

Losing the World's Best and Brightest:

America's New Immigrant Entrepreneurs, Part V

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Ewing Marion
KAUFFMAN
Foundation

March 2009

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This research was funded in part by the Ewing Marion Kauffman Foundation.
The contents of this publication are solely the responsibility of the authors.

Losing the World's Best and Brightest

Contents

Introduction and overview	1
Our findings	3
Few want to stay permanently	3
Most are worried about visas	3
Where do they think the jobs and opportunities are?	3
Was the U.S. as they had expected?	3
High overall opinion of American education	4
Students would recommend American education to their friends, so what is stopping their friends from coming?	4
Why did students who were leaving the U.S. make this decision?	4
Entrepreneurial aspirations, but not in the U.S.	4
Conclusions and interpretation	5
Methodology	6
Characteristics of respondents	7
Figure 1: Area of study	7
Figure 2: Level of degree	7
Figure 3: Expected date of graduation	7
Figure 4: Number of years living in the U.S.	8
Detailed findings	9
Intentions to stay after graduation, and concerns	9
Figure 5: Would you stay after graduation if given a choice?	9
Figure 6: For how many years would you like to stay in the U.S. after graduation?	9
Concerns about jobs	9
Figure 7: how difficult will it be for you to find a job in your field in the U.S.?	9
Concerns about work visas	10
Figure 8: How concerned are you about obtaining a work visa after graduation?	10
Obtaining permanent residency	10
Figure 9: How concerned are you about obtaining permanent residency in the U.S. ?	10
Perceptions about U.S. opportunities, education system, and economic future	10
How did the U.S. stack up against expectations?	10
Figure 10: Has your view of the U.S. changed since coming here?	11
Where are the opportunities?	11
Figure 11: Country perceived as offering the best job opportunities	11
Which economy has a better future?	11
Figure 12: Foreign national student perceptions: best days of U.S. economy behind or ahead?	11
Figure 13: Foreign national student perceptions: best days of home country's economy behind or ahead?.	12

Where will the most innovative products be created in the future?	12
Figure 14: Chinese responses: Which economy do you think will generate the most innovative products and services over the next...	12
Figure 15: European responses: Which economy do you think will generate the most innovative products and services over the next...	12
Figure 16: Indian responses: Which economy do you think will generate the most innovative products and services over the next...	12
Comparisons of education systems	12
Figure 17: How does the U.S. education system compare with your home country's education systems?	13
Advising friends: studying in the U.S. still a highly valued experience	13
Figure 18: Would you advise friends in home country to study in the U.S.?	13
Figure 19: Number of friends in home country wishing to study in the U.S. but unable to	13
Reasons for leaving.	14
Figure 20: How did the following factors contribute to your decision to leave the U.S.?	14
Entrepreneurial intentions	14
Figure 21: How interested are you in starting a business some day?	14
Figure 22: Timeframe for starting a business (if interested in starting a business)	15
Figure 23: Likely location of business startup (if interested in starting a business).	15
Figure 24: key problems faced by friends seeking to come to the U.S.	15

Introduction and overview

Foreign national students have come to the United States to study in increasing numbers and have participated in some of the most advanced academic research efforts to date, lending enormous brainpower to the development of technological and scientific innovations that benefitted America. The students were drawn to the United States by the country's highly vaunted academic research institutions and enormous budgets for funding basic and applied research.

U.S. foreign national students have focused in particular on the science, technology, engineering, and mathematics (STEM) fields. In these fields, they have had disproportionate representation. According to statistics collected by the National Science Foundation,¹ foreign students received nearly 60 percent of all engineering doctorates awarded in the U.S. and over 50 percent of all doctorates in engineering, mathematics, computer sciences, physics, and economics. Foreign students also received over 40 percent of all doctorates in agricultural sciences, a field of growing importance today.

Foreign enrollments in STEM fields are also growing quickly. According to data from the Bureau of Citizenship and Immigration Services, from April 2006 to April 2007, foreign enrollment in science and engineering fields grew by 8 percent. The growth was concentrated in computer sciences (up by 14 percent) and engineering (up by 10 percent). In April 2007, seventy percent of the 66,500 Indian foreign graduate students in the U.S. were pursuing science or engineering. There were 48,300 foreign graduate students from China enrolled in U.S. institutions,

with 67 percent in science and engineering fields.² After declining briefly in the period following 9/11, when visa standards were tightened, the total foreign student enrollment in U.S. universities has resumed a rapid rate of increase. While studying, foreign national graduate students have contributed significantly to innovation and patent applications. According to research by Chellaraj, Maskus, and Mattoo, a 10 percent increase in the number of foreign graduate students would raise patent applications by 4.5 percent, university-patent grants by 6.8 percent, and non-university patent grants by 5.0 percent.³

Those who have stayed have comprised a rising percentage of the U.S. science and engineering workforce. According to research by the National Science Foundation, between 1990 and 2000 the number of individuals with college degrees (bachelor's or higher) born in Asia who were employed in science and engineering occupations in the United States rose from approximately 141,000 to 460,000.⁴

Upon completion of their studies, significant numbers of foreign students have traditionally chosen to remain in the U.S. to work full-time or pursue post-doctoral work. According to research by Michael Finn,⁵ two-thirds of foreign citizens who received science/engineering doctorates from U.S. universities in 2003 lived in the United States in 2005. The five-year stay rates for Chinese and Indians was much higher: 92 percent and 85 percent respectively.

