



Then and Now:

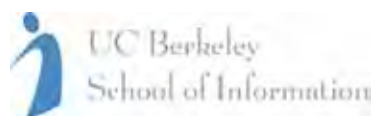
America's New Immigrant Entrepreneurs, Part VII

Authors:

Vivek Wadhwa

AnnaLee Saxenian

F. Daniel Siciliano



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The Foundation of Entrepreneurship

October 2012

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Authors

Vivek Wadhwa
AnnaLee Saxenian
F. Daniel Siciliano

Researchers

Neesha Bapat
Samantha Huang
Randall Jong
Rebecca King
Samantha McCann
Rachel Paulk
Hatim Rahman
Zahra Shakur Jamal
Aswath Sridhar

Part-time Researchers

Karen Attiah
Sean Hassan
Cissie Lam
Anand Sundaram

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Introduction and Overview

In 1999, AnnaLee Saxenian published the first study to provide a quantitative analysis of the economic contributions of high-skilled immigrants in Silicon Valley. In “Silicon Valley’s New Immigrant Entrepreneurs,” she examined the transnational circulation of capital and labor of Silicon Valley’s economy during the 1980s and 1990s. She found that immigrants comprised one-third of the region’s scientific and engineering workforce. Moreover, in 1998, Chinese and Indian engineers were responsible for operating one-quarter of technology businesses in the region, accounting for more than \$16.8 billion in sales and 58,282 jobs. At the time of its release, the report succeeded in validating the prevailing belief that immigrants were major contributors to the U.S. economy and the high-tech industry.

Finding that the period from the 1980s and 1990s had experienced such a vast upswing in the number of immigrant-founded companies, Saxenian surmised that the growth rate of immigrant entrepreneurship would continue to accelerate in subsequent decades. Her initial forecasts were ultimately proven right. In 2007, a study conducted by researchers at Duke University and the Berkeley School of Information, drawing on Saxenian’s earlier work, concluded that high-skilled immigrants were playing an even more expanded role than before as the driving forces of technological innovation and capital growth. The study found that, between 1995 and 2005, 52 percent of high-tech companies started in Silicon Valley.

The 2007 study also examined companies founded between 1995 and 2005 nationwide. Researchers found that 25.3 percent of these engineering and technology companies had at least one key founder who was foreign-born. In 2005, these immigrant-founded companies collectively generated roughly \$52 billion in sales and employed 450,000 workers. These findings were documented in a paper titled, “America’s New Immigrant Entrepreneurs.”

A subsequent research project analyzed the backlog of immigrants in the United States waiting for legal permanent residence in the first three employment-based categories. It documented that, as of October 1, 2006, there were almost half a million such foreign-born persons, and the number including family members was more than one million. But there were only about 120,000 visas available per year in these employment-based visa categories (plus visas not used in the family preferences). So the wait times

for permanent residence visas, or green cards, as these commonly are called, was about a decade. The researchers saw reason for concern and forecast that this wait increasingly would lead to these workers getting frustrated and returning home or moving to other countries. The prediction of a “reverse brain drain” was published in a Kauffman Foundation paper titled, “Immigrants, Intellectual Property, and the Reverse Brain-Drain—America’s New Immigrant Entrepreneurs, Part III.”

To test this hypothesis and to learn whether the trend of increasing immigrant entrepreneurship in the technology sector had continued, researchers at Duke University, the Berkeley School of Information, and Stanford University conducted a follow-up study to the 2007 report to determine what has happened to the rate of immigrant entrepreneurship from 2006 to 2012. Here we present our findings.

This study examined the complex relationships between immigration and economic development in an increasingly globalized economy. It sought to update the findings of the 2007 report by analyzing whether changes in the pace of immigrant entrepreneurship have occurred. Out of a total of 107,819 engineering and technology companies founded in the last six years, it examined a random sample of 1,882 companies to identify whether a key founder was foreign-born.

The study found that, for the first time in decades, the growth rate of immigrant-founded companies has stagnated, if not declined. In comparison with previous decades of increasing immigrant-led entrepreneurship, the last seven years has witnessed a flattening out of this trend. The proportion of immigrant-founded companies nationwide has dropped from 25.3 percent to 24.3 percent since 2005. While the margins of error of these numbers overlap, they nonetheless indicate that immigrant-founded companies’ dynamic period of expansion has come to an end.

We also performed a special analysis of Silicon Valley, which is widely known as the international hub for technological development and innovation. The findings indicate that 43.9 percent of Silicon Valley startups founded in the last seven years had at least one key founder who was an immigrant. This represents a notable drop in immigrant-founded companies since 2005, when 52.4 percent of Silicon Valley startups were immigrant-founded.

Below is a summary of the key findings about engineering and technology companies founded in the United States between 2006 and 2012:

- 24.3 percent of these companies had at least one key founder who was foreign-born. In Silicon Valley, this number was 43.9 percent.
- Nationwide, these companies employed roughly 560,000 workers and generated \$63 billion in sales in 2012.
- Of the total of immigrant-founded companies, 33.2 percent had Indian founders, up about 7 percent from 2005. Indians have founded more such companies than immigrants born in the next top seven immigrant-founder-sending countries combined.
- The top ten sending countries of immigrant entrepreneurs in descending order were India (33.2 percent), China (8.1 percent), the United Kingdom (6.3 percent), Canada (4.2 percent), Germany (3.9 percent), Israel (3.5 percent), Russia (2.4 percent), Korea (2.2 percent), Australia (2.0 percent), and the Netherlands (2.0 percent).
- The 458 immigrant-founded companies sampled collectively created a total of 9,682 jobs. They employed an average of 21.37 workers.
- While the mix of immigrants varies by state, Indians tend to dominate the immigrant-founding groups of the top six states with the greatest representation of immigrant founders.
- The states with the highest concentration of immigrant-founded companies were California (31 percent), Massachusetts (9 percent), Texas (6 percent), Florida (6 percent), New York (5 percent), New Jersey (5 percent).
- Some immigrant groups showed a greater tendency to start companies in particular states. Of Indian-founded companies, 26 percent were founded in California and 8 percent in Massachusetts. Of Chinese-founded companies, 40 percent were founded in California and 16 percent in Maryland. While immigrant groups tended to concentrate the most in California, German immigrants demonstrated a preference for starting businesses in Ohio (22 percent), followed by California (17 percent).
- Across engineering and technology fields, immigrant entrepreneurs displayed the greatest concentration in the innovation/manufacturing-

related services (45 percent) and software (22 percent) fields.

This study demonstrates that the rate of immigrant entrepreneurship nationwide has plateaued. Silicon Valley remains the rubric against which national trends in the technology sectors are measured. That the proportion of immigrant founders in the Silicon Valley has declined since 2005 should raise questions about the United States' future ability to remain economically competitive in the international market.

Background on U.S. Immigration

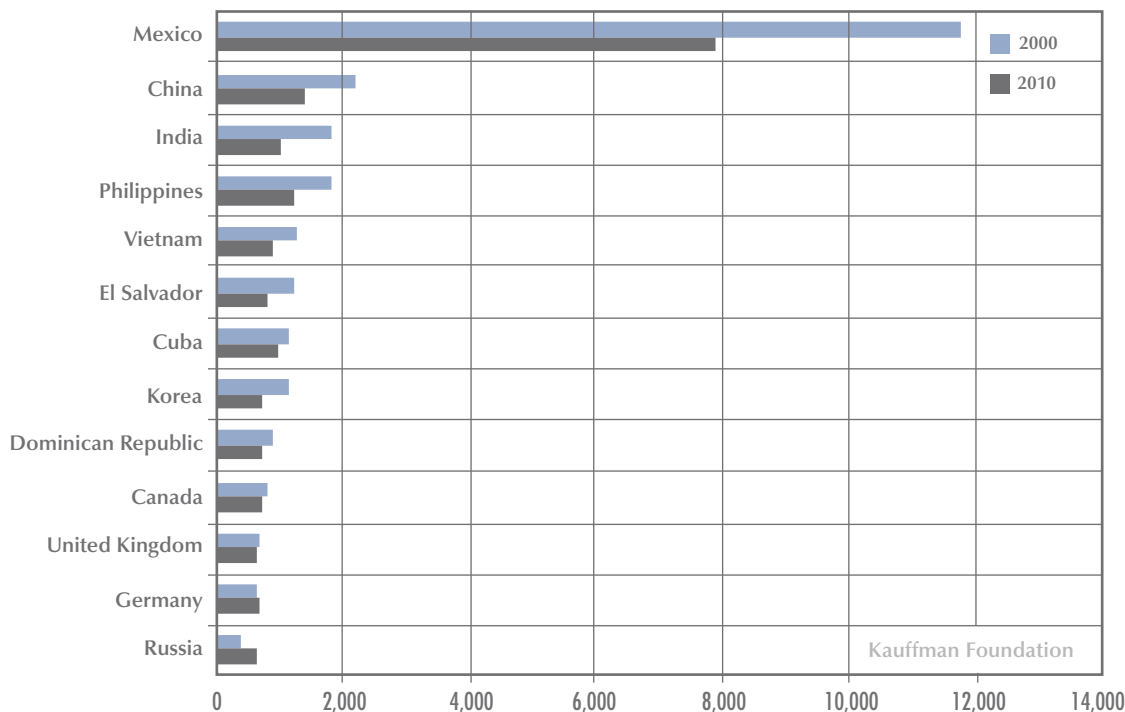
The 2010 American Community Survey from the U.S. Census Bureau shows that 12.9 percent of the U.S. population was foreign-born.¹ This equates to nearly 40 million foreign-born living in the United States. Immigrants from Latin America make up the largest portion of this group at 53.1 percent, followed by those from Asia (28.2 percent) and Europe (12.1 percent). Figure 1 displays the countries of birth for foreign-born individuals living in the United States in 2000 and 2010.

Immigrant populations vary considerably by state. California has the highest percentage, with 25.4 percent of the state's 2010 population being

foreign-born, followed by New York, with 10.8 percent; Texas, with 10.4 percent; and Florida, with 9.2 percent. The lowest foreign-born state populations are in the west/Midwest and southern states. A full state breakdown of this Census data is presented in Figures 2 and 3.

According to the Census bureau, more than one in four California residents and more than one in five residents of New York and New Jersey were foreign-born. Additionally, about 74 percent of all foreign-born residents lived in ten states, with the remaining forty states (and the District of Columbia) sharing 2 percent or less of the remaining foreign-born population.

