

# A Study on the in Relationship of STEM majors and H-1B Visa Acceptance rate

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## INTRODUCTION:

According to [fws.us](https://fws.us), “A majority (73%) of prospective international students to the U.S. in 2021 say they would stay in the U.S. to live and work if they were graduating from their degree program today and a visa were easily accessible to them”. H-1B visa is a nonimmigrant work visa that allows foreign workers to work in the United States for specialty jobs that require a bachelor’s degree or above. The included fields are finance, engineering, architecture and more. H-1B visa status is available for students that were offered temporary professional positions by U.S. employers. However, the probability of receiving the H-1B visa is around 30% to 38%.

## PROBLEM STATEMENT:

In the 2021 to 2022 academic year there are around 1 million students that came to the United States to study from more than 200 countries. It is fairly competitive for an international student to get an H-1B visa. There are rumors flowing around that Non-Stem majors are equally likely to receive H-1B visas. As international student studying Non-stem majors, we want to find out: is it possible for non- STEM majors to have a higher probability to receive the H-1B visa than STEM majors? What major should I choose if I want to stay and live in the United States?

## OBJECTIVES:

Our objective is to test out the hypothesis if non- STEM majors have a higher probability of receiving H-1B visa than STEM majors. Also to identify specific industries in STEM or non STEM (whichever has the higher chance) that provide the highest probability of receiving the H-1B visa. In addition, we aim to create diagrams and suggestions for incoming international students as a reference for their future career path.

## METHOD:

### - Data Collection

After we identified our problem, we collected data from Usafacts (their data comes from USCIS) which includes the number of H-1B initial approvals granted by year, state, industry, and employer from 2009 to 2019. Considering the number changed every year, we decided to use the most current year (2019) as our reference.

### - Descriptive Statistics

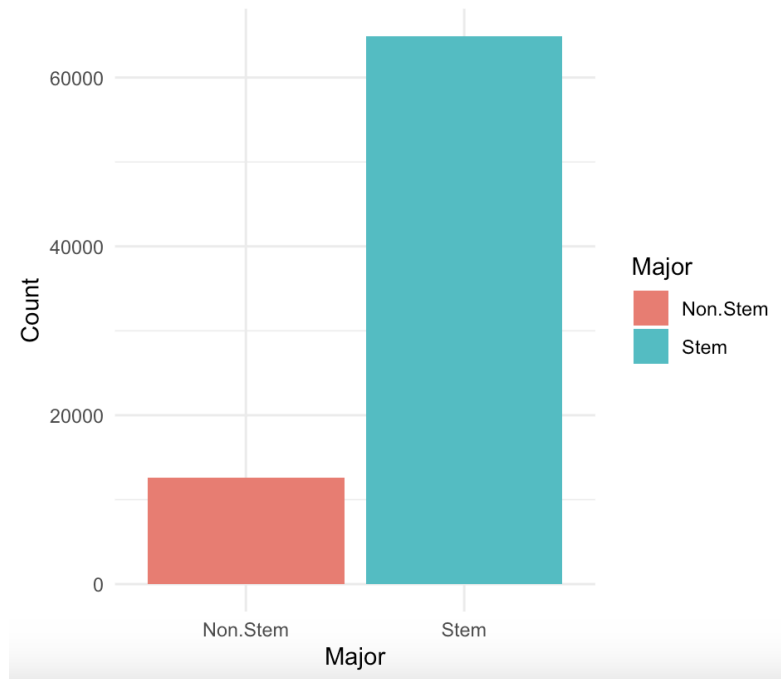
```
> summary(data)
```

	Stem		Non.Stem
Min.	: 1939	Min.	: 133.0
1st Qu.:	8226	1st Qu.:	281.0
Median	:11782	Median	: 578.5
Mean	:22607	Mean	: 2040.8
3rd Qu.:	26163	3rd Qu.:	1408.0
Max.	:64927	Max.	:12581.0
NA's	:16		

Figure 1: Descriptive Statistics of H-1B Visa Approval

Based on Figure 1, it demonstrates the difference between the number of case approval for STEM and non STEM majors. The minimum case number of approval for STEM majors is 1939 compared to 133 for non-STEM majors. Which indicates that STEM majors actually have the higher probability of receiving an H-1B visa.

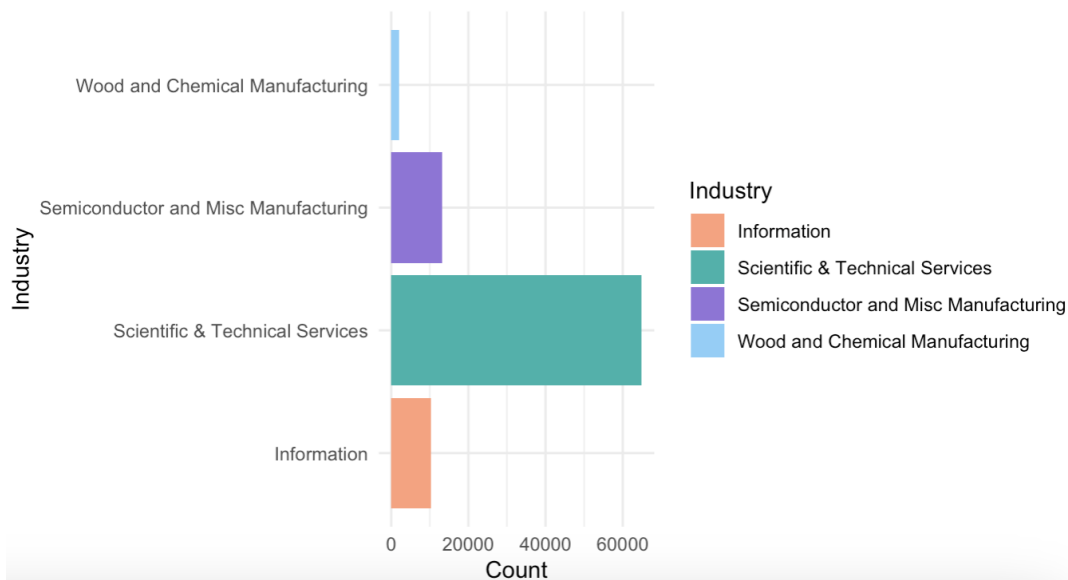
#### - Data Visualization



**Figure 2: Total approve case between STEM and non-STEM majors**

Based on figure 2, the total approved case number for STEM majors(blue) outstrip non-STEM majors(red).

