

PESTEL-Driven Investment Insights

Evaluating Macroeconomic Factors Across Industries and Countries for Strategic Decision-Making



TopicReasoning of Selection

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Problem & Solution

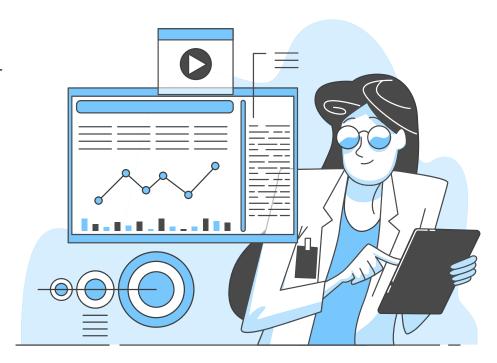
Questions aimed to answer



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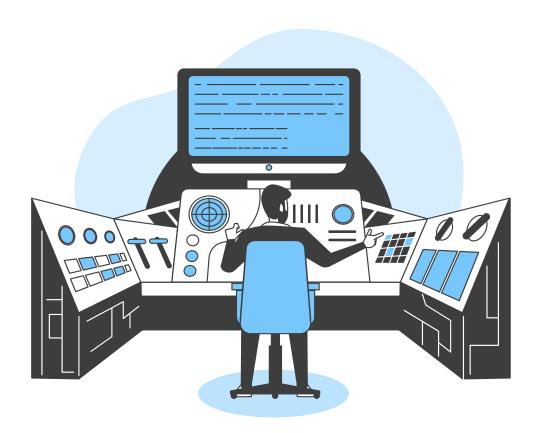
Data Visualization



Recommendations



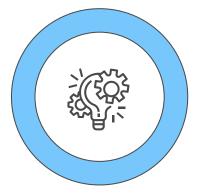
Conclusion





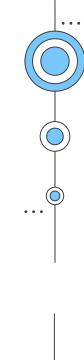


Reasoning of Selection

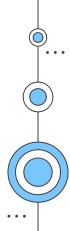


The project topic focuses on leveraging **PESTEL** analysis to assess macroeconomic factors across various industries and countries, with the goal of informing strategic **decision-making** for investors and entrepreneurs. By examining Political, Economic, Social, Technological, Environmental, and Legal factors, this project aims to provide a comprehensive understanding of the business environment in different regions and industries. By incorporating news articles, **sentiment analysis**, and **economic data**, the project offers valuable insights that can help users identify potential **investment opportunities**, **risks**, and **growth areas**, ultimately facilitating informed decisions on **market entry or expansion**.

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O2Problem & Solution



Understanding the Problem



What are the <u>top countries</u> to invest in based on their GDP, GDP growth rate, and ease of doing business score?

This project identifies the most attractive countries for investment by considering key economic indicators such as GDP, GDP growth rate, and the ease of doing business score



What industries are thriving in these countries?

The project examines various industries within the topperforming countries to determine which ones are experiencing growth and success



What is the current state of the political, economic, social, technological, environmental, and legal (PESTEL) factors for each country and industry?

By conducting a PESTEL
analysis, the project assesses
the current status of these
factors in each country and
industry, providing a
comprehensive understanding
of the business environment



What is the sentiment of the news articles related to a particular country, industry, and category?

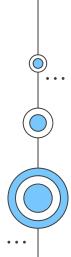
Sentiment analysis is performed on the collected news articles to determine the overall sentiment, which is then used to inform the PESTEL analysis and provide insights into the business environment for each country and industry





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Data Collection





Description of the Data Source



THE WORLD BANK

World Bank API

To obtain economic indicators such as GDP growth, ease of doing business, and industry size for different countries and sectors



Bing News Search API

To retrieve news articles related to specific countries and sectors





Description of the Data Source

Sentiment140

CSV Trained Data

Twitter trained data to use for the machine learning



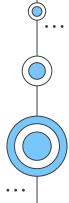
Python

To create a sample dataset of the news articles, their sentiment score based on the machine learning model, and their corresponding country and sector.



