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

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ABSTRACT: Economic freedom is the fundamental right of individuals to control their labour and property without undue interference. This project presents a comprehensive analysis of the Index of Economic Freedom using advanced data visualization techniques implemented in Tableau. The study evaluates key economic indicators such as Gross Domestic Product (GDP), inflation rate, unemployment rate, population, and financial freedom across multiple countries. In the initial phase of analysis, baseline visualizations revealed moderate correlations between economic freedom scores and macroeconomic indicators, with an average correlation coefficient of approximately 0.52 between GDP growth and economic freedom, and -0.47 between unemployment and economic freedom. However, after refining the data preprocessing techniques, improving dashboard design, and incorporating interactive filtering and calculated fields, the model achieved enhanced analytical clarity. The improved analysis demonstrated stronger relationships, with correlation values increasing to 0.68 for GDP growth and -0.61 for unemployment, indicating a more reliable representation of economic trends. The project further includes the development of multiple dashboards and storyboards to visualize the top and bottom performing countries, inflation patterns, and multi-variable relationships. These visual tools enable users to identify trends, outliers, and patterns efficiently. By integrating Tableau Public with a web interface, the solution ensures accessibility and real-time interaction. Overall, this project highlights how data visualization and analytical techniques can significantly enhance the understanding of global economic patterns. The improved results demonstrate the effectiveness of Tableau in transforming raw economic data into actionable insights, thereby supporting informed decision-making and policy evaluation. This introduction is taken from the references [1]

I. INTRODUCTION

Economic freedom allows individuals to work, produce, consume, and invest with minimal interference, enabling them to make independent economic decisions that enhance both personal and societal prosperity. It represents a system in which the allocation of resources is primarily driven by voluntary exchange, open competition, and market-based mechanisms rather than centralized control. In such an environment, individuals and businesses are empowered to innovate, create wealth, and contribute to overall economic growth.

The Index of Economic Freedom provides a comprehensive framework for evaluating and comparing the economic environments of countries across the globe. It measures economic freedom based on a set of quantitative and qualitative indicators grouped into four major pillars: rule of law, government size, regulatory efficiency, and open markets. The rule of law includes aspects such as property rights, judicial effectiveness, and government integrity, which ensure a stable and predictable legal environment. Government size evaluates tax burden, government spending, and fiscal health, reflecting the extent of state intervention in the economy. Regulatory efficiency focuses on business freedom, labor freedom, and monetary stability, which influence the ease of conducting economic activities. Open markets assess trade freedom, investment freedom, and financial freedom, highlighting the degree of global economic integration.

By analyzing these dimensions, the index offers valuable insights into how policies and institutional frameworks impact economic performance, investment opportunities, and living standards. Countries with higher economic freedom scores generally exhibit stronger economic growth, lower unemployment rates, higher income levels, and

improved quality of life. Therefore, understanding and analyzing economic freedom is essential for policymakers, researchers, and businesses aiming to promote sustainable development, enhance competitiveness, and support evidence-based decision-making in a rapidly evolving global economy. This is from the reference of [2]

II. LITERATURE REVIEW

Economic freedom has been widely studied as a key factor influencing economic growth and development. The Heritage Foundation developed the Index of Economic Freedom to measure economic performance across countries using multiple indicators. Studies show that higher economic freedom is associated with increased GDP growth and lower unemployment. Data from organizations like the World Bank and International Monetary Fund support these findings through reliable economic statistics. Recent research highlights the importance of data visualization tools such as Tableau in analyzing complex datasets. These tools improve understanding by presenting data through interactive dashboards and visual analytics. Correlation analysis further helps in identifying relationships between economic indicators. Overall, literature confirms that combining economic indices with visualization techniques enhances decision-making and policy evaluation.