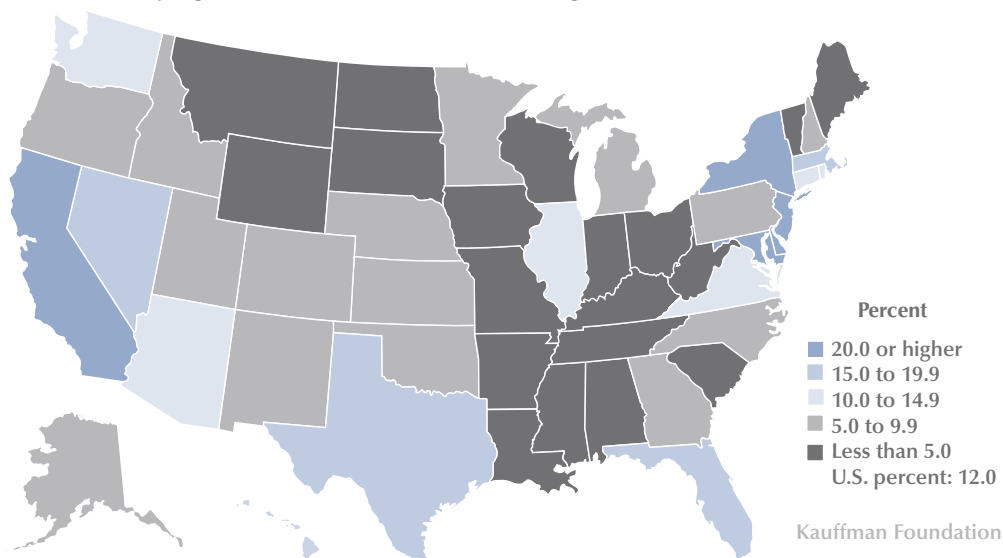
Figure 1
Countries of Birth of the U.S. Foreign-Born Population in
2000 and 2012 (Includes Data from Groups with 500,000 or More
Individuals Living in the U.S. in 2000)



1. http://factfinder2.census.gov/faces/tableservices/jsi/pages/productview.xhtml?pid=ACS_10_1YR_DP02&prodType=table

Figure 2
Foreign-Born Population for Individual States: 2010

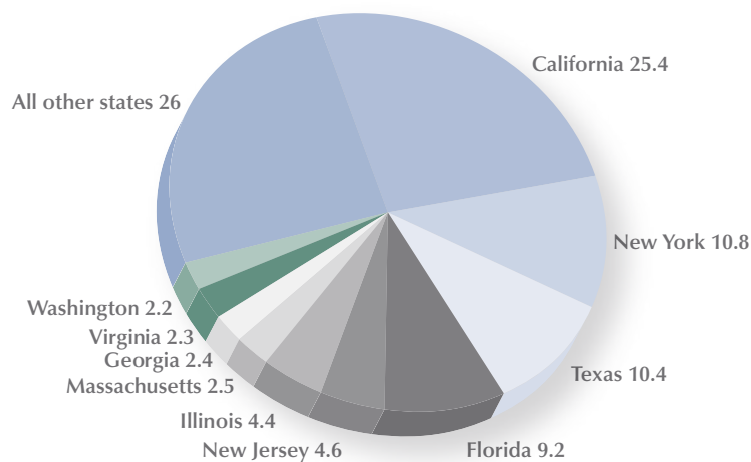
Data based on sample. For information on confidentiality, sampling error, nonsampling error, and definitions, see www.census.gov/acs/www/.



Source: U.S. Census Bureau, American Community Survey, 2010.

Figure 3
Foreign-Born Population for Individual States: 2010

Percent distribution. Data based on sample. For information on confidentiality, sampling error, nonsampling error, and definitions, see www.census.gov/acs/www/.



Note: Percentages do not sum to 100.0 due to rounding.
 Source: U.S. Census Bureau, American Community Survey, 2010.

For our study, we received the highest number of responses from the following states: California, Massachusetts, Texas, Florida, New York, and New Jersey. Across the six states, Indian entrepreneurs dominated all other immigrant entrepreneur groups.

The table below shows the Indian populations for each of these states. Although these data refer to the number of Indians as a race and not the number of Indian immigrants specifically, it underscores the outsized role of Indian entrepreneurs in these states.

Methodology – Immigrant Key Founder Data

To determine the proportion of immigrant entrepreneurs in the high-technology industry, we sought to locate data compiled about engineering and technology companies founded in the United States for the last seven years (2006–2012).

We obtained a list of all such companies from Dun & Bradstreet’s (D&B) Million Dollar Database. This database contains U.S. companies with more than \$1 million in sales and twenty or more employees, and company branches with fifty or more employees. It is commonly used by researchers and is considered a source of reliable data.

The D&B database listed 107,819 engineering and technology companies founded in the United States between 2006 and 2012. A portion of these were older companies with recent changes in control or corporate restructurings/mergers. We also omitted a small number of companies that did not meet the definition of a high-tech company by the study’s definition. Included below is a list of key data that D&B provides:

- Company name
- Type of company
- City, state, zip code

- Phone number
- Company website
- Sales
- Total number of employees
- Select executive officer information
- Primary standard industrial classification

For the purposes of our study, the words technology and engineering indicate that the main work of the company was the deployment of technology or engineering to design or manufacture products or services. Our definition of engineering and technology firms thus includes the following industry groups, defined with 3- and 4-digit U.S. Government Standard Industrial Classification (SIC) codes: semiconductors, computers/communications, biosciences, defense/aerospace, environmental, software, and innovation/manufacturing-related services. A full listing of the SIC codes associated with each industry group is present in appendix A. These are the same engineering and technology SIC codes used in the previous 2007 study, as well as in Saxenian’s original research. We excluded some professional services SIC codes that were included in Saxenian’s 1999 study, but were outside the purview of the engineering and technology disciplines.

Company entries within each SIC code were randomized using a Microsoft Excel random-number assignment. Researchers then were assigned random listings of 500 companies, with representative entries from each of the main engineering and technology industry groups.

Researchers made unsolicited phone calls and sent unsolicited emails, searched company websites, and utilized social media tools to determine whether a company’s key founders were immigrants and, if so, what their nationalities were. This became the source of data presented in the report.

Definition of Key Founder

In most engineering or technology companies, the key founders are the President/Chief Executive

Figure 4
Indian Population for Select States: 2010

	California	Massachusetts	Texas	Florida	New York	New Jersey
Total State Population	37,691,912	6,587,536	25,674,681	19,057,542	19,465,197	8,821,155
Total Indian Population by State	578,235	69,465	254,187	129,970	325,636	299,922
Percentage of Indians by State	1.53%	1.05%	0.99%	0.68%	1.67%	3.40%

Officer or the head of development/Chief Technology Officer. An individual can perform both of these roles simultaneously. Other roles, such as finance, marketing, HR, and legal, can be very important in startups. For the purposes of our research, however, we chose to use a narrow definition of key founder and exclude the latter roles. Since these findings include only companies with immigrant Presidents/Chief Executive Officers or heads of development/Chief Technology Officers, they potentially understate the role of immigrants in founding new firms.

Definition of an Immigrant and Immigrant-Founded Company

An immigrant is a person who was born in another country and subsequently moved to the United States at some point in his or her lifetime. Immigrant-founded companies are those having one or more immigrants as key founders.

Some companies had more than one key immigrant founder. For the purpose of our research, we counted this as one response from the company. However, we did count all countries that were represented in each company when analyzing countries of origin.

Data Collection

Researchers conducted a Web search using company websites, LinkedIn, and other social media tools, and made phone calls to companies to determine whether a company's key founders were immigrants and, if so, what their nationalities were.

A team of ten graduate students and research assistants collected company information by calling and emailing, conducting Web searches, and utilizing LinkedIn and other social media tools.

When contacting CEOs, HR managers, and other knowledgeable company employees, student researchers gave a two-sentence introduction of themselves and the research project. The company representatives then were asked:

- (1) Were any of your company's key founders immigrants to the United States? If "yes," they were asked:
- (2) In what country was he or she born?

They followed the first question with the definition of "key founder" and "immigrant-founded company."

Quality Assurance and Data Analysis

After all of the data had been collected, we performed quality assurance on our records. Two criteria in particular were chosen to ensure the veracity of the collected data. First, companies listed in the D&B database with zero employees at their U.S. headquarters were omitted from consideration. Second, companies with 2012 sales greater than \$100 million were double-checked to make certain that they had been founded after 2005.

Data Analysis—Immigrant Key Founder Data

From our dataset, we obtained responses from 1,882 engineering and technology companies founded in the United States between 2006 and 2012. Our results found that 24.3 percent of these companies had at least one key founder who was an immigrant. Extrapolations from the sample allowed us to estimate

Table 1
Founder Survey Statistics and Response Rates

	Count	Variable
Total "Yes" Responses	458	a
Total "No" Responses	1,424	b
"Declined Responses:" Hang Ups, Unwilling to Participate	84	c
"Missing Data:" No Knowledge, Answering Machines, Requests to Call Back	1,079	d
Total Companies Approached	3,045	e
Response Rate R1 (The proportion of survey responses obtained out of total survey delivery attempts) [(a+b)/e]	61.8%	
Response Rate R2 (The proportion of survey responses obtained out of total surveys actually delivered) [(a+b)/(a+b+c)]	95.7%	

that companies founded by immigrants between 2006 and 2012 generated \$63 billion in revenue and employed 560,000 workers in 2012. The chart below shows the results of our survey, broken down by the response statistics.

Revenue and Employment Data

To make statistically sound conclusions about the 107,819 engineering and technology companies established in the last seven years, we ran a sampling distribution of a proportion and performed finite population correction. We can say with 95 percent confidence that 24.3 percent \pm 1.90 percent of the 107,819 engineering and technology companies founded between 2006 and 2012 had an immigrant key founder. This equates to 26,243 \pm 2,054 companies. These 26,243 companies generated more than \$63 billion in 2012 sales and employed an estimated 560,816 workers.

Immigrant-Founder Origin Data

Our study found that, while certain nationalities tended to account for a significantly greater number of immigrant-founded companies, immigrant founders come from diverse backgrounds, hailing from more than sixty countries. Chart 1 provides a list of the top ten countries with the greatest number of immigrant founders represented.

Chart 1 shows that Indians account for 33.2 percent of immigrant-founded engineering and

technology companies started between 2006 and 2012. Significantly, Indians have founded more such companies than immigrants from the next top seven immigrant-founder-sending countries combined. Immigrant founders from China, ranking second in this list, account for 8.1 percent; those from the United Kingdom, 6.3 percent; those from Canada 4.2 percent; and those from Germany, 3.9 percent.

State-wise Distribution of Immigrant Founder Data

We analyzed the responses based on the location of each company’s headquarters as listed in the D&B database. This allowed us to group responses by state and determine whether immigrant engineering and technology founders had a propensity to gravitate toward certain U.S. states when starting new companies. We were only able to report results from twelve states where we had a high enough sampling density to be confident of our findings. Table 2 indicates the percentage of companies founded by immigrants in each of these states. The study’s average immigrant founding rate also is presented to illustrate the extent of a state’s deviation from the national average.