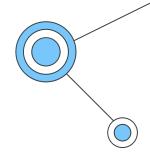


O4 Data Preprocessing



Extracting relevant data

- Obtain GDP, GDP growth rate, and Ease of Doing Business scores for countries using the World Bank API
- Retrieve news articles related to specific countries and industries using the Bing News Search API



Cleaning and filtering the data

- Filter out the top 25 countries based on GDP and GDP growth rate, then merge these two lists to identify countries appearing in both.
- Select countries with an Ease of Doing Business score greater than 77 and merge this information with the previously obtained country list to finalize the top countries for analysis.

Data combination and expansion

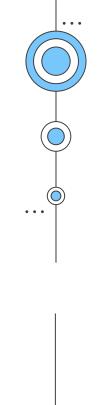
- Create a comprehensive list of industries based on the World Bank classification.
- Generate a new dataset containing all possible combinations of the chosen countries, industries, and PESTEL categories.

Data Storage and Integration

- Export the trained data and the processed news articles to a database (e.g., using pgAdmin and Python)
- Import the data back from the database to be used in the machine learning model and analysis

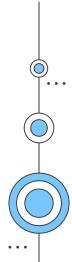
Preparing data for sentiment analysis

- Utilize a labeled dataset of news headlines (positive or negative) to train a machine learning model for sentiment analysis.
- Clean and preprocess the training dataset (e.g., remove special characters, convert text to lowercase) to ensure it's compatible with the model and can be used for accurate sentiment prediction.



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Data Analysis





Our Process

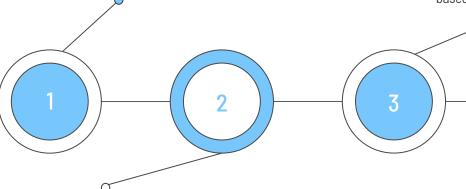
Sentiment analysis model training:

- Train a machine learning model, such as logistic regression, on the preprocessed and labeled dataset of news headlines.

 Evaluate the model's accuracy using metrics such as confusion matrix.
 - and classification report, ensuring its suitability for sentiment prediction. *Accuracy of 0.78*

PESTEL analysis:

- Analyze the content of the news articles and the sentiment scores to assess the political, economic, social, technological, environmental, and legal factors impacting each country and industry.
- Identify the strengths, weaknesses, opportunities, and threats (SWOT) for each industry in the selected countries based on the PESTEL analysis.



Sentiment analysis on news articles:

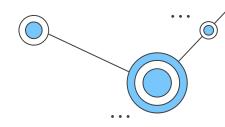
- Apply the trained sentiment analysis model to predict the sentiment of the news articles (positive or negative) for each combination of country, industry, and PESTEL category.
 - Aggregate the sentiment results to obtain an overall sentiment score for each combination.

<u>Identifying investment opportunities:</u>

- Rank countries and industries based on their overall PESTEL scores, sentiment analysis results, GDP, GDP growth rate, and Ease of Doing Business scores.
- Identify the top investment opportunities by highlighting the countries and industries that have the most favorable combination of these factors.



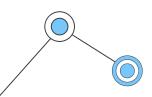
Resources Used



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Libraries and Tools:

- Pandas: A Python library for data manipulation and analysis.
 - NumPy: A Python library for numerical computing.
- Scikit-learn: A Python library for machine learning and data mining tasks.
- NLTK (Natural Language Toolkit): A Python library for natural language processing.
- Beautiful Soup: A Python library for web scraping.
 - Requests: A Python library for making HTTP requests.



Algorithms and Evaluation Metrics:

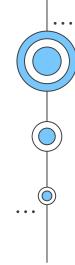
- Logistic Regression: A machine learning algorithm used for binary classification tasks.
- Confusion Matrix and Classification Report: Evaluation metrics providing insights into the performance of the trained logistic regression model.



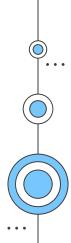
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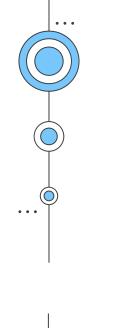
Programming Language:

A versatile programming language used for various purposes, including data analysis, machine learning, and web development. It serves as the primary language for implementing data processing, analysis, and machine learning tasks in this project.