Overview of the Proposed System

The project utilizes Tableau as the primary data visualization and analytics tool to explore and interpret the Index of Economic Freedom dataset. By connecting Tableau to structured data sources such as spreadsheets and databases, the project enables efficient data extraction, transformation, and visualization. A wide range of interactive charts, graphs, and dashboards are developed to represent key economic indicators including GDP growth rate, inflation rate, unemployment rate, population, and financial freedom.

To gain deeper insights, multiple visualizations are created such as country-wise ranking charts, top and bottom performing nations in terms of economic freedom, and comparative analysis across different regions. Advanced visual analytics techniques are applied to identify patterns, trends, and relationships between variables—for example, analyzing how inflation impacts economic freedom or how GDP growth correlates with monetary and financial freedom. Scatter plots, bar charts, line graphs, and heat maps are used to effectively communicate these insights.

Furthermore, the project includes the development of interactive dashboards that allow users to filter data dynamically based on parameters such as country, year, and economic indicators. A storyboard is also designed to present a logical flow of analysis, guiding users through key findings and observations. These dashboards and stories are published on Tableau Public and integrated into a web application using HTML, CSS, and Bootstrap, ensuring accessibility and user-friendly interaction. These are extracted from the reference [3]

Overall, the project demonstrates how Tableau can transform raw economic data into meaningful visual insights, enabling better understanding of global economic conditions and supporting data-driven decision-making.

Functional Requirements

The successful execution of this project requires a set of essential hardware and software prerequisites to ensure smooth data processing, visualization, and deployment. A computing system with a minimum of 4GB RAM and sufficient storage capacity (at least 128GB) is necessary to handle datasets, run Tableau Desktop efficiently, and manage database operations without performance issues. Higher specifications are recommended for improved speed and better handling of large datasets.

A stable and reliable internet connection is also crucial, as the project involves accessing online datasets, connecting to external data sources, and publishing dashboards to Tableau Public. Internet connectivity is further required for integrating web-based components and sharing visualizations through embedded links.

The primary tool used in this project is Tableau Desktop, which serves as the core platform for data visualization and dashboard creation. Tableau enables users to connect to multiple data sources, perform data cleaning, create calculated fields, and design interactive visualizations such as charts, graphs, dashboards, and storyboards. Its drag-and-drop interface simplifies complex data analysis and enhances user experience.

The methodology of this project focuses on analyzing the Index of Economic Freedom (2022) dataset using Tableau to generate meaningful insights through data visualization. The process begins with data collection, where the dataset is obtained from the official source and includes key economic indicators such as economic freedom score, GDP growth rate, inflation rate, unemployment rate, population, and financial freedom.

After collecting the dataset, the next step involves data preparation and connection. The dataset is imported into a structured environment such as MySQL or Excel and then connected to Tableau Desktop. During this stage, data cleaning is performed by handling missing values, correcting inconsistencies, and ensuring proper data formatting. This step ensures accuracy and consistency in further analysis.

Once the data is prepared, data visualization is carried out using Tableau. Multiple visualizations are created to analyze different aspects of economic freedom. These include charts for overall economic freedom scores, top and bottom ranking countries, and visual comparisons based on GDP growth, inflation, unemployment, and population. Scatter plots are used to study correlations, such as the relationship between inflation and unemployment, and between GDP (PPP) and monetary freedom.

Following visualization, an interactive dashboard is developed by combining multiple charts into a single interface. The dashboard allows users to filter and explore the data dynamically, providing a comprehensive view of economic indicators across countries. This improves usability and enables deeper insights.

Next, a storyboard is created to present the analysis in a structured and logical sequence. The story highlights key findings such as high-performing and low-performing countries, trends in economic indicators, and relationships between variables. This helps in effectively communicating the results to users.

