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THE FORUM REPORTS

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discussions
on vital issues
concerning the
Bay Area*

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*Immigrant
Entrepreneurs &
the Bay Area
Economy:*

*How Human Capital
from Asia Places the
Bay Area at the Heart
of New Global Networks*

THE FORUM REPORTS

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**Public
Policy
Institute of
California**

Panel Discussion

Bay Area Economic Forum
Public Policy Institute of California
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Immigrant Entrepreneurs and the Bay Area Economy: How Human Capital from Asia Places the Bay Area at the Heart of New Global Networks

In recent decades, the Bay Area and Silicon Valley in particular have benefited from large scale immigration from Greater China, India and other nations. Attracted by the region's institutions of higher learning and by opportunities in the technology sector, these immigrants, many with high levels of technical education and training, have made a distinct contribution to the region's economy, founding start-ups and supporting much of the technological innovation that the region is known for. Now they are developing new ties to their countries of origin, generating both trade and investment and locating the Bay Area at the center of new global networks.

A recent joint forum of the Bay Area Economic Forum and the Public Policy Institute of California looked at the phenomenon of immigrant entrepreneurs, their global connections, and the implications for the regional economy.

David Lyon

Dr. Saxenian's current research explores the contributions of highly skilled immigrants to Silicon Valley and their growing ties to regions in Asia, particularly Taiwan, Mainland China, and India. Those of you who know her work will recall that when PPIC first got started she had just released a book called *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*. That was a blockbuster publication. It got my attention, so we contacted professor Saxenian to see if she would do additional work on the subject. Since that book was published for PPIC she has published two reports. The first was *Silicon Valley's New Immigrant Entrepreneurs*, and then most recently, *Local and Global Networks of Immigrant Professionals in Silicon Valley*. Dr. Saxenian is a professor at the University of California at Berkeley, and holds a Ph.D. in political science from MIT, a master's degree in regional planning from University of California Berkeley, and a bachelor's from Williams College.

We have three panelists. Rakesh Mathur is chairman and co-founder of Stratify Incorporated, formerly called PurpleYogi. His previous companies were Jungle started in 1996 and Armedia started in 1994. He holds a master's degree in industrial engineering and operations research from the University of Texas and a bachelor's degree in mechanical engineering from the Indian Institute of Technology.

Dr. Po Chi Wu is a highly experienced and successful international venture capitalist who has lived and worked both in the United States and in Asia. He's one of the managing directors of Alameda Capital, a new venture capital and management firm. Alameda Capital is currently raising a venture capital fund for investors in Asia and

the United States. Before this, he was president and co-founder of Allegro Capital, which manages a fund that invests in high technology companies based in the United States. Dr. Wu holds a Ph.D. in molecular biology from Princeton University and a bachelor's degree in mathematics and music from the University of California at Berkeley.

Hillel Rapoport is a visiting research fellow at the Center for Research on Economic Development and Policy Reform, at Stanford. He's an assistant professor in the department of economics at Bar-Ilan University in Israel and is affiliated with the University of Lille in France. His research focuses on the growth effects of migration in developing countries, either directly or through the impact of migration, on economic inequality. He holds a Ph.D. in economics from the University of Paris.

AnnaLee Saxenian

To describe the research that I'm going to present, I need to say a few words about an earlier report I did that set out to find out how many immigrant entrepreneurs there were here and how they operated. The research was mainly based on interviews with people like our panelists

"There's a joke that Silicon Valley is built on ICs, not integrated circuits, but Indians and Chinese."

here today. The story I came up with was staggering. In 1997 there was a small group called the Indus Entrepreneurs that sent out all this stuff on funky paper. There were misspellings on it, and it looked like a Third World organization. For those of you who know the Indus Entrepreneurs now, when you go to

their conferences there are over 1,000 people, they telecast globally, and they have 30 offices around the world. But I was looking then at something that was just beginning. At that time the group that I focused on the most was Taiwanese, largely because the Taiwanese were the first group of highly skilled immigrants to come to Silicon Valley during the 1970's and 80's. They had become very deeply integrated into the technical networks in Silicon Valley and by the mid 90's they'd already started to go back to Taiwan, transferring technology and know-how. Since then, Taiwan has been exceedingly successful in manufacturing integrated circuits and personal computers, PCs, and now laptops.

I concluded that their success was largely due to this traffic back and forth of Taiwanese entrepreneurs and venture capitalists. Some went back to start companies. Some invested in companies here that built alliances with companies there. This led to a very complex set of relationships, bridging the Silicon Valley economy to the economy of one region in Taiwan in particular, the Tshinshu region, which extends from Taipei to the Tshinshu Science Park in the South.