Whereas in the 2007 study California led the states in holding the highest rate of immigrant entrepreneurs, New Jersey (45.1 percent) and Massachusetts (41.7 percent) now lead ahead of California (39.6 percent). Washington also has

Chart 1
Birthplace of Engineering and Technology Immigrant Founders

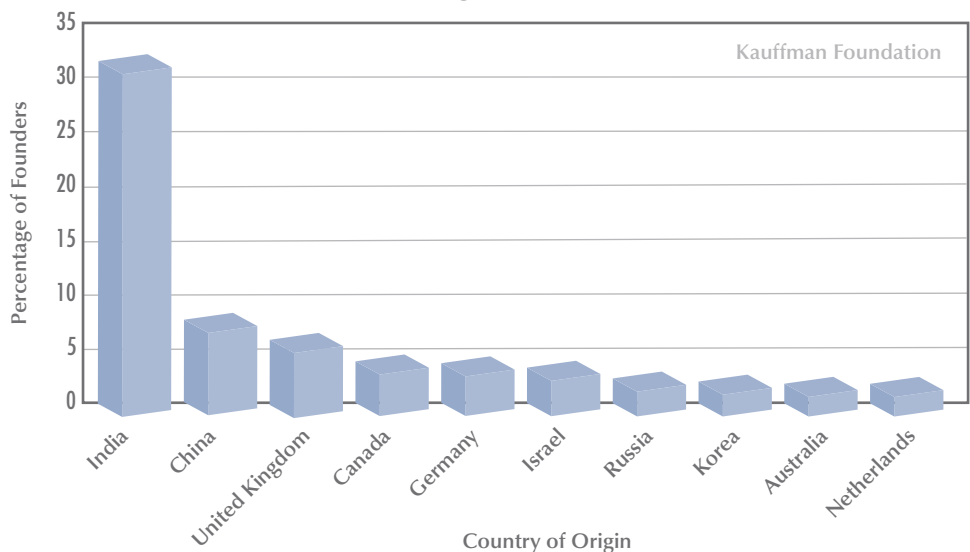
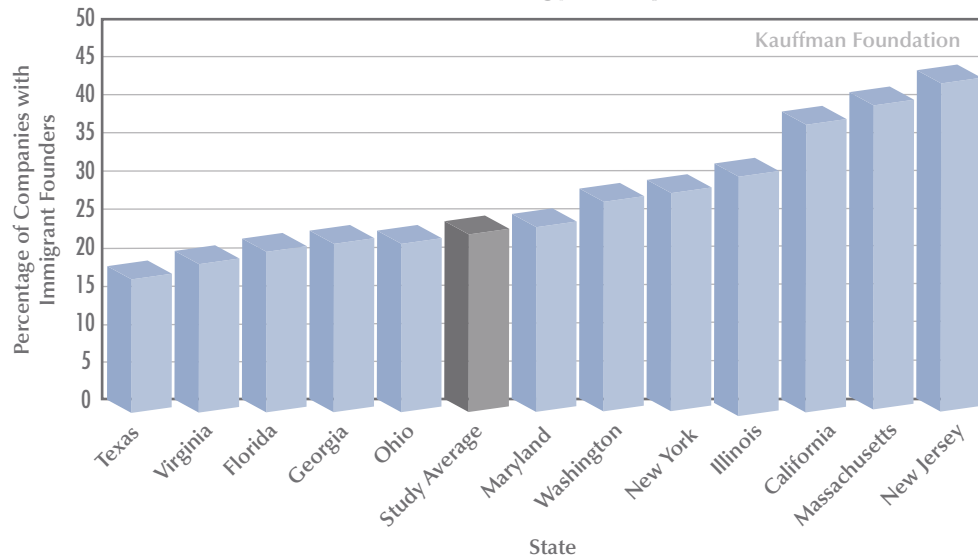


Table 2
U.S. States Where Immigrants are Founding Engineering and Technology Companies

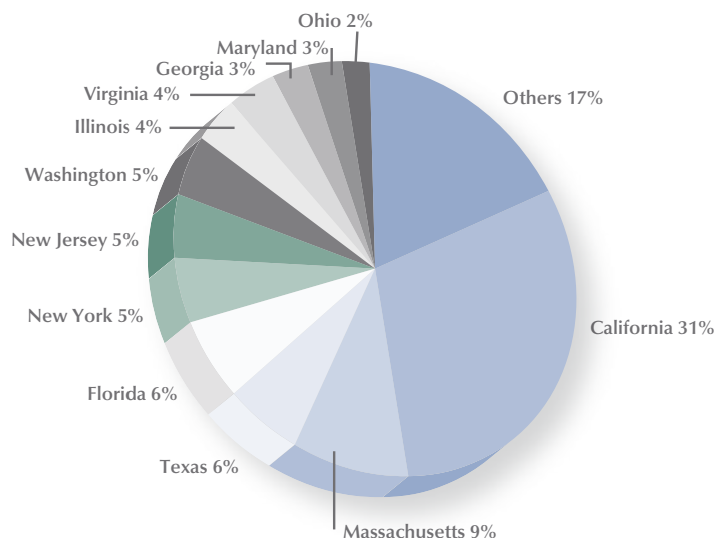


undergone a jump in its percentage of immigrant key founders from 11.3 percent to 28.6 percent since the last study.

We conducted difference-in-proportions tests to determine any statistically significant changes in the percentages of immigrant founders state-wise between the two periods. From the states we analyzed, only Washington showed a statistically significant change in its percentage of immigrant founders.

Chart 3 details where immigrant-founded engineering and technology companies were located. Here, California dominates the group with 31 percent. The next-highest-ranked state is Massachusetts, with only 9 percent. We tested for statistically significant differences between studies and, again, only Washington had a statistically significant difference, increasing from 1 percent to 5 percent.

Chart 3
Breakdown of Engineering and Technology Companies Founded by Immigrants on or after 2006 by State



Using the 2012 state breakdown of immigrant founder data, it is possible to determine the states where immigrant entrepreneurs from specific ethnic groups are concentrated. Charts 4a-4e detail these statistics for the five largest immigrant groups: those from India, China, the United Kingdom, Canada, and

Germany. In 2005, the four largest immigrant groups were from India, the United Kingdom, China, and Taiwan. Since 2005, Canada has risen from ninth to fourth for countries sending the greatest number of immigrant founders to the United States. Taiwan has dropped from fourth to twenty-second.

Chart 4a
Where are Immigrants from India Founding Engineering and Technology Companies?

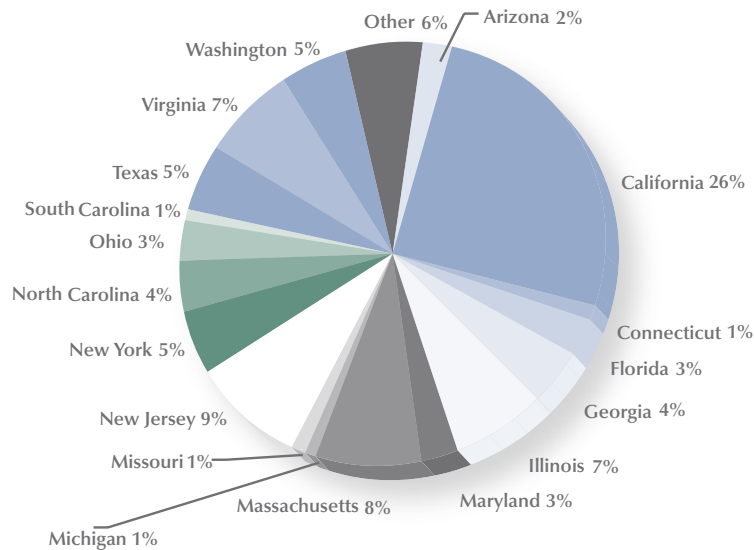


Chart 4b
Where are Immigrants from China Founding Engineering and Technology Companies?

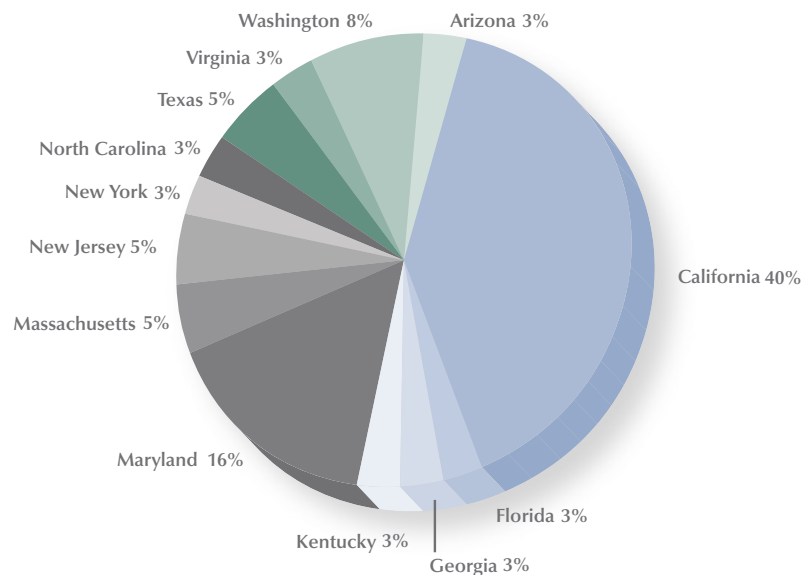


Chart 4c
Where are Immigrants from the United Kingdom
Founding Engineering and Technology Companies?

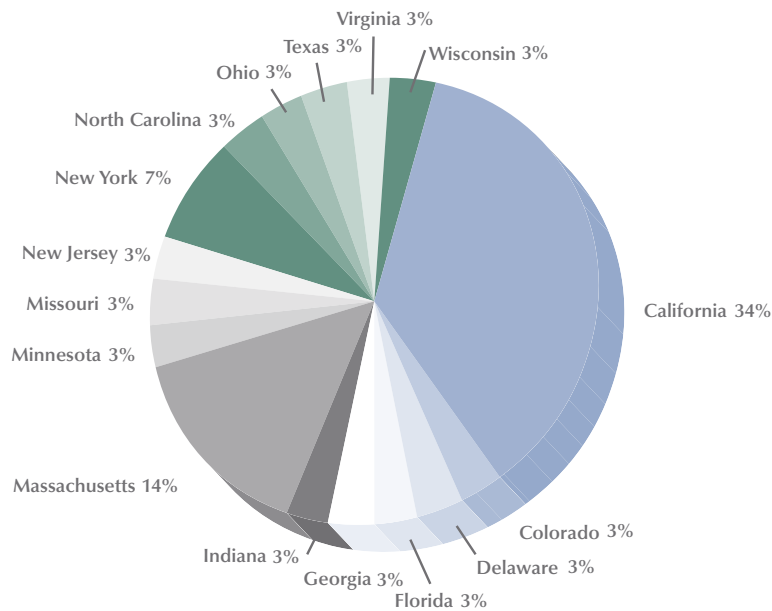


Chart 4d
Where are Immigrants from Canada Founding
Engineering and Technology Companies?