O6 Data Visualization



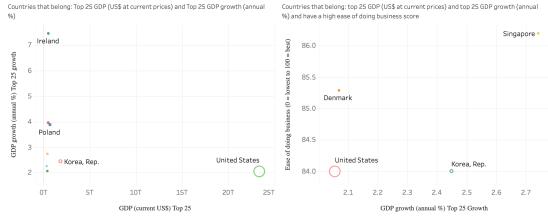


PESTEL Analysis by Country and Sector

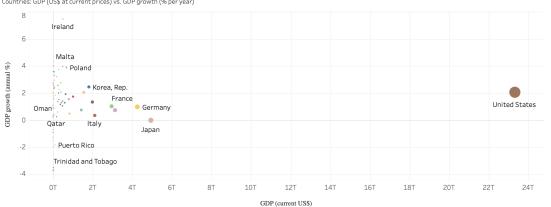
Selection of countries that belong to the top 25 of GDP and its growth and that are countries where it is easy to do business

PESTEL Analysis by Country and Sector

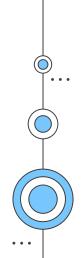
Overall Score based or



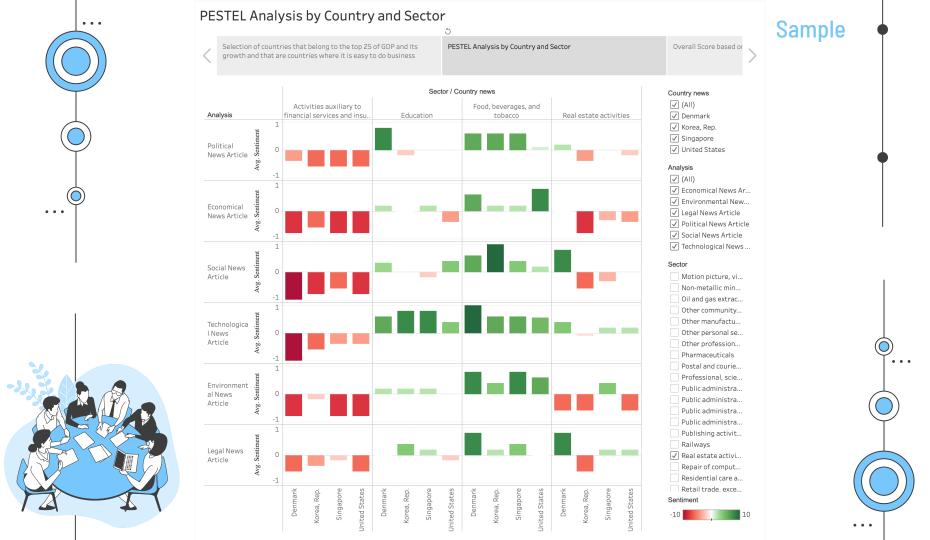
Countries: GDP (US\$ at current prices) vs. GDP growth (% per year)

