The Importance of Data Analytics to Win Government Contracts

A presentation for APMP

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What is the definition Data Analysis?

Data Analysis is the process of systematically applying statistical and/or logical techniques to describe and illustrate, condense and recap, and evaluate data

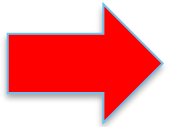
Types of Data Analysis

- **Organizations can use several data analysis methods to uncover actionable insights**
  - **Main data analysis techniques include:**
    - **Text Analytics**
    - **Statistical Analysis**
    - **Diagnostic Analysis**
    - **Predictive Analysis**
    - **Prescriptive Analysis**

Data Visualization

What is Data Visualization?

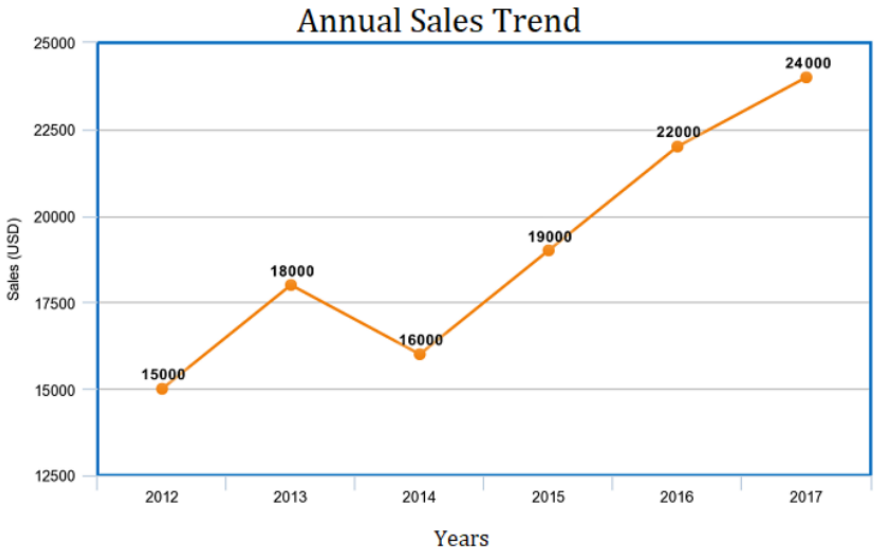
- Visual representation of Data
- Helps to observe & communicate patterns and trends with naked eye



Why Data Visualization is important?

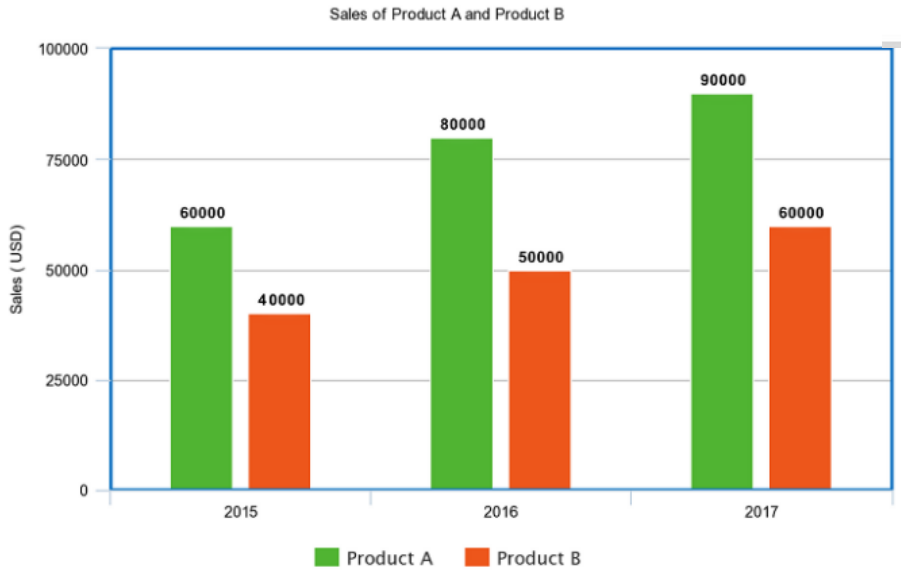
- Data Visualization helps to communicate information in a manner that is universal, fast and effective.
- It provides communication insights to "non-technical decision makers" . And it is one of the most critical phases in data analysis.

