

Are Leaders Born or Made?

Database Implementation and
SQL Data Analysis of Fortune 500 CEOs

Natalia Barczyszyn



Project Background

Explore Patterns in CEO Professional Growth Using Fortune 500 Data:

- Investigate the influence of CEO zodiac signs on leadership traits
- Analyze the impact of education and geographical location on career advancement
- Examine the role of age and gender in CEO trajectories
- Explore the career progression paths of Fortune 500 CEOs

Project Objectives



Establish an Oracle
Cloud Database



Import data to database
and create tables



Conduct SQL-based data exploration
using Oracle SQL Developer



Extract valuable insights from SQL
analysis



Answer the age-old question: Are
Leaders Born or Made?

Project Documentation

- SQL Code Worksheet
- Comprehensive Report of Findings
- Presentation Slides of Project Summary and Core Findings
- Python Notebook of Visualizations
- Datasets

Documentation can be found on GitHub repository: [database-implementation-and-SQL-analysis](#)
GitHub username: natalia47

Data Sources

2021 Fortune 1000 Dataset sourced from Kaggle

<https://www.kaggle.com/datasets/winston56/fortune-500-data-2021?resource=download>

Supplemental data collected for Fortune 500 subset of Kaggle data

ADDITIONAL COLUMNS				
DOB of CEO	Month & Day of DOB	Birth Year	Missing DOBs	City of Birth
Birth State	Home State	State of Residence	Bachelor's School	Bachelor's Major
Master's School	Master's Major	Has PhD	Dropped Out	Year Became CEO
Prior CEO Experience	2 nd Master's School	2 nd Master's Major	3 rd Master's School	3 rd Master's Major
Zodiac of CEO	CEO Age	Age Became CEO		

Data Transformations

Original Column	New/Transformed Column	Purpose of New Column
DOB_MMDD	ZODIAC	Used DOB month and day to group zodiacs by their date ranges
12/31/2023 - DOB_YYYY	AGE	Used year of birth to get CEOs' current ages
YR_TURNED_CEO - DOB_YYYY	AGE BECAME CEO	Collected the year in which CEOs became CEO and used that to get their age at the time

Database Development

- Imported two datasets into Oracle Cloud database
- Created two tables in Oracle SQL Developer

S
C
H
E
M
A
S

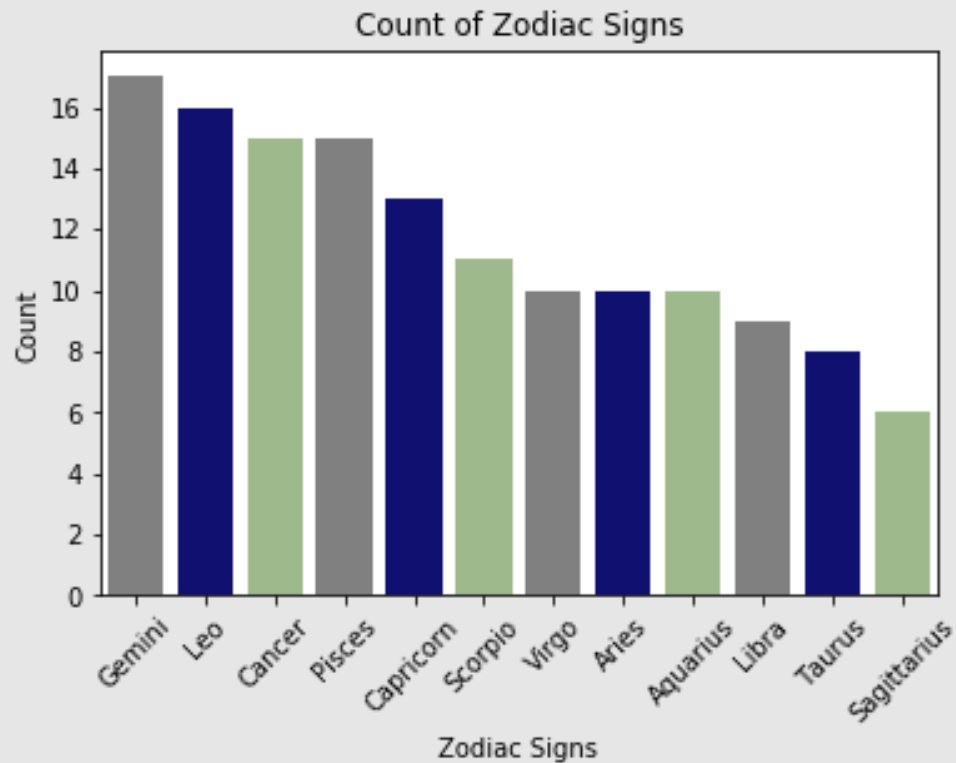
F500	F500_CEO_ADD
COMPANY	CEO_NAME
RANK	CEO_DOB
RANK_CHANGE	DOB_MMDD
REVENUE	DOB_YYYY
PROFIT	MISSING_DOBS
NUM_OF_EMPLOYEES	BIRTH_CITY
SECTOR	BIRTH_STATE
CITY	ORIGIN_STATE
STATE	CEO_BACH_MAJOR
NEWCOMER	CEO_BACH_SCHOOL
CEO_FOUNDER	CEO_MAST_MAJOR
CEO_WOMAN	CEO_MAST_SCHOOL
PROFITABLE	PHD
PREV_RANK	DROPPED_OUT
CEO	YR_TURNED_CEO
WEBSITE	PREVIOUSLY_CEO
TICKER	SECOND_MAST_MAJOR
MARKET_CAP	SECOND_MAST_SCHOOL
	THIRD_MAST_MAJOR
	THIRD_MAST_SCHOOL
	ZODIAC
	AGE
	AGE_TURNED_CEO

