Data Preparation	USN-1	As a user, I want to collect and clean the Index of Economic Freedom dataset for analysis	8	High	M. Kaveri
Sprint-1	Data Integration	USN-2	As a user, I want to import the dataset into MySQL and structure it for Tableau connectivity	6	High	K. Harini
Sprint-2	Dashboard Creation	USN-3	As a user, I want to connect Tableau to the MySQL database and design visualizations by country and pillar	5	High	T. John
Sprint-2	Interactive Filtering	USN-4	As a user, I want to filter data by region, pillar, and income group	5	Medium	G. Sanjana
Sprint-3	Story Building	USN-5	As a user, I want to create a Tableau Story to walk through insights and trends	5	Medium	K. Kaveri
Sprint-3	Final Report & Documentation	USN-6	As a user, I want to generate a final project report with screenshots and analysis summar	4	High	K. Harini

Project Tracker, Velocity & Burndown Chart: (4 Marks)

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	20	6 Days	01 Jun 2025	06 Jun 2025	20	06 Jun 2025
Sprint-1	20	6 Days	07 Jun 2025	12 Jun 2025	20	12 Jun 2025
Sprint-2	20	6 Days	13 Jun 2025	18 JUN 2025	20	18 JUN 2025
Sprint-2	20	6 Days	19 Jun 2025	24 Jun 2025	20	24 Jun 2025
Sprint-3	20	6 Days	25 Jun 2025	01 Jul 2025	20	01 Jul 2025
Sprint-3	20	2Days	02 Jul 2025	03 Jul 2025	20	03 Jul 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)

$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

- **Team Velocity = 20 story points per sprint**
- **Sprint Duration = 6 days**
- **Velocity per day (AV) = 20 / 6 = 3.33 story points/day**

5.1 Project Planning

- Sprint 1: Dataset collection, preprocessing
- Sprint 2: Connecting to Tableau
- Sprint 3: Creating visualizations
- Sprint 4: Dashboard + Storyboard + Web embedding

6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

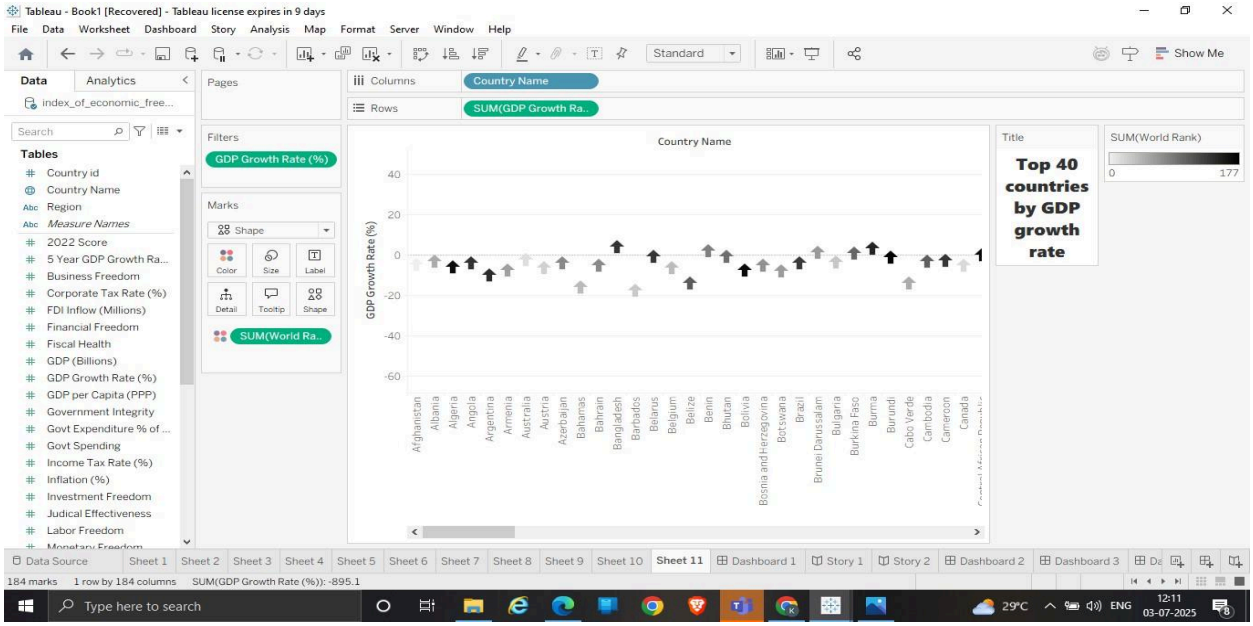
Model Performance Testing:

Project team shall fill the following information in model performance testing template.