Then I started to wonder about how generalizable were the trends that I was observing? Could we tell a similar story about Indian entrepreneurs and their ties back home or even about Mainland Chinese? Immigration from Mainland China was increasing very rapidly, especially after 1989 and the Tiananmen Square incident. So this project was an attempt to assess the scale of this phenomenon linking Silicon Valley to these emerging regions in Asia.

Have any of you have tried to figure out how many immigrant entrepre-

neers there are in Silicon Valley? How many high-skilled Chinese come here? How many go back? How much capital flows between Silicon Valley, or the Bay Area, or even California and Asia? There's no data. I have tried and it's extremely hard to find. So this survey was an attempt to fill that gap.

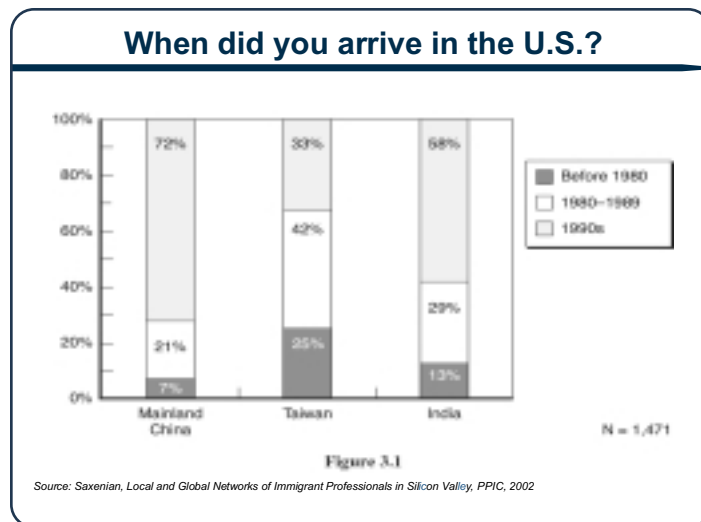
We conducted the survey in the summer of 2001. Finding a sample is difficult, but I did it by contacting associations like the Indus Entrepreneurs. There is a whole raft of Chinese professional associations, both Taiwanese and Mainland, that also cooperated with me. We focused mainly on Chinese and Indian immigrant associations because they are overwhelmingly the largest groups of immigrant engineers in Silicon Valley, although there are many others that are emerging more recently.

The first thing I wanted to do is look at how immigrants integrate into local networks, both associational and entrepreneurial. The second thing was to what extent are they building bridges back to their home countries. Are they traveling back and forth? Are they investing money in startups back there? What is the nature and scale of these connections? Finally, I was interested in the extent to which immigrants were actually going back to their home countries: Either starting businesses in the US that draw on resources in their home countries or going back to their home countries to start companies. How do these first two feed into a new pattern of entrepreneurship that actually builds on their ethnic ties to their home countries?

This is what I think the survey tells us. First, that these first-generation immi-

grants, very quickly catch the entrepreneurial bug. They want to become entrepreneurs like everyone else in Silicon Valley. And they also very quickly assimilate this pattern of relying on external resources and social networks in the region to access capital, get employees to start a company, and learn how to write a business plan—the multiple functions that social networks have played in Silicon Valley among the native-born population. They quickly become entrepreneurs and part of the Silicon Valley culture. There's a joke that Silicon Valley is built on ICs, not integrated

Rakesh here who started a company called Junglee and then more recently one called PurpleYogi, look very similar to those of native-born entrepreneurs, except that they are taking advantage of resources in their home countries. So it's not that there's a different model of business or entrepreneurship. It's simply that they have privileged access to resources in a place where they understand the language and the culture and the institutions, and are able to tap that much more easily than those of us who were born in this country.



What we see from this first figure, "When did you arrive in the US?" is that these immigrant groups have come in distinct waves. 25 percent of the Taiwanese community arrived in the US before 1980, whereas fewer than 10 percent of the Mainland Chinese and 13 percent of the Indians arrived before 1980. So the Taiwanese came much earlier. Indians are the second group—30 percent came in the 1980s, compared to only a small percentage of Mainlanders. So the sequence we've observed in the Valley is Taiwan, followed by India, and then by China.

circuits, but Indians and Chinese. The second conclusion is that Indians and Chinese have very diverse business, and professional, as well as personal ties, back to their home countries, that range from business travel and informal information exchange, to advising companies, investing in startups, and even meeting with governments and advising policy makers—so a very wide range of activities bridging the Bay Area economy to regions in Asia. This is not to all of Asia, or even to all parts of these countries in Asia, but really to select urban areas in these countries.