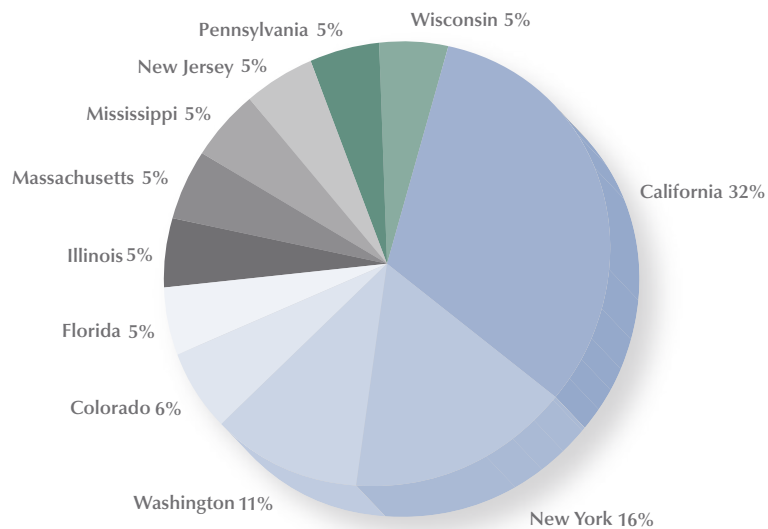
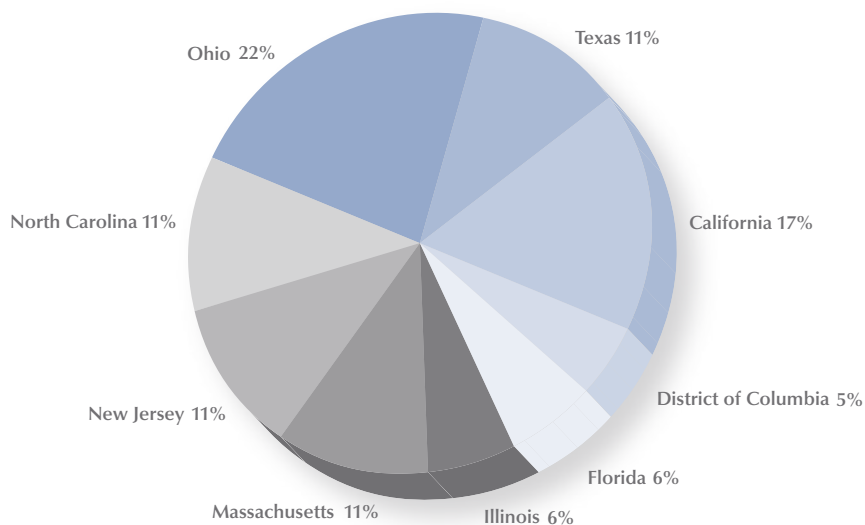


Chart 4e
Where are Immigrants from Germany Founding Engineering and Technology Companies?



These results demonstrate a high degree of ethnic clustering of immigrant-founded engineering and technology companies, particularly in California.

Indian founders continued to favor California and New Jersey as locations to start businesses, founding 35 percent of their companies in these two states alone. Chinese founders (mainland only) also continued to heavily favor California, with 40 percent establishing companies in the state; founders from the United Kingdom and Canada had higher founding rates in California, as well, with rates of 34 percent and 32 percent, respectively. Germans displayed a high level of dispersion in their preferences, showing no centralized founding locations, with the exception of slightly higher rates in Ohio and California.

Grouping the data by state reveals both the distinct spatial clustering of immigrant founders and the diversity of immigrant founders in the same

states. Graphs 5a to 5f display the immigrant groups founding engineering and technology companies in the states with the highest response profiles: California, Massachusetts, Texas, Florida, New York, and New Jersey. In our previous study, these same six states also had the highest response profiles.

Graph 5a demonstrates the continuing prevalence of Asian immigrant founders of engineering and technology companies established in California since 2006, particularly those from India (26 percent) and China (10 percent). In 2005, the top three immigrant founder groups were India (20 percent), Taiwan (13 percent), and China (10 percent). The percentage of Indian founders in California has increased from 20 percent to 26 percent since 2005. Graph 5b shows that Massachusetts continues to demonstrate high percentages of Israeli immigrant founders at 16 percent, compared with 17 percent in 2005.

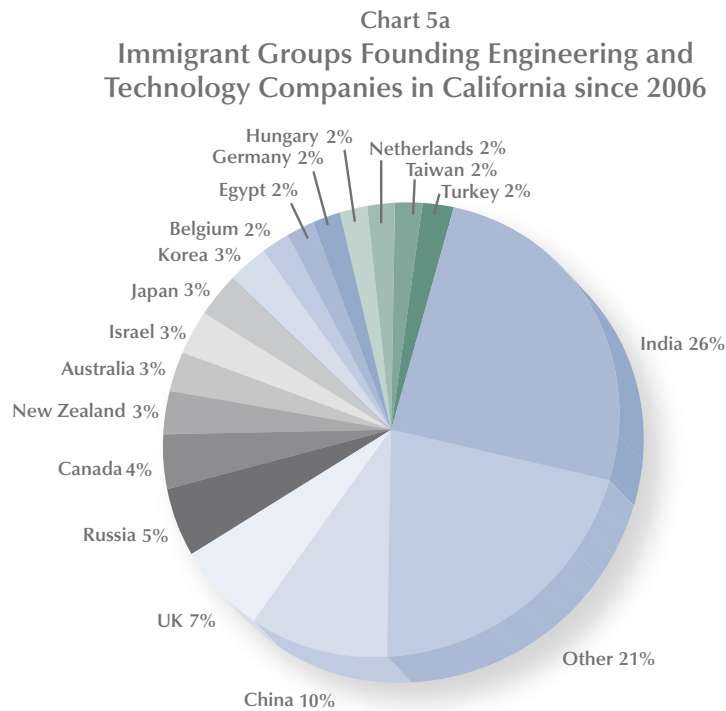
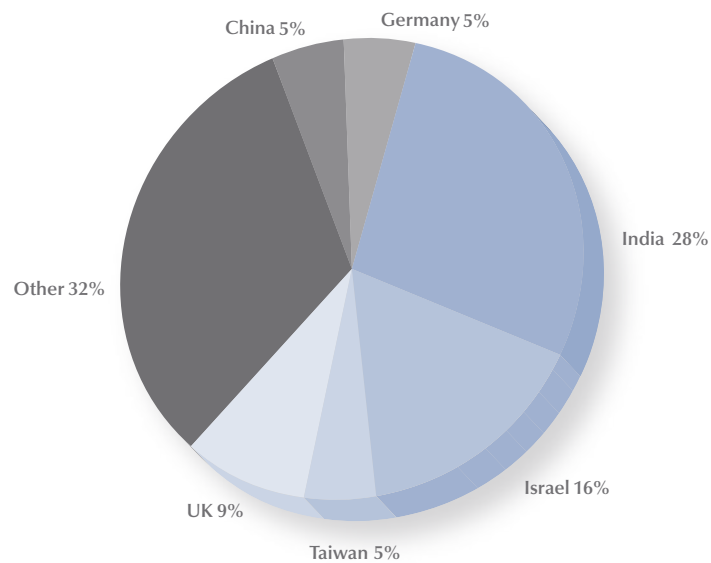


Chart 5b
Immigrant Groups Founding Engineering and Technology Companies in Massachusetts since 2006



*The large “Other” category includes countries that have only one or two immigrant founders in Massachusetts. Those countries are: the Bahamas, Brazil, Canada, Croatia, France, Hungary, Iran, Ireland, Lebanon, the Netherlands, New Zealand, Sweden, and Switzerland.

Texas holds a high percentage of Indian immigrant founders (28 percent), as illustrated in Graph 5c. Not surprisingly, immigrants from Mexico (10 percent) account for the second-greatest number of immigrant founders in Texas. In Graph 5d, Florida shows

comparatively greater diversity of immigrant founders from South American and Latin American countries, with those from Brazil at 10 percent, Cuba at 7 percent, and Mexico at 7 percent.

Chart 5c
Immigrant Groups Founding Engineering and Technology Companies in Texas since 2006

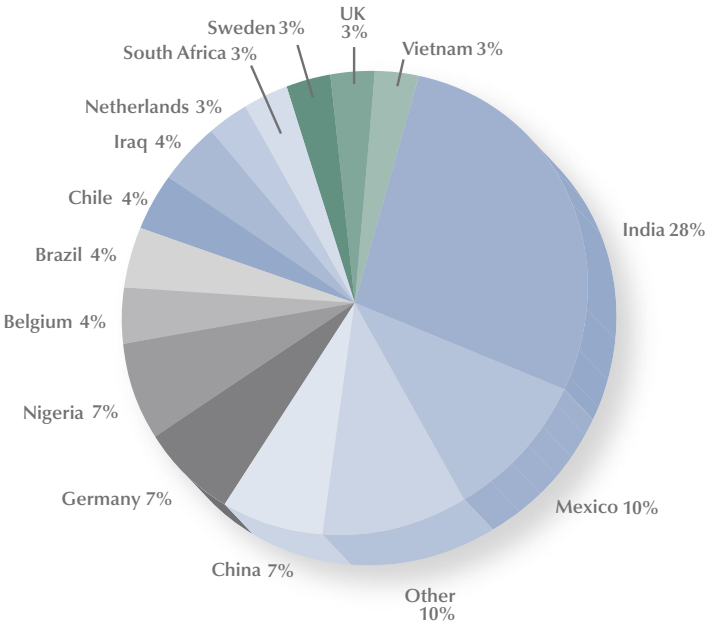
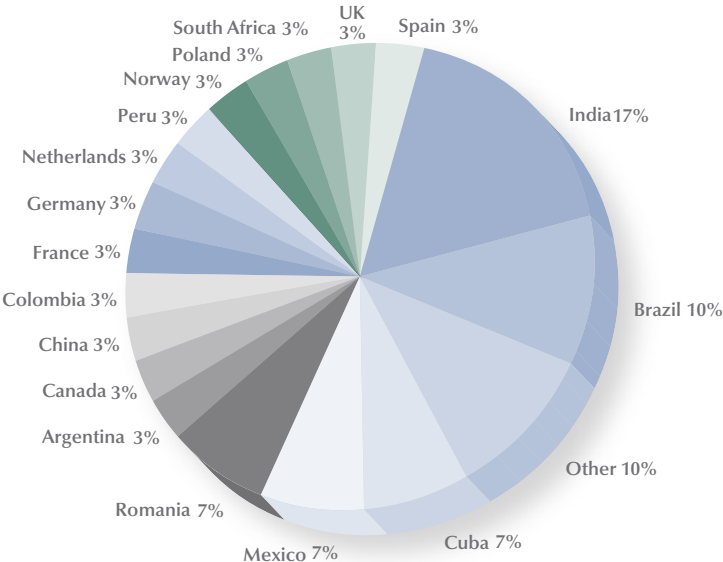


Chart 5d
Immigrant Groups Founding Engineering and Technology Companies in Florida since 2006



Graph 5e demonstrates that the greatest proportion of immigrant founders in New York is from India (27 percent). Canadians are the next-largest group (11 percent). Graph 5f shows that Indian founders

are dominant in New Jersey at 57 percent; China and Germany, both at 9 percent, are the next-largest groups.