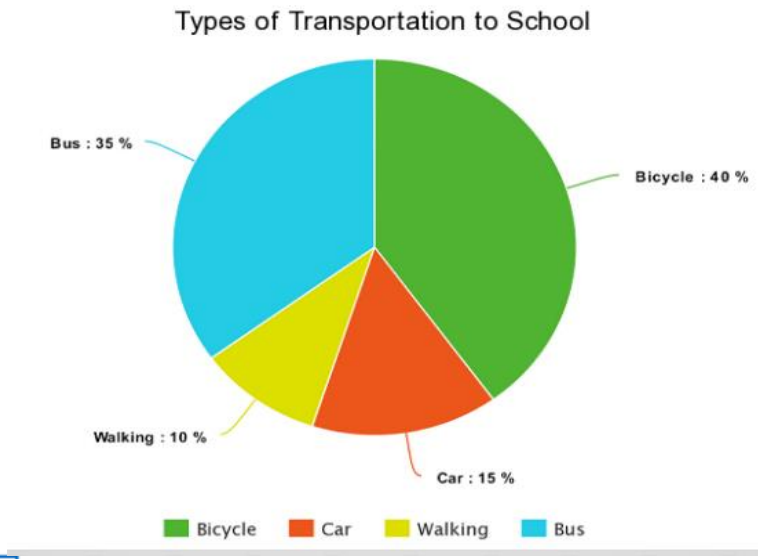
Chart Types



Line Graphs: Show a trend

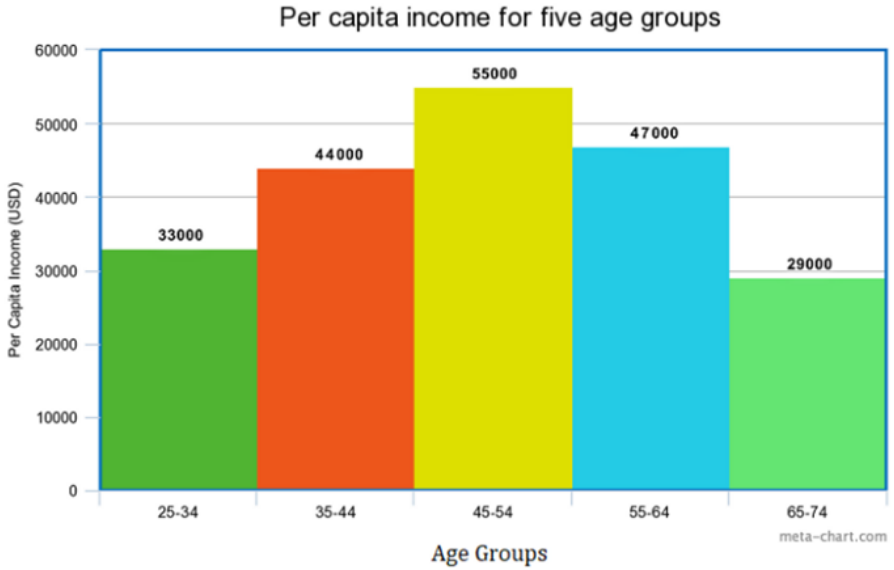
Bar Chart: Categorical comparison



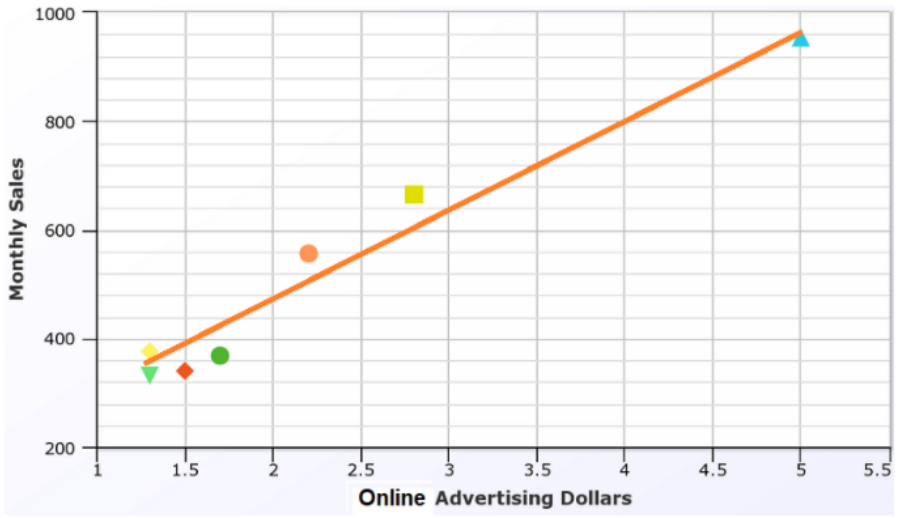


Pie Chart: Represent a composition

Chart Types



Histogram: Data distribution

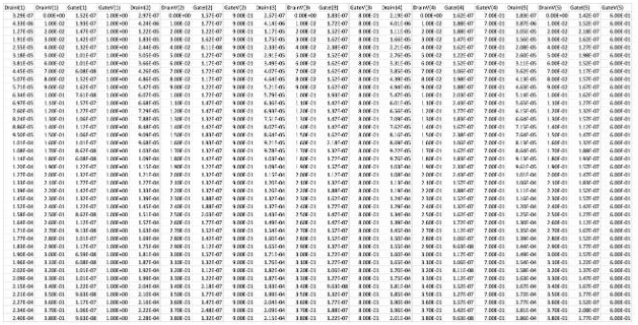


Scatter plot: relationship between two variables

Data Analysis Process

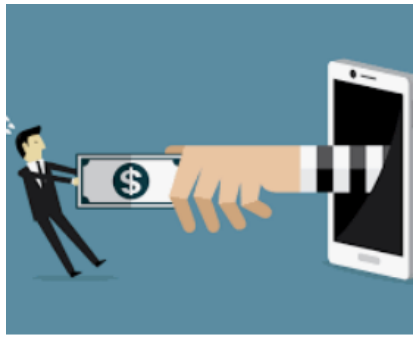
To get the most of their data, organizations need to implement a data analysis process

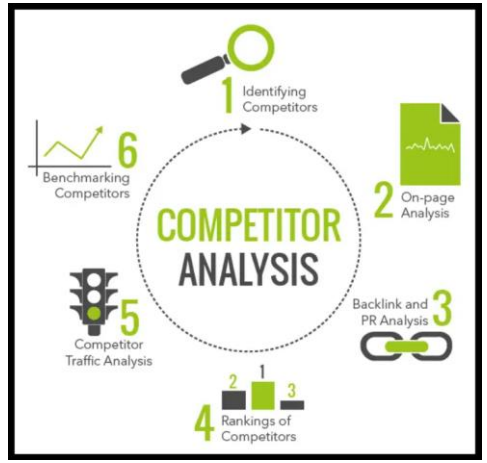
Define Goals → Integrate Tools for Data Analysis → Collect the Data → Clean the Data → Analyze the Data → Draw Conclusions → Visualize



Benefits to Data Analysis

- **Organizations reap several benefits from analyzing data, including:**
  - **Improved websites**
  - **Customized shopping experience**
  - **Customer retention**
  - **Competitor research**
  - **Improved employee performance**
  - **Improved security**
  - **Improved operational efficiency**
  - **Improved inventory management**





Case Study: Forbes Top Billionaires 2020

- **Real life example**
  - **Forbes is an American media and publishing company owned by Integrated Whale Media Investments and the Forbes family**
  - **Known for its magazine and lists that rank everything from billionaires to sports teams**