And these immigrant-run startups, like

The majority of Chinese came to go to school in the US. Virtually all, 80 percent of Chinese professionals in Silicon Valley, came first to do either a master's degree or Ph.D., typically in fields like electrical engineering or computer science. The Indian group has a slightly different profile. What we see is that 54 percent look exactly like the Mainlanders and the Taiwanese. There's another group, 25 percent, that came to work, and another 10 percent that were recruited through an intermediary. This latter portion reflects the very large numbers

of Indians that have come over on H1B visas, either through big Indian software corporations that are essentially putting software talent to assist big American corporations, or who are being recruited directly by firms here.

This shows up in other data, like levels of education. You have one group with higher degrees (especially PhDs), another that has just college or less than college education. The other interesting thing about the Indian community, in contrast with both groups of Chinese immigrants, is that they're much more likely to have MBAs. And this is, I believe, partly a function of language skill. It's much easier for an Indian immigrant to go to an American business school, where verbal skills are very much in demand, than it is for a Chinese immigrant.

So here's where we find out that they catch the entrepreneurial bug. The first question we asked about entrepreneurship was, "Have you ever been involved in founding or working for a startup company?"

What we find is that 34 percent of these immigrants have worked full-time in a startup and another 18 percent part-time. So more than half has already been involved in a startup in some way. That's a staggering number. I'm sure if you went anywhere else in the world you would be hard-pressed to find this rate of entrepreneurship among first-generation immigrants, and especially in high-tech. I think a lot of this is moonlighting, especially these part-time people. They have a full time job but they're off working part-time on a new startup that they hope will take off so that they can leave and work there full-time.

"Do you have plans to start your own busi-

ness on a full-time basis?" This is the one that really amazed me. 62 percent of the foreign-born respondents are planning to start a company. Now remember, this survey was done in the summer of 2001, one of the worst times in the past couple of decades to start a company, at least to raise money for a company. And yet, 62 percent are definitely planning to start a company. Another 30 percent don't know. And that, compared to the US-born proportion, suggests that they've become even more entrepreneurial than their native-born counterparts.

10 people who have returned home to work. So we know that it's not just a one-way brain drain any more: the old story of the best and brightest coming here and the developing world losing, and us winning. Now we're seeing some reverse flow back.

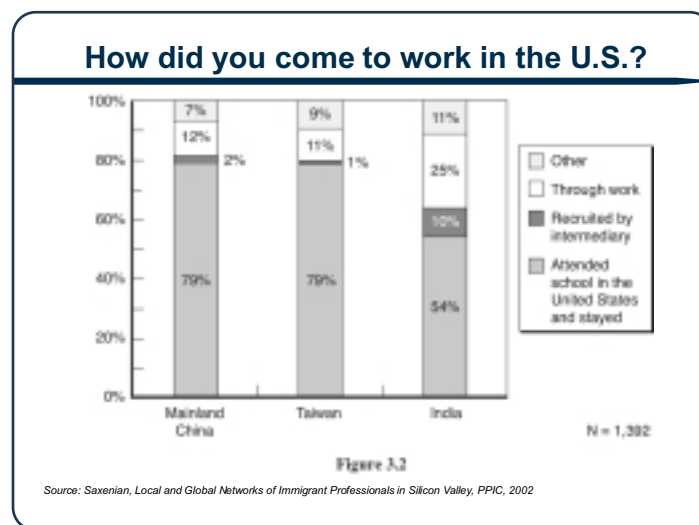
"Would you consider returning to live in your country of birth in the future?"

Again, we don't know if this will happen, but this is what their intentions are: 25 percent of India-born say it's "quite likely" and 20 percent say "somewhat likely." That's a large proportion.

Again, I'm not sure you would have found that 40 to 50 years ago among first-generation immigrants. For most first-generation immigrants, especially with this level of skill and occupational success in the US, very few would have wanted to go back. But now we're seeing over 40 percent, 50 percent of the Mainland Chinese, saying that it's either somewhat or quite likely that they'll go back. The low ratio among Taiwanese, I believe, reflects the fact that because they

came earlier, there's a large cohort of older professionals who are very well settled here. They have homes, they have families, they have social worlds, and it's much harder for them to think about returning home. I bet Dr. Wu fits into that category. Whereas the more recently arrived Mainlanders and Indians are much less settled and much more interested in the possibility of being able to go back home. The other thing to say about Taiwan is that a lot of people have returned already.