More recently, as the economies of the developing world have grown rapidly and Western economies have grown less quickly, anecdotal evidence has begun to suggest that fewer foreign national students

1 National Science Foundation, 2008. Science and Engineering Indicators 2008. Available at <http://www.nsf.gov/statistics/seind08/c2/c2s5.htm>

2 Ibid.

3 Chellaraj, Gnanaraj; Maskus, Keith E.; and Mattoo, Aaditya. 2008. The Contribution of International Graduate Students to U.S. Innovation. *Review of International Economics* August 2008; 16(3):444-462. Available at SSRN: <http://ssrn.com/abstract=1158794> or DOI: 10.1111/j.1467-9396.2007.00714.x

4 National Science Foundation, Division of Science Resources Statistics. 2007. *Asia's Rising Science and Technology Strength: Comparative Indicators for Asia, the European Union, and the United States*. NSF 07-319. Arlington, VA: National Science Foundation

5 Finn, Michael G., 2007. Stay Rates of Foreign Doctorate Recipients From U.S. Universities, 2005. Oak Ridge, TN: Oak Ridge Institute for Science and Education. <http://orise.orau.gov/sep/files/stayrate07.pdf>

INTRODUCTION

wish to stay in the U.S. after graduation. Reports in the popular press^{6,7} and elsewhere have suggested that many of these students now believe that greater opportunities exist elsewhere in the world.⁸ To date, there has been very little empirical research, aside from the NSF surveys, into the postgraduate intentions of foreign nationals, and into the decisive factors in their decisions either to seek to stay in the U.S. or to move abroad. This paper attempts to fill some of this void.

The survey reported here was conducted in October 2008 via the social-networking site Facebook. Members of this site were asked to introduce team members to their foreign student friends, and those who referred the most students who completed our survey were awarded prizes. This paper is based on responses from 1,224 foreign nationals who are currently studying in institutions

of higher learning in the United States or who had graduated by the end of the 2008 academic school year. The survey respondents comprise 229 students from China (and Hong Kong), 117 students from Western Europe, and 878 students from India.

This survey was not conducted by random means, and the responses we received are not representative of the relative student populations of their nationalities. This study also was not longitudinal and is only a snapshot of current intentions. It should be noted that this survey occurred during a period when the U.S. economy was clearly deteriorating and the political leadership of the U.S had become unpopular both at home and abroad. This context may have affected responses. Clearly, many of the questions asked on this survey require longer-term analysis and thinking. Regardless, the information culled from this survey appears to be of significance.

6 Kalra, Aparna, 2009. Students in Overseas Business Schools Look to India Placements. *Livemint.com/WSJ.com* January 27. Available at <http://www.livemint.com/2009/01/27002136/Students-in-overseas-business.html>

7 Gentleman, Amelia, 2009. 'Brain Gain' for India as Elite Return. *The Observer* Sunday 20 April. Available at <http://www.guardian.co.uk/world/2008/apr/20/india.globeconomy>

8 Saxenian, A.; Motoyama, Y; and Quan, X., 2002. *Local and Global Networks of Immigrant Professionals in Silicon Valley*. San Francisco, CA: Public Policy Institute of California

Our findings

Here is what we learned about the sample of foreign students who responded to our survey:

Few want to stay permanently

Very few would like to stay in the U.S. permanently—only 6 percent of Indian, 10 percent of Chinese, and 15 percent of European students. Many students would like to stay for a few years after graduation if given a choice—58 percent of Indians, 54 percent of Chinese, and 40 percent of Europeans. But 30 percent of Indians, 36 percent of Chinese, and 39 percent of Europeans are undecided.

The largest group of respondents wants to return home within five years—55 percent of Indian, 40 percent of Chinese, and 30 percent of European students. Additionally, 16 percent of Indians, 13 percent of Chinese, and 12 percent of Europeans would like to stay for six to 10 years.

Most are worried about visas

The vast majority of foreign students, and 85 percent of Indians and Chinese and 72 percent of Europeans are concerned about obtaining work visas. Seventy-four percent of Indians, 76 percent of Chinese, and 58 percent of Europeans are also worried about obtaining jobs in their fields.

Students appear to be less concerned about getting permanent-resident visas than they are about short-term jobs. Only 38 percent of Indian students, 55 percent of Chinese, and 53 percent of Europeans expressed concerns about obtaining permanent residency in the U.S.

Where do they think the jobs and opportunities are?

Chinese students in particular strongly feel that the best job opportunities lie in their home country—52 percent of them, as do 32 percent of Indian respondents and 26 percent of European ones. This contrasts starkly with the beliefs of most skilled immigrants in the 1980s and 1990s that the best opportunities were in the U.S.

Only seven percent of Chinese students, nine percent of European students, and 25 percent of Indian students stated that they believe the best days of the U.S. economy lie ahead. Conversely, 74 percent of Chinese students and 86 percent of Indian students stated that the best days for their home country's economy lie ahead.

Indians are the most positive on the economic future of their home country and are less than one-third as likely to see the economic future of their home country as negative as Chinese students are to view their own that way.

Was the U.S. as they had expected?

Foreign students found the American people to be friendlier than they had expected. On a scale of one to five—five being much better than expected and one being much worse than expected—Chinese, European, and Indian students on average rated their U.S. experience with regard to friendliness of Americans as 3.2, 3.7, and 3.6 respectively.

Indian students thought that the quality of life in the U.S. was somewhat better than they had expected,

FINDINGS

and Europeans thought it was slightly worse. Chinese students rated it as a 2.9, European students as a 2.8, and Indian students as a 3.3.

On the other two measures—opportunities to start a business and opportunities for immigrant success—foreign students stated their experience in the U.S. was slightly worse than they had expected, the Chinese recording the lowest responses and the Europeans the highest.

High overall opinion of American education

All nationalities thought that American education quality was better than in their home countries. On a scale of one (the U.S. is a lot worse) to five (the U.S. is a lot better), on average, Indians gave education quality a comparison rating of 4.2; Chinese, 4.3; and Europeans, 3.6.

Comparing U.S. and home-country teaching of independent thinking, Chinese, Europeans, and Indians gave averages of 4.3, 3.3, and 4.3 respectively.

