

Project Design Phase: Measuring the Pulse of Prosperity - Economic Freedom Analysis

1. Project Overview

Objective

Develop an interactive dashboard that visualizes global economic freedom metrics, correlates them with prosperity indicators (e.g., GDP, unemployment, HDI), and allows policymakers, economists, and researchers to analyze trends by country, region, and time.

Key Features

- **Visualizations:**
 - World map showing economic freedom scores.
 - Interactive scatter plots (e.g., **Income Tax Rate** vs. **Business Freedom**).
 - Economic freedom component breakdown (radar charts).
- **Data Controls:**
 - Filters for regions, income levels, and time.
 - Comparison between top/bottom performers.
- **Export & Reporting:**
 - PDF generator with key findings.
 - CSV/Excel export of selected data.

2. Data Analysis & Methodology

Data Sources

Dataset	Source	Key Metrics
Economic Freedom Index	Heritage Foundation	World Rank, 2022 Score, Tariff Ra
Prosperity Indicators	World Bank, IMF, UNDP	GDP, Unemployment, Human Developme
Geospatial Data	Natural Earth, GeoJSON datasets	Country boundaries for mapping

Analysis Approach

1. Correlation Analysis:

- Pearson/Spearman tests between 2022 Score and economic indicators (e.g., GDP per capita).

2. Regional Comparisons:

- Group by Region Rank to identify trends (e.g., Europe vs. Sub-Saharan Africa).

3. Time-Series Trends:

- Track changes in World Rank and Tax Burden from 2020–2022.

3. System Architecture

Frontend (Interactive Dashboard)

Component	Tech Stack	Purpose
Map Visualization	Leaflet.js + D3.js	Render country-level scores
Charts	Chart.js / Plotly	Scatter, bar, and radar charts
UI Framework	React.js + Tailwind CSS	Responsive layouts, filters
PDF Export	html2pdf.js	Generate reports

Backend (If Needed)

Component	Tech Stack	Purpose
API	Node.js + Express	Serve pre-processed data
Database	PostgreSQL	Store historical indices

Data Pipeline

mermaid

RunCopy code

```
1 flowchart LR
2   A[Raw CSV/Excel] --> B[Python Pandas Cleaning]
3   B --> C[JSON for Frontend]
```

4. Wireframes & UI Flow

Dashboard Layout

```
plaintext
RunCopy code
1+-----+
2| NAV: Filters [Region] |
3+-----+
4| MAP |
5+-----+
6| SCATTER: IncomeTax vs GDP |
7+-----+
8| RADAR: Freedom Components|
9+-----+
10| TABLE: Top 10 Countries |
11+-----+
```

- **Filters:** Dropdowns for Region, Income Level.
- **Charts:** Hover tooltips, zoomable plots.
- **Export:** Button to download PDF/CSV.

5. Execution Plan

Phase 1: Setup (Week 1)

Task	Deliverable
Data cleaning & validation	Cleaned dataset in JSON/CSV
Frontend scaffolding	Basic React app structure

Phase 2: Core Features (Weeks 2–3)

Task	Deliverable
Map integration	Interactive Leaflet.js map
Chart implementation	3+ dynamic visualizations

Phase 3: Testing (Week 4)

Test	Tool	Goal
Data accuracy	Jupyter Notebook	Validate correlations
Mobile UI	Chrome DevTools	Responsive down to 320px
PDF export	Jest	Verify content rendering

Phase 4: Deployment

- **Hosting:** Netlify/Vercel for frontend.
- **Docs:** GitHub README with setup instructions.

6. Risk Mitigation

Risk	Solution
Missing data for some countries	Impute median values or exclude
Poor mobile performance	Optimize chart rendering
API rate limits	Pre-process data to static JSON

7. Expected Outputs

- **Dashboard:** Live demo comparing countries.
- **Key Findings Report (PDF):**
 - "Higher **Business Freedom** correlates with GDP growth ($R^2 = 0.72$)."
 - "Europe dominates top **Region Rank** scores."