

Global Workforce Analysis Report

Shravan Kumar Gajula

1. Project Overview

Project Name: Global Workforce Analysis

Objective: Analyze the migration patterns of skilled professionals (primarily H-1B visa holders) between the U.S. and India, and their impact on the economies of both countries, and create a visual dashboard to present the findings.

2. Data Collection & Cleaning

Data Sources:

- H-1B Visa Application Data
- Country, Employer, Industry, and City-wise visa application data (Top 20 list).

Data Cleaning:

- Used **Python** (with libraries like **Pandas** and **NumPy**) to clean and preprocess the data.
 - Used **SQL Workbench** to clean and preprocess the data.
 - Executed **SQL queries** (available in the Scripts folder) to remove duplicates, handle missing values, and filter relevant data.
 - Further processing was done using **Python (Pandas, NumPy)** to transform data into a format suitable for **Tableau** visualization.
 - Used **Matplotlib in Jupyter Notebook** to generate bar chart data for analysis, using:
 - **Stacked bars with multiple colors for top countries.**
 - **Horizontal bars with blue color for top cities.**
 - **Pie charts with multiple colors for top employers.**
 - **Pie charts with multiple colors for top industries.**
 - Data was split into multiple columns for granular analysis (Employer, Industry, Country, City, Applications).
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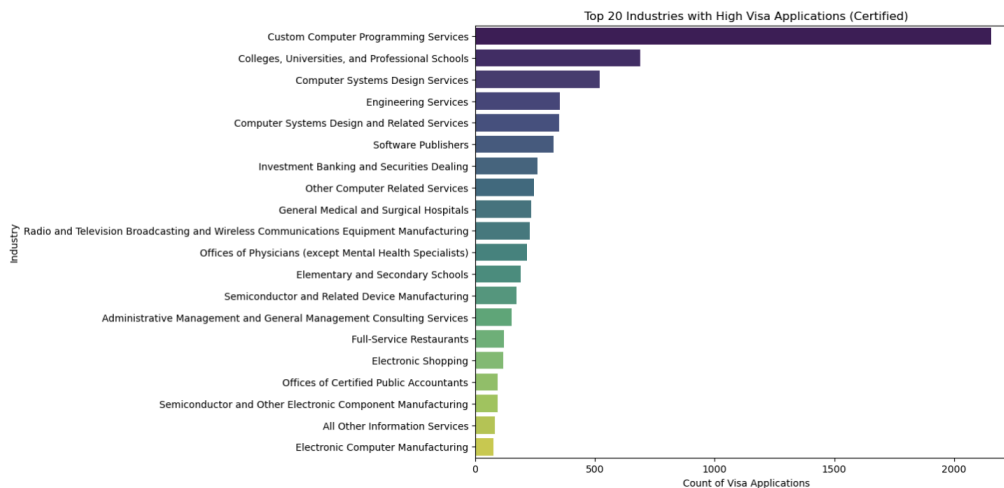
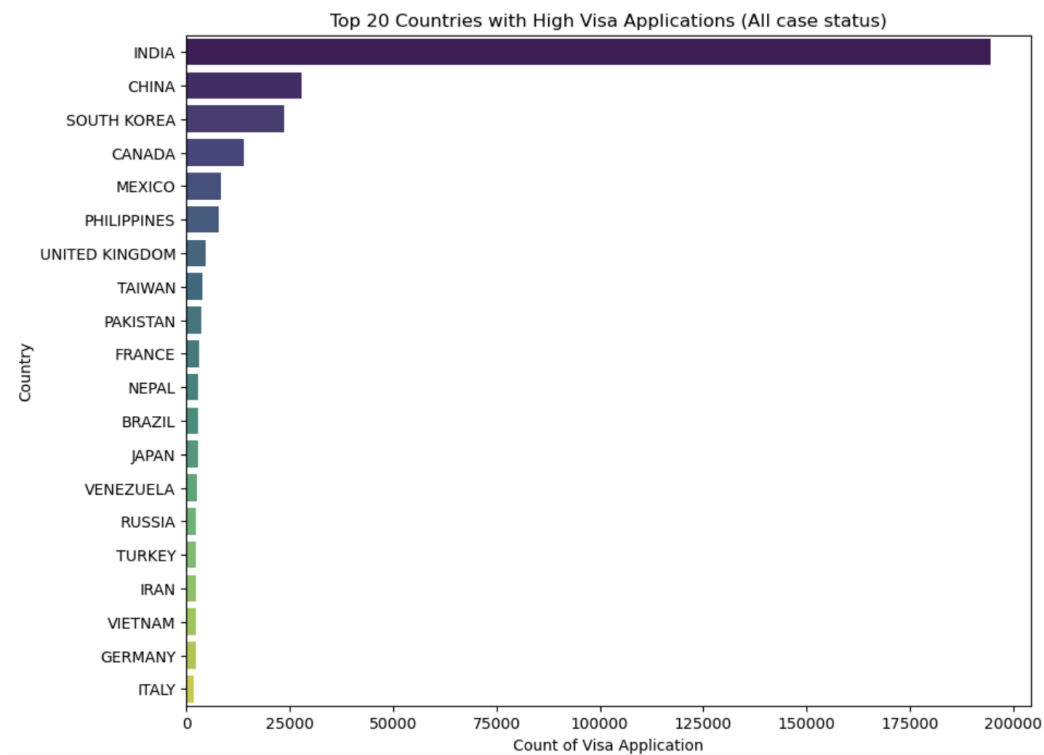
3. Tools & Technologies Used