With regard to preparing one to enter the workforce in their country, Chinese, Europeans, and Indians gave average comparison ratings of 3.7, 3.1, and 3.8 respectively; and with regard to preparing them to enter the workforce in the U.S., average ratings of 4.1, 4.0, and 4.0 respectively.

Indian and Chinese students said on average that U.S. education offered better value for money than the education in their home countries (average comparison ratings, 3.3 each), and Europeans thought it offered somewhat worse (2.6).

Students would recommend American education to their friends, so what is stopping their friends from coming?

Seventy-one percent of Chinese, 75 percent of Europeans, and 70 percent of Indians would definitely advise friends to study in the U.S.

Chinese and Indian students indicated that they had large numbers of friends who would like to come and study in the U.S. but couldn't. Sixty-one percent of Chinese respondents had three or more friends who would like to come but couldn't. Of Indian respondents, 53 percent had three or more friends who would like to study in the U.S. but couldn't. Europeans had a lesser percentage.

The strongest barrier cited by respondents as preventing friends from coming to the U.S. is lack of funding or scholarships. Visa problems and lack of proper academic credentials were the least-important barriers cited.

Why did students who were leaving the U.S. make this decision?

The strongest reason students cited for leaving the United States was the desire to be with friends and families at home. The second-most important factor was a perception that economic opportunities in the home country were better. The least-important factor cited of those provided in the survey was discrimination, followed by the difficulty of getting a visa to stay in the U.S. and availability of jobs in the U.S. This was consistent with our previous findings of why experienced, skilled workers had returned to India and China.

Entrepreneurial aspirations, but not in the U.S.

Seventy-four percent of Indian, 77 percent of European, and 71 percent of Chinese students indicated that they wished to start a business within the next decade. Of Indian and Chinese students wishing to start a business at some time, the majority (53 percent and 55 percent respectively) hoped to do so in their home countries, whereas only 35 percent of corresponding European students wished to start their business in their home country.

Conclusions and interpretation

Foreign national students in our sample are planning to leave the U.S. after graduation in numbers that appear to be higher than the historical norm as measured in STEM disciplines. A significant percentage of these students also say they intend to open businesses in the future. This expressed intent, prevalent among Indian and Chinese nationals currently studying in the U.S., appears to be in marked contrast with the recent past, when Chinese and Indian degree holders were very likely to stay in the U.S. and continue working or researching (even more so in the PhD ranks).

Should their intentions turn into actions, the departure of these foreign nationals could represent a significant loss for the U.S. science and engineering workforce, in which such immigrants have played increasingly larger roles over the past three decades. Foreign nationals are also represented disproportionately among the ranks of founding executives at technology firms around the U.S. Key impetuses for their intention to depart are the fear that they will not be able to find a job in this country upon graduation and their growing belief that the economy of the U.S. will shortly lag behind global growth rates. Many of these foreign nationals are also very worried about obtaining the work visas required to pursue employment in the U.S. and about the difficulties of obtaining permanent residency.

In her book *The New Argonauts*,⁹ A. Saxenian notes that the loss of talented entrepreneurs and researchers to their home countries is not necessarily a zero-sum game. These entrepreneurial pioneers may leave U.S. soil, but they often maintain networks of contacts inside the U.S. and return regularly to use specialized services, to found companies,

to underwrite key research, and, perhaps most importantly, to provide expert insights into the inner workings of their home countries. It is unclear, however, at what point a brain circulation becomes a reverse brain drain. It is troubling that these students expressed so much pessimism about the future of the U.S. Whilst this is hardly a completely representative sample, the sample size is large enough to confer significant validity on the trends indicated in responses.

From this survey, however, it seems clear that the U.S. higher-education system remains highly regarded. Nearly three-quarters of Europeans, Chinese, and Indians indicated that they would advise friends to study in the U.S. Almost as many respondents stated they had one or more friends who would like to study in the U.S. but had been unable to. The double-digit increases in foreign students matriculating here suggest that the supply of talented foreign nationals coursing through academe is unlikely to abate. At the same, roughly one-fifth of all foreign students who plan to open businesses also plan to do so in the U.S. Should the U.S. economy rebound or, alternatively, their home economies considerably weaken, the U.S. may become a more palatable long-term option.

Better job prospects, looser visa restrictions, and a U.S. economic rebound could all prove to be attractive to would-be entrepreneurs holding newly minted sheepskins. Adding incentive programs to encourage foreign-immigrant entrepreneurship—perhaps pairing fast-track residency status with launching of companies—could go a long way toward ensuring that those who want to stay and start companies can do so.

⁹ AnnaLee Saxenian. *The New Argonauts: Regional Advantage in a Global Economy*. Cambridge, Mass.: Harvard University Press, 2006. 424 pp. ISBN 0-674-02201-7

Methodology

This survey was conducted during the month of October 2008 through social networking website Facebook. Members were asked to invite their friends who are foreign students currently studying in institutions of higher learning in the United States or who had graduated by the end of the 2008 academic school year to complete our survey. When a friend did complete a survey, the member who referred the friend was given points. Those with the highest points were awarded prizes.

The survey was administered on line. We required each respondent to provide an e-mail address, which we matched with our lists of e-mails sent to check the validity of the response. We also validated that the respondent were foreign students by checking their Facebook profiles or by asking them to provide university e-mail addresses. We asked the subjects a series of questions covering a variety of topics, including their intended academic degree, their intentions upon graduating from their current program, the effects of visa and residency concerns upon their impending decisions to stay or leave, their

feelings about prospects for growth in the U.S. and abroad, and their impressions of the higher-education system in the U.S.

Questions were asked in multiple-choice, ratings-scale, text-box, and open-ended formats. Response level varied from question to question. Some questions were mandatory, the respondent being unable to proceed with the survey unless the question was answered. The remainder were optional.