    - **As a newly hired Data Scientist of Forbes company, you have been given the task of analyzing the net worth of Forbes Top Billionaires 2020**
- **Objective**
  - **Analyze the net worth of Forbes Top Billionaires 2020 and draw insights**


CASE STUDY

Sample from Forbes List Dataset

	A	B	C	D	E	F	G
1	**Name**	**NetWorth in billions**	**Country**	**Source**	**Rank**	**Age**	**Industry**
2	Jeff Bezos	177	United States	Amazon	1	57	Technology
3	Elon Musk	151	United States	Tesla, SpaceX	2	49	Automotive
4	Bernard Arnault & family	150	France	LVMH	3	72	Fashion & Retail
5	Bill Gates	124	United States	Microsoft	4	65	Technology
6	Mark Zuckerberg	97	United States	Facebook	5	36	Technology
7	Warren Buffett	96	United States	Berkshire Hathaway	6	90	Finance & Investments
8	Larry Ellison	93	United States	software	7	76	Technology
9	Larry Page	91.5	United States	Google	8	48	Technology
10	Sergey Brin	89	United States	Google	9	47	Technology
11	Mukesh Ambani	84.5	India	diversified	10	63	Diversified
12	Amancio Ortega	77	Spain	Zara	11	85	Fashion & Retail
2751	Axel Stawski	1	United States	real estate	2674	70	Real Estate
2752	Vlad Tenev	1	United States	stock trading	2674	34	Finance & Investments
2753	Vlad Vendrow & family	1	United States	software	2674	53	Technology
2754	J. Wayne Weaver	1	United States	Shoes	2674	85	Diversified
2755	Sandy Weill	1	United States	Citigroup	2674	88	Finance & Investments
2756	Yu De-Chao	1	United States	pharmaceuticals	2674	57	Healthcare