- **Data Cleaning & Preprocessing:** Python (Pandas, NumPy)
- **Data Analysis & Visualization:** Tableau Desktop
- **Data Sources:** H-1B Visa Application Data, Country/City-level Applications Data

4. Data Analysis and Insights

The analysis aimed to uncover insights regarding the following:

- **Top Employers:** Identifying companies with the highest number of visa applications.
- **Top Industries:** Analyzing industries that hire the most foreign talent.
- **Top Countries:** Identifying which countries (especially India) contribute the most skilled labor to the U.S.
- **Top Cities:** Looking at U.S. cities with the highest visa application numbers.



5. Visualization – Tableau Dashboard

Tool Used: Tableau Desktop

The data was visualized using Tableau, focusing on **four key visualizations**:

1. Top Employers by Visa Applications (Pie Chart)

- A pie chart displaying the top 20 employers and their respective visa application counts with multiple colors.

2. Industry Distribution (Pie Chart)

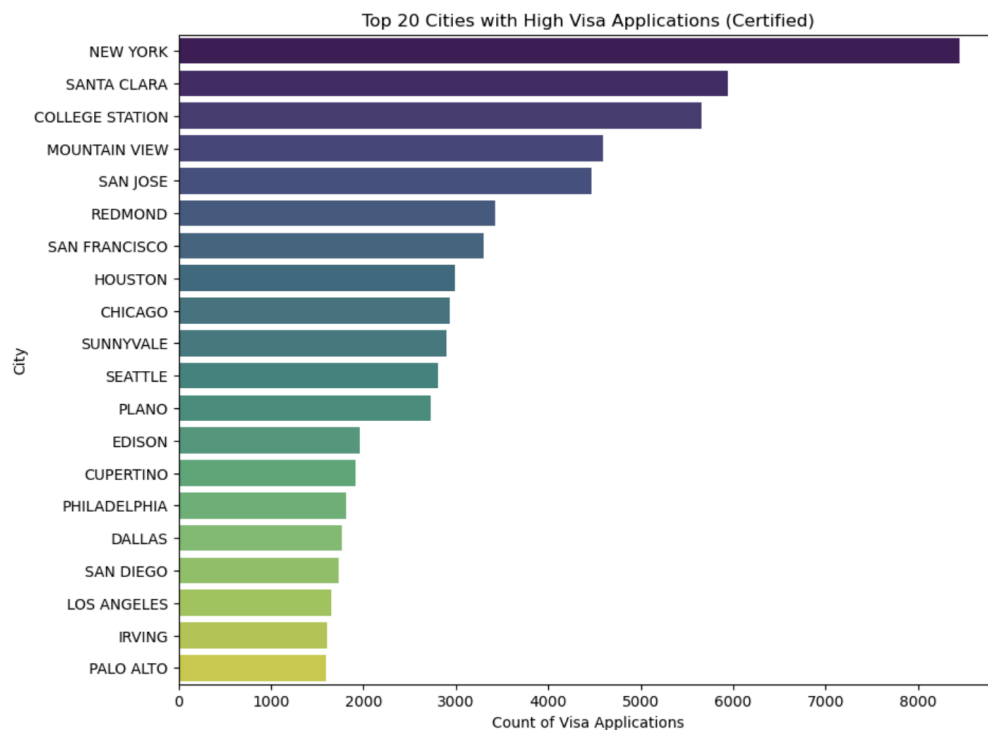
- A pie chart depicting the distribution of visa applications across different industries with multiple colors.

