Data Analysis
Dataset: Forbes Global Companies in 2022

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- ABSTRACT

This template demonstrates the data analysis of a dataset from Kaggle regarding the Forbes Global Top 2000 Companies in the year 2022. This dataset is derived from the companies' progress in the year 2021 and part of 2022. The document is an inference of the analysis of the dataset using Python in the Jupyter Notebook. The analysis is done by drawing parts of the dataset and plotting them on to different types of graphs like histogram, pie chart, and bar charts. In concussion, we have analyzed why and how some companies have the top position in the industry and some have not in the list of top 2000 companies.

Keywords: Data Analytics, Python, Forbes 2000

- METHOD

○ *Data Set*

The data set used for this analysis was Forbes Global Companies in 2022 [1]. Forbes is a business magazine that is known for its lists, which rank people and companies in a variety of categories, such as the richest people in the world, the most powerful women in business, and the best places to work [2].

The Forbes Global Companies in 2022 dataset lists the 2000 largest companies in the world using four metrics: sales, profits, assets, and market value. The dataset ranks the companies using the latest 12 months of financial data available as of April 22, 2022.

For this analysis, we will use the top 200 companies listed on the Forbes dataset.

○ *Data Analytics Strategy and Python (methodology how are we going to do this?)*

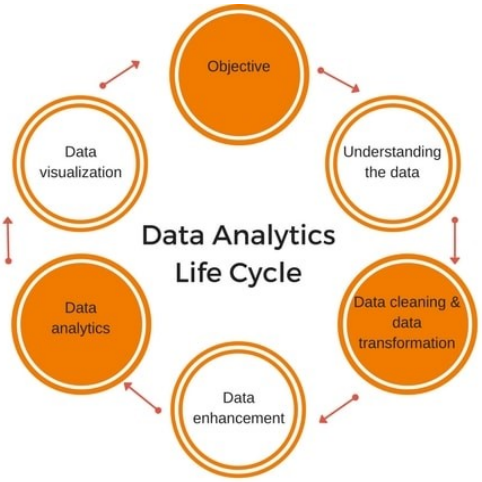

Fig. 1. Data Analytics Life Cycle [3].

For this analysis, we followed the Data Analytics Life Cycle described in Figure 1 to give the project the right structure.

First, we defined our objective as to analyze and gain insights from a dataset. Second, once we found the dataset, we understood the information and defined what to do with it. Understanding the four financial metrics (sales, profits, assets, and market value) was key to moving forward with the other steps.

Third, we cleaned and transformed the data. For this, we used Python with the help of the Jupyter library. The dataset was imported and cleaned using the Pandas library and functions such as removing dollar symbols, commas, and changing the numbers from strings to floats. We also checked for any missing data.

Fourth, we enhanced the data. For this step, to help us get better insights, considering the available financial

information, we decided to add three financial key ratios: profit margin, price-to-sales ratio, and return on assets.

Profit margin is a financial ratio that measures how much profit a company makes from each dollar of sales [4].

Profit margin: (profit/ revenue(sales) * 100

The price-to-sales ratio (P/S) is a valuation metric that compares a company's stock price to its revenue. A lower P/S ratio indicates that the stock is undervalued, while a higher P/S ratio indicates that the stock is overvalued [5].

Price to sales: market value/ revenue (sales)

Return on assets (ROA) is a financial ratio that measures a company's profitability relative to its total assets. A high ROA indicates that a company is using its assets efficiently to generate profits, while a low ROA indicates that a company is not using its assets efficiently. [6].

Return on assets: (profit/ assets) * 100

Fifth, we used Python functions and the Matplotlib library to do the data analytics and data visualization. We defined the following:

- Top 10 countries with the highest market cap participation in the Forbes 2000 list in 2022.
- Which are the top 20 companies in the list?
- Which are the bottom 20 companies?

Comparison of financial ratios between companies in the same industry that rank in the top 20 of the Forbes 2000 list in 2022.

- Alphabet/Microsoft (IT, Internet, Software & Services)
- JP Morgan/ Bank of America (Banking)

Comparison of financial ratios between companies in the same industry that rank in the top 20 and bottom 20 of the Forbes 2000 list in 2022.

- AT&T/ Telefónica/ China Telecom (Telecommunications)

All the work done on Python can be found in this file, which will be attached to this paper.
<BUA500-DataAnalyticsUsingPythonKavyaKandNathalyC.html>

- RESULTS

Next, we will analyze the graphs and list the insights we gained.