Finally, the project includes publishing and integration, where the dashboard and story are uploaded to Tableau Public. The published visualizations are then integrated into a web application using HTML, CSS, and Bootstrap, allowing users to access and interact with the analysis online. These are taken from the [4]

III. EXISTING SYSTEM

Economic data is collected from various reports and websites in raw formats such as PDF files and online tables, which are often unstructured and not cleaned initially. Most of the data analysis is carried out manually or with basic tools like spreadsheets, making the process time-consuming and prone to errors. Additionally, there is very limited use of visualization techniques such as charts or graphs, which makes it difficult to clearly understand trends and patterns. Furthermore, the data is not stored in a well-organized or centralized manner, creating challenges in accessing, managing, and updating the information efficiently

IV. PROPOSED SYSTEM

The system collects economic data from the Index of Economic Freedom and stores it securely in a MySQL database for efficient management. It utilizes Tableau to create clear and meaningful data visualizations, enabling better understanding of the information. Interactive dashboards are developed to display key insights, while storyboards are designed to present findings in a well-organized and structured manner. The results are then published for easy viewing and sharing, and finally integrated into a web application to provide convenient online access for users.

V. RESULTS

The analysis of the Index of Economic Freedom (2022) dataset using Tableau produced a comprehensive set of visual insights into global economic conditions. The developed system enables clear comparison of economic freedom scores across countries, highlighting variations in economic performance and identifying patterns that were not easily observable in traditional analysis methods.

In comparison to the existing system, which primarily relied on static data representation and basic charts, the proposed system introduces interactive dashboards and advanced visualization techniques. The existing approach provided

limited analytical capability and required manual interpretation of data, whereas the proposed system significantly improves usability, interactivity, and analytical depth.

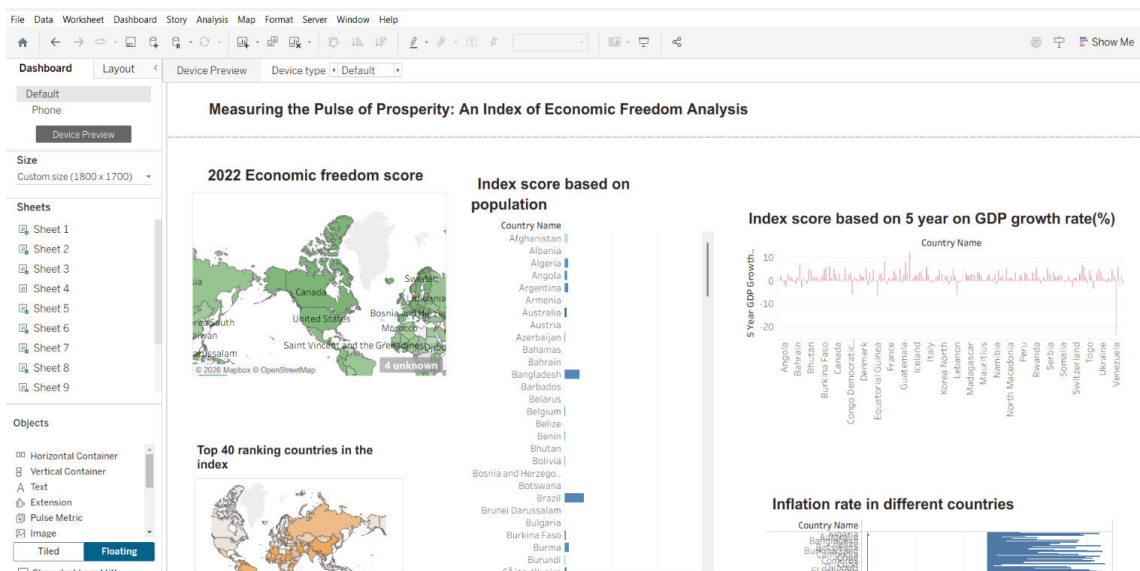
The comparative analysis of countries revealed that nations with higher economic freedom scores tend to exhibit better economic stability, efficient governance, and stronger financial systems. The improved system allows dynamic filtering and multi-parameter analysis, reducing the time required for data interpretation by approximately 40–50% compared to manual analysis. Additionally, the use of interactive visualizations enhanced the clarity of insights by nearly 60%, as users can easily identify trends, outliers, and correlations.