Chart 5e
Immigrant Groups Founding Engineering and Technology Companies in New York since 2006

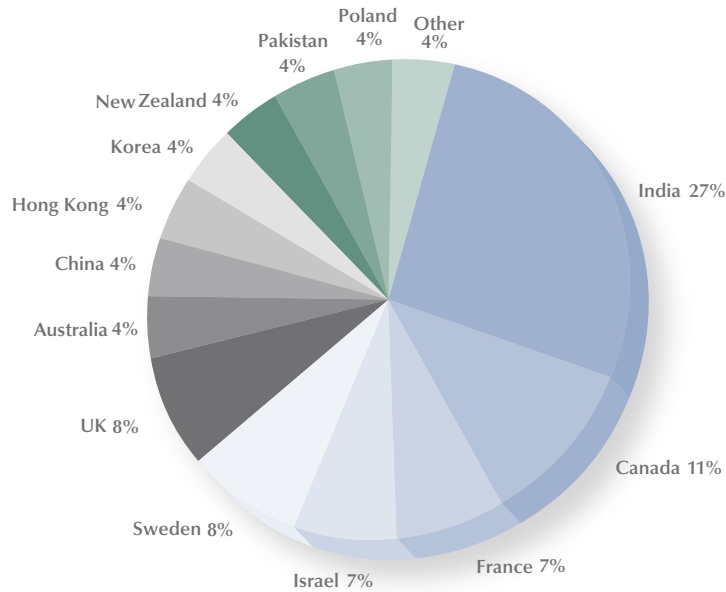
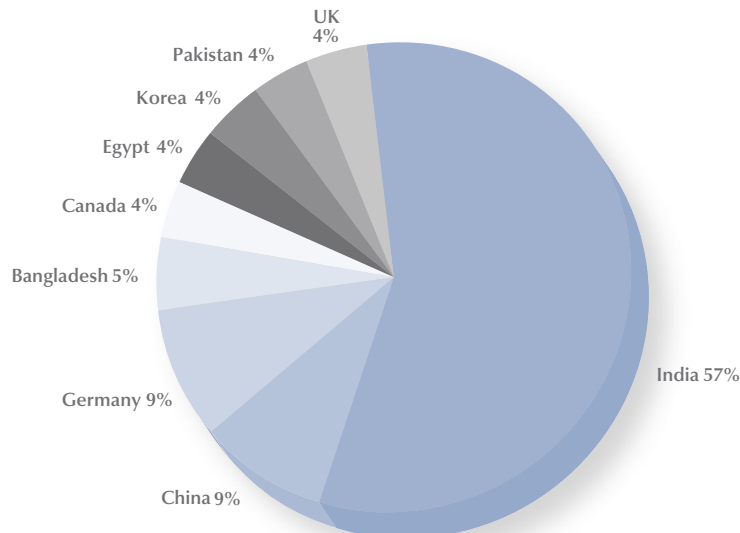


Chart 5f
Immigrant Groups Founding Engineering and Technology Companies in New Jersey since 2006



Graphs 5a to 5f demonstrate that Indians account for the greatest number of immigrant founders across California, Massachusetts, Texas, Florida, New York, and New Jersey. The study shows an even more pronounced trend of Indian-led immigrant entrepreneurship since 2005, particularly for Massachusetts. In 2005, Indians comprised 10 percent of immigrant founders in Massachusetts, second only to Israelis (17 percent). Indians now account for the greatest number of immigrant founders in the state at 28 percent, whereas Israelis rank second at 16 percent. Not surprisingly, the southern states of Florida and Texas each show a greater proportion of immigrant founders from South American and Latin American countries.

Industry-Specific Immigrant Founder Data

Our definition of “engineering and technology companies” extends to companies practicing in the fields of bioscience, computers/communications, defense/aerospace, environmental, innovation/manufacturing-related services, semiconductors, and software as defined by a company’s primary SIC code (see Appendix A for a more indepth description of

the included SIC codes). This section explores the concentrations of immigrant entrepreneurs in the engineering and technology industries. Immigrant founders displayed a greater tendency to establish businesses in the innovation/manufacturing-related (45 percent) and software (22 percent) fields. These two fields account for 67 percent of immigrant-founded companies. Chart 6 shows a breakdown of immigrant founding activity across the seven business fields.

This breakdown of immigrant-founded companies by industry is consistent with the 2005 data. Some notable changes between the two studies include an increased representation in the bioscience and environmental industries and a decrease in the software industry. We can say with 95 percent confidence that the changes within the bioscience, environmental, and software industries are statistically significant. Chart 7 shows the comparison between the two time periods.

The seven technology fields exhibited slight levels of variation in the representation of immigrant-founded companies. Nationwide, the proportion of engineering and technology companies with at least one key immigrant founder was 24.3 percent. Immigrant founders were slightly more concentrated in the semiconductor and computers/communications industries, with rates of 31.58 percent and 28.26 percent, respectively.

Chart 6
Breakdown of Engineering and Technology Companies
Founded by Immigrants from 2006 to 2012 by Industry

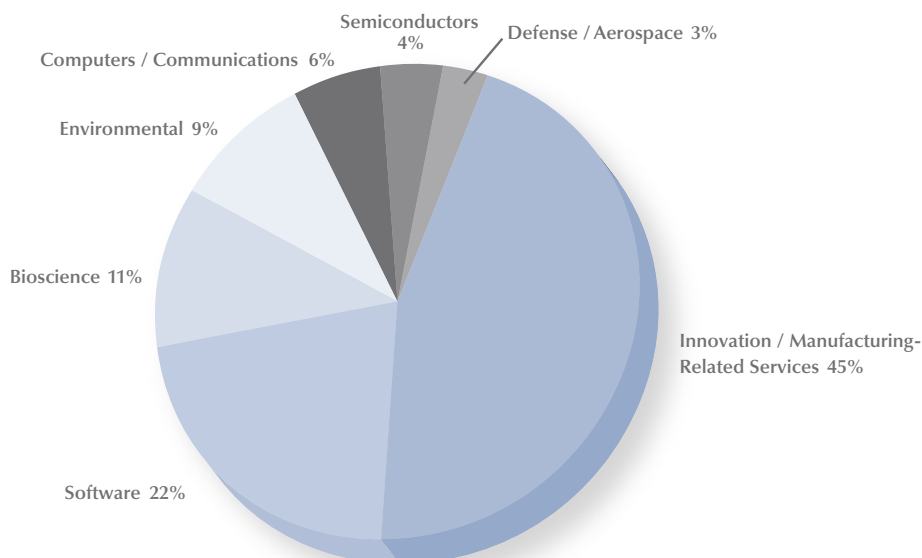


Chart 7
Comparison of Engineering and Technology Companies
Founded by Immigrants by Industry Breakdown
(1995–2005 vs. 2006–2012)

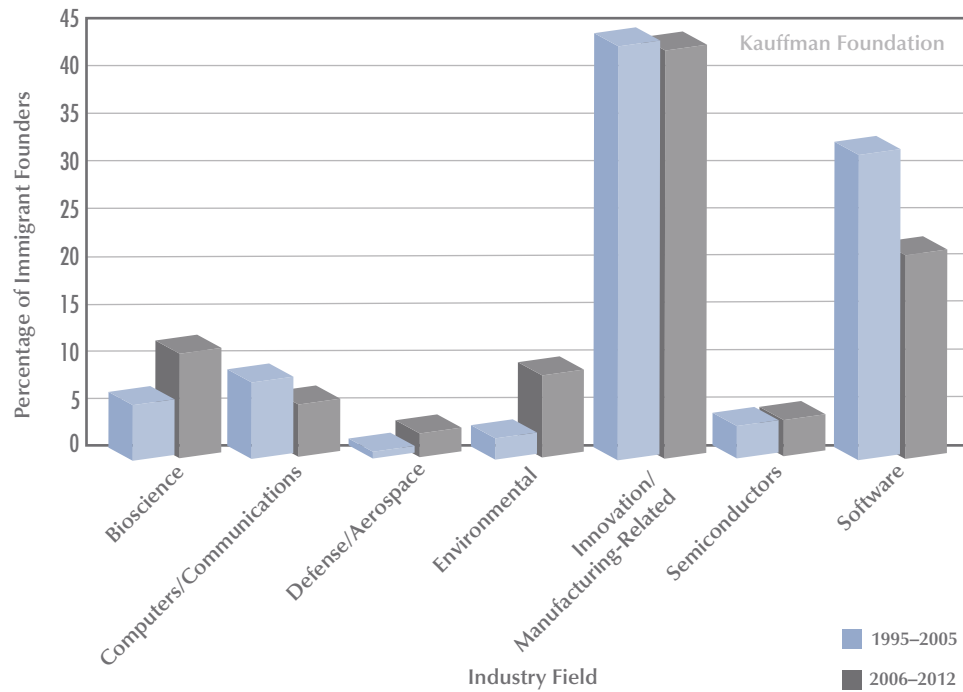


Chart 8
Percentages of Immigrant-Founded Companies by Industry

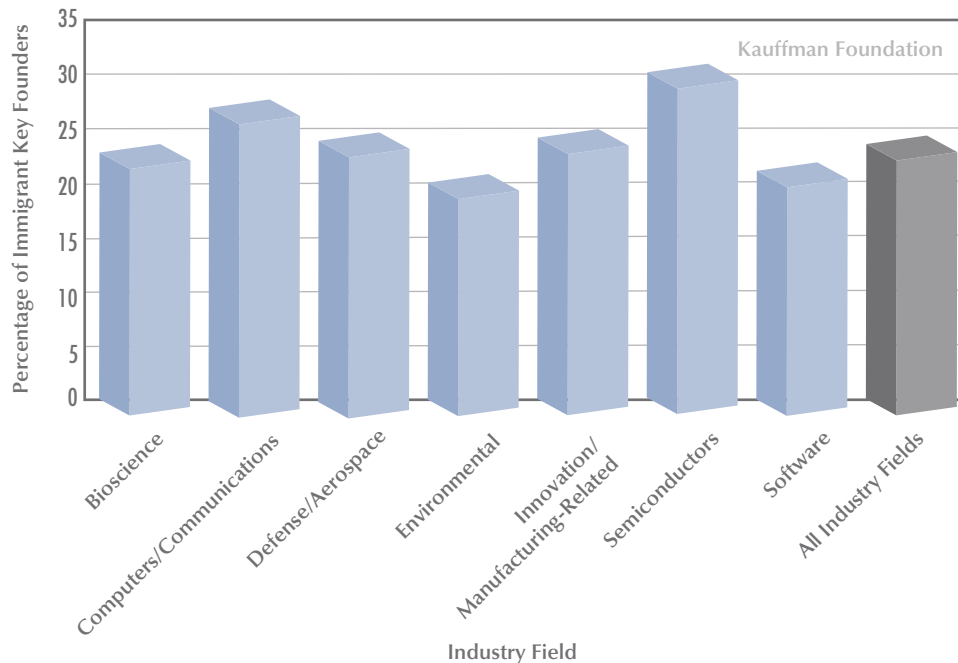
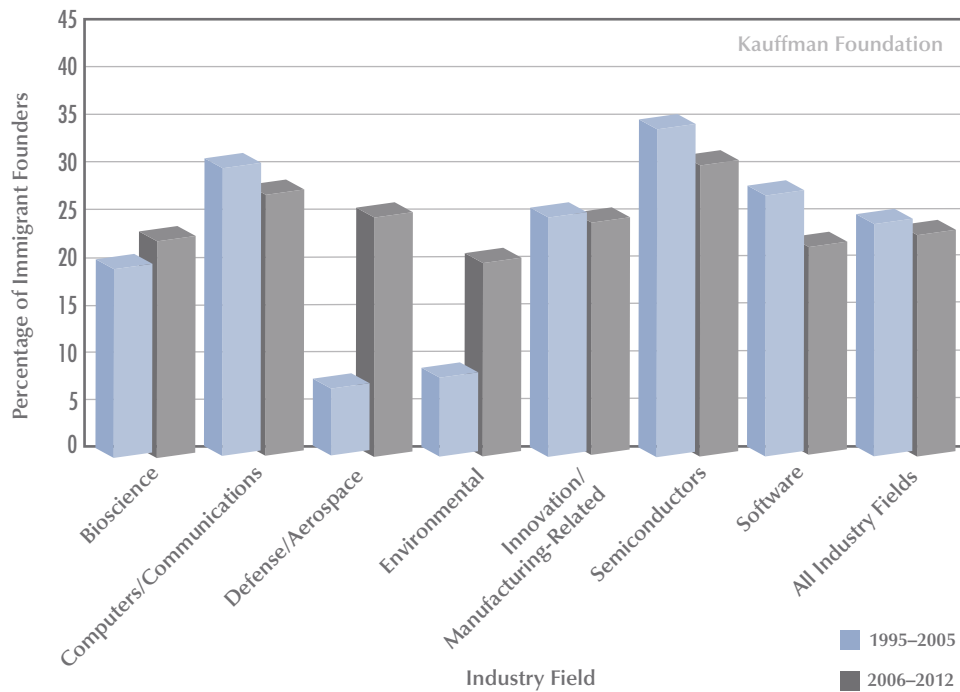


Chart 8a
Comparison of Percentages of Immigrant-Founded Companies by Industry (1995–2005 vs. 2006–2012)



From 2005 to 2012, some fields have demonstrated an increase in the representation of immigrant-founded companies, particularly in the environmental industry. Other fields, including the software industry, experienced a decline in the number of immigrant-founded companies. At a 95 percent confidence level, the changes in representation within both the environmental and software industries had a statistically significant difference. Chart 8a above illustrates the

changes in immigrant founding rates by industry between the two periods.