- *Top 10 countries with the highest market cap participation in the Forbes 2000 list.*

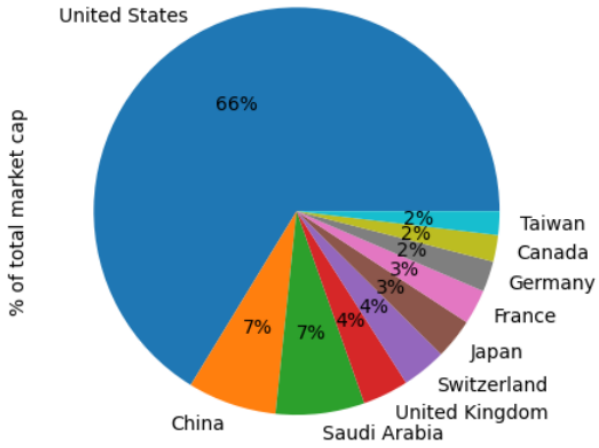

Fig. 2. Top 10 countries with the highest market cap participation in the Forbes 2000 list in 2022.

The analysis of the figure 2 reveals that the United States is by far the leader in terms of market cap participation, with a share of 66.26%. This is not surprising, given that the US is home to some of the world's largest and most successful companies, such as Berkshire, Apple, JP Morgan Chase, Microsoft and Amazon.

China comes in second place with a market cap participation of 7.13%, which is significantly lower than the US. However, China has been rapidly growing its presence in the global market, and it is likely that its market cap participation will continue to increase in the coming years. They count with the presence of many large companies such as ICBC, Bank of China and Alibaba [1].

Saudi Arabia comes in third place with a market cap participation of 7%. This is due in large part to the country's oil industry, which has helped to create some of the largest companies in the world, such as Saudi Aramco [1].

The remaining countries on the list, including the United Kingdom, Switzerland, Japan, France, Germany, Canada, and Taiwan, all have much smaller market cap participation, ranging from 4% to 2%. These countries are still home to some of the world's largest and most successful companies, but they are not as dominant in the global market as the United States, China, and Saudi Arabia.

Overall, this list highlights the global distribution of market capitalization among the world's largest public companies, and it underscores the continued dominance of the United States in this area.

○ *Which are the top 20 companies in the list?*

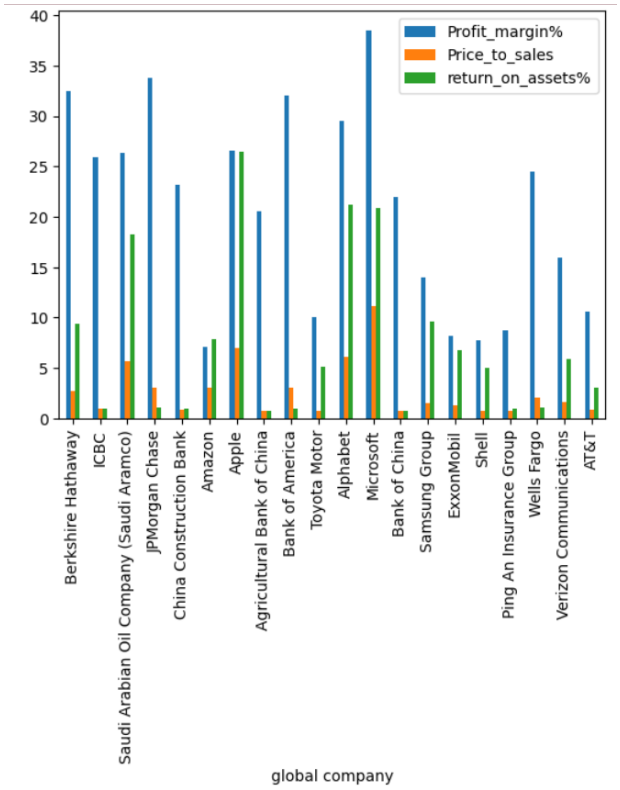

Fig. 3. Top 20 companies from Forbes 2022.

○ *Which are the bottom 20 companies?*

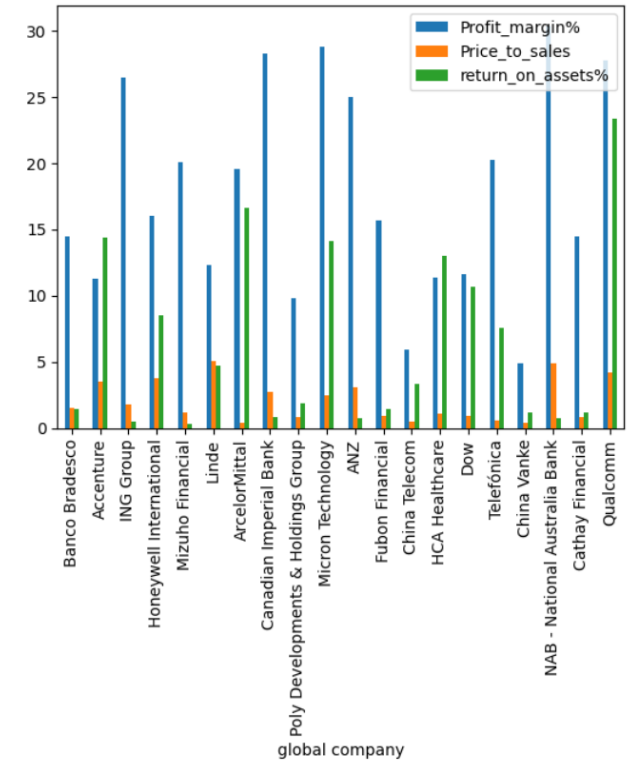

Fig. 4. Bottom 20 companies from Forbes 2022.