M
E
T
A
D
A
T
A

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1 COMPANY	VARCHAR2(150 BYTE)	Yes	(null)	1 (null)	
2 RANK	NUMBER(38,0)	Yes	(null)	2 (null)	
3 RANK_CHANGE	NUMBER(38,0)	Yes	(null)	3 (null)	
4 REVENUE	NUMBER(38,0)	Yes	(null)	4 (null)	
5 PROFIT	NUMBER(38,0)	Yes	(null)	5 (null)	
6 NUM_OF_EMPLOYEES	NUMBER(38,0)	Yes	(null)	6 (null)	
7 SECTOR	VARCHAR2(50 BYTE)	Yes	(null)	7 (null)	
8 CITY	VARCHAR2(100 BYTE)	Yes	(null)	8 (null)	
9 STATE	VARCHAR2(26 BYTE)	Yes	(null)	9 (null)	
10 NEWCOMER	VARCHAR2(26 BYTE)	Yes	(null)	10 (null)	
11 CEO_FOUNDER	VARCHAR2(26 BYTE)	Yes	(null)	11 (null)	
12 CEO_WOMAN	VARCHAR2(26 BYTE)	Yes	(null)	12 (null)	
13 PROFITABLE	VARCHAR2(26 BYTE)	Yes	(null)	13 (null)	
14 PREV_RANK	NUMBER(38,0)	Yes	(null)	14 (null)	
15 CEO	VARCHAR2(100 BYTE)	Yes	(null)	15 (null)	
16 WEBSITE	VARCHAR2(150 BYTE)	Yes	(null)	16 (null)	
17 TICKER	VARCHAR2(26 BYTE)	Yes	(null)	17 (null)	
18 MARKET_CAP	NUMBER(38,0)	Yes	(null)	18 (null)	

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1 CEO_NAME	VARCHAR2(50 BYTE)	Yes	(null)	1 (null)	
2 CEO_DOB	DATE	Yes	(null)	2 (null)	
3 DOB_MMDD	DATE	Yes	(null)	3 (null)	
4 DOB_YYYY	DATE	Yes	(null)	4 (null)	
5 MISSING_DOBS	VARCHAR2(128 BYTE)	Yes	(null)	5 (null)	
6 BIRTH_CITY	VARCHAR2(50 BYTE)	Yes	(null)	6 (null)	
7 BIRTH_STATE	VARCHAR2(50 BYTE)	Yes	(null)	7 (null)	
8 ORIGIN_STATE	VARCHAR2(50 BYTE)	Yes	(null)	8 (null)	
9 CURRENT_RESIDENCE	VARCHAR2(50 BYTE)	Yes	(null)	9 (null)	
10 CEO_BACH_MAJOR	VARCHAR2(150 BYTE)	Yes	(null)	10 (null)	
11 CEO_BACH_SCHOOL	VARCHAR2(150 BYTE)	Yes	(null)	11 (null)	
12 CEO_MAST_MAJOR	VARCHAR2(150 BYTE)	Yes	(null)	12 (null)	
13 CEO_MAST_SCHOOL	VARCHAR2(150 BYTE)	Yes	(null)	13 (null)	
14 PHD	VARCHAR2(26 BYTE)	Yes	(null)	14 (null)	
15 DROPPED_OUT	VARCHAR2(26 BYTE)	Yes	(null)	15 (null)	
16 YR_TURNED_CEO	DATE	Yes	(null)	16 (null)	
17 PREVIOUSLY_CEO	VARCHAR2(128 BYTE)	Yes	(null)	17 (null)	
18 SECOND_MAST_MAJOR	VARCHAR2(150 BYTE)	Yes	(null)	18 (null)	
19 SECOND_MAST_SCHOOL	VARCHAR2(150 BYTE)	Yes	(null)	19 (null)	
20 THIRD_MAST_MAJOR	VARCHAR2(150 BYTE)	Yes	(null)	20 (null)	
21 THIRD_MAST_SCHOOL	VARCHAR2(150 BYTE)	Yes	(null)	21 (null)	
22 ZODIAC	VARCHAR2(15 BYTE)	Yes	(null)	22 (null)	
23 AGE	NUMBER(38,0)	Yes	(null)	23 (null)	
24 AGE_TURNED_CEO	NUMBER(38,0)	Yes	(null)	24 (null)	

