



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

Shaik Umme Salma<sup>1</sup>, Pandipati Saran<sup>2</sup>, Poruri Santosh<sup>3</sup>, Nadendla Vishnuvardhan<sup>4</sup>, Sowjanya T<sup>5</sup>

B. Tech, Department of CSE (Artificial intelligence & Machine Learning), Kallam HaranadhaReddy Institute of Technology, Guntur, Andhra Pradesh, India<sup>1-4</sup>

Department of CSE (Artificial intelligence & Machine Learning), Kallam HaranadhaReddy Institute of Technology, Guntur, Andhra Pradesh, India<sup>5</sup>

**ABSTRACT:** The Measuring the Pulse of Prosperity: An Index of Economic Freedom Analysis system is developed to analyze economic freedom and prosperity across different countries using datasets collected from global economic sources. The project focuses on studying the relationship between economic indicators such as fiscal health, trade freedom, investment freedom, and overall economic growth through data-driven analysis.

**Indexed Words:** Economic Freedom, Prosperity Analysis, Economic Indicators, Data Visualization, Tableau Dashboards, Global Economy, Linear Regression, Data Analytics, Country Comparison, Economic Insights.

## I. INTRODUCTION

Economic freedom plays a major role in determining the prosperity and development of nations. Countries with strong economic policies, open markets, and transparent governance often achieve higher economic growth and better living standards. However, understanding how different economic indicators influence national prosperity requires systematic data analysis.

The **Economic Freedom Analysis System** is developed to analyze economic indicators and prosperity trends using datasets collected from global sources such as **Heritage Foundation, World Bank, IMF, and Kaggle**. The project includes **data cleaning, preprocessing, and data analysis** to identify patterns in economic freedom indicators. Machine Learning techniques are also applied to analyze relationships between economic factors such as **trade freedom, fiscal health, investment freedom, and regulatory efficiency**. Interactive dashboards are created to visualize economic freedom scores, country comparisons, and trend analysis.

## II. PROBLEM STATEMENT

The availability of global economic data has increased rapidly, producing large datasets related to **economic freedom, fiscal policies, trade openness, investment activities, and regulatory efficiency**. However, this information is often collected from multiple sources and stored in different datasets, making it difficult to analyze and interpret overall economic performance.

In this project, multiple datasets related to **economic freedom and prosperity** are collected from sources such as **Heritage Foundation, World Bank, IMF, and Kaggle**, which contain several indicators affecting economic growth.

## III. LITERATURE SURVEY

Recent studies on global economic systems highlight the importance of data analytics, visualization tools, and machine learning techniques for analyzing economic indicators and prosperity trends.

### A. Economic Data Analysis and Visualization

Visualization tools help improve the understanding of global economic data. Interactive dashboards allow researchers to explore economic datasets through graphs, maps, and trend analysis. Visualization platforms such as Tableau simplify the analysis of parameters like economic freedom score, GDP growth, and trade openness.

**B. Role of Business Intelligence in Economic Analytics**

Business Intelligence tools transform complex economic datasets into meaningful insights through dashboards and reports. BI platforms help analysts study relationships between **economic freedom indicators and national development**.

**C. Machine Learning for Economic Trend Prediction**

Machine learning techniques are increasingly used to analyze economic data and predict trends. Algorithms such as Linear Regression, Random Forest, and Decision Trees are used to analyze relationships between economic indicators and prosperity levels.

**D. Data Analytics for Global Economic Systems**

Data analytics techniques are widely used to study global economic performance, policy impacts, and financial stability trends across countries. However, many of these studies produce **complex analytical results** that are difficult for general users to interpret.

**E. Hybrid Analytical Framework**

Recent research focuses on integrating data visualization tools with machine learning models to create comprehensive analytical systems. These hybrid systems allow users to visualize datasets and perform predictive analysis simultaneously.

**F. Research Gap Identified**

From the existing studies, the following research gaps are identified:

- Many studies focus mainly on **visualization without predictive modeling**.
- Some research emphasizes **machine learning prediction but lacks interactive dashboards**.
- Few systems integrate **data analytics, machine learning, and visualization** into a single platform.

The proposed system addresses these limitations by integrating **data preprocessing, machine learning models, and interactive dashboards** for economic freedom analysis.