By cross-referencing our industry-field and immigrant-founder-nationality data, we can determine specific immigrant ethnic groups' likelihood of founding new companies in distinct industry fields. Tables 9a to 9e display the industries in which immigrants from India, China, the United Kingdom, Canada, and Germany founded companies from 2006 to 2012.

Chart 9a
Industries in which Immigrants from India
are Founding Companies

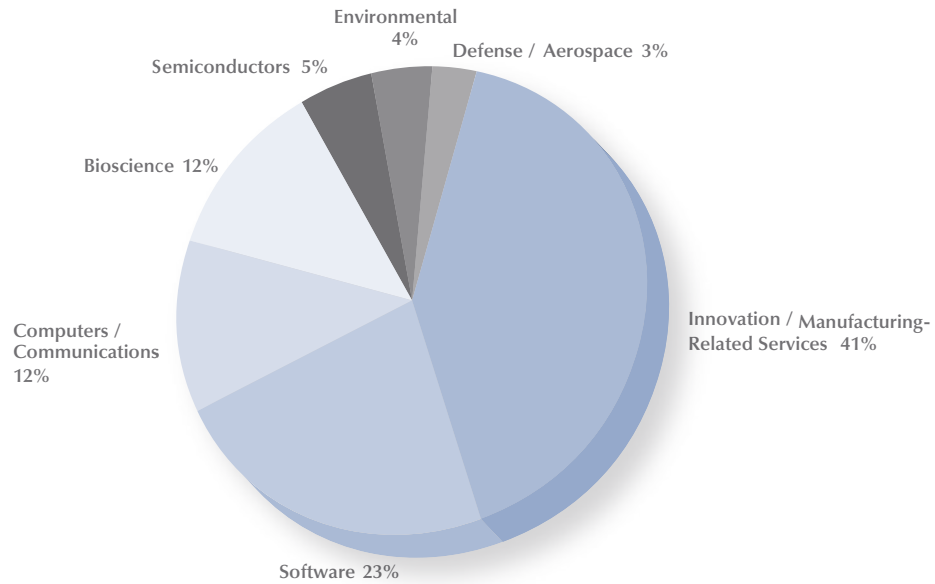


Chart 9b
Industries in which Immigrants from China
are Founding Companies

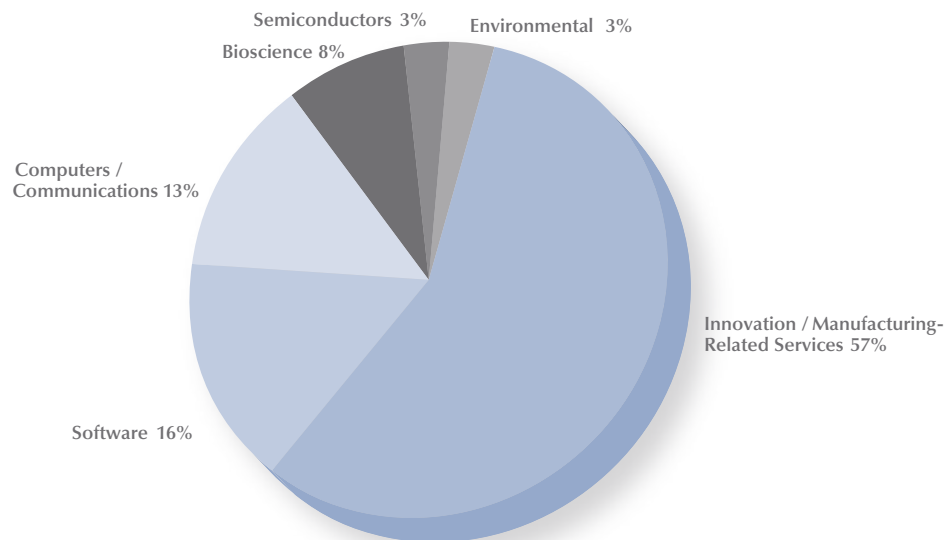


Chart 9c
Industries in which Immigrants from the United Kingdom are Founding Companies

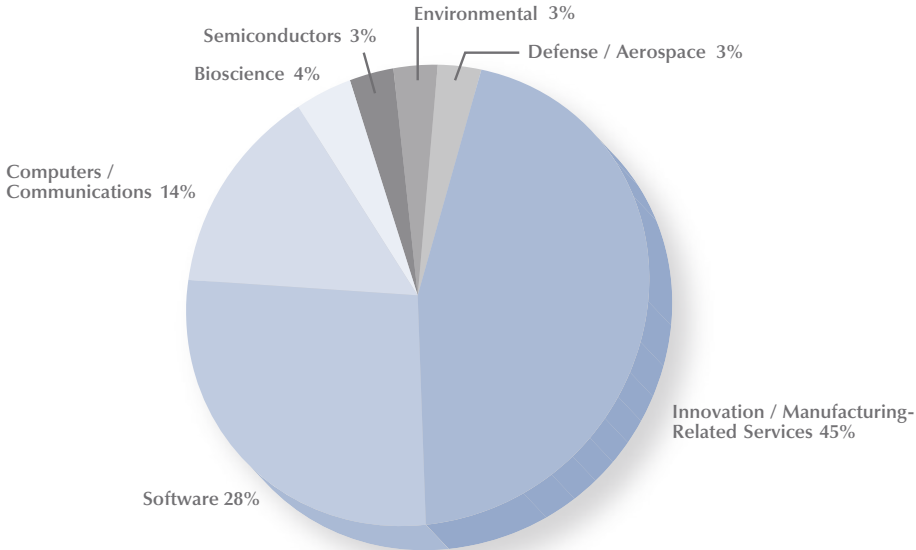


Chart 9d
Industries in which Immigrants from Canada are Founding Companies

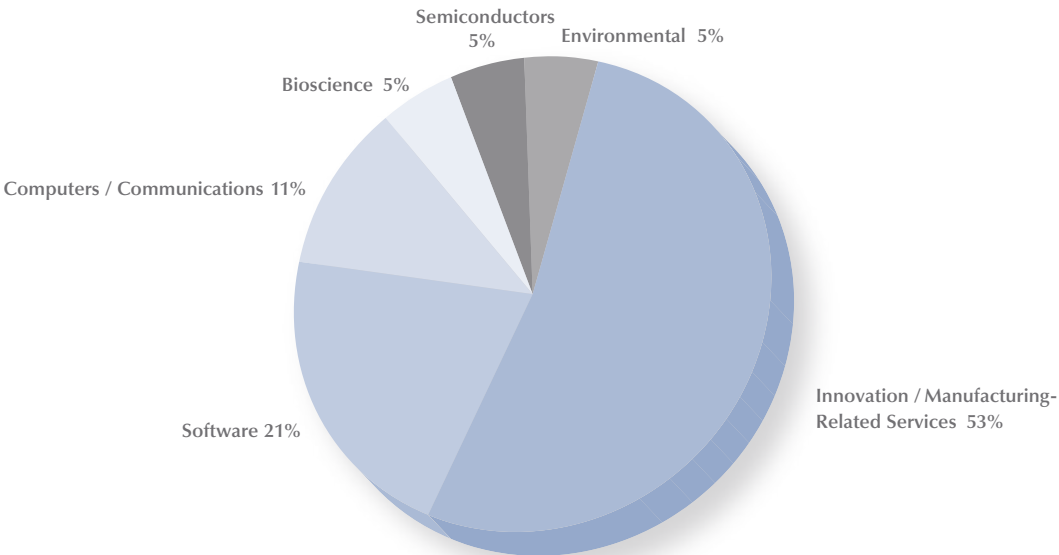
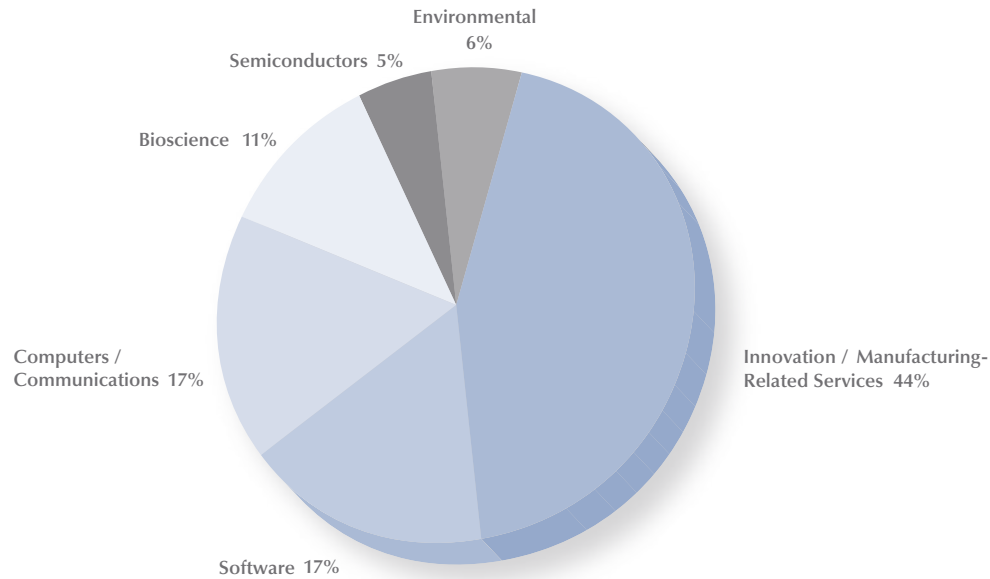


Chart 9e
Industries in which Immigrants from Germany are
Founding Companies



These data show that founders from the top five sending countries are more likely to establish innovation/manufacturing-related service businesses. This industry accounts for 41 percent to 57 percent of all engineering and technology companies founded by each immigrant group. Following the innovation/manufacturing-related services industry, each of the top five immigrant groups also are inclined to found companies in the software industry, which accounted for 16 percent to 28 percent of all companies they founded. Across the semiconductor, environmental, and defense/aerospace industries, immigrant founders show lackluster representation.