Zodiac Findings



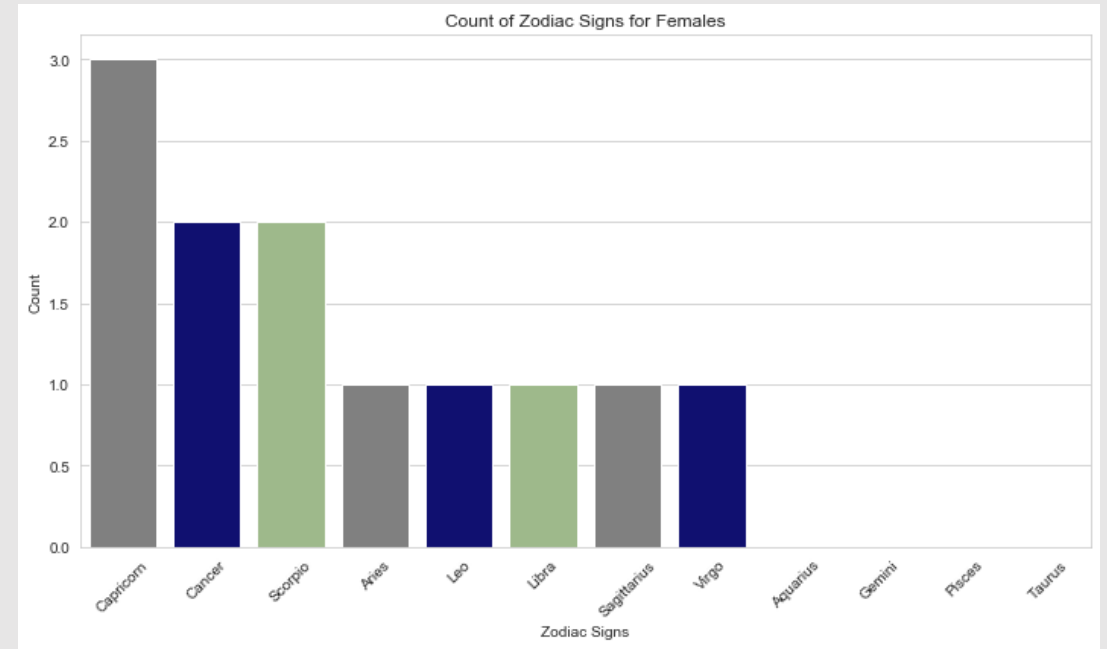
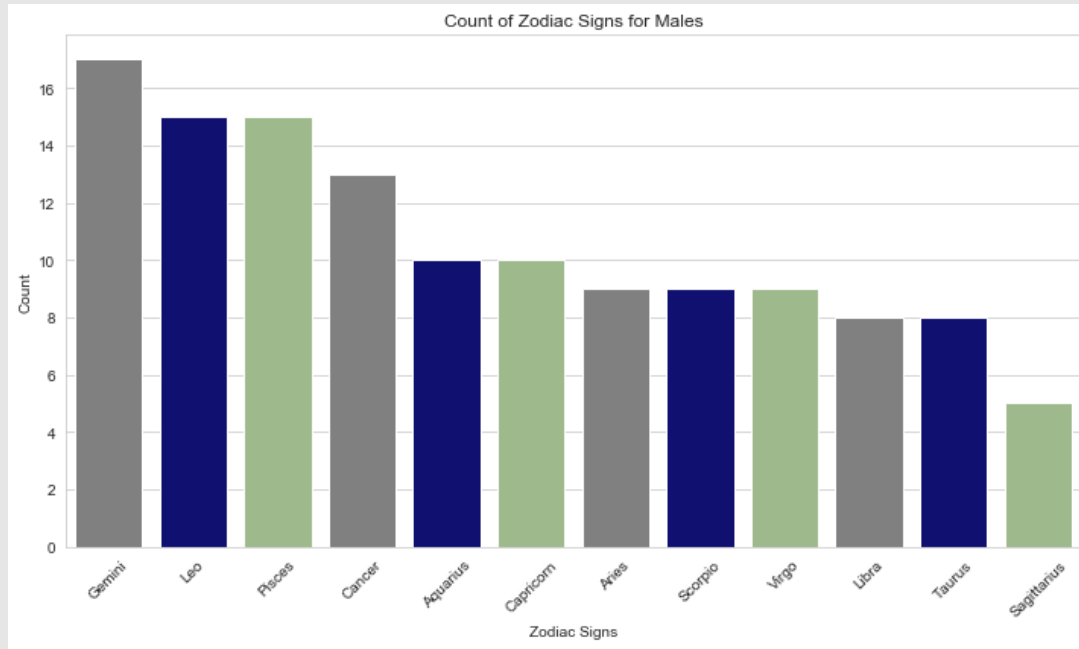
Predominant zodiac signs are Gemini, Leo, and Pisces, with Pisces sharing a position with Cancer

Among Aries, Leo, and Capricorn (signs commonly associated with natural-born leaders), only Leo emerges within the top 3

Aries, Leo, and Capricorn do not form the majority of CEOs

Findings based on 140 DOBs collected – additional data collection needed for more conclusive insights

Zodiac Findings by Gender

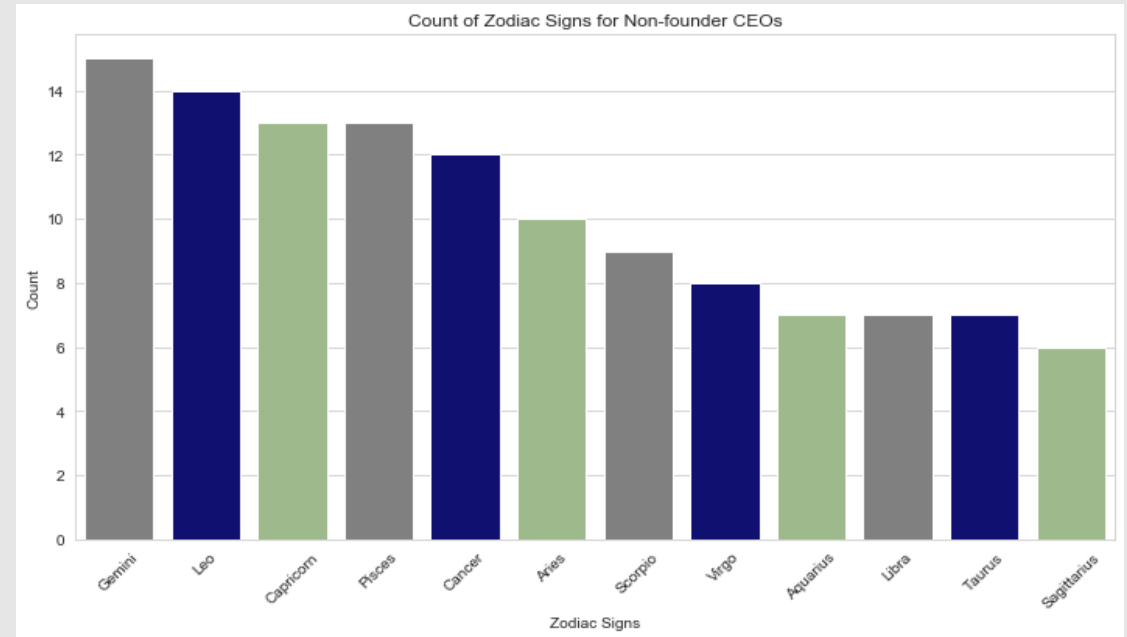
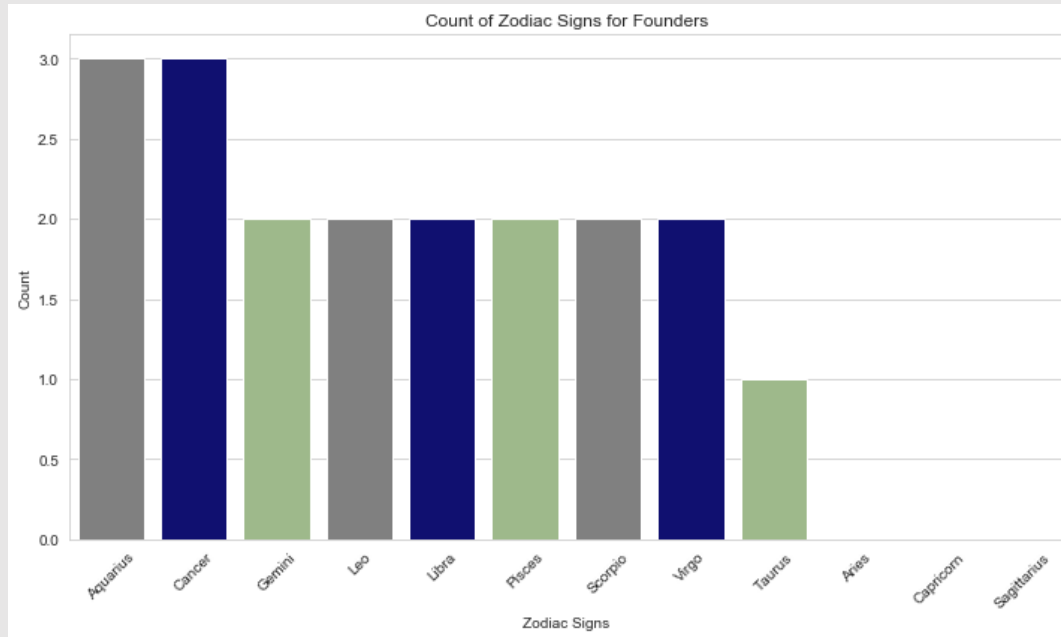