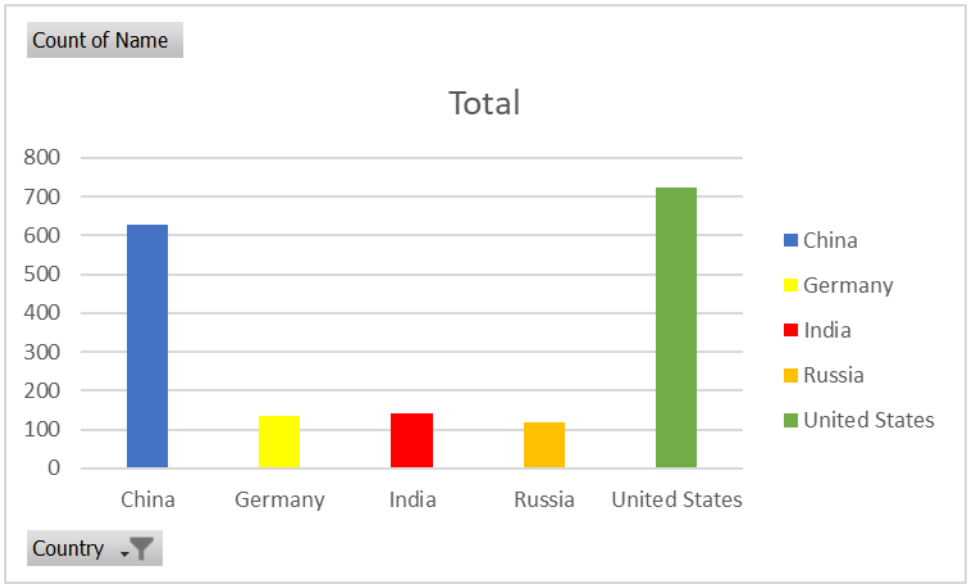
Forbes List Data Set

- Which 5 countries have the maximum number of billionaires?
- What is the distribution of the percentage of billionaires across different industries?
- Identify the Quartile position in Net worth and Age
- Who are the top 10 billionaires?
- What is the distribution of the age variable?
- What is the distribution of the Net worth in billions?