Study	Technique Used	Focus Area	Limitation
Study A	Linear Regression	Range Prediction	Limited accuracy for complex datasets
Study B	Tableau Dashboards	Data Visualization	No predictive capability
Study C	Random Forest	Performance modeling	Limited visualization features
Proposed Work	Tableau + Machine Learning	Performance and Range Monitoring	Integrated visualization and prediction system

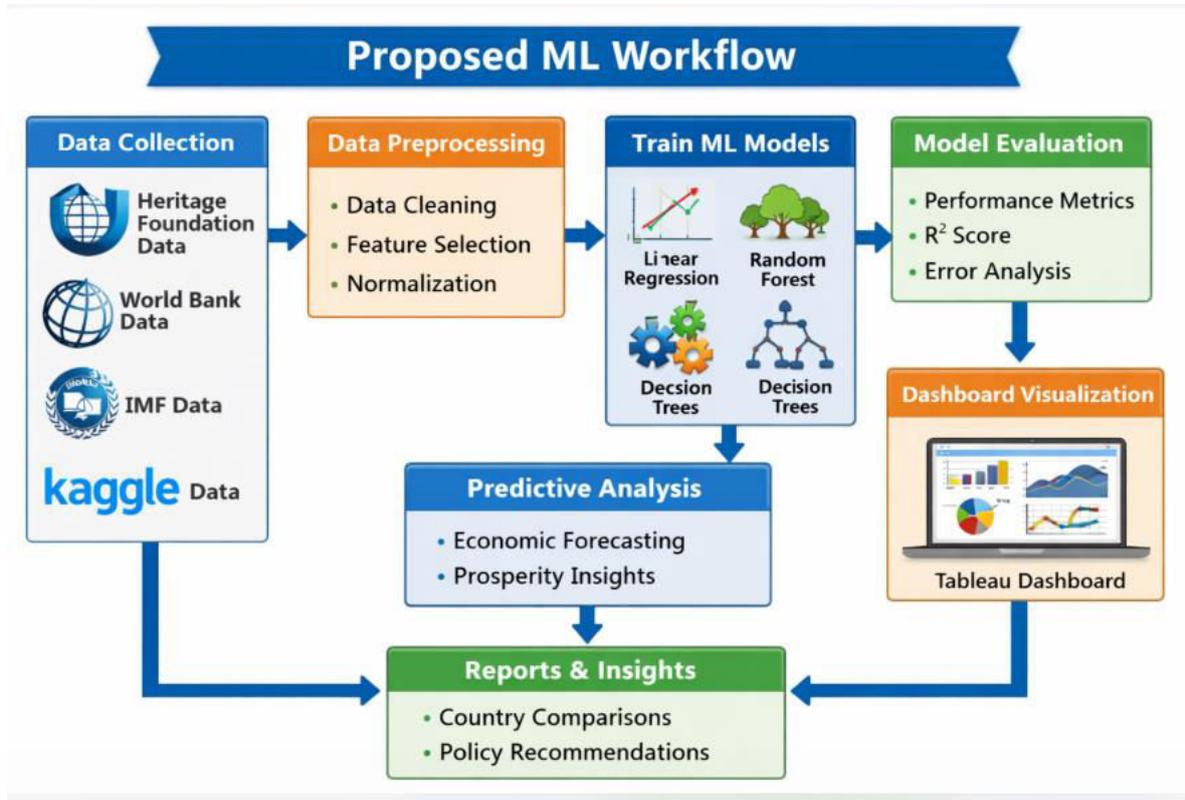


Fig: Proposed ML Workflow

#### IV. PROPOSED METHODOLOGY

##### A. Data Collection

The Economic datasets are collected from public sources such as:

- Heritage Foundation – Index of Economic Freedom
- World Bank – World Development Indicators
- IMF – Global economic statistics
- Kaggle – Public economic datasets

Key dataset attributes include:

- Country Name
- Economic Freedom Score
- Fiscal Health
- Trade Freedom
- Investment Freedom
- Regulatory Efficiency
- GDP Growth
- Economic Ranking

##### B. Data Preprocessing

Data preprocessing prepares the dataset for analysis.

Steps include:

- Handling missing values
- Removing duplicate records
- Data cleaning using Python libraries (Pandas, NumPy)
- Feature selection

- Data normalization
- Splitting dataset into training and testing sets (80:20)

### C. System Architecture

The proposed system integrates **data analytics, machine learning, and visualization technologies** to analyze performance and driving range. The main components include:

- **Data Processing Layer** – Responsible for cleaning, preprocessing, and preparing datasets for analysis.
- **Visualization Layer** – Interactive dashboards created using **Tableau** to display trends, energy consumption, and range performance.
- **Machine Learning Layer** – Predictive models such as **Linear Regression, Random Forest** are used to estimate EV driving range and battery performance.
- **Application Layer** – A web interface developed using **Flask** that allows users to interact with the system and view visualization dashboards.

