

# A Time series analysis of GDP from 2000 to 2010

## Introduction:

This report presents an in-depth analysis of the global economic landscape through the lens of Gross Domestic Product (GDP) data from 2000 to 2010. The focus is on identifying the disparities between nations with the highest and lowest GDPs and understanding the economic trajectory of the United States during this period.

## Methodology:

A structured approach was employed to assess the GDP data. The methodology entailed collecting raw data, preprocessing it for accuracy and consistency, and utilizing Tableau for dynamic visualization. Python was the primary tool used for data preprocessing, and Tableau served as the platform for data analytics and interactive dashboard creation.

## Data Set Preprocessing:

The preprocessing phase was executed methodically to transform the raw GDP data into a format suitable for analysis:

1. **Data Cleaning:** Standardization of country names and codes was carried out to address inconsistencies. Redundant columns were removed, and duplicate records were merged or deleted.
2. **Missing Value Imputation:** Linear regression was used to predict and fill missing GDP values, ensuring a complete dataset without compromising the integrity of economic trends.
3. **Data Reshaping:** The data was restructured from a wide format, with separate columns for each year, to a long format that aligns country, year, and GDP value into individual rows. This was essential for the time-series analysis that followed.
4. **Normalization and Rounding:** GDP values were normalized to account for inflation and other economic factors and were rounded to the nearest whole number to streamline the dataset.

## Data Analytics:

Post-preprocessing, the analytics stage leveraged Tableau's visualization features to uncover insights:

### Dynamic Parameters and Filters:

**Select N Countries:** A key parameter enables the user to choose Top N and Bottom N number of countries by GDP, highlighting disparities.

**Year Filter:** This filter allowed users to isolate data from specific years, providing insights into the effects of significant global events.

**Country Selection:** A filter for detailed, country-specific economic analysis.

### Interactive Dashboard Actions:

Selections in one visualization updated related data in other parts of the dashboard, allowing for an intuitive analysis experience.

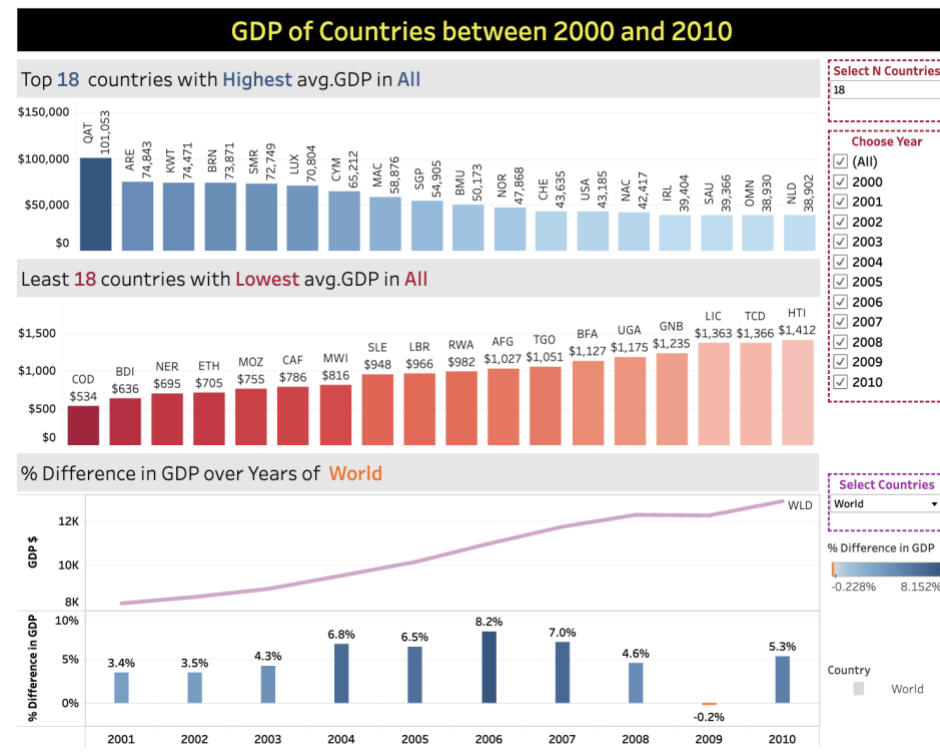
### Table Calculations:

The percentage difference in GDP over the years was calculated, revealing growth rates and economic changes over time.

## Visualization Techniques:

**Bar Charts:** Illustrated the economic standings of the countries, with color coding for immediate visual distinction.

**Line Chart:** Tracked the annual GDP fluctuations of the United States, providing a clear indication of economic stability and resilience.



## Insights:

- The visual analysis revealed a pronounced disparity between the nations with the highest and lowest GDPs.
- Middle Eastern countries dominated the upper class, while several African nations grappled with the lowest economic outputs.
- The United States, U.K, Germany and most of the countries showcased a generally positive GDP growth, with a notable dip in 2008-2009 due to the financial crisis, followed by a subsequent recovery.
- The dip in Oman's GDP in 2003 could be attributed to the inherent volatility of oil prices, which directly affect the country's economy. Oman's economy heavily relies on its oil sector, with petroleum products constituting a significant portion of its GDP.
- Throughout the ten-year period, India maintained positive year-over-year GDP growth, with no instances of negative growth, which is indicative of a robust economy during those years.
- China experienced high GDP growth throughout the decade, consistently above 9%. The sharpest dip occurs in 2009, where the growth rate falls to 9.7%, the lowest in the decade.

This suggests that the financial crisis had a delayed impact on China compared to many Western economies.

**Future Work:**

Further studies could extend the analysis to include data post-2010, providing a more comprehensive view of economic trends and recovery patterns after the financial crisis. Additional economic indicators such as GDP per capita, unemployment rates, and inflation could enrich the analysis. A time series forecast can be conducted to predict future data.

**Challenges:**

The project confronted several challenges, including handling incomplete data records, ensuring the accuracy of predicted GDP values, and making the data visually accessible and comprehensible for users with varying levels of economic expertise.

**Conclusion:**

This project not only illuminated the stark contrasts in economic prosperity among nations but also underscored the complexity of the global economy. The insights derived from this analysis serve as a testament to the potential of data visualization in making sense of vast datasets and facilitating a better understanding of world economics.