For male CEOs, the top three zodiacs are Gemini followed by Pisces and Leo, with Pisces and Leo tied.

For female CEOs, the top three zodiacs are Capricorn followed by Cancer and Scorpio.

It's noteworthy that the top three zodiacs differ between male and female CEOs. To ascertain the consistency of this pattern, especially for female CEOs, additional data would be necessary.

Zodiac Findings by Founder Status



The primary zodiacs for founders are Aquarius and Cancer.

Additional data collection would be essential to determine if founders tend to be Aquarians or Cancers, and further investigation would be needed to confirm if Aquarians or Cancers exhibit a tendency to become entrepreneurs.

Education Findings – Top 20 Schools

Rank	Undergraduate Schools Attended
1	UPenn
2 (tie)	Harvard
2 (tie)	Cornell
3 (tie)	Purdue
3 (tie)	Iowa State
4 (tie)	Stanford
4 (tie)	Boston College
4 (tie)	Georgetown University
4 (tie)	Texas A&M
5 (tie)	Miami University
6 (tie)	United States Military Academy
6 (tie)	University of Virginia
6 (tie)	Brown
6 (tie)	University of Wisconsin-Madison
6 (tie)	University of Texas, Austin
6 (tie)	Georgia Tech
6 (tie)	Dartmouth
7 (tie)	Notre Dame
7 (tie)	University of Michigan Ann Arbor
7 (tie)	Princeton

Out of the 480 total records, 129 CEOs attended the top 20 undergraduate universities, accounting for 27% of the total. In contrast, 351 CEOs attended universities outside of the top 20, representing a larger proportion of CEOs and constituting 73% of the total.

Rank	Graduate Schools Attended
1	Harvard
2	Northwestern
3	Stanford
4	UPenn
5	Columbia
6	University of Chicago
7 (tie)	Arizona State University
7 (tie)	MIT
7 (tie)	NYU
8 (tie)	University of Texas, Austin
8 (tie)	University of Wisconsin-Madison
8 (tie)	UCLA
9 (tie)	University of Michigan Ann Arbor
9 (tie)	Dartmouth
9 (tie)	University of Illinois, Urbana-Champaign
9 (tie)	Rutgers
9 (tie)	Boston University
10 (tie)	University of Virginia
10 (tie)	University of California Berkeley
10 (tie)	Texas A&M

Out of the 358 total records, there were 208 records documenting CEOs who attended the top 20 graduate schools, with an additional 150 records for CEOs who attended schools outside of this top tier. This results in 58% of records falling within the top 20 and 42% outside of it.

Education Findings – Ivy League

- 9% of CEOs attended Ivy League schools for their undergraduate studies
- 25% of CEOs attended Ivy League schools for their graduate studies
- Six Ivy League schools, including UPenn, Harvard, Cornell, Brown, Dartmouth, and Princeton, made it to the Undergraduate Top 20. Columbia and Yale, although Ivy League, ranked 38th and 151st, respectively, out of 280 schools.
- Four Ivy League institutions—Harvard, UPenn, Columbia, and Dartmouth—secured positions in the top 20. Meanwhile, the remaining Ivy League schools (Cornell, Princeton, Yale, and Brown) held rankings of 74th, 114th, and 130th (last) respectively, with Brown notably absent from the list.

Education Findings – Prestigious Universities

- Among the top 20 undergraduate institutions, 51% of CEOs hailed from prestigious universities, including Ivy League schools.
- Among the top 20 graduate institutions, 87% of CEOs hailed from prestigious universities, including Ivy League schools.
- Notably, Harvard, Northwestern, Stanford, UPenn, Columbia, and the University of Chicago account for 69% of Master's degree attendance within the top 20 graduate universities.