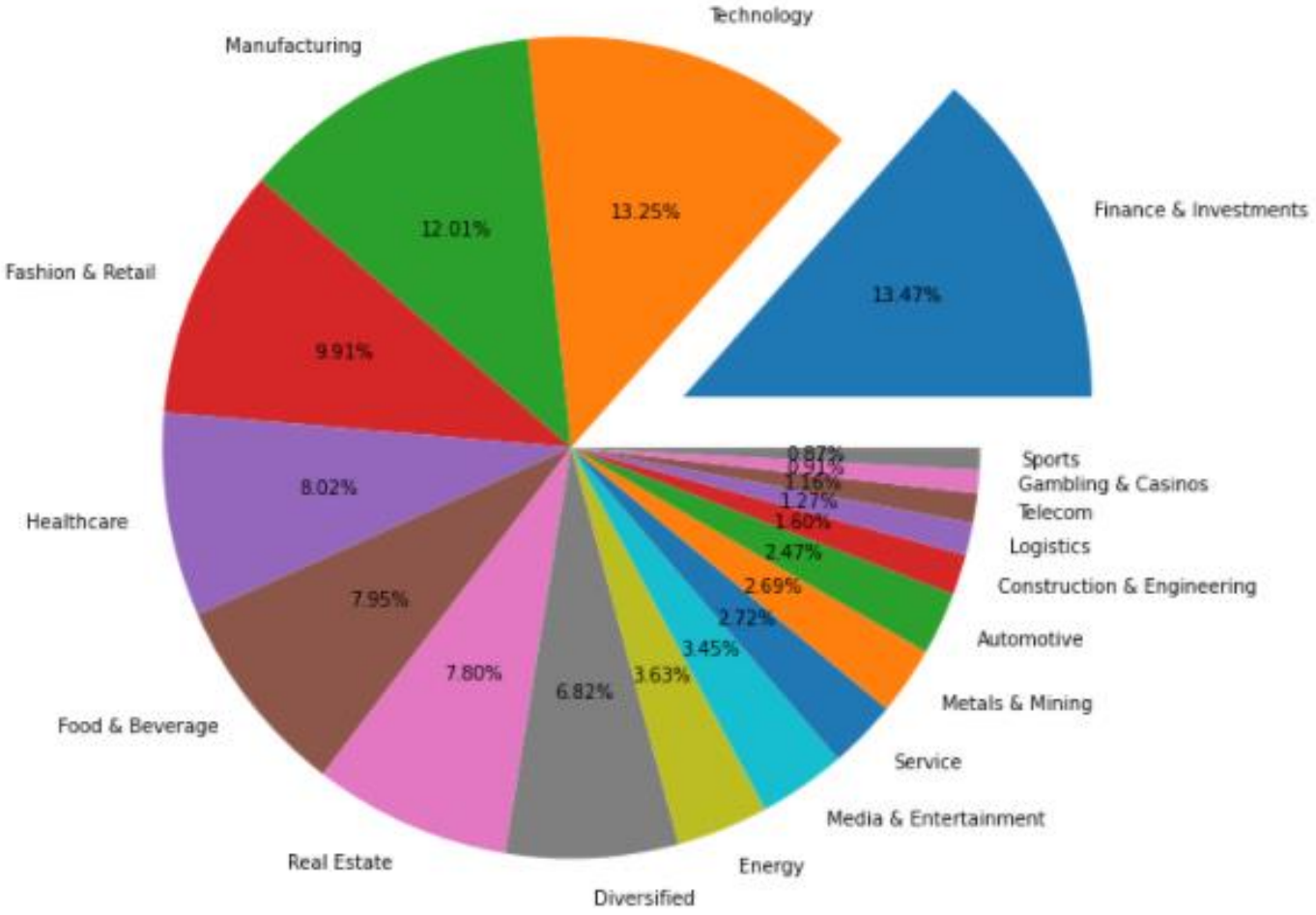
Which 5 countries have the maximum number of billionaires?

```
In [ ]: df.Country.value_counts().head()
```

```
Out[ ]: United States    724
        China            626
        India            140
        Germany          136
        Russia           118
        Name: Country, dtype: int64
```



What is the distribution of the percentage of billionaires across different industries?



Who are the top10 billionaires?

Name	NetWorth in billions	Country	Source	Rank	Age	Industry
Jeff Bezos	177	United States	Amazon	1	57	Technology
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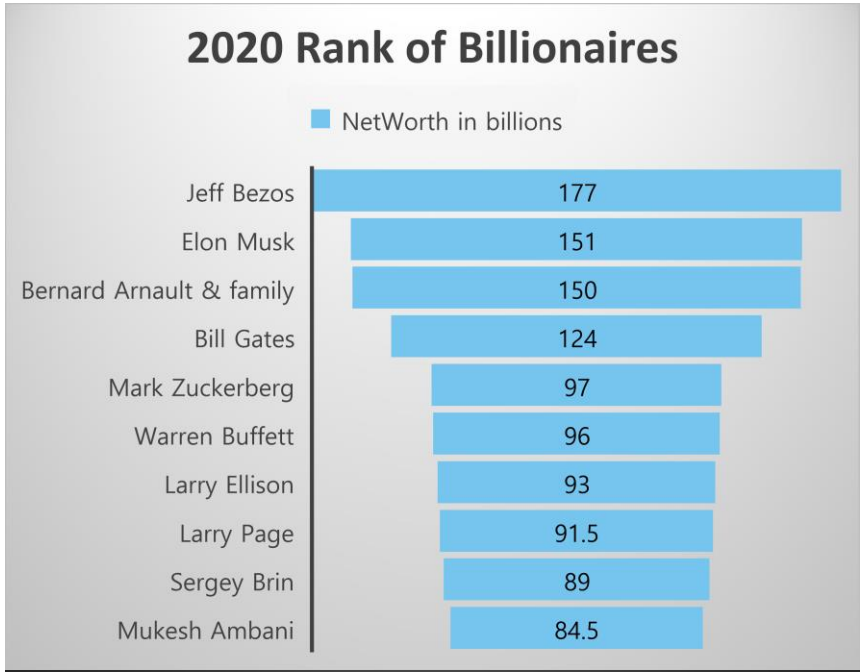
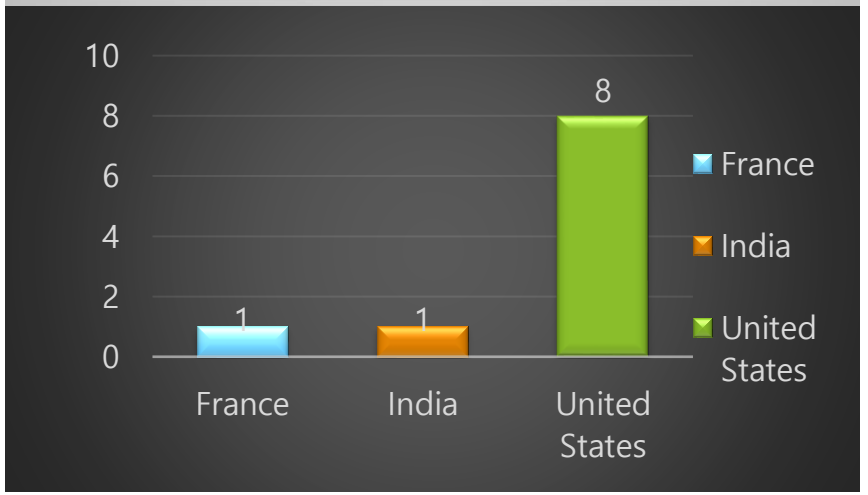