In total, we received 1,957 responses from students of a large assortment of nationalities. The analysis in this paper is based on responses from the largest groups who took our survey—1,224 students from India (878 responses), China and Hong Kong (229 responses), and Western Europe (117 responses).

This survey was not conducted by random means, and the relative numbers of responses from various nationalities is not representative of the student populations of those nationalities, and our findings may not generalize to all foreign students. They do provide insights into the views of a fairly large sample of foreign students.

Characteristics of respondents

The average age of Chinese respondents was 24. The areas of study most popular among Chinese students were engineering (25.8 percent), business and economics (21.4 percent), and biological sciences (9.2 percent). The average age of European respondents was 26. The most popular areas of studies among European students were business and economics (17.9 percent), engineering (17.1 percent), and biological sciences (17.1 percent). The average age of Indian respondents was 24. The areas of study most popular among Indian students were engineering (51.1 percent), computer science (16.9 percent), and biological sciences (6.4 percent). Indian students were concentrated in engineering, computer science, biological sciences, and business and economics fields. Chinese and European respondents were fairly evenly distributed between bachelor's, master's, and PhD degree tracks. Indian students were primarily (78.1 percent) pursuing master's degree tracks, with a small but significant number also pursuing PhD tracks. The majority of students in all three ethnic groups intend to graduate within the next five years.

Figure 1
Area of study

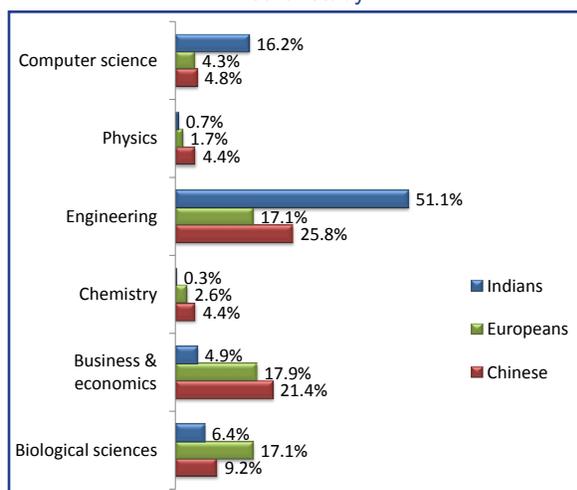


Figure 2
Level of degree

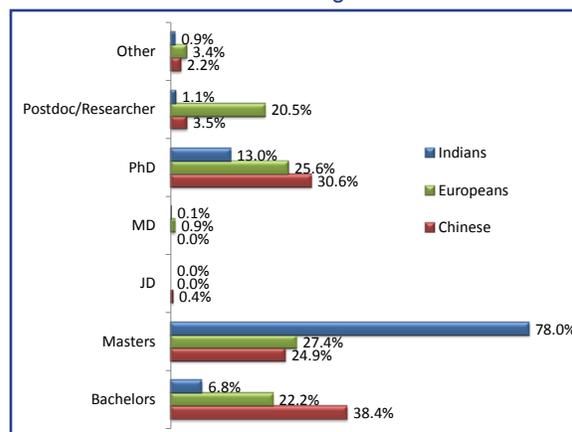


Figure 3
Expected date of graduation

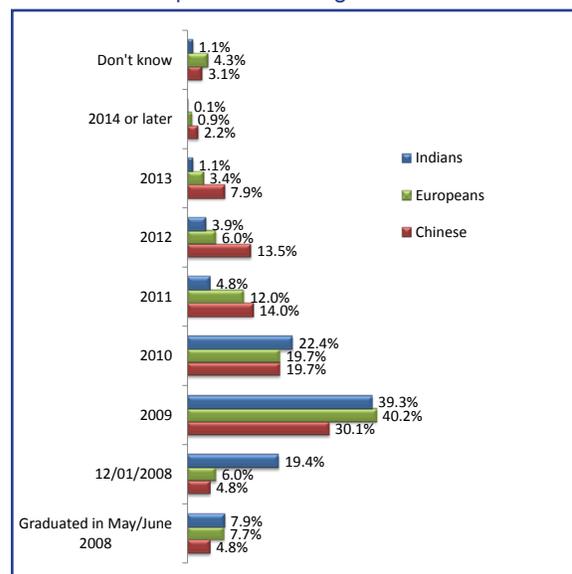
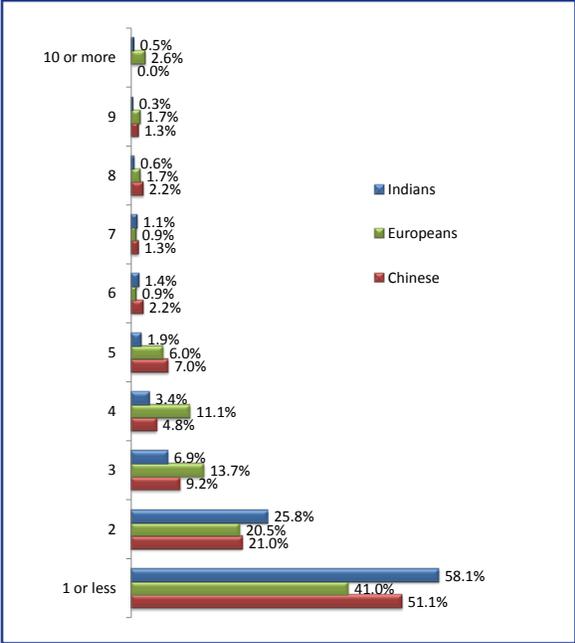


Figure 4
Number of years living in the U.S.