Education Findings – Degree Attainment

93% of CEOs earned their Bachelor's degree

60% of CEOs earned their Master's degree

10% of CEOs earned their second Master's degree

Less than 1% of CEOs earned their third Master's degree

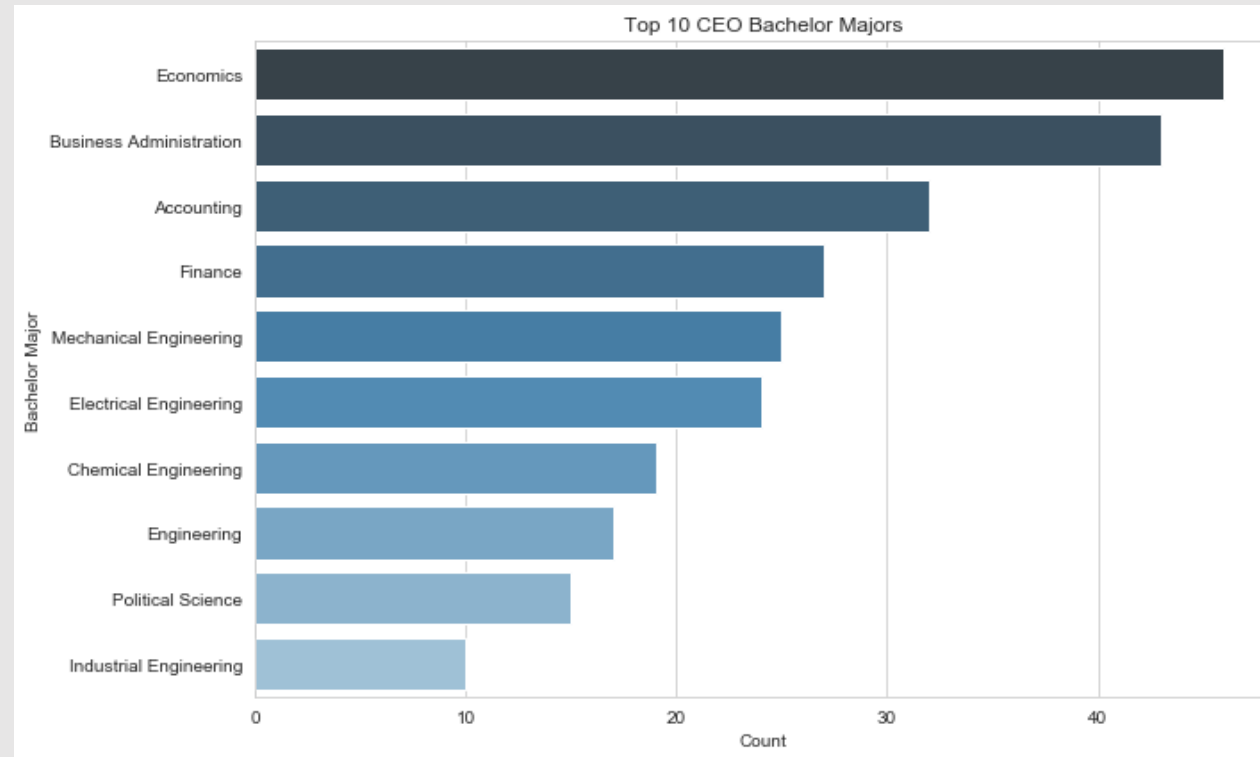
2% of CEOs earned their PhD

6% of CEOs earned an honorary PhD for their societal, business, and industry impact

The findings suggest:

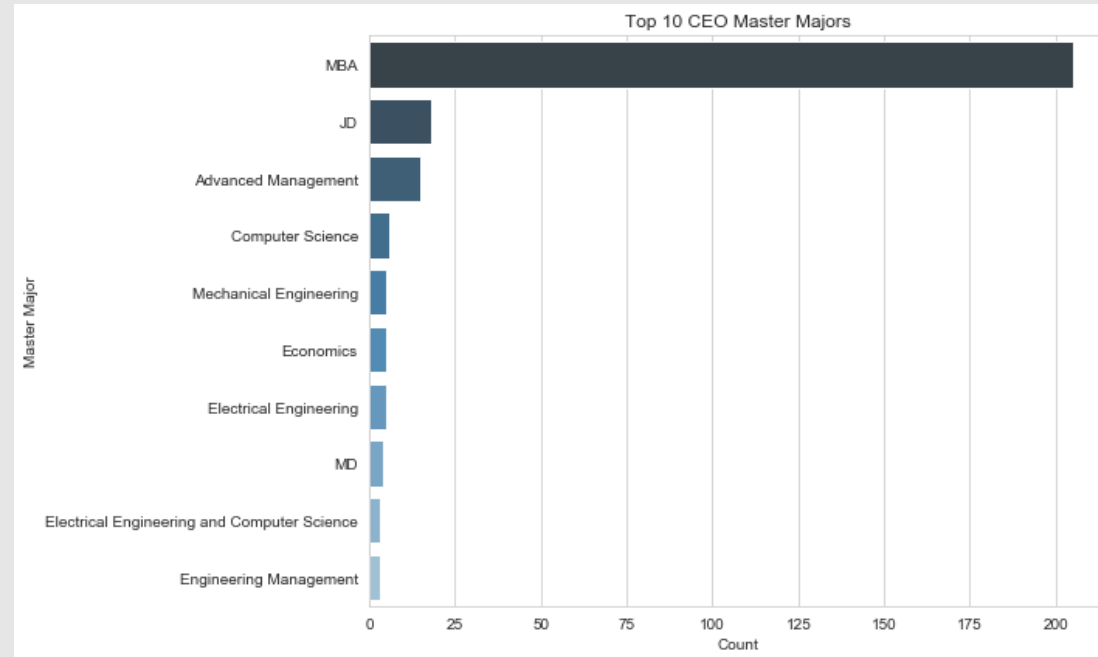
- A Bachelor's degree is almost universally held among CEOs
- Pursuing a Master's degree is prevalent and may signify a strong advantage
- The significance of a second Master's degree may diminish after obtaining the first one
- Holding a PhD is not a prerequisite for reaching the CEO position and may not provide a significant advantage. There are more CEOs with a second Master's than a PhD.

Education Findings – Undergraduate Majors



Engineering disciplines dominate, constituting 37% of the top 10. Additionally, it's noteworthy that all majors listed are quantitative in nature, except for Business Administration.