Identify the Quartile position in Net worth and Age

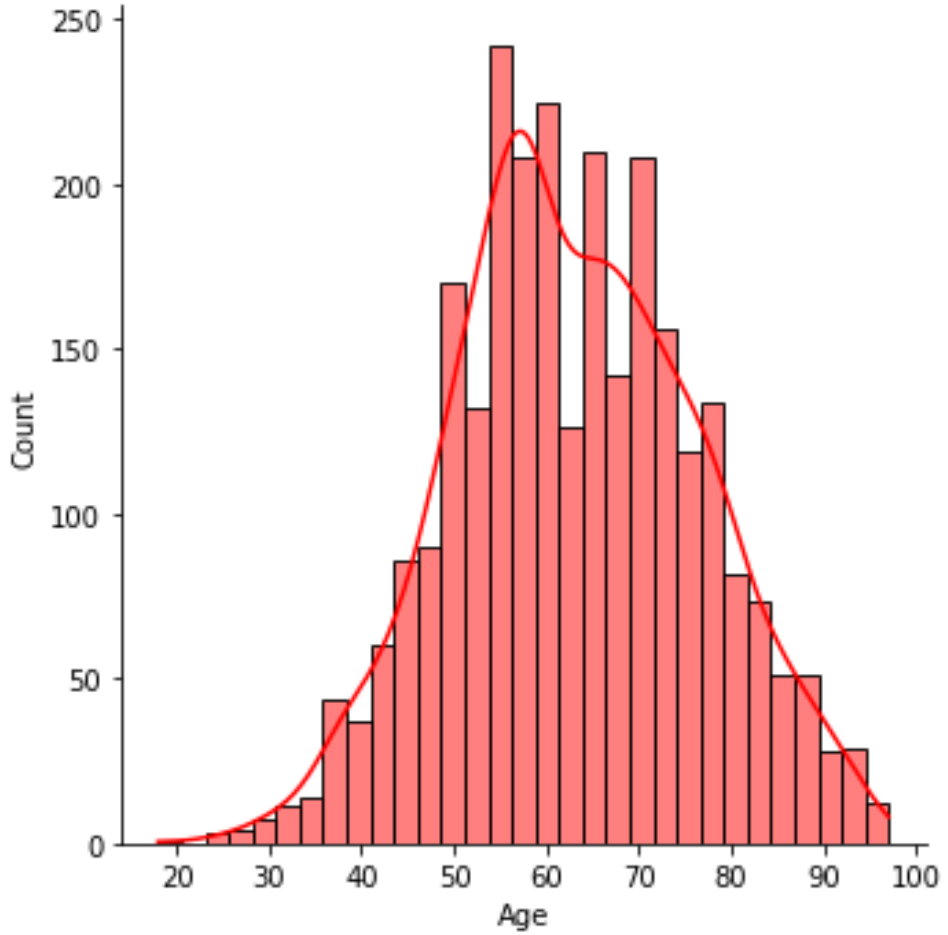
```
In [ ]: df.describe().T
```

Out[ ]:

	count	mean	std	min	25%	50%	75%	max
NetWorth in billions	2755.0	4.749220	9.615358	1.0	1.5	2.3	4.2	177.0
Rank	2755.0	1345.663521	772.669811	1.0	680.0	1362.0	2035.0	2674.0
Age	2755.0	63.014519	13.259017	18.0	54.0	62.0	72.0	97.0