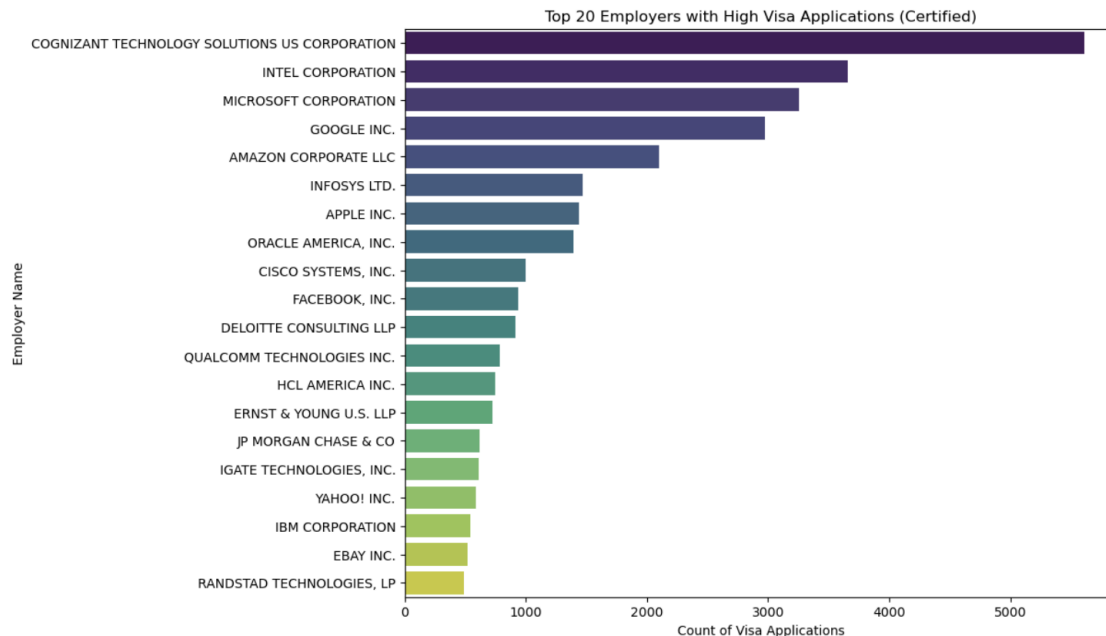
3. Visa Applications by Country (Stacked Bar Chart)

- Stacked bar chart with multiple colors showing visa application distribution by country.

4. Top Cities by Visa Applications (Horizontal Bar Chart)

- A horizontal bar chart with blue color listing the top U.S. cities and the number of visa applications.





6. Impact Analysis (India & USA)

Impact on the U.S. Economy

Loss of Skilled Labor:

- The U.S. heavily relies on H-1B visa holders, particularly in industries like technology, healthcare, finance, and research.
- If a significant portion of these skilled professionals return to India, there could be a severe talent gap, affecting innovation, product development, and economic growth.
- Companies may struggle to find qualified replacements, leading to slowed project timelines and reduced efficiency.

Potential GDP Decline:

- The U.S. economy benefits from high-skilled immigrants who contribute to research, development, and business expansion.
- With a reduced workforce, key industries may experience decreased productivity, directly impacting GDP growth.
- Startups and tech giants, which rely on Indian talent for engineering, AI, and data science, might see delays in innovation and expansion.
- Loss of tax revenue from departing professionals could lead to reduced government funding for infrastructure and social programs.

Wage Increase & Talent Shortages:

- A reduction in the skilled workforce could drive up wages in tech, healthcare, and finance due to increased demand for available professionals.
- While this may benefit local professionals, companies may face higher labor costs, leading to increased outsourcing or automation investments.
- Small and mid-sized businesses, unable to compete with tech giants in salaries, may face hiring difficulties.

Decline in Investment & Competitiveness:

- Many multinational companies choose the U.S. as a base due to its access to top global talent. A reduction in skilled professionals could make other countries more attractive for investment.
- The U.S. may lose its competitive edge in fields like AI, cloud computing, and biotech as companies seek talent elsewhere.

Impact on Higher Education & Research:

- Many international students from India pursue advanced degrees in the U.S., filling crucial roles in research and academia.
- A reduced pipeline of skilled professionals could weaken university programs and decrease funding for scientific research.

Impact on India's Economy**Brain Gain & Knowledge Transfer:**

- The return of skilled professionals could lead to a surge in innovation, knowledge transfer, and entrepreneurship.
- Professionals with global exposure bring best practices in technology, management, and research, boosting domestic industries.
- India's software and IT services sector could expand rapidly with experienced professionals re-entering the workforce.

GDP Growth & Economic Expansion:

- With a highly skilled workforce, India could see growth in high-tech industries, AI, automation, and deep tech.
- The startup ecosystem could benefit from returning entrepreneurs who have gained experience in Silicon Valley and other global markets.
- Increased disposable income among skilled professionals could drive demand in real estate, consumer goods, and services, boosting overall economic growth.