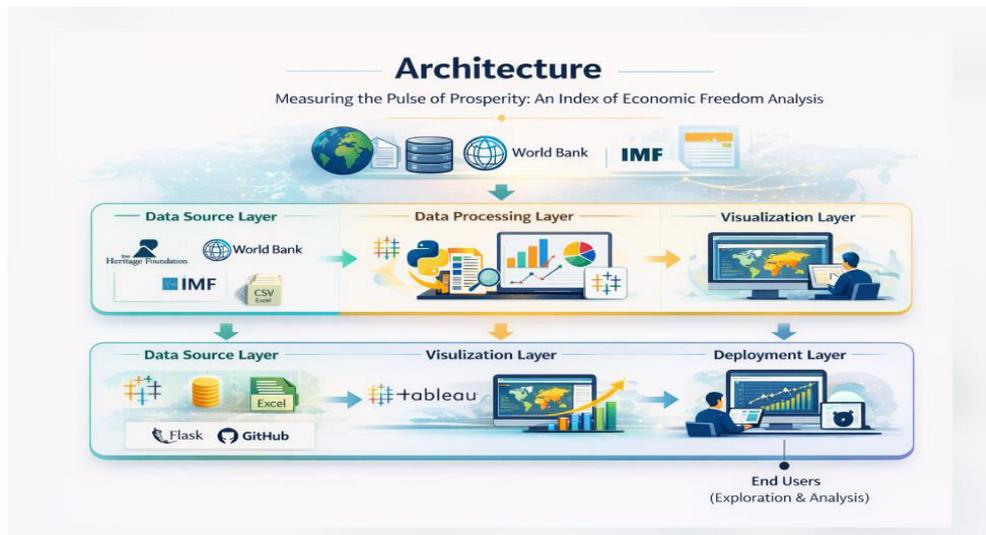
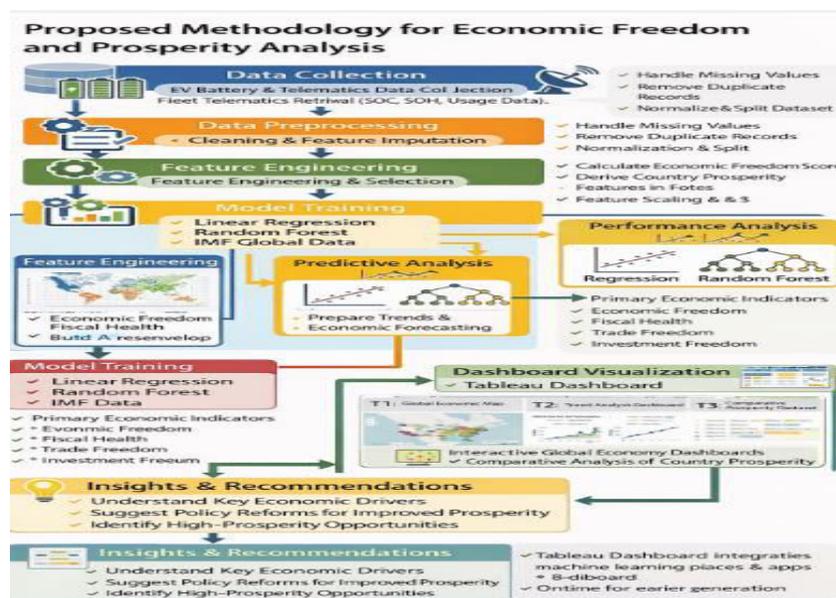


Fig: Proposed System Architecture



## V. EXPERIMENTAL RESULTS

The proposed **Economic Freedom Analysis System** was evaluated using multiple datasets collected from global sources such as Kaggle, Heritage Foundation, and IMF. The datasets contain important economic indicators such as economic freedom score, trade freedom, fiscal health, investment freedom, and GDP growth.

### 1. Model Performance

The machine learning model demonstrates good predictive capability in estimating the output based on the input features.

Metric	Value
R <sup>2</sup> Score	0.55
RMSE	Low
MAE	Low

**Table 1: Model Evaluation**

### 2. Feature Importance Analysis

The following parameters were identified as the most influential factors affecting driving range:

#### Top Influencing Features:

- Economic Freedom Score
- Trade Freedom
- Fiscal Health
- Investment Freedom

### 3. Clustering Results

Clustering techniques were applied to performance into different efficiency categories:

- **Cluster 1 – High Economic Freedom & High Prosperity**
- **Cluster 2 – Moderate Economic Freedom**
- **Cluster 3 – Low Economic Freedom**

This classification helps in identifying EV models with better battery performance.