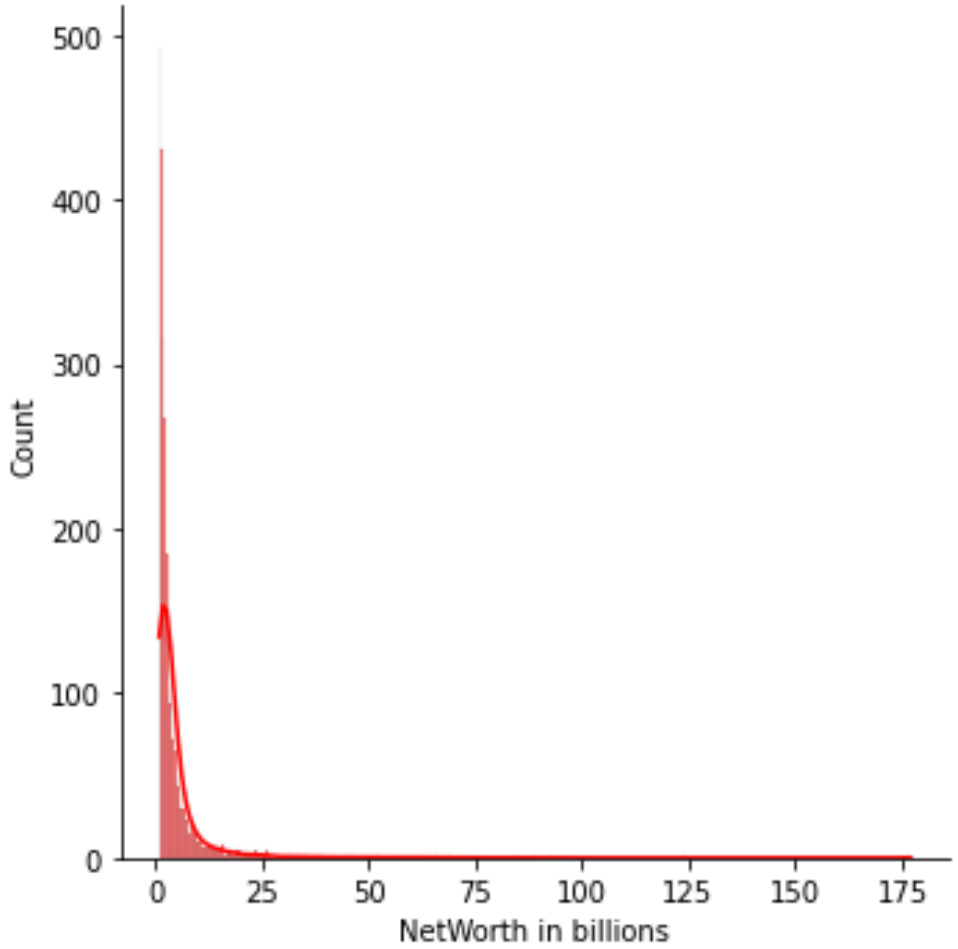
What is the distribution of the age variable?

```
In [ ]: sns.displot(df["Age"], kde = True, color = 'red')
        plt.show()
```



What is the distribution of the Net worth in billions?

```
In [ ]: sns.displot(df["NetWorth in billions"], kde = True, color = 'red')
        plt.show()
```