Education Findings – Graduate Majors



- The majority of Fortune 500 CEOs hold MBAs as their graduate degrees, representing 71% of the top 10.
- There appears to be a transition from technical to non-technical disciplines during graduate studies, outside of Engineering.
- Engineering degrees still feature prominently, indicating a continued interest in technical education among engineering leaders.

Education Findings – CEOs with no College Education

CEO	Company	Industry	Company Description	CEO Background
Jeffrey Musser	Expeditors Intl. of Washington	Transportation	Global logistics company	Started as a part-time messenger and progressed through roles such as District Manager, RVP of Sales & Operations, and CIO.
Arie Kotler	ARKO	Retailing	Fuel wholesaler, convenience store operator	Founded one of the companies that later merged with ARKO.
Randall T. Jones Sr.	Publix Super Markets	Food & Drug Stores	Supermarket chain	Began as a grocery bagger and moved up through roles such as store manager, district manager, and eventually President.
David W. Hult	Asbury Automotive Group	Retailing	Automotive retailer	Started as a retail sales associate within the industry and gradually advanced, eventually joining Asbury in 2014.

Findings on States of Origin

- The top birthplaces for Fortune 500 CEOs include New York, California, Ohio, Pennsylvania, and India.
- New York, Pennsylvania, Texas, Ohio, Michigan, and California emerge as the leading home states of Fortune 500 CEOs.
- Leading states for the current residence of Fortune 500 CEOs include California, Texas, New York, Illinois, and Ohio.

The states that boast the highest number of CEOs are often home to numerous corporate headquarters. Notably, New York, California, and Ohio appear consistently across all three categories. It is also interesting to observe India among the top countries of origin for CEOs.

Findings on Origin - Relocation

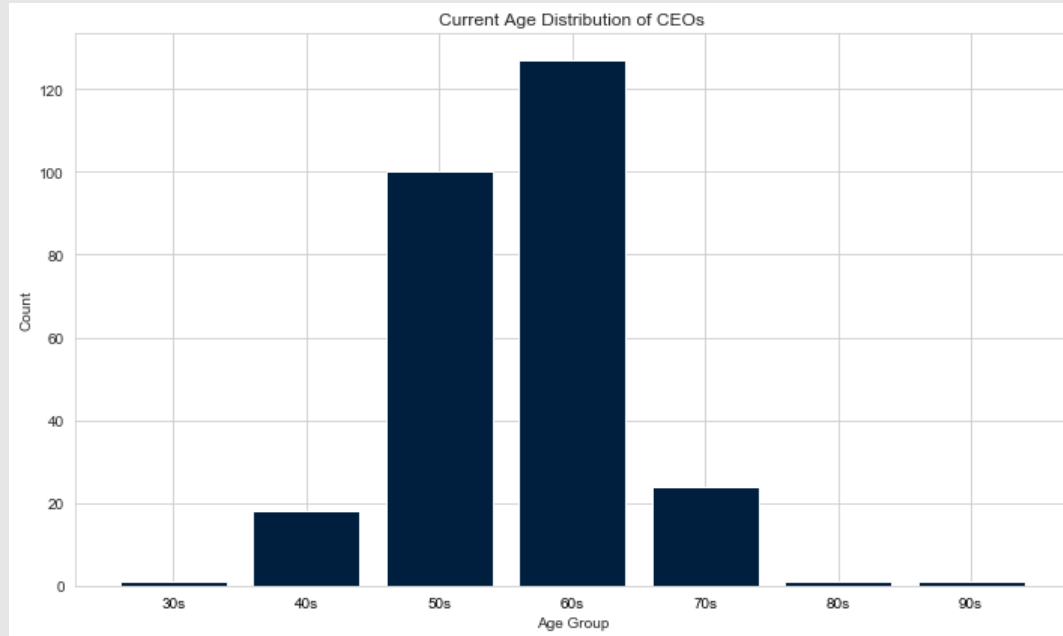
75% of CEOs relocated from their birth state

64% relocated from their home state

The countries with the highest representation of non-US born CEOs were India, the United Kingdom, Canada, Germany, and Brazil. Roughly a third of CEOs trace their origins beyond US borders, indicating a significant presence of expatriates.

The critical inquiry is whether relocation positively impacted their careers. While this data alone may not offer definitive answers, it prompts consideration. Nonetheless, it does indicate that the majority of CEOs did, indeed, relocate from their home states or countries.