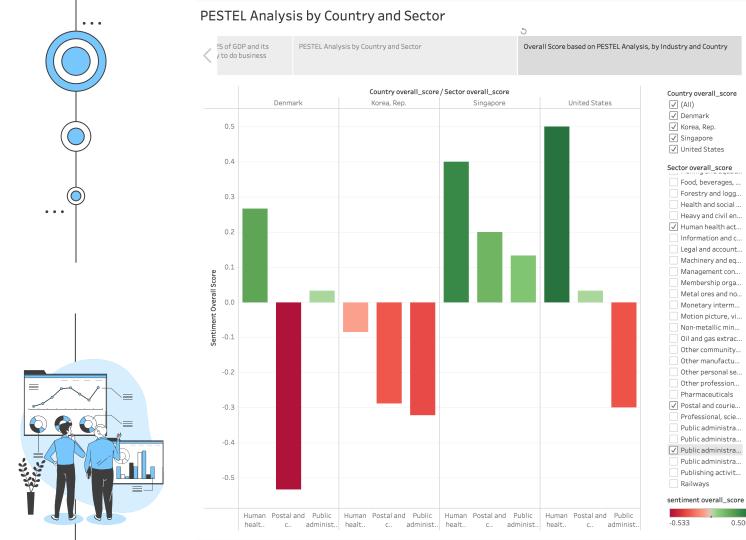




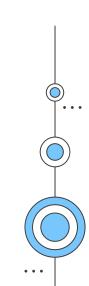




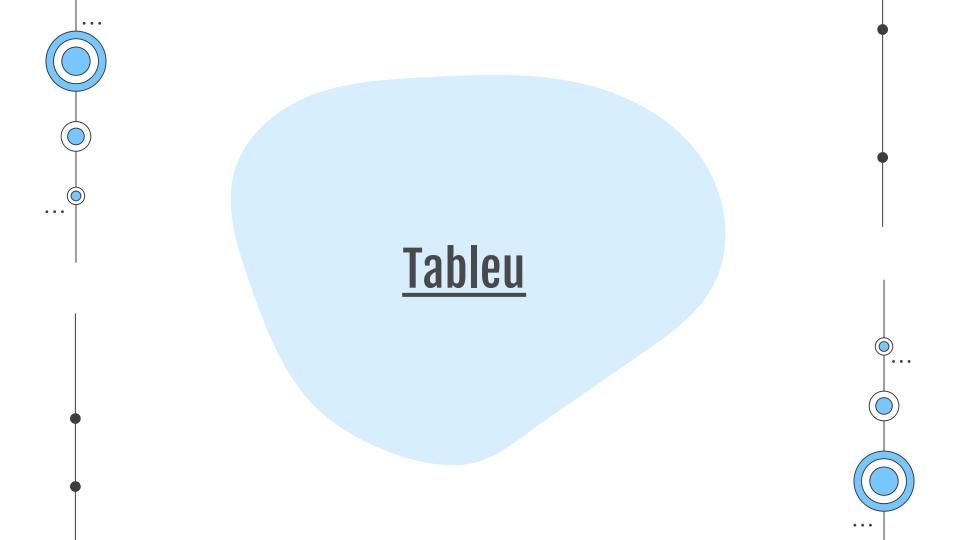


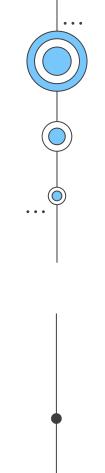


Sample



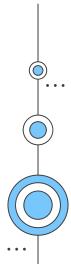
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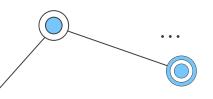




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Recommendations





For Future Analysis





- Expand data sources for a comprehensive view of countries and industries.
- Perform <u>time series analysis</u> to identify trends and predict future performance.
- Include <u>additional factors</u> such as cultural, demographic, or competitive aspects.
- Use sentiment analysis to understand <u>public</u> <u>opinion</u> and potential impact on investments.
- Experiment with <u>advanced machine learning</u> <u>techniques</u> to improve prediction accuracy.
- Incorporate <u>macroeconomic indicators</u> to better assess the investment climate.
- Develop a <u>risk assessment framework</u> to evaluate potential investment risks.
- Conduct <u>industry-specific analysis</u> to account for unique factors, trends, and challenges.









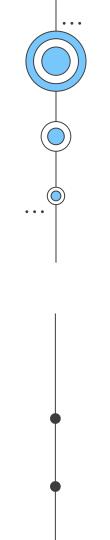


If given the chance to approach this project differently, the team might consider

- Starting with a <u>broader scope</u>, including more countries and industries for a comprehensive analysis.
- Collaborating with <u>domain experts</u> to better understand the nuances of each industry and country.
- Implementing a <u>more robust data validation</u> and cleaning process to ensure the highest quality data.
- Utilizing <u>additional machine learning algorithms</u> to compare their performance and optimize the analysis.
- Incorporating <u>real-time</u> data feeds to keep the analysis up to date and relevant.
- Building a <u>user-friendly interface</u> to make the tool more accessible to a wider audience.
- Allocating more time for testing and refining the model to improve its accuracy and reliability.
- Exploring <u>different visualization techniques</u> to better communicate the insights and findings to stakeholders.

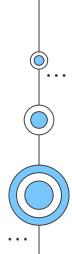






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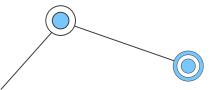
Conclusion



Conclusion

This project identified top investment countries using GDP, growth rate, and ease of doing business scores. It also analyzed thriving industries, PESTEL factors, and news sentiment. By utilizing data processing and machine learning algorithms, the project provided valuable insights for potential investors, guiding investment decisions and offering a comprehensive understanding of various countries and industries. This serves as a strong foundation for future analysis and informed decision-making.





Thanks!



jj.gomezg@uniandes.edu.co +1 917 420 5904 https://github.com/jjgomezg17

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