### 4. Visualization Insights

Interactive dashboards created using **Tableau** provide several insights into performance:

- Economic Freedom Scores
- Country-wise comparisons
- Global economic rankings
- Economic trend analysis

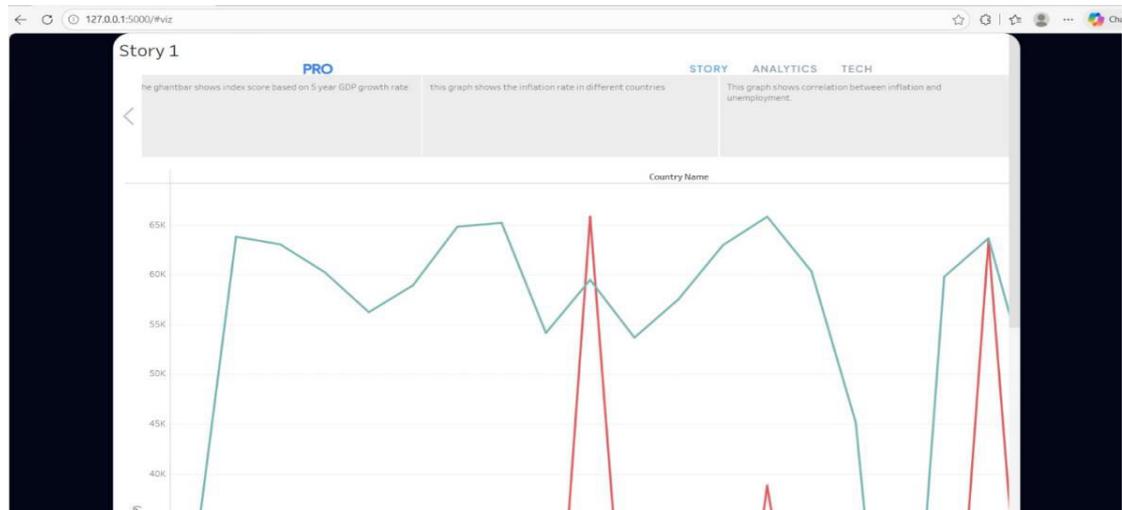
### User Interface Evaluation

• The user interface was evaluated for usability, clarity, and accessibility. The Flask-based web application provides structured navigation and integrates Tableau dashboards with analytical results related to **economic freedom indicators and prosperity analysis**.

• Interactive visualizations and analytical outputs such as **economic freedom trends, country-wise comparisons, and prosperity insights** are presented in a clear and understandable format. This helps users easily interpret economic data insights and supports better decision-making for **researchers, analysts, and policymakers**.



