

Project Design Phase-II

Data Flow Diagram & User Stories

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Team ID: LTVIP2025TMID50318

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

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Maximum Marks: 4 Marks

Data Flow Diagrams

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. For our Economic Freedom Analysis project, the DFD depicts how economic data enters the system, gets processed through various analytical components, and produces meaningful insights about economic freedom and prosperity.

Level 0 DFD - Context Diagram

External Data Sources → [Economic Freedom Analysis System] → Economic Freedom Reports & Insights

Level 1 DFD - Major Processes

Process 1: Data Collection & Integration

- **Input:** Heritage Foundation Data
- **Output:** Economic Freedom Dataset
- **Data Store:** Raw Economic Indicators Database

Process 2: Data Normalization & Validation

- **Input:** Integrated Dataset
- **Output:** Normalized Indicators (0-100 scale)
- **Data Store:** Processed Data Repository

Process 3: Index Construction

- **Input:** Normalized Indicators
- **Output:** Economic Freedom Composite Index (EFCI)
- **Data Store:** EFCI Database

Process 4: Statistical Analysis

- **Input:** EFCI, Prosperity Metrics (GDP, HDI, Gini)
- **Output:** Correlation & Regression Results
- **Data Store:** Analysis Results Repository

Process 5: Visualization & Reporting

- **Input:** Analysis Results, EFCI Rankings
 - **Output:** Interactive Dashboards, Reports
 - **Data Store:** Report Database
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User Stories

Using the template format for our Economic Freedom Analysis project:

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance Criteria	Priority	Release
Data Analyst	Data Collection	EFA-1	As a data analyst, I can import economic indicators from Heritage Foundation API	Data is successfully imported and validated with error handling	High	Sprint-1
		EFA-2	As a data analyst, I can view data quality reports showing missing values and outliers	Quality report displays completeness percentage and identifies anomalies	High	Sprint-1
		EFA-3	As a data analyst, I can schedule automated data updates from Heritage Foundation source	System automatically fetches latest data on scheduled intervals	Medium	Sprint-2
Researcher	Index Construction	EFA-4	As a researcher, I can configure weighting schemes for different economic freedom components	System allows custom weights and shows impact on final rankings	High	Sprint-1
		EFA-5	As a researcher, I can perform Principal Component Analysis on economic indicators	PCA results show variance explained and component loadings	High	Sprint-1
		EFA-6	As a researcher, I can validate index consistency using Cronbach's alpha	System calculates and displays reliability statistics	Medium	Sprint-1
Policy Maker	Analysis & Insights	EFA-7	As a policy maker, I can view country rankings based on Economic Freedom Composite Index	Rankings table shows scores, ranks, and year-over-year changes	High	Sprint-1

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance Criteria	Priority	Release
		EFA-8	As a policy maker, I can analyze correlation between economic freedom and prosperity metrics	System displays correlation coefficients and statistical significance	High	Sprint-2
		EFA-9	As a policy maker, I can generate comparative reports between countries or regions	Report includes detailed breakdowns by freedom components	Medium	Sprint-2
Academic User	Visualization	EFA-10	As an academic user, I can access interactive visualizations of economic freedom trends	Dashboard provides scatter plots, heat maps, and time series charts	High	Sprint-2
		EFA-11	As an academic user, I can export analysis results in multiple formats (CSV, PDF, Excel)	Export function preserves data integrity and formatting	Medium	Sprint-2
		EFA-12	As an academic user, I can access detailed methodology documentation	Documentation explains index construction and statistical methods	Low	Sprint-3
General Public	Public Access	EFA-13	As a citizen, I can view my country's economic freedom score and ranking	Public dashboard shows current scores with historical context	Medium	Sprint-3
		EFA-14	As a citizen, I can understand what factors contribute to my country's economic freedom score	Interface provides clear explanations of each component	Low	Sprint-3
System Admin	System Management	EFA-15	As a system admin, I can monitor system	Admin panel shows processing times,	High	Sprint-1

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance Criteria	Priority	Release
			performance and data processing status	error logs, and system health		
		EFA-16	As a system admin, I can backup and restore analysis results and datasets	Backup system ensures data preservation and quick recovery	High	Sprint-1

Data Flow Components Detail

External Data Sources

- Heritage Foundation Index of Economic Freedom 2024**
 - 12 quantitative & qualitative indicators
 - Annual updates
 - Country coverage: 180+ economies

Key Processing Steps

- Data Normalization:** Transform indicators to 0-100 scale
- Weighting Application:** PCA-based weighting scheme
- Index Aggregation:** Weighted sum to obtain EFCI
- Statistical Validation:** Cronbach's alpha = 0.81
- Correlation Analysis:** EFCI vs. prosperity metrics

Output Products

- Economic Freedom Composite Index (EFCI)
- Country rankings and scores
- Statistical analysis results ($r \approx 0.78$ correlation with GDP)
- Interactive Tableau dashboard
- Research documentation and methodology