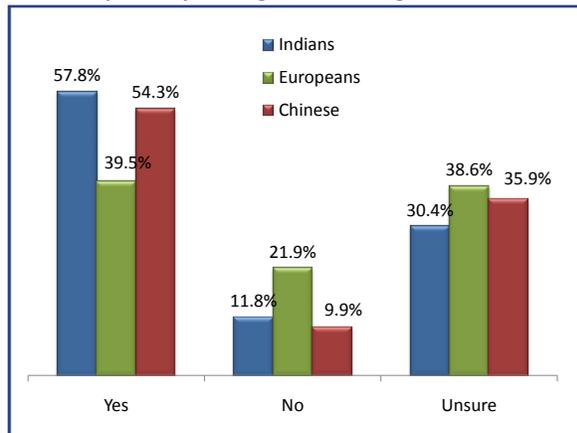
Detailed findings

Intentions to stay after graduation, and concerns

Chinese and Indian students showed a significant preference to stay in the U.S. after graduation if given a chance. Among these groups, 54.3 percent of Chinese and 57.8 percent of Indian students said they would like to remain. Of European respondents, 39.5 percent said they would like to. Only 9.9 percent of Chinese and 11.8 percent of Indian students stated that they did not wish to remain in the U.S. after graduation; 21.9 percent of European students indicated they did not wish to remain. The remainder were unsure.

Figure 5

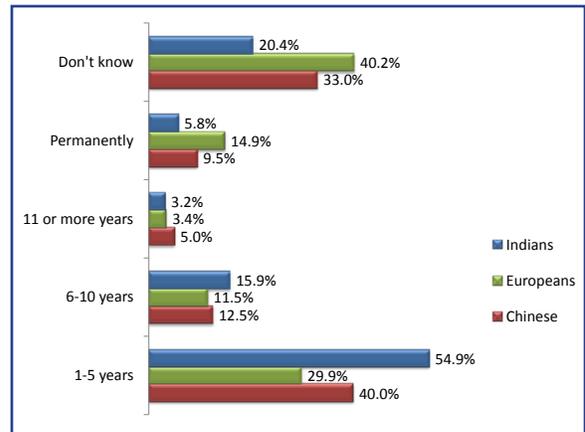
Would you stay after graduation if given a choice?



Survey respondents do not intend to remain in the U.S. for very long after graduation, however, the largest proportion intending to leave within five years of graduation. Forty percent of Chinese students, 54.9 percent of Indian students, and 29.9 percent of European students intended to stay for five years or less. It is notable, however, that there remains significant uncertainty on this question: a considerable percentage of respondents stated that they were unsure when they would return home.

Figure 6

For how many years would you like to stay in the U.S. after graduation?

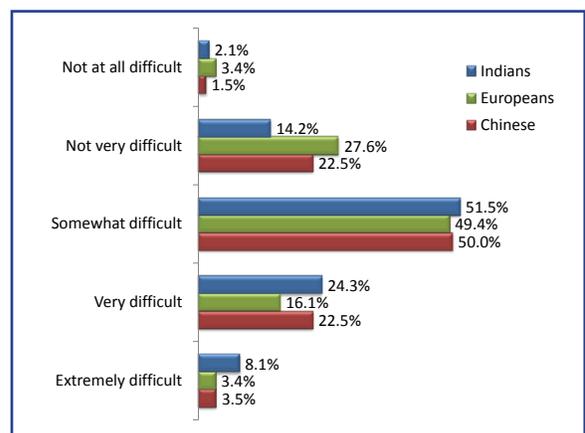


Concerns about jobs

Respondents expressed significant concerns that, should they chose to try to remain in the U.S., they would have difficulty finding a job. Seventy-six percent of Chinese students stated that it would be difficult to find a job in their field in the U.S. Of European respondents, 68.9 percent agreed that it would be difficult. Of Indian respondents, 83.9 percent stated that it would be difficult.

Figure 7

How difficult will it be for you to find a job in your field in the U.S.?



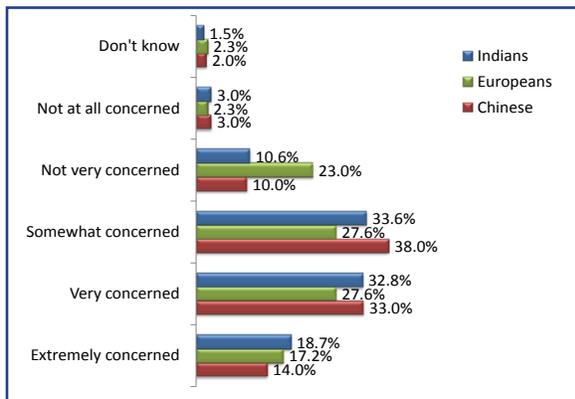
Losing the World's Best and Brightest

DETAILED FINDINGS

Concerns about work visas

Respondents expressed serious concerns about obtaining work visas after graduation: of Chinese respondents, 85 percent; of European respondents, 72.4 percent; and of Indian respondents, 85.1 percent.

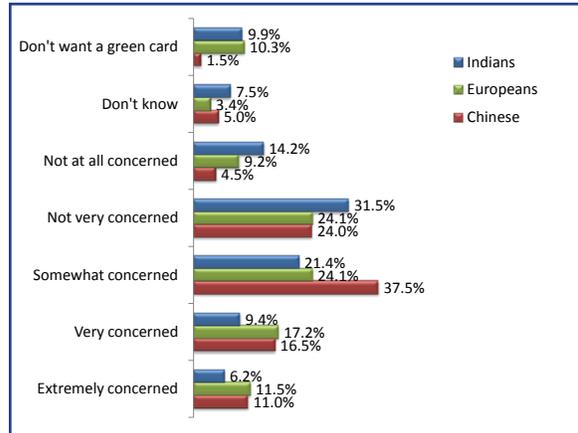
Figure 8
How concerned are you about obtaining a work visa after graduation?



Obtaining permanent residency

Students had greater short-term concerns about jobs and work visas than about permanent-resident visas. Of Indian respondents, 37 percent stated that they were concerned about obtaining permanent residency in the U.S. Of the Chinese respondents, 65 percent stated they were; of European respondents, 52.8 percent stated that they were. Conversely, 55.6 percent of Indian students stated they were not very or not at all concerned about obtaining permanent residency in the U.S.