**Figure 3: Approval rate for different industry under STEM majors**



Based on figure3, the Scientific and Technical Services industry has the highest chance(71.7%) of receiving an H-1b visa and Wood and Chemical Manufacturing has the lowest chance (2.14%) out of all four industries.

#### - Data Analysis

```
Two Sample t-test

data: Count by Major
t = -3.4093, df = 22, p-value = 0.002515
alternative hypothesis: true difference in means between group Non.Stem and group Stem is not equal to 0
95 percent confidence interval:
 -33077.017 -8055.983
sample estimates:
mean in group Non.Stem    mean in group Stem
      2040.75              22607.25
```

**Figure 4: Two Sample T-Test**

## RESULT

In Figure 4, we compared the means of the Non-Stem group and the Stem group, and found that 22607.25 (Stem) is significantly higher than 2040.75 (Non-Stem). The total number of approved stem major applications is 90429, accounting for 69% of the total acceptance rate. In contrast, Non-Stem majors only have 40815 approved applications, which is only 31% of the total accepted applications. Of the 90429 approved applications, 64927 come from Scientific & Technical Services, which is 71.7% of the approved Stem majors.

## CONCLUSION & RECOMMENDATIONS

### Conclusion

Stem majors have a significantly higher probability of receiving an H1B visa compared to Non-Stem majors. This is a reasonable outcome since STEM industries are necessary for staying globally competitive and growing the economy of the country. This result rejects the rumor and our hypothesis that Non-Stem majors have an equal probability of receiving an H-1B visa as Stem majors.

### Recommendation #1

We recommend that international students who aim to stay and work in the United States choose a Stem major to study. Stem majors have a higher chance of receiving an H-1B visa, which would allow the students to legally work in the United States. We particularly recommend majors in Computer Science and Engineering, since the industry with the highest H-1B approval rate is Scientific and Technical Services.

### Recommendation #2

We also recommend that students choose their location of study and work wisely, as the distribution of H-1B visas is not equal throughout the United States. Certain areas such as California, Texas, and New York have higher approval rates, which could be related to the presence of large corporations. On the other hand, states like South Dakota and Louisiana have lower approval rates.

### **Recommendation #3**

Our third recommendation is to choose a larger corporate company to maximize the probability of getting sponsored for an H-1B visa. According to data from USCIS, large corporate companies such as Infosys and Meta have higher approval rates. Amazon, in particular, has the highest approval rate out of all the companies.

### **Lessons Learned**

#### *Data Collection*

During the research and analysis process, we learned to avoid bias as much as possible in order to collect objective data. Initially, we explored the idea that Non-Stem majors are easier to obtain an H-1B visa, which led us down the wrong path. The research we analyzed was biased and aimed to encourage a particular outcome. To address this issue, we redirected our research to collect objective data based on national information from USCIS. After doing so, it became clear that the overall trend was completely different from our initial research.

#### *Data Relation to Location*

Initially, we assumed that H-1B visas were equally distributed, but our research revealed that the H-1B quota is not evenly spread across the United States. The acceptance rate varies depending on the location, which is influenced by the density of high-skilled foreign workers and larger technology companies. States such as California, Texas, New York, and New Jersey have the highest acceptance rates, while states like South Dakota, Alabama, and Louisiana have lower rates.

#### *Interesting Insights*

- In 2021, more than half of H1-B visas is awarded to Indian nationals

-Business Analyst(2022) has a 99.85% H-1B approval rate. This is good news to most international students studying in MIS or Business Analytics. We will be having a higher chance of receiving H-1B Visa.

### **Challenges**

#### *Topic Selection*

During the topic selection process, our team members had varying interests, with one member wanting to research topics related to fashion and another wanting to research sports. After some discussion, we realized that we needed to choose a topic that we were both interested in and could easily access information about. To overcome this challenge, we focused on communicating objectively and recognizing that this was a group project that required teamwork and communication. We took a step back to prioritize the success of the team and work together towards a common goal.

#### *Data Visualization*

During our data visualization process, we encountered a coding error that proved challenging to solve. Despite our best efforts, we were unable to create a bar chart using our initial code. As a result, we reached out for help and worked collaboratively to edit the code into a more simplified version. We also

added other graph labels to ensure that our graph was as clear and informative as possible. In the end, we were able to successfully visualize our data and present it in a way that effectively communicated our findings.

### *Time Conflict*

During the process of scheduling our meetings, we encountered conflicts. To address this, we learned the importance of setting clear time frames and creating action plans prior to our meetings. This ensured that we had all the necessary information to discuss and move our project forward. Additionally, we recognized the efficiency gained from individual preparation and completing assigned tasks before the meeting. By implementing these strategies, we were able to improve our cooperation and productivity as a group.

### *Data Categorization*

In the process of data collection, we encountered a challenge where we could only find data points in the time series line chart. This was hindering our progress in performing calculations. To overcome this challenge, we manually input the data points into an Excel sheet and ran it in R, which allowed us to create charts and graphs with the data.