Workforce Expansion & Job Market Development:

- Indian industries struggling with a talent shortage could benefit from an influx of experienced professionals.
- More professionals in AI, fintech, biotech, and automation could accelerate domestic innovation and reduce reliance on foreign companies.
- Returning workers might contribute to improving work culture, productivity, and operational efficiencies in Indian companies.

Increased Foreign Investment & Business Growth:

- If India successfully integrates returning professionals, global investors may see greater potential in the Indian market.
- More startups and R&D centers could emerge, attracting venture capital and corporate investment.

Challenges of Large-Scale Workforce Return:

- India's job market would need to absorb a large number of professionals, requiring policies to support employment and entrepreneurship.
 - Infrastructure, wages, and work conditions may need improvements to retain these skilled professionals.
 - The government may need to implement tax incentives and regulatory reforms to attract and retain top talent.
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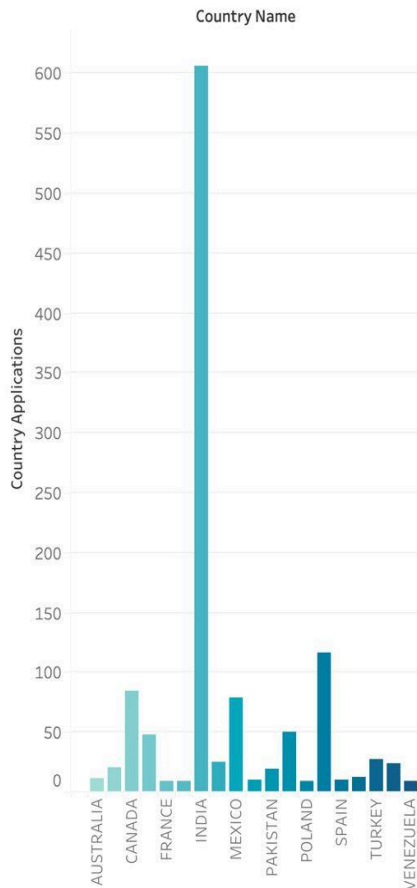
7. Dashboard Features

The Tableau dashboard was designed to provide interactive insights into the following:

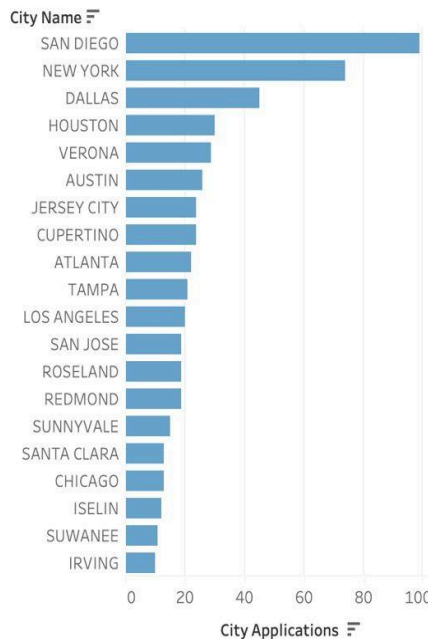
- **Interactive Filters:** Users can filter by Employer, Industry, Country, and City to see the impact in different regions.
 - **Scenario Simulation:** Simulated scenarios like the return of 70% of Indian professionals to India, and its impact on both economies.
 - **Forecasting & Trends:** Insights into how workforce migration could evolve in the future, with forecasting for both the U.S. and India.
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H-1B Visa Workforce Analysis

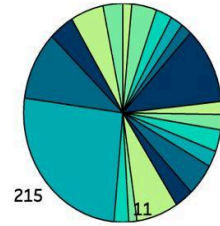
Top Countries



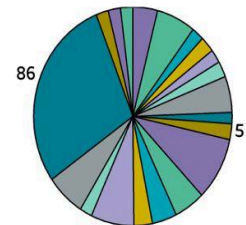
Top Cities



Top Industries



Top Employers



✓ Impact on the U.S.:

Loss of skilled labor if visa holders return to India.
Impact on tech, healthcare, and finance industries.
Potential increase in wages due to labor shortages.

✓ Impact on India:

Brain gain and rise in skilled workforce.
Growth in India's startup ecosystem and innovation.
Increase in GDP due to returning professionals.
Reduce India's **\$120B** annual remittance inflow.

8. Conclusion and Recommendations

• For the U.S.:

- Short-term impact includes loss of skilled labor and possible GDP reduction. The long-term focus should be on improving domestic workforce development.
- Policies to retain skilled workers should be considered.

• For India:

- In the short term, India would see a major boost in workforce quality and innovation.
- Long-term effects could include sustained economic growth and technological advancements.

9. Sources

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