Figure 9
How concerned are you about obtaining permanent residency in the U.S.?

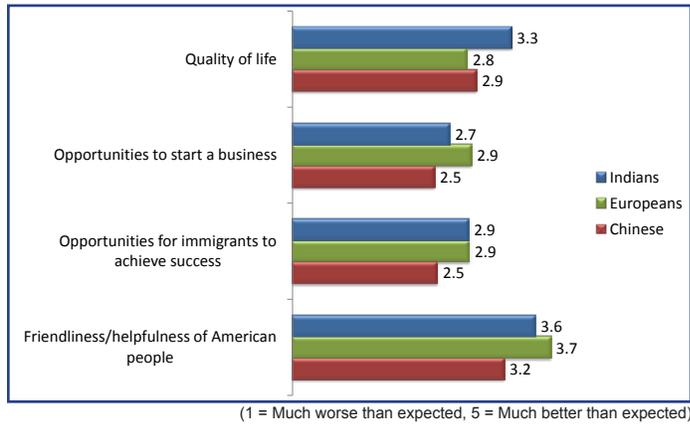


Perceptions about U.S. opportunities, education system, and economic future

How did the U.S. stack up against expectations?

Spending time in the U.S. studying resulted in only minor changes in perceptions, overall. The only clear area where the U.S. exceeded expectations was with regard to friendliness of the American people. Indian and European respondents, in particular, said that the U.S. was considerably friendlier than they had expected. This was also true, to a lesser degree, quality of life. Indian respondents, in particular, felt that quality of life in the U.S. was somewhat better than they had expected. In no area was experience in the U.S. appreciably worse than expectations, and in most it was very slightly better.

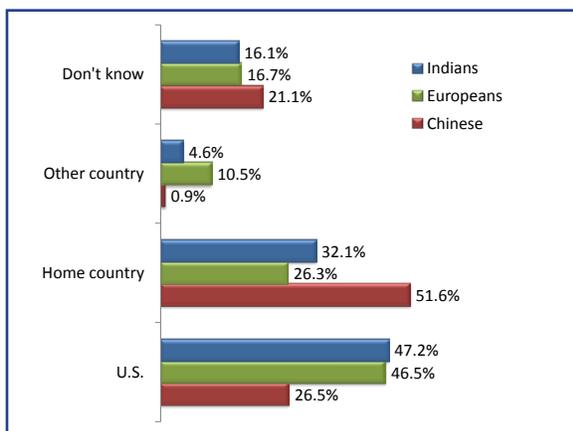
Figure 10
Has your view of the U.S. changed since coming here?



Where are the opportunities?

Of Chinese respondents, 51.6 percent perceived their home country as having the best job opportunities. Of Europeans respondents, 26.3 percent perceived their home country as having the best; of Indians, 32.1 percent perceived their home country as having the best. Only 26.5 percent of Chinese students agreed that the best job opportunities could be found in the U.S., but of Europeans, 46.5 percent agreed that the best job opportunities could be found in the U.S., and of Indians, 47.2 percent did. It is noteworthy that fewer than 50 percent of members of all three groups perceived the U.S. to have the best job opportunities.

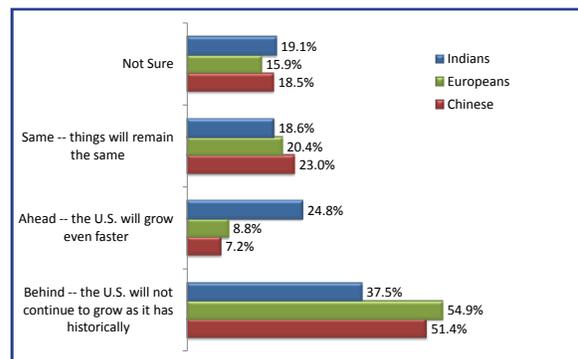
Figure 11
Country perceived as offering the best job opportunities



Which economy has a better future?

The respondents generally believed that the U.S. economy will not continue to grow at its historical pace and that the economies of their home countries would grow faster. Amongst the respondents, 51.4 percent of Chinese students, 54.9 percent of European students and 37.5 percent of Indian students stated they believed the best days of the U.S. economy lay in the past. Only 7.2 percent of Chinese students and 8.8 percent of European students stated that they believe the best days of the U.S. economy are in the future. Indian students were less pessimistic, with 24.8 percent stating they believe the U.S. economy will grow even faster in the future and its best days are still to come. Indian and Chinese students were far more optimistic about the future of their home country's economy than were European students. Seventy-four percent of Chinese students and 85.8 percent of Indian students agreed that their home country's economy would grow even faster in the future than it had in the past decade. Of European respondents, only 21.2 percent agreed that their home country's economy would grow faster in the future than it had in the past decade.

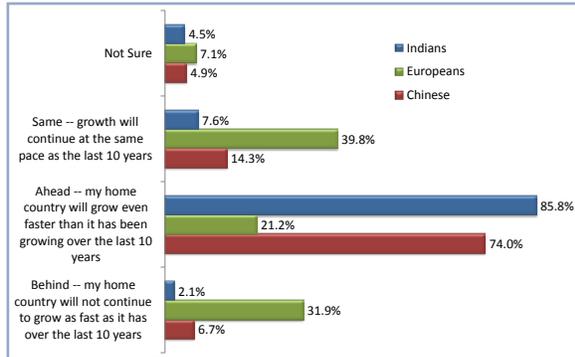
Figure 12
Foreign national student perceptions: best days of U.S. economy behind or ahead?



Losing the World's Best and Brightest

DETAILED FINDINGS

Figure 13
Foreign national student perceptions: best days of home country's economy behind or ahead?



Where will the most innovative products be created in the future?