"What do you discuss regularly with classmates or colleagues in your home country?" What we see is that it's extremely common to discuss jobs or business opportunities in the US, and also tech-



Here's a set of questions about the ties back home. We asked "How many of your friends or colleagues have returned home to work in your home country?" What we see is that 9 percent of

"Anywhere else in the world you would be hard-pressed to find this rate of entrepreneurship among first-generation immigrants, and especially in high-tech."

respondents from Greater China (this one includes Hong Kong, Mainland, and Taiwan) know more than 10 people who have gone back to work. For Taiwan it's a much higher percent; 15 percent of Taiwanese know more than

nology across the board. So that's a very significant amount of information going back and forth: Information about jobs and technology, informal transfers of know-how and information.

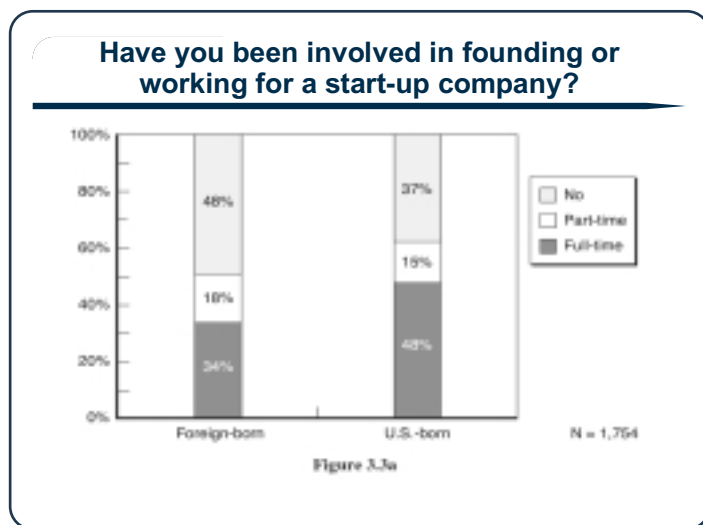
"How often do you travel to your home country for business every year?" This is people who are going back for business. And again the Taiwanese stand out for obvious reasons. The business traffic back and forth between Taiwan and Silicon Valley is extremely well developed. Six percent go back more than 5 times a year, and twenty percent between 2 and 4 times a year. I have met both Mainland Chinese and Taiwanese who go back 10 or 12 times a year. It's harder to do that to India. But there is a cohort of Indian-born engineers in Silicon Valley that is traveling back and forth to India very regularly. It's not everybody, but there is a solid community in all three groups of what the Chinese call astronauts. It seems like they're living in airplanes.

So I'm telling a story that has information flowing, and people moving back and forth transferring know-how, probably capital, as well as building business ties that link these economies. Often this has to do with setting up alliances or contracts between firms in each region.

"Have you advised or arranged contracts for companies in your home country?" I found this really impressive. 34 percent of the Indians have advised companies in their home country, and 24 percent of the Taiwanese. Even 15 percent of Mainland Chinese are advising companies in China from Silicon Valley, or are going back and forth and advising them, and helping to arrange business contracts. I think this sup-

ports the notion that it's not just about information and people flowing back and forth, but real economic ties being built between firms based here and firms based there. Whether it's contracts or marketing arrangements or what, we don't really know from this data, but there's a lot of activity.

"Have you invested your own money in startups in your home country?" Again, we don't know how much money is being invested. But just the fact that 10 percent of the Mainland Chinese are investing money in companies in their home country is a staggering fact.



Again, it may be that a lot of this is early-stage angel funding. It may not be large amounts of capital, but it's still substantial. Once, you're just an angel. But when you start doing it more frequently, I think you move into the venture funder category.

The last category of ties to the home country was meeting with government officials. The Taiwanese government, especially in the 1980s and 90s, has relied on advice from overseas Chinese engineers in the US. I wanted to also see how much that was going on with bigger countries like India and China. And again we found very significant response on this: 35 percent of the Chinese meet with government offi-

cially "sometimes" or "regularly." In the case of China, there are probably at least one or two delegations coming from some province in China to Silicon Valley every week; the traffic back and forth between the provincial governments in China and Silicon Valley is amazing. So this may mean that people just meet with them on their trips, but there's 3 percent that meets with them regularly. And I suspect those people are involved more in advising about things like reform of securities law, or the attempt to set up a second board in Shenzhen, like a NASDAQ that would cater to small technology companies.

Likewise in India, we know that professionals from Silicon Valley have been active in advising the Indian government on venture capital legislation and telecommunications reform, both of which are very important issues for high tech companies that want to do business in India. So now we've got policy advice in addition to capital and information and know-how, and bodies going back and forth.