S.No.	Parameter	Screenshot / Values
1.	Data Rendered	
2.	Data Preprocessing	
3.	Utilization of Filters	
4.	Calculation fields Used	
5.	Dashboard design	
6	Story Design	

7. RESULTS

7.1 Output Screenshots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Country Name
Region
Measure Names
2022 Score
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Business Freedom
Corporate Tax Rate (%)
FDI Inflow (Millions)
Financial Freedom
Fiscal Health
GDP (Billions)
GDP Growth Rate (%)
GDP per Capita (PPP)
Government Integrity
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Govt Spending
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Investment Freedom
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Labor Freedom
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Sheet 11
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Story 1
Story 2
Dashboard 2
Dashboard 3
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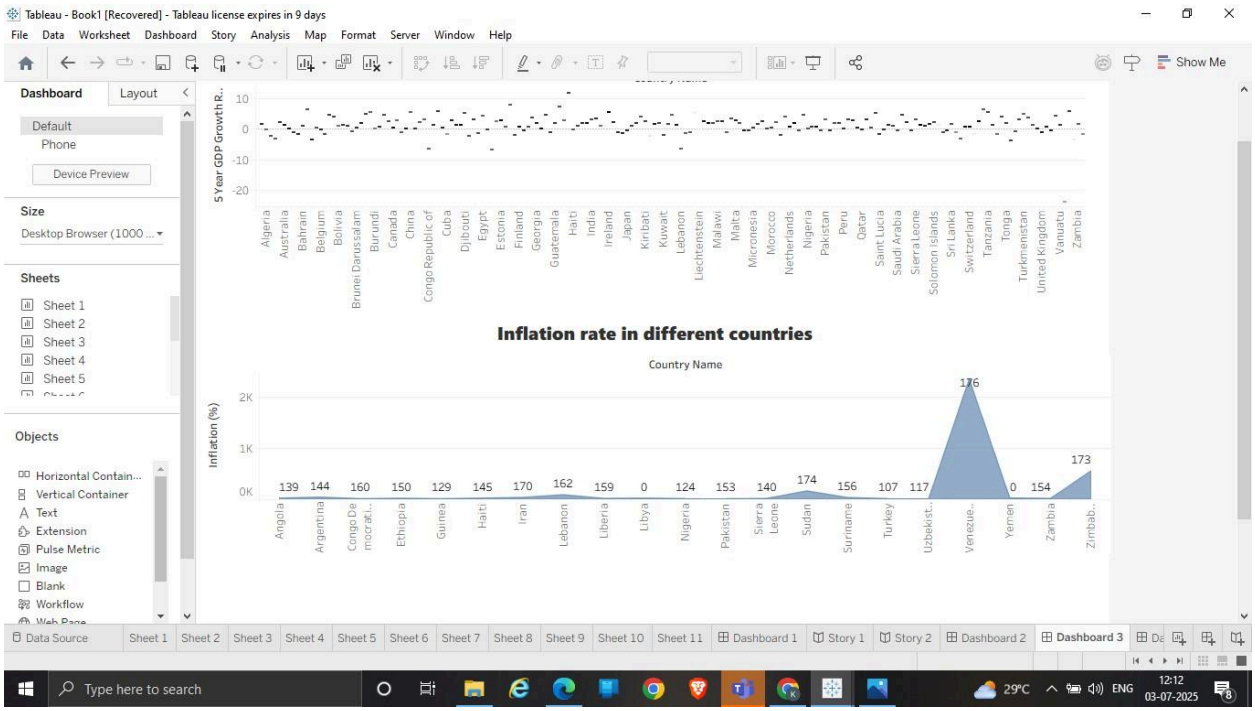
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Sheet 2
Sheet 3
Sheet 4
Sheet 5
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Pulse Metric
Image
Blank
Workflow
5 Year GDP Growth R...
Inflation rate in different countries
Country Name
Inflation (%)
139 144 160 150 129 145 170 162 159 0 124 153 140 174 156 107 117 176 0 154 173