○ *Comparison of financial ratios between companies in the same industry that rank in the top 20 of the Forbes 2000 list.*

- **Industry - Technology**
- **Alphabet/Microsoft**

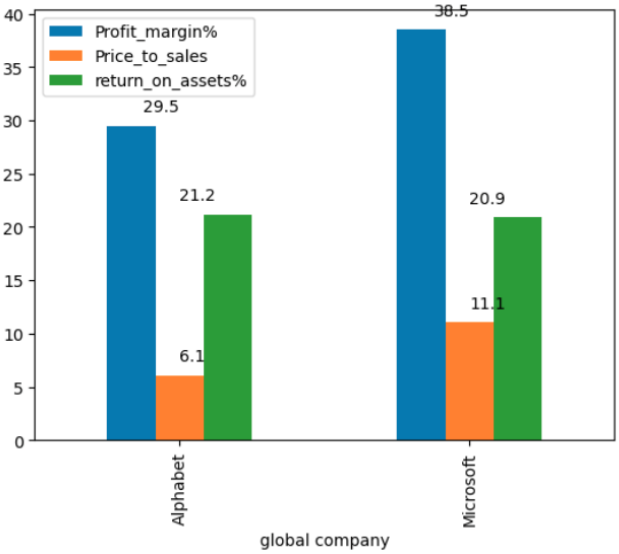

Fig. 5. Alphabet and Microsoft financial ratios for 2022.

The given data in figure 5 presents key financial ratios for two technology giants, Alphabet and Microsoft, for the year 2022.

Alphabet has a profit margin of 29.5%, while Microsoft's profit margin is higher at 38.5%. This indicates that Microsoft is generating more profits per dollar of revenue compared to Alphabet. One reason is that Microsoft has a more diversified business model than Alphabet. Microsoft has a strong presence in several markets, including personal computers, gaming, and cloud computing. This diversification allows Microsoft to generate revenue from multiple sources [7].

The price to sales ratio suggests that the market values Microsoft's revenue more than Alphabet's revenue, which is a positive indicator of the company's future growth prospects. However, when compared to Alphabet, this could indicate that Microsoft is overpriced. Microsoft has been focusing on key areas where it can boost cloud revenue to accelerate sales growth. Microsoft's Azure is ranked second in the cloud computing market, behind Amazon Inc.'s (AMZN) Amazon Web Services (AWS) [7].

Both Alphabet and Microsoft have a high return on assets with Alphabet at 21.2% and Microsoft at 20.9%. This indicates that both companies are efficiently utilizing their assets to generate profits.

Overall, the data suggests that Microsoft is generating more profits per dollar of revenue compared to Alphabet,

and the market values Microsoft's revenue more than Alphabet's revenue. However, both companies are efficiently utilizing their assets to generate profits.

- **Industry: Banking**
- **JPMorgan Chase/Bank of America**

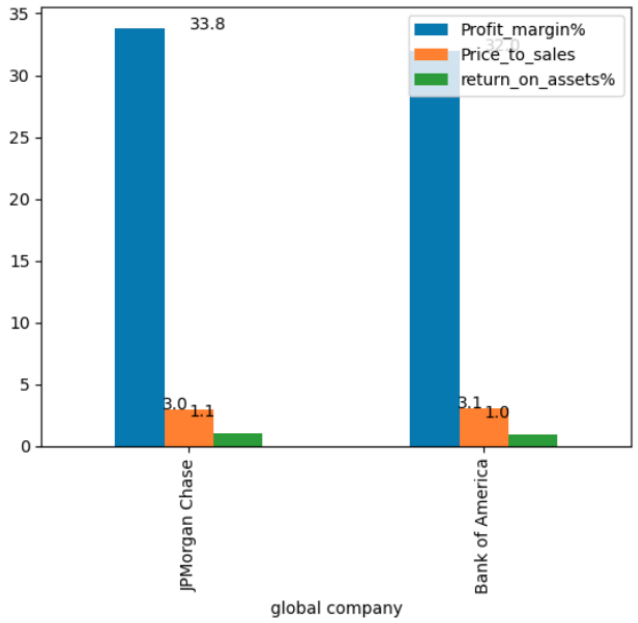

Fig. 6. JPMorgan Chase and Bank of America financial ratios in 2022

The given data in figure. 6 represents key financial ratios for two banking giants, JPMorgan Chase and Bank of America, for the year 2022. The analysis is based on three different aspects, Profit Margin %, Price to Sales, and Return on Assets %.