Respondents from both India and China conclusively stated that they expect that the generation of innovative products and services in their home countries will increase during the next quarter century at a much faster pace than in the U.S. Europeans felt that innovation would also shift to China and India, but they gave China a slight lead in that regard.

Figure 14
Chinese responses: Which economy do you think will generate the most innovative products and services over the next...

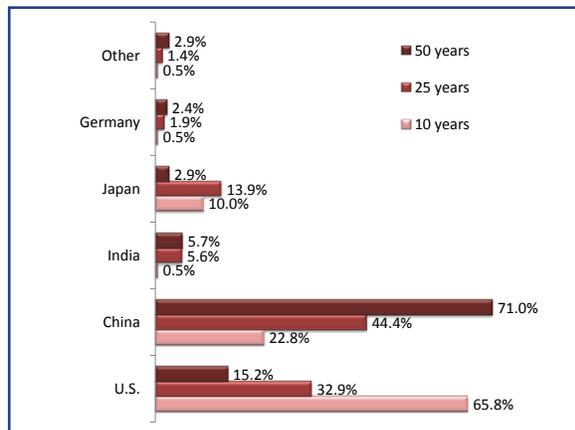
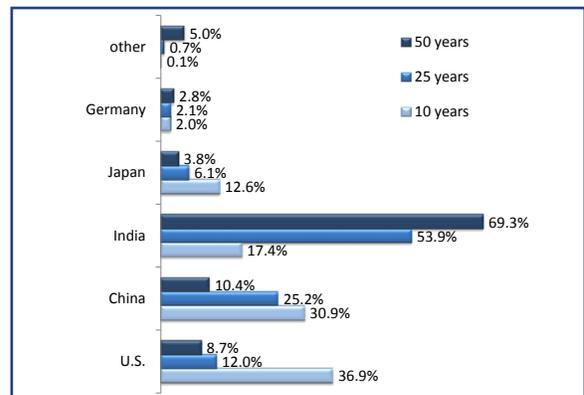


Figure 15
European responses: Which economy do you think will generate the most innovative products and services over the next...



Figure 16
Indian responses: Which economy do you think will generate the most innovative products and services over the next...



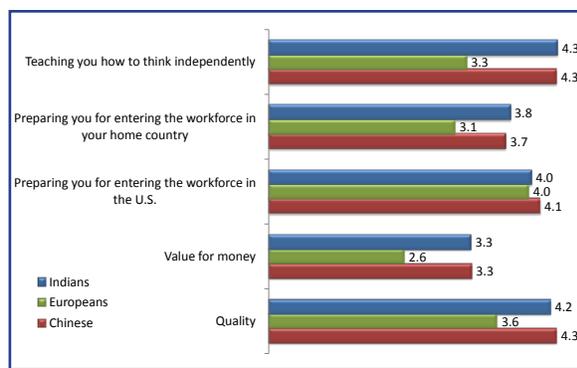
Comparisons of education systems

To the respondents, the U.S. education system compared extremely favorably with those of their home countries. On not a single measure did the education comparison rating score below 2.5 on a scale of one to five, and only in one instance did ratings drop below 3 (for European respondents on "value for the money"). Indians and Chinese, in particular, found the U.S. much better than

Losing the World's Best and Brightest

their home countries' systems in terms of teaching independent thought, overall quality, preparing for entry into the U.S. workforce, and, surprisingly, preparing graduates for entry into the home country's workforce. The one area where the U.S. was less successful in this regard was value, which likely reflects the stiff price of collegiate and graduate education programs in the U.S. Europeans were less positive than Indians or Chinese but were still decidedly positive about a U.S. education on a comparative basis.

Figure 17
How does the U.S. education system compare with your home country's education systems?



Advising friends: studying in the U.S. still a highly valued experience

Respondents indicated that they would overwhelmingly advise friends in their home countries to study in the U.S. if possible: 71.4 percent of Chinese, 75 percent of Europeans, and 69.5 percent of Indians would advise friends to study in the U.S. Most respondents had significant numbers of friends in their home countries who wish to study in the U.S. but are unable to. Of Chinese respondents, 94.4 percent had one or more friends in wishing to study in the U.S., and 22.7 percent had 10 or more. Of Indian respondents, 84.4 percent had one or more

friends wishing to the study in the U.S. but unable to, and 17.6 percent had 10 or more. Only 60.2 percent of European respondents have one or more friends who wish to come study in the U.S. but are unable to, and only 10.2 percent have 10 or more.

Figure 18
Would you advise friends in home country to study in the U.S.?

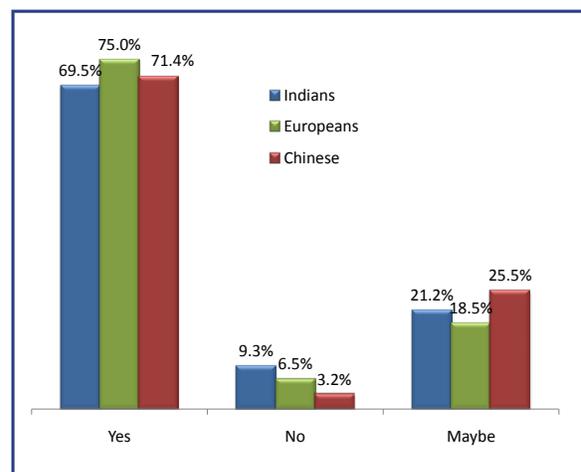
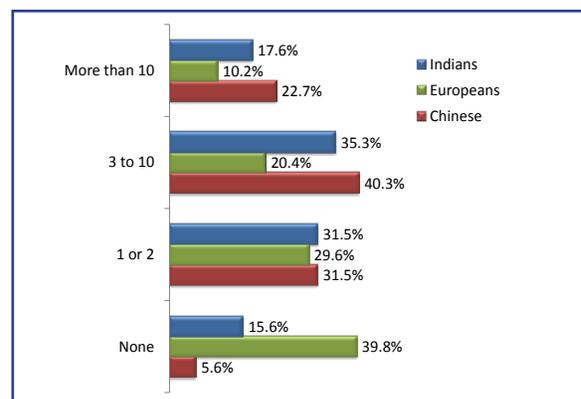