Sheet 11
Dashboard 1
Story 1
Story 2
Dashboard 2
Dashboard 3
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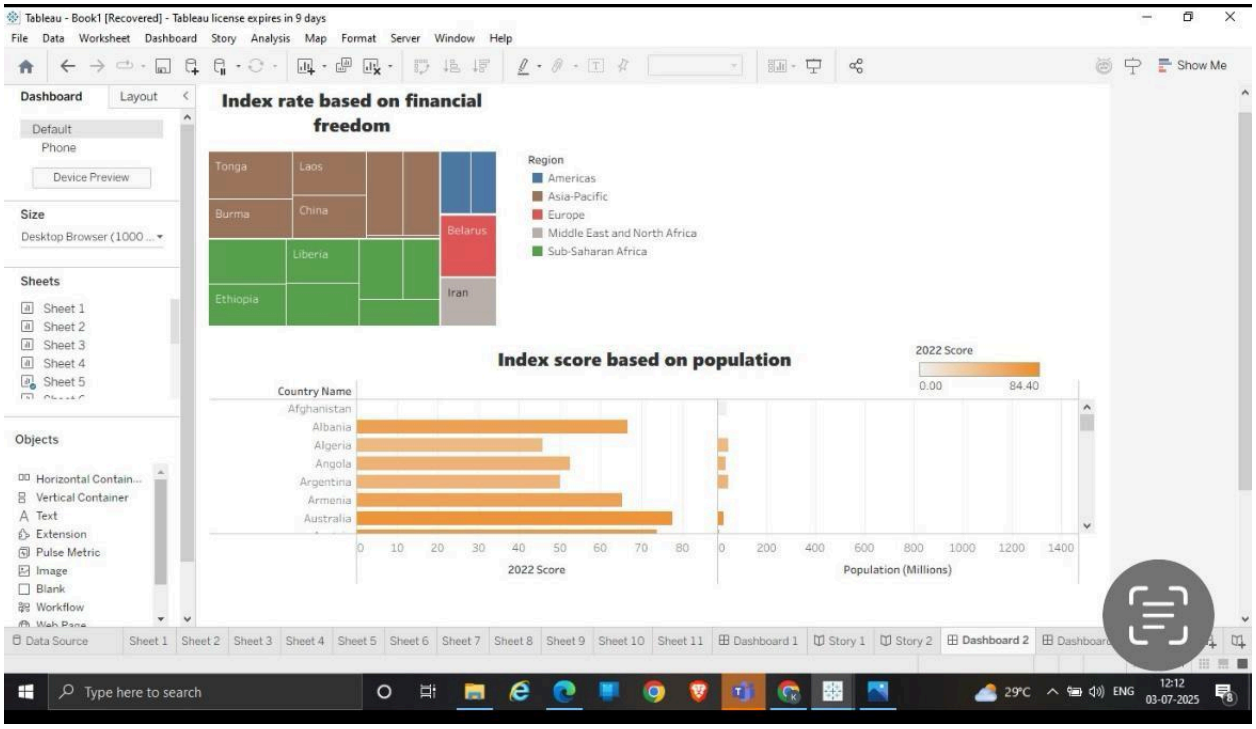

8. ADVANTAGES & DISADVANTAGES

Advantages:

- Easy comparison of countries' economic policies
- Visual storytelling for non-technical audiences
- Supports evidence-based policymaking

Disadvantages:

- Data may lack real-time updates
- Analysis limited by source dataset coverage

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9. CONCLUSION

This project reveals how economic freedom is a powerful driver of prosperity. Countries with stronger property rights, low corruption, and freer markets tend to outperform others in growth, employment, and investment. The project highlights the importance of promoting open markets and judicial integrity.

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10. FUTURE SCOPE

- Integrating real-time economic data from APIs
- Adding time-series analysis for trend prediction

- Incorporating more interactive filters (like HDI, GDP growth)

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11. APPENDIX
    - Source Code: NA (Visualization project)
    - Dataset Link: Index of Economic Freedom - Heritage Foundation
    - GitHub / Project Demo Link: (Add your Tableau Public or Web embed link here)