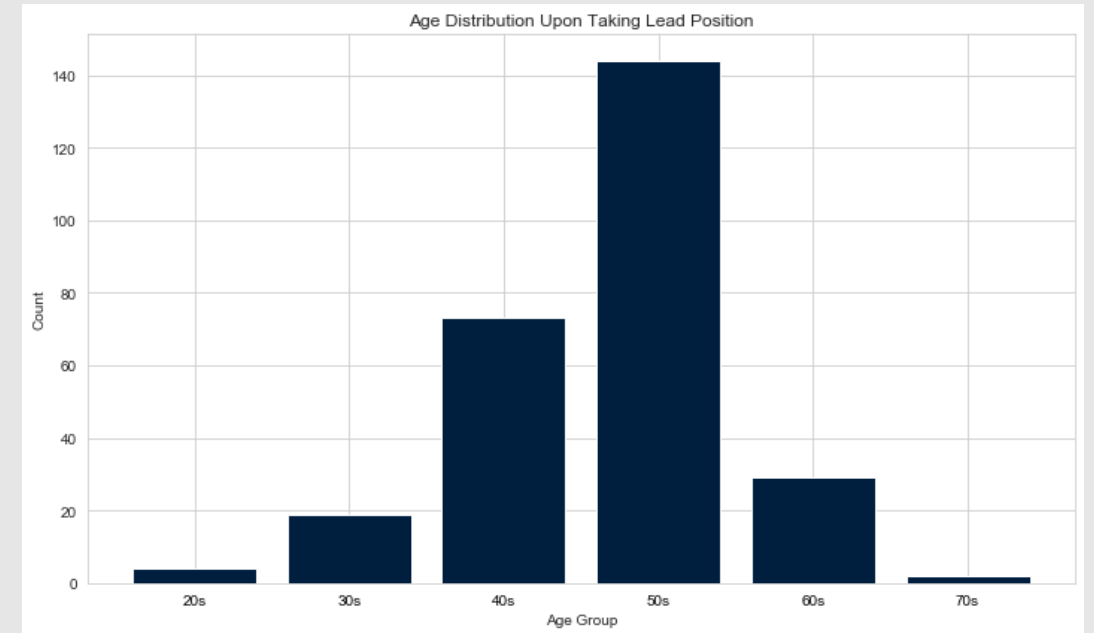
Age Findings



Most CEOs are in their 50s and 60s

Few CEOs are in their 30s, 80s, and 90s

This demonstrates a natural progression of gaining leadership over time, attaining the CEO spot, and eventually retiring later in life.



53% of CEOs assumed their role as CEO in their 50s

27% assumed role in their 40s

11% assumed role in their 60s

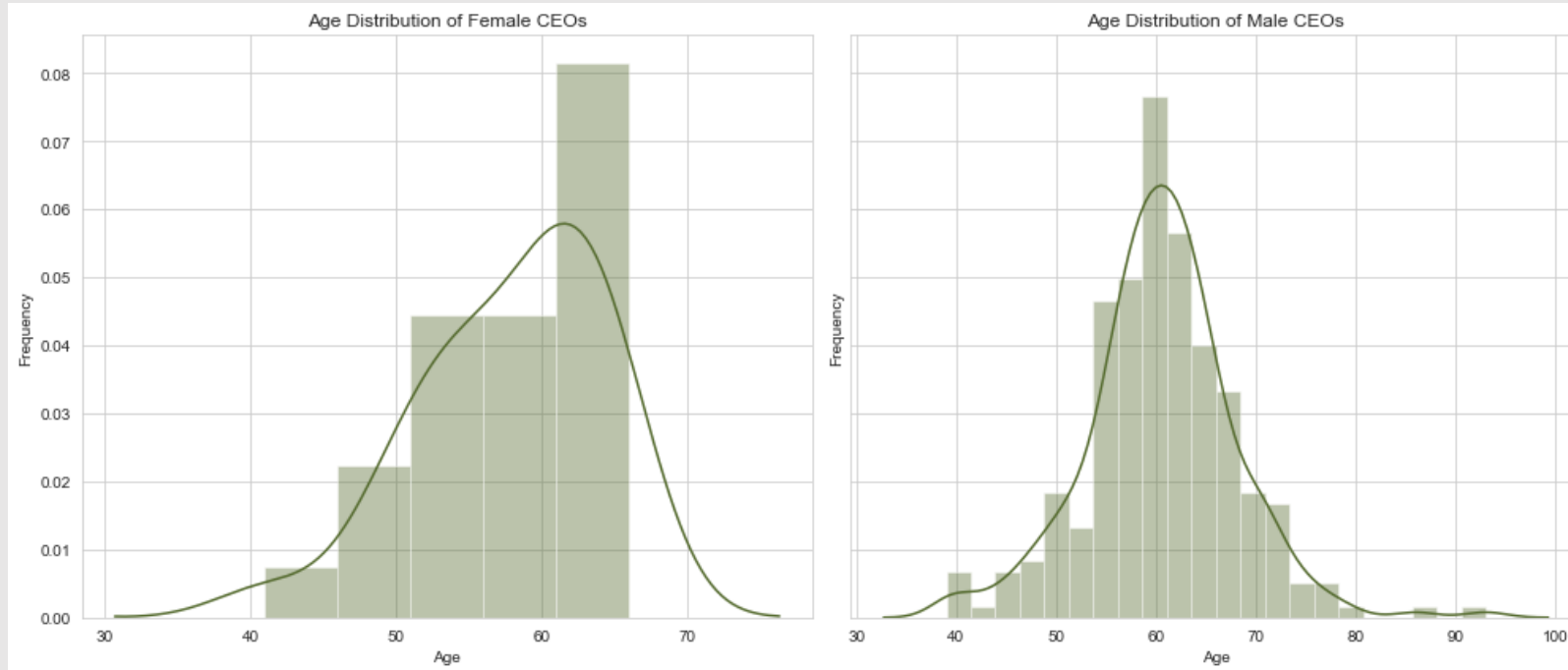
CEOs who assumed the CEO position in their early adult years are usually founders

A significant portion of CEOs attained their position in their 50s, possibly indicative of accumulated experience and career advancement by that stage. This suggests that achieving top positions can be a gradual process, achievable later in one's career.

Gender Findings - Women

- Women represent 9% of Fortune 500 CEOs
- There are no female founders on the Fortune 500
- There is no female leadership present in the Telecommunications, Media, Apparel, and Business Services industries
- The most female-friendly industry for CEOs is Food & Drug Stores
- Only one female newcomer compared to 29 male newcomer CEOs