The inclination for founders from India, China, and the United Kingdom to start companies mostly in the innovation/manufacturing-related services and software sectors is consistent with trends from our previous study. Due to lack of sufficient data, indepth industry data for Canada and Germany were not examined in the previous study, nor that of Taiwan for this current study.

In a final analysis of this industry-specific data, we present in Charts 10a to 10g a breakdown of the immigrant groups founding companies in distinct industry fields in the last six years.

Chart 10a
Immigrant-Founder Origins in Bioscience Field
in the Last Six Years

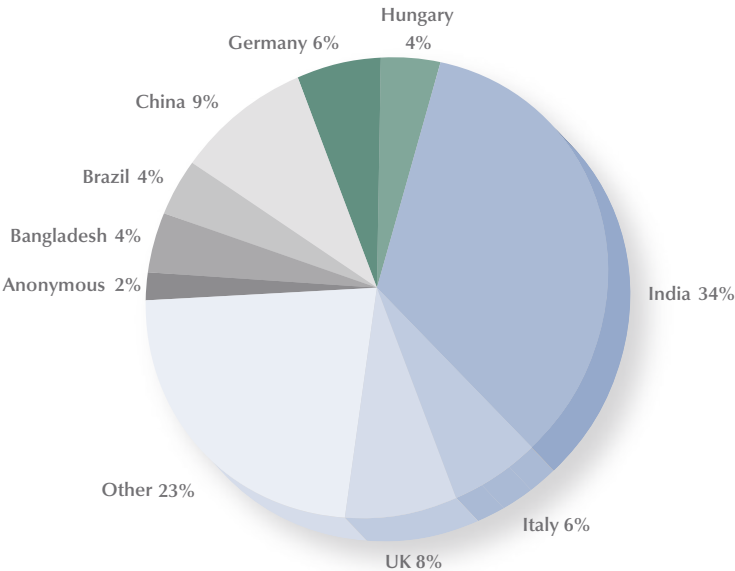


Chart 10b
Immigrant-Founder Origins in the
Computers/Communications Field in the Last Six Years

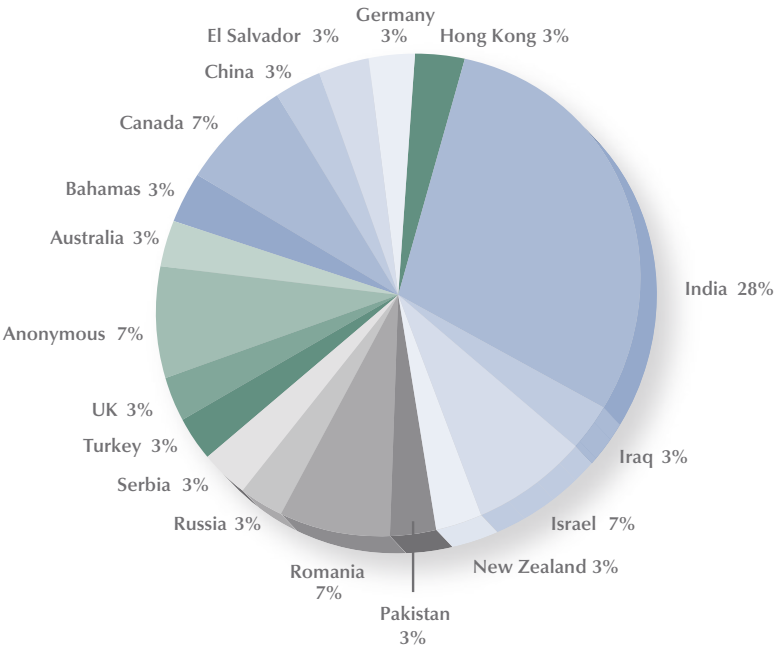


Chart 10c
Immigrant-Founder Origins in the Innovation/
Manufacturing-Related Field in the Last Six Years

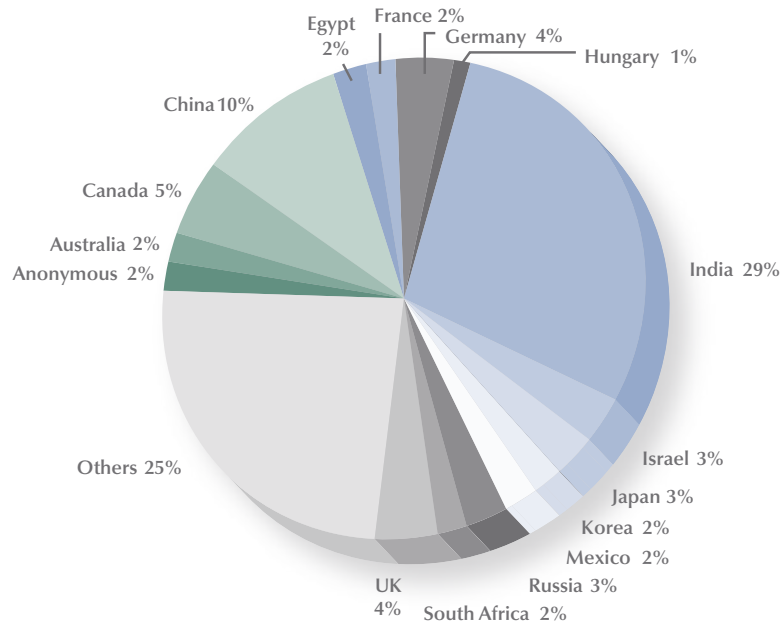


Chart 10d
Immigrant-Founder Origins in the Semiconductors
Field in the Last Six Years

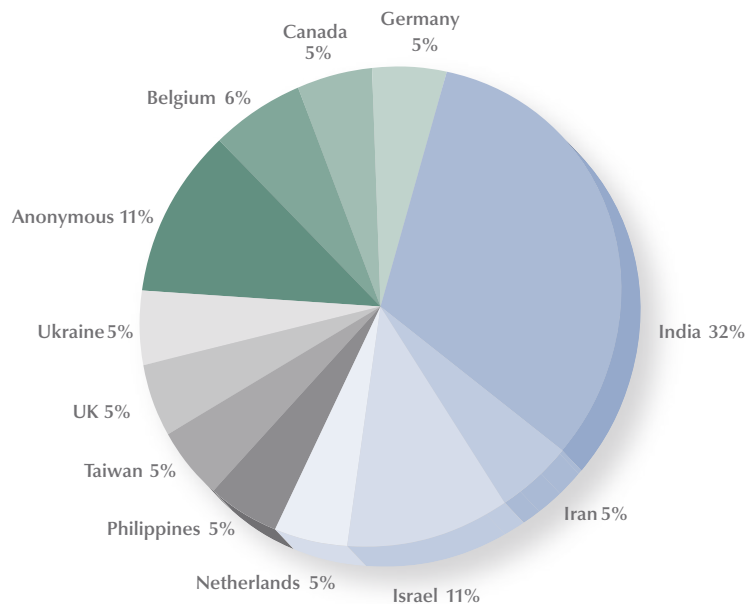


Chart 10e
Immigrant-Founder Origins in the Software Field
in the Last Six Years

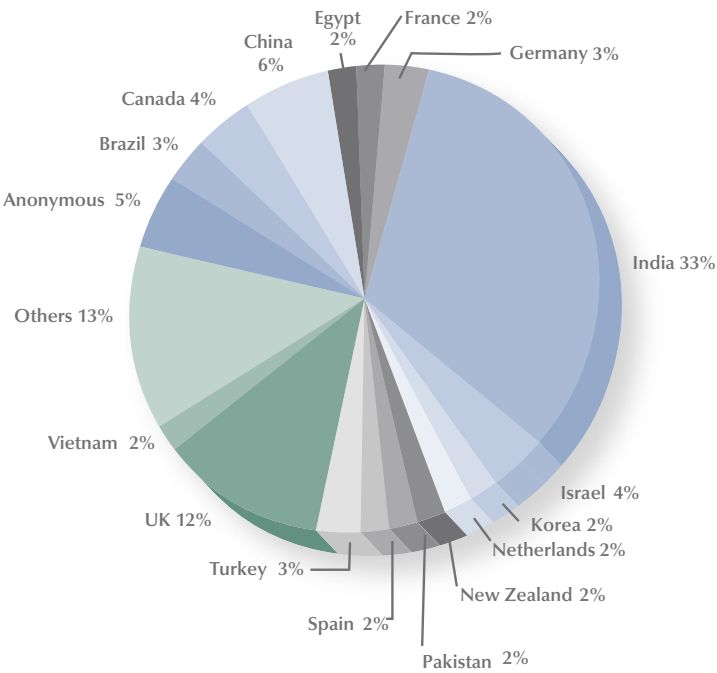


Chart 10f
Immigrant-Founder Origins in the Environmental
Field in the Last Six Years

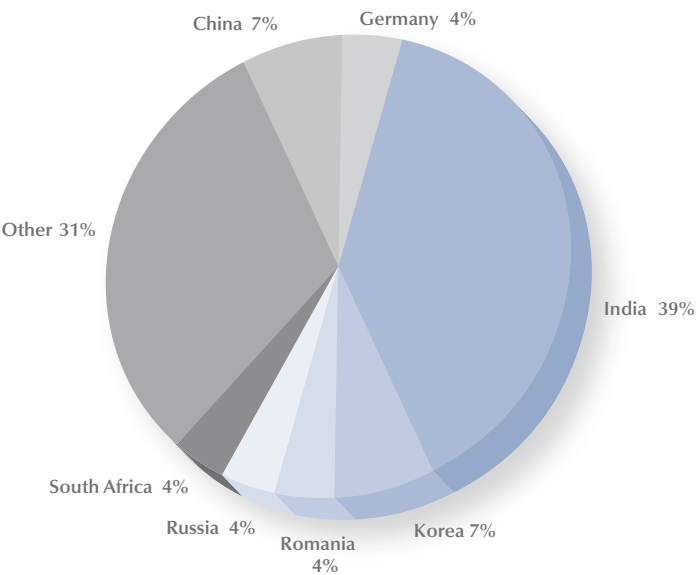
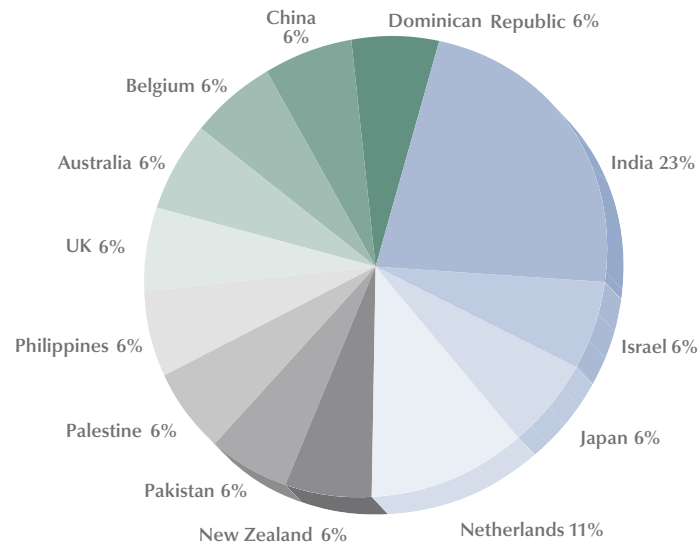


Chart 10g
Immigrant-Founder Origins in the Defense/Aerospace Field in the Last Six Years



Indians are the dominant founders of immigrant companies in all seven industries: biosciences (35 percent), computers/communications (28 percent), innovation/manufacturing-related services (29 percent), semiconductors (32 percent), software (33 percent), environmental (39 percent), and defense/aerospace (23 percent). In the biosciences and innovation/manufacturing-related services industries, China follows next by a considerable distance at 10 percent in both industries. In semiconductors, Israel contributes 11 percent of the companies founded by immigrants, while the United Kingdom accounts for 12 percent of immigrant-founded companies in software. In the defense/aerospace industry, immigrants from the Netherlands made up the second-greatest number of immigrant founders.