Figure 19
Number of friends in home country wishing to study in the U.S. but unable to



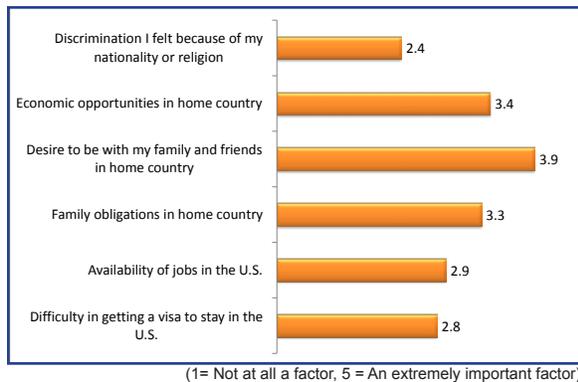
DETAILED FINDINGS

Reasons for leaving

Out of the total sample, 240 students responded to questions about why they had decided to leave the U.S. The relatively low percentage responding of the total sample is likely due to the fact that many of the students had not yet left and were undecided. Regardless, the responses from this sample were instructive.

The respondents rated on average the desire to be with family and friends in their home countries as the most important factor in a decision to leave the U.S. No other factor rated above 3.5 on the five-point scale. Most notable, discrimination was cited as the least-important reason to depart.

Figure 20
How did the following factors contribute to your decision to leave the U.S.?



Entrepreneurial intentions

Over all, respondents expressed a strong interest in starting a business. Of Chinese respondents, 68.4 percent are interested in starting a business or have already done so; of European respondents, 44.1 percent; and of Indian respondents, 56 percent. Only a small percentage of respondents have actually started their own business. The majority of respondents who expressed interest in launching a business planned to do so within the next decade: of Chinese respondents planning to, 71.2 percent; of Europeans, 77.2 percent; and of Indians, 74 percent. Respondents appeared to be more inclined to launch a business in their home country than in the U.S. Of Chinese respondents interested in starting a business, 52.5 percent indicated they would be more likely to start a business in their home country; of Europeans, 34.6 percent; and of Indians, 54.7 percent.

Figure 21
How interested are you in starting a business some day?

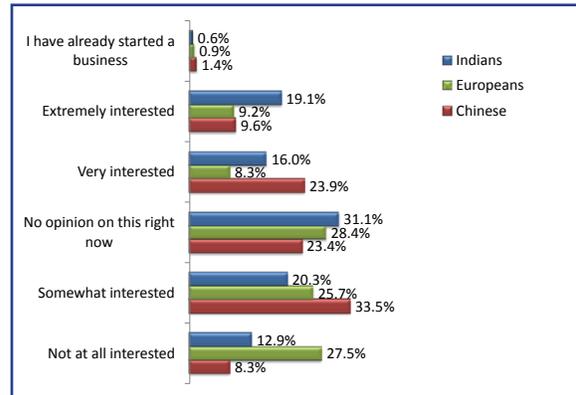


Figure 22
Timeframe for starting a business (if interested in starting a business)

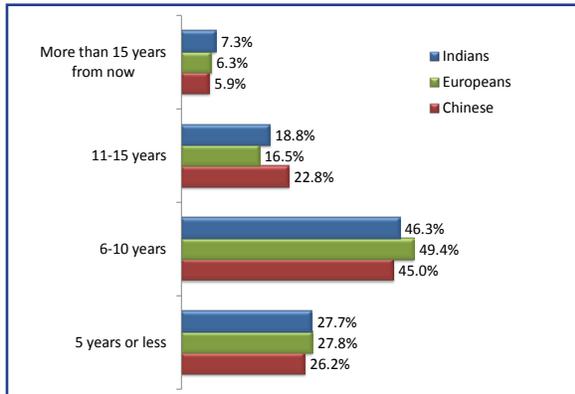


Figure 24
Key problems faced by friends seeking to come to the U.S.

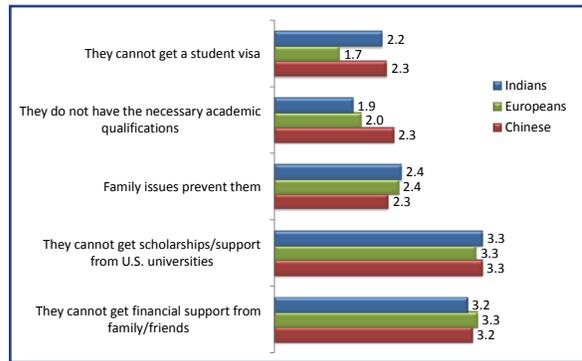
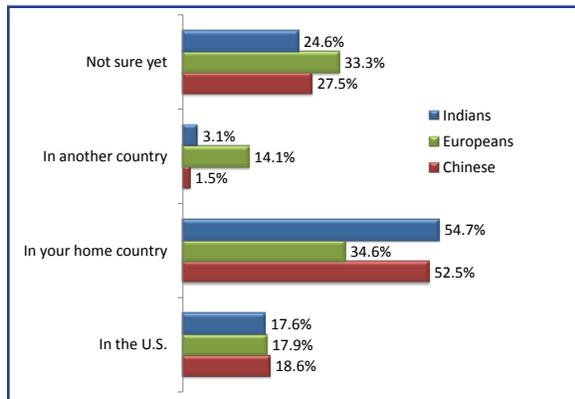


Figure 23
Likely location of business startup (if interested in starting a business)



(1 = No one has this problem, 5 = Everyone has this problem)