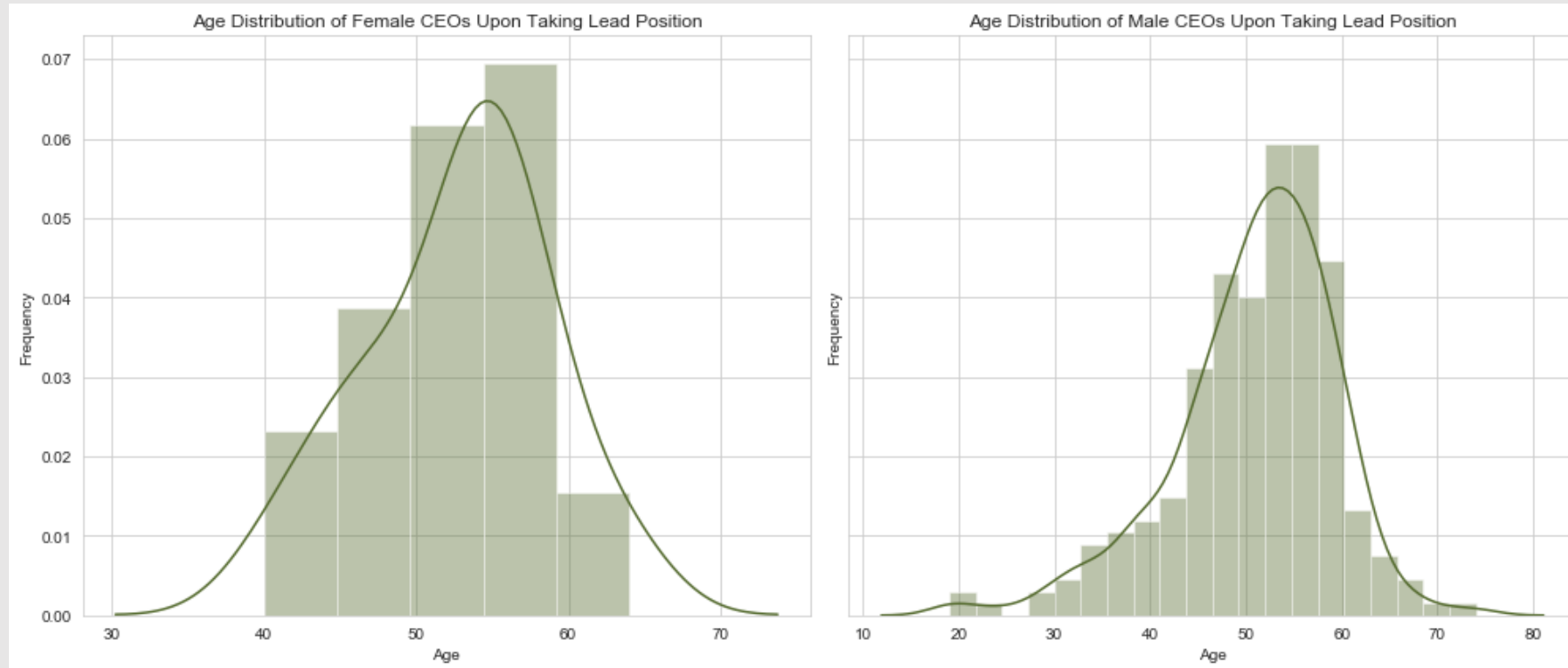
Gender Findings – Male vs Female Current Age



Female CEOs tend to be in their 50s and 60s, aligning closely with the age demographics observed among male CEOs. Female CEOs range in age from 41 to 66. In comparison, male CEOs span from 39 to 93, with the majority falling between their 40s and 70s.

The age distributions of male and female CEOs show considerable overlap, suggesting that both genders progress in their careers at similar rates in terms of age.

Gender Findings – Male vs Female Age Upon Becoming CEO



Most female and male CEOs ascend to their positions during their 40s or 50s, with a notable proportion achieving CEO status in their 50s.

Male and female CEOs typically reach their positions at comparable ages, although the broader representation of male CEOs results in a wider age range for this demographic.

Career Trajectory Findings

63% of Fortune 500 CEOs ascended to their roles through internal promotions or external career shifts.

21% of Fortune 500 CEOs previously held the CEO position at another company.

6% of Fortune 500 CEOs served as CEOs of internal subsidiaries or divisions before transitioning to the CEO role of the entire enterprise.

5% of Fortune 500 CEOs founded the company they currently lead.

4% of Fortune 500 CEOs were CEOs of external subsidiaries or divisions before assuming the CEO position at their current company.

1% of Fortune 500 CEOs became CEOs through a merger.

10% ascended to the CEO position after having been the CEO of an internal or external subsidiary. Internal subsidiary experience slightly holds a higher proportion in this regard.

Founder Insights

- Founders constitute a relatively small portion of CEOs (24 CEOs), suggesting that the majority of CEOs have climbed the corporate ladder, leveraging their accumulated experience.
- 21% of founders have a history of dropping out of college, suggesting that the majority of founders complete their college education
- All 4 of the CEOs under the age of 40 are founders, suggesting they were youthful entrepreneurs with successful ventures

Limitations and Assumptions

- Analysis limited to 508 CEO records from 2021 data
- Higher incidence of missing values in additional data collected (i.e. 28% of DOBs collected) affecting robustness of insights
- Credibility of data contingent on reliability of data collection sources
- Aries, Leo, and Capricorn designated as natural-born leader signs based on frequent appearance as leadership indicators on various astrology websites
- No official ranking for Ivy League and other prestigious institutions, creating potential for subjectivity
- There may be other influences on CEO growth not captured in this analysis

Conclusion

In answering the question of whether leaders are born or made, the evidence points more towards *made*.

Zodiac

Any zodiac sign can lead to becoming a CEO, indicating that CEO potential is not inherent from birth.

Education

93% of CEOs hold degrees, attendance at Ivy League schools remains low, and graduate degrees from esteemed universities are highly favored. These results underscore the significance of educational choices in CEO attainment.

Age

CEOs generally reach their positions at similar stages in their careers, typically later in life, indicating a steady advancement driven by years of leadership experience.

Gender

The age at which men and women become CEOs is similar, indicating that gender is not a determining factor in the timing of CEO appointments.

Career Trajectory and Origin findings remain inconclusive. More data collection and analysis needed.

Areas for Further Investigation

- Enhanced Data Collection:
 - Gathering more dates of birth would offer deeper insights into zodiac and age patterns.
 - Additional data on career trajectories:
 - Quantifying internal versus external promotions for CEOs.
 - Analyzing the duration CEOs spent at each company before attaining top positions.
 - Investigating whether CEOs originate from small towns or major cities.
- Comparative Analysis:
 - Collecting data on a non-CEO sample for origin analysis could facilitate comparisons and validation of relocation trends among CEOs and their career impacts.