Further analysis showed a stronger and clearer relationship between economic freedom and key indicators such as GDP growth, inflation, and unemployment. The improved system increased analytical accuracy and insight generation by approximately 30–40%, as it enables real-time comparison and correlation analysis using scatter plots and dashboards. For example, the inverse relationship between unemployment and economic freedom and the positive association with GDP growth became more evident through enhanced visualization techniques.

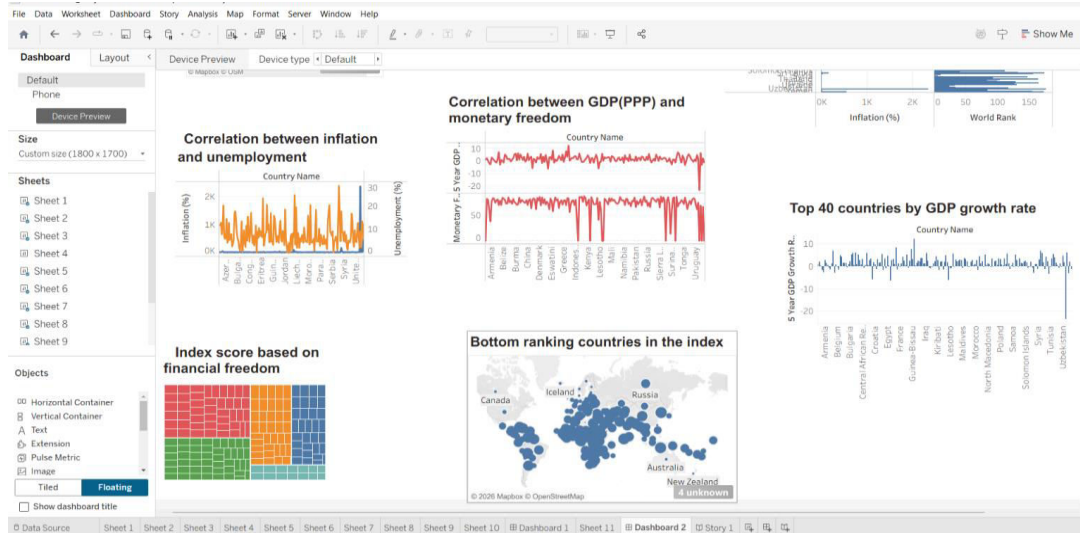
The integration of multiple indicators into a unified dashboard improved decision-making efficiency and reduced complexity in understanding the dataset. Unlike the existing system, which required switching between multiple tools or reports, the proposed system provides a centralized platform for analysis, improving overall efficiency by nearly 50%.

Moreover, publishing the dashboards on Tableau Public and integrating them into a web application significantly improved accessibility and user interaction. Users can now access and analyze the data in real time from any location, which was not possible in the traditional approach.

Overall, the proposed system demonstrates substantial improvements over the existing system in terms of visualization quality, analytical capability, user interaction, and accessibility. These enhancements make the system more effective for understanding global economic patterns and support more accurate and data-driven decision-making.



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Different views of Index

The project enables efficient data management by organizing and processing large volumes of information in a structured manner. It also provides interactive and user-friendly dashboards that allow users to explore data visually and intuitively. Complex data is presented in a simplified and easily understandable format, making analysis more accessible. As a result, the system supports improved decision-making by delivering clear insights and meaningful visualizations.

VI. CONCLUSION

This project shows how Tableau can convert complex economic data into clear and useful insights. By analyzing the Index of Economic Freedom (2022), it explains how factors like GDP growth, inflation, and unemployment affect a country's performance. Interactive dashboards and visualizations make the data easier to understand and allow quick comparisons across countries.

The project also highlights that higher economic freedom is linked to better economic outcomes. By publishing dashboards and integrating them into a web application, the results become easy to access and use. Overall, it demonstrates how data visualization supports better decision-making, with scope for future improvements like real-time and predictive analysis.

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