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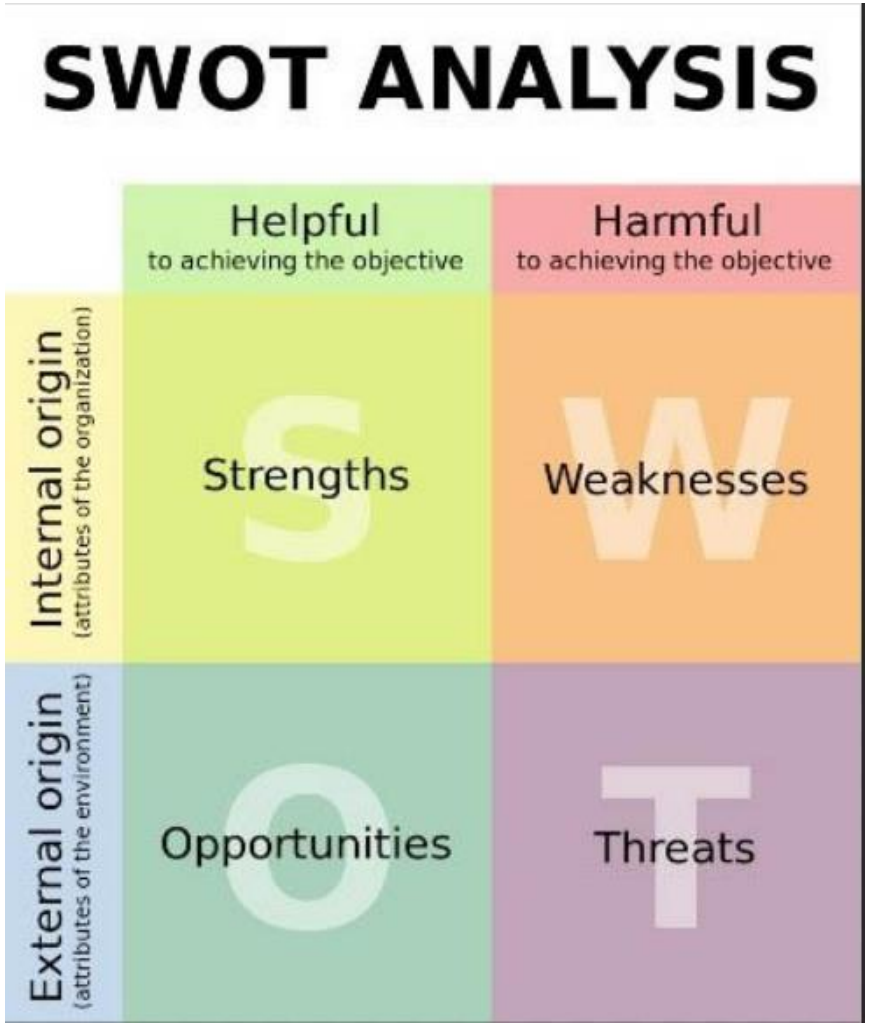
Case Study Conclusion

- 'United States' and 'China' have more than 500 billionaires. It indicates that these two countries might be rich as compared to the other countries. Developments in the field of technology and manufacturing are in progress
- The first quartile of the 'Age' column is 54. It indicates that most of the billionaires are over 50 years old.
- Most of the billionaires are from 'Finance & Investments', 'Technology', 'Manufacturing', and 'Fashion & Retail' industries. This suggests that these fields are profitable business fields.
- There are very few young billionaires. The young billionaires might have some innovative fresh business ideas (such as cryptocurrency, food delivery app) that made them successful.

Applying Data Analysis to Win Gov. Contract

- **"<u>Descriptive analysis</u>" application on Government Contracting:**
  - **Performing Salary surveys**
  - **Competitor analysis**

Michael Porter described how to perform a competitor analysis in 4 steps;
1) define which competitors should be analyzed,
2) perform a competitor analysis by diagnosing competitors' goals, identifying assumptions, and appraising each competitor's capabilities,
3) develop a competitor response profile
4) assess the potential strategic moves of the competitors



Applying Data Analysis to Win Gov. Contract (Continued)

- **Diagnostics analysis can be used to analyze competitor's past performance and CPARs on similar contracts, for example.**

CPARS – Ratings

Rating	Definition (See DoD CPARS Guide for details)
Exceptional (Dark Blue)	Meets contractual requirements and exceeds many, to Government's benefit; few minor problems
Very Good (Purple)	Meets contractual requirements and exceeds some, to Government's benefit; some minor problems
Satisfactory (Green)	Meets contractual requirements; some minor problems
Marginal (Yellow)	Does not meet some contractual requirements; serious problems with no corrective actions
Unsatisfactory (Red)	Does not meet most contractual requirements and recovery not likely in a timely manner

Applying Data Analysis to Win Gov. Contract (Continued)

- **<u>Predictive analysis</u> can be used when creating/analyzing a budget, predicting future sales or purchasing behaviors**

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