**Fig: Analysis of Economic Freedom**



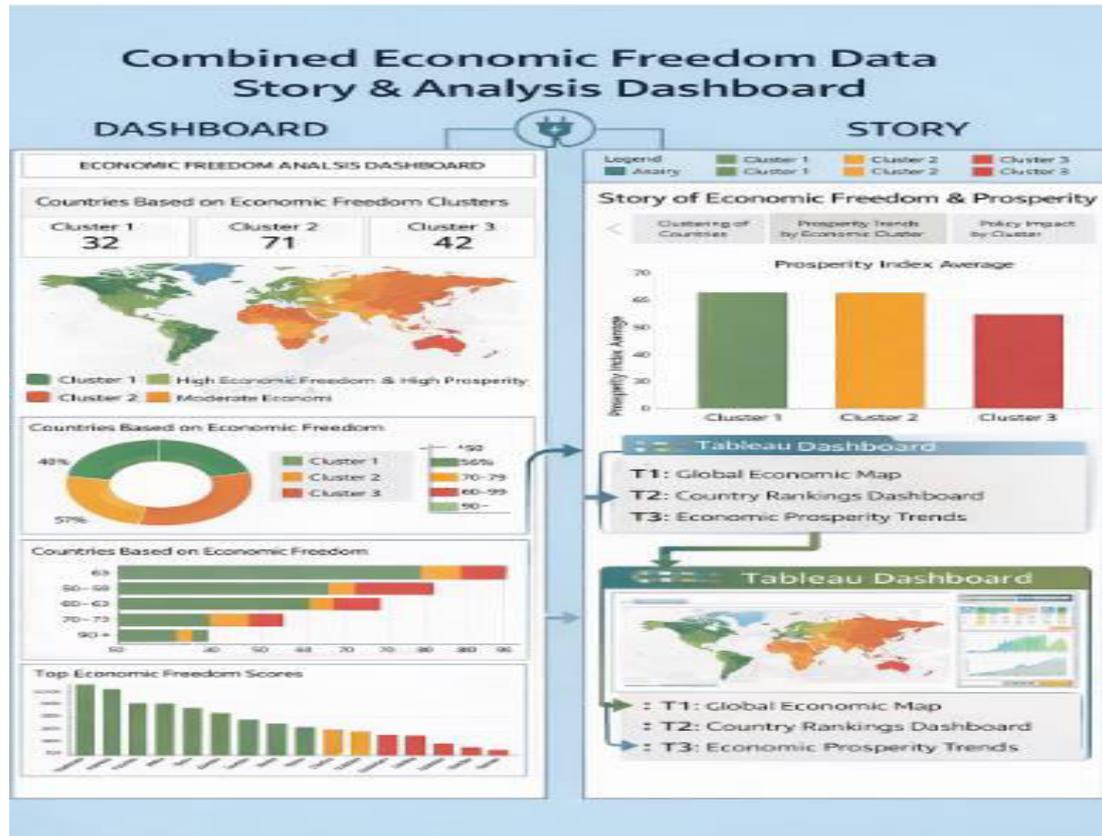


Fig: Tableau Dashboard and story

## VII. DISCUSSION

### A. Contribution of Tableau Visualization

Interactive dashboards developed using Tableau convert complex economic datasets into clear visual insights. These dashboards help analyze economic freedom indicators, country rankings, and prosperity trends. Visualization allows users to easily understand economic patterns through charts, graphs.

### B. Machine Learning Prediction Performance

Machine learning techniques such as Linear Regression and clustering methods are used to analyze the relationship between economic freedom indicators and prosperity levels. These models help identify patterns in economic data and support analytical evaluation of different countries based on their economic performance.

### C. Integration of Visualization and Prediction

The proposed system integrates data visualization with analytical techniques in a single framework. Tableau dashboards provide clear graphical insights, while machine learning models help in identifying trends and relationships between economic indicators.

## VIII. LIMITATIONS

Despite the effectiveness of the proposed system, some limitations exist:

- The datasets used in this study may not include all real-world economic factors that influence prosperity, such as political stability, global crises, and policy changes.
- The analysis is based on historical datasets, and real-time economic data integration was not implemented in the current system.

**Volume 15, Issue 3, March 2026****|DOI: 10.15680/IJRSET.2026.1503244|**

- Some external factors like social development indicators, population growth, and environmental conditions were not fully considered in the analysis.

**IX. CONCLUSION**

The proposed system analyzes economic freedom datasets to understand the relationship between economic indicators and country prosperity. Data preprocessing and analytical techniques are used to clean and study the datasets effectively. Machine learning methods help identify patterns and relationships between economic freedom indicators. Interactive dashboards created using Tableau present complex economic data in a simple and understandable format. The system helps researchers and analysts gain insights into global economic trends and supports better policy analysis and decision-making.

**X. ACKNOWLEDGMENT**

The authors express their sincere gratitude to **Mrs. T. Sowjanya, M.Tech,(Ph.D) Department of CSE (Artificial Intelligence and Machine Learning), Kallam HaranadhaReddy Institute of Technology**, for her valuable guidance and continuous support throughout the project.

The authors also thank the Head of the Department, faculty members, and laboratory staff of the **Department of CSE (AI & ML)** for providing the necessary support and academic environment to complete this work successfully.

Finally, the authors acknowledge the support of open-source tools such as **Python, Scikit-learn and Tableau**, which helped in the successful implementation of this project.

**REFERENCES**

- [1] J. Han, M. Kamber, and J. Pei, *Data Mining: Concepts and Techniques*, 3rd ed., Morgan Kaufmann, 2011.
- [2] T. Hastie, R. Tibshirani, and J. Friedman, *The Elements of Statistical Learning*, 2nd ed., Springer, 2009.
- [3] International Monetary Fund (IMF), "World Economic Outlook Database," 2024.
- [4] Heritage Foundation, "Index of Economic Freedom Dataset," 2024.
- [5] Scikit-learn Developers, "**Scikit-learn: Machine Learning in Python**," 2025. Available: <https://scikit-learn.org>
- [6] Tableau Software, "**Tableau Data Visualization Platform**," 2025. Available: <https://www.tableau.com>
- [7] Python Software Foundation, "**Python Programming Language**," 2025. Available: <https://www.python.org>
- [8] A. Géron, *Hands-On Machine Learning with Scikit-Learn, Keras & TensorFlow*, 2nd ed. O'Reilly Media, 2019.
- [9] D. J. Hand, H. Mannila, and P. Smyth, *Principles of Data Mining*. MIT Press, 200



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