JPMorgan Chase has relatively higher profit margin % than the industry averages and it has been strong and consistent, driven by the ability to generate strong ROAs, equity, and operational income.

In terms of Price to sales, both the banks have similar yet slow revenue growth. This suggests that the market is watchful about the bank's future revenue growth in comparison to its competitors in the industry.

In terms of Return on Assets, both the banks have similar ROAs, displaying strong financial performance and their ability to generate profits.This has been possible because of efficient operations like implementations of numerous efficiency initiatives including investments in technology, process automation, and streamlining of operations.

- *Comparison of financial ratios between companies in the same industry that rank in the bottom 20 of the Forbes 2000 list.*

- **Industry - Telecommunications**
- **AT&T/ Telefónica/ China Telecom**

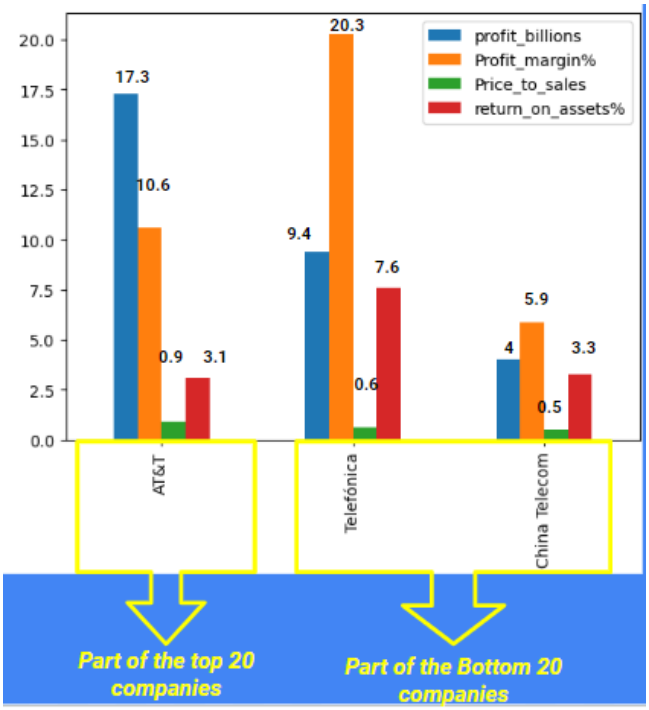

Fig. 7. AT&T/Telefonica/China Telecom financial ratios for 2022.

The profit margin data in figure 7 suggests that Telefónica is the most profitable company among the three, while China Telecom lags behind in terms of generating profits. One possibility is that Telefónica has a lower cost structure than AT&T. This could be due to a number of factors, such as lower labor costs or lower material costs.

The P/S ratios of AT&T, Telefónica, and China Telecom in 2022 were 0.9, 0.6, and 0.5, respectively. One possibility is that investors are more confident in AT&T's ability to generate future sales growth than they are in Telefónica's or China Telecom's ability to generate future sales growth.

The ROAs of AT&T, Telefónica, and China Telecom in 2022 were 3.1%, 7.6%, and 3.3%, respectively. One possibility is that Telefónica and China Telecom are able to turn their assets into sales more quickly than AT&T. Another possibility is that Telefónica and China Telecom have a lower cost of goods sold than AT&T.

In 2022, AT&T's profit was $17.3 billion, Telefónica's profit was $9.4 billion, and China Telecom's profit was $4 billion. This means that AT&T was more profitable than Telefónica and China Telecom.

There are a number of possible reasons for this difference in profitability. One possibility is that AT&T has a larger customer base than Telefónica and China Telecom. This means that AT&T is able to generate more revenue from its customers.

From the figure 7 we can analyze that Telefónica is in a better financial position than AT&T and China Telecom in 2022. Telefónica has a higher profit margin, return on assets, and price to sales ratio than AT&T. China Telecom has a lower profit margin and return on assets than AT&T.

● Conclusions

Forbes compares companies in different industries and includes financial metrics such as sales, profit, assets, and market value. However, it does not consider financial ratios such as profit margin, price to sales, return on assets, and other factors that could affect a company's financial position, such as its debt load, cash flow, and liquidity.

It is important to do a complete analysis of a company's financial position to get a better vision of the overall financial health. This can help drive different ranks and also help with investment decisions.

Python was used for this analysis. It is an easy programming language to learn and a useful tool for managing small, large, and complex datasets. Its libraries, such as NumPy, Pandas, and Matplotlib, make it easy to perform a wide variety of data analysis.

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