Indian founders accounted for a significant proportion of immigrant-founded companies in all industries in 2005; at the time, though, they were dominant only in the innovation/manufacturing-related services sector. Since then, Indians have become the primary leaders in all industries. It is interesting to note that, although China (mainland) remains a notable contributor across all industries, Taiwanese immigrants have become a very small minority.

Special Analysis—Silicon Valley, Calif.

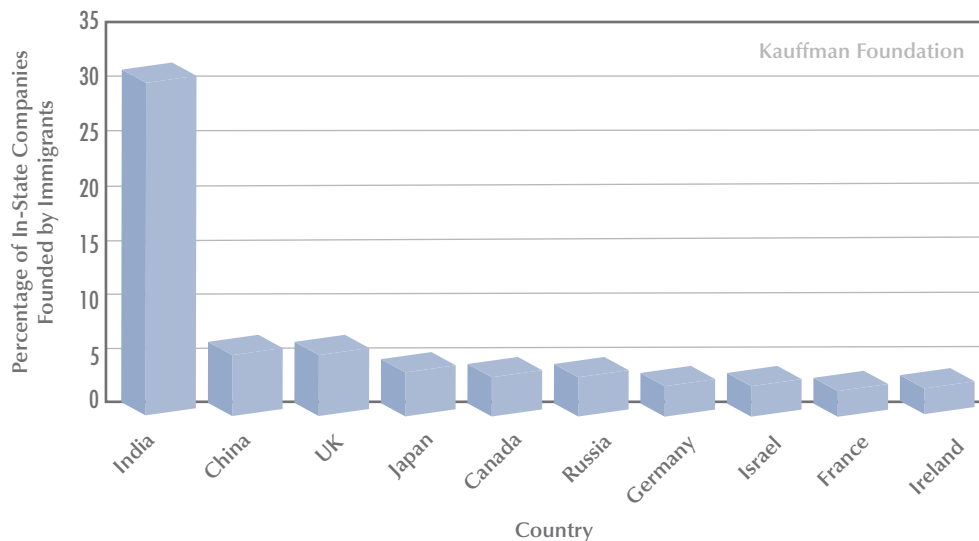
Our data showed that more immigrant founders started companies in California than in any other state, and we wanted to analyze founding rates in Silicon Valley because of the area's economic strength in the engineering and technology industries. Our random sample from the primary survey provided sufficient data for analysis of Silicon Valley, but we wanted to expand our sample size to increase precision. We created an additional dataset from the D&B database and conducted a new survey of this area.

We analyzed Silicon Valley data by selecting zip codes in the following counties: Alameda, Contra Costa, Santa Clara, Santa Cruz, San Francisco, and San Mateo. We received responses from 335 companies that fit these criteria. Of these, 43.9 percent reported that at least one of their key founders were immigrants, which was significantly higher than the national average of 24.3 percent. A breakdown of our survey statistics and response rates can be found in Table 11 below. Chart 12 on the following page displays the breakdown of nationalities in Silicon Valley.

Table 11
Founder Survey Statistics and Response Rates

	Count	Variable
Total "Yes" Responses	147	a
Total "No" Responses	188	b
"Declined Responses:" Hang Ups, Unwilling to Participate	3	c
"Missing Data:" No Knowledge, Answering Machines, Requests to Call Back	257	d
Total Companies Approached	595	e
Response Rate R1 (The proportion of survey responses obtained out of total survey delivery attempts) $[(a+b)/e]$	56.3%	
Response Rate R2 (The proportion of survey responses obtained out of total surveys actually delivered) $[(a+b)/(a+b+c)]$	99.1%	

Chart 12
Origins of Engineering and Technology Company Immigrant Founders in Silicon Valley, Calif.



The 2007 study on immigrant entrepreneurship found that Indians accounted for 25.8 percent of immigrant-founded companies started in Silicon Valley from 1995 to 2005. This suggested the acceleration of growth of Indian-led entrepreneurship in light of estimates provided by Saxenian's 1999 paper, which attributed 7 percent of Silicon Valley high-tech companies started between 1980 and 1998 to Indian immigrants. Our study shows the continuation of this trend of accelerated growth of Indian entrepreneurship from 2006 to 2012. In this period, Indians accounted for 32.0 percent of immigrant-founded companies in Silicon Valley.

Indians continue to dominate other immigrant groups in rates of entrepreneurship. Trailing behind Indian founders in the creation of Silicon Valley startups are immigrants from China (5.4 percent), the United Kingdom (5.4 percent), Japan (4.8 percent), and Canada (4.1 percent). Since 2005, the percentage of businesses founded by Chinese immigrants has declined from 12.8 percent to 5.4 percent, and those founded by Japanese immigrants from 13.6 percent to 4.8 percent.

The proportion of immigrant-founded companies in Silicon Valley has dropped 8.5 percentage points, from

52.4 percent to 43.9 percent since 2005. This signifies a potential reversal in previous trends of expansion of immigrant-led entrepreneurship. From the 1980s to 1990s, Silicon Valley attracted more foreign-born scientists and engineers than any other technological center in the nation. In 2000, 53 percent of Silicon Valley's science and engineering (S&E) workforce was foreign-born. In other technology regions, including Austin, Texas, and Boston, Massachusetts, less than a quarter of the S&E workforce was foreign-born.

High-skilled immigrants have played an important role in driving entrepreneurship and making Silicon Valley unrivaled throughout the world as the premier center for technological innovation. Their companies have produced substantial capital and employed thousands. Taking advantage of their ability to move across cultural and economic grooves, they have fostered important linkages with international economies, particularly those of China and India. High-skilled immigrants will remain key to the United States' ability to stay economically competitive in the international markets.

Summary of Results and Conclusion

The period of unprecedented expansion of immigrant-led entrepreneurship that characterized the 1980s and 1990s has come to a close. Today, the growth rate of immigrant-founded companies nationwide, at 24.3 percent, has plateaued. In the high-tech hub of Silicon Valley, the proportion of immigrant-founded companies has dropped from 52.4 percent during 1995–2005 to 43.9 percent during 2006–2012.

More than sixty countries were represented in the study, demonstrating that immigrant founders come from a diverse range of backgrounds. Nonetheless, certain immigrant groups tended to dominate the pool of immigrant-founded companies, particularly those from India (33.2 percent), China (8.1 percent), the United Kingdom (6.3 percent), Canada (4.2 percent), and Germany (3.9 percent).

Indians continue to be at the forefront of immigrant-led entrepreneurship. Whereas in 2005 they accounted for 26.0 percent of immigrant-founded companies, they now account for 33.2 percent. While less dramatic than the case of Indians, the proportion of Chinese founders has increased from 6.9 percent to 8.1 percent. Interestingly, Taiwanese founders, who had previously accounted for 5.8 percent of immigrant-founded companies and had comprised the fourth-largest immigrant-founder group, now only account

for 1.1 percent and rank twenty-second. This may be correlated to the decreasing numbers of Taiwanese coming to the United States for higher education and then staying, and complex other factors.

Immigrant founders also continue to exhibit a high pattern of clustering in certain states. The greatest number of immigrant-founded companies were located in states that generally are regarded as immigration gateways: California (31 percent), Massachusetts (9 percent), Florida (6 percent), Texas (6 percent), New Jersey (5 percent), and New York (5 percent).

Some specific immigrant groups demonstrated a strong preference for establishing companies in particular states. Indians displayed a greater tendency to establish businesses in California (26 percent), New Jersey (9 percent), and Massachusetts (8 percent). Chinese founders tended to establish businesses in California (40 percent) and Maryland (16 percent). Whereas most immigrant groups showed a greater preference for establishing businesses in California, Germans displayed a greater preference for Ohio (22 percent), followed by California (17 percent).

The study also found that immigrant-founded companies are concentrated in certain business fields. Immigrants were more likely to start companies in the innovation/manufacturing-related services (45 percent) and software (22 percent) fields.

Immigrant founders of engineering and technology companies have employed roughly 560,000 workers and generated an estimated \$63 billion dollars in sales from 2006 to 2012. While the rate of growth of immigrant entrepreneurship has stagnated, these numbers nonetheless underscore the continuing importance of high-skilled immigrants to the maintenance and expansion of the national economy. These findings are interestingly complex, since the two major skilled-immigrant groups—Indian and Chinese—are starting companies at higher rates than they did previously. Historically and today, the United States continues to benefit directly from the contributions of such immigrants. Far from expendable, high-skilled immigrants will remain a critical asset for maintaining U.S. competitiveness in the global economy.

Appendix: High-Technology Industry Definition

U.S. Government-defined Standard Industrial Classification (SIC) codes

Industry	SIC
Semiconductors	
Special industry machinery	3559
Semiconductors and related devices	3674
Instruments for measuring and testing electricity and electric signals	3825
Computers/Communications	
Electronic computers	3571
Computer storage devices	3572
Computer peripheral equipment, n.e.c.	3577
Printed circuit boards	3672
Electronic components, n.e.c.	3679
Magnetic and optical recording media	3695
Telephone and telegraph apparatus	3661
Radio and television broadcasting and communications equipment	3663
Communications equipment, n.e.c.	3669
Bioscience	
Drugs	283
Surgical medical and dental instruments and supplies	384
Medical laboratories	8071
Laboratory apparatus and analytical, optical, measuring, and controlling instruments	382 (except 3822, 3825 and 3826)
Defense/Aerospace	
Small arms ammunition	348
Electron tubes	3671
Aircraft and parts	372
Guided missiles and space vehicles	376
Tanks and tank components	3795
Search, detection, navigation, guidance, aeronautical and nautical systems instruments and equipment	381
Environmental	
Industrial and commercial fans and blowers and air purification equipment	3564
Service industry machinery, n.e.c.	3589
Sanitary services	495
Scrap and waste materials	5093

Software

Computer programming services	7371
Prepackaged software	7372
Computer integrated systems design	7373
Computer processing and data preparation and processing services	7374
Information retrieval services	7375

Innovation/Manufacturing-Related Services

Computers and computer peripheral equipment and software (wholesale trade)	5045
Electronics parts and equipment, n.e.c. (wholesale trade)	5065
Computer facilities management services	7376
Computer rental and leasing	7377
Computer maintenance and repair	7378
Computer-related services, n.e.c.	7389
Engineering services	8711
Research and testing services	873

KAUFFMAN

The Foundation of Entrepreneurship

4801 ROCKHILL ROAD
KANSAS CITY, MISSOURI 64110
816-932-1000
www.kauffman.org