The final set of questions was about startups. What we learned about first-generation immigrant-run startups, is that on every variable that we looked at, with the exception of business ties to their home country, they looked exactly like US companies. So in their first round of funding, they raised approximately the same amount of money, usually from angel investors or family and friends. In the second round, they again raised comparable amounts of money, but mainly from formal venture capitalists. The rate of incorporation for both groups has gone way up since 1996. So this is an accelerating pace of entrepreneurship.

It would be interesting to look and see if there has been a fall off since the dot com bust. My sense is, some, but not as much as you might expect. You've seen impacts on the dot com sectors in China and in India. But I don't think the overall process has been stopped at all.

"Where has the company incorporated?" Virtually all of these companies, even if 99.5 percent of their employees are based in, say, Beijing or in Bangalore, incorporate in the US. Why do they do that? It's much easier to do business, to incorporate say in Delaware, where you're subject to US law, and which is much more reliable or predictable than the Indian or Chinese legal systems. Your financial dealings are also much easier. You have an exit option. It's very hard for an entrepreneur or a venture capitalist in China to get their money back. If you're incorporated in the US, it's going to be easier to go public on NASDAQ. So essentially, they're taking advantage of our more sophisticated institutional infrastructure, while at the same time starting companies that by all other accounts would look like Indian or Chinese companies.

"How many of the original founders are from your home country?" This tells a story you might expect. Indians tend to start companies with other Indians, and Chinese tend to start companies with other Chinese. They're often classmates or colleagues from former big companies. Over 50 percent in both groups started their companies between two or more co-founders from their home country. I think that's easily explained if you think about the experience of a first-generation immigrant.

In the old Chinatown, ties were based on clan, or hometown, or family associations. Today they are often based

on alumni associations. These are people who went to the Indian Institute of Technology at Bombay and start companies together. Or Madras, they start companies together. And likewise for Taiwan, National Taiwan University. Or for China, Beijing University. The elite engineering universities. Because they send such large numbers of engineers here, that's where a lot of the professional identities of these immigrants are created. And that's who they often start companies with. Not universally, but often.

Although these companies are started by co-ethnics, by teams of Indians or Chinese, over time as they grow, they become less ethnic. What you see is that as the companies get bigger, a smaller and smaller proportion have more than half of their employees from their home country. Which fits.

"When we've thought of globalization, we've thought of big multinationals with their global reach, moving around the world. But what we're seeing here is the globalization of entrepreneurship."

If you're trying to grow a company, trying to take it public, you often need to diversify the employment, and the management ranks. So the ethnic component of these startups diminishes as the companies grow.

When we asked these entrepreneurs about their ties back to their home countries, it turns out that for those that have business operations in Greater China, it's spread among a bunch of different functions, although marketing and sales dominates, which I think is probably oriented towards the Mainland market. Hardware design and manufacturing is a continuation of the Taiwan story. You also see some

R&D, some software content development going on.

As for the location of the business relationships in the Greater China region, it's dominated by Taiwan; as I said that's the early wave that's gone back already. But you're also seeing the emergence of select urban areas along the eastern coast of China: Beijing, Shanghai, and the Shenzhen, Guangzhou, Hong Kong. Those are the three biggest technology centers we see emerging in the Mainland.

For India, the story is slightly different. There is more orientation toward software services, or content development, some back office and remote services, and R&D. There is very little marketing and sales. There are also select urban areas in India: Bangalore, Chennai, Hyderabad, Bombay, and Pune. So it's not the entire country; they are clustering. Just like Silicon Valley is a clustered regional economy, so these returnees are clustering in areas where the skills and other institutions are more advanced than the rest of the country.

"What factors influenced your decision to set up operations in your home country?" The thing that's interesting about this, if you look at the Indians, is that overwhelmingly they went there for "availability of skills" and "the low cost of labor." It's not just cheap labor. It's about low cost skilled labor. And that story comes out with the Chinese as well. The only thing that really is different is that in China "access to the market" dominates as it does with almost any business. So Chinese entrepreneurs are very often going home to start companies that serve the China market, whether it be a telecommunications company or a software company. They perceive the opportunity as very big and that they have a special handle. That hasn't happened

yet in India. In fact, most Indian companies are serving a foreign market, the US, or an external market. But this tells a story about the knowledge economy. This is about access to skills, seeking out pockets of skill in other parts of the world, given the relative shortage and the high cost of skill in the Bay Area and the US.

Let me just say a few quick words about the connection to policy. I think this paints a very different picture of globalization. Traditionally, when we've thought of globalization, we've thought of big multinationals with their global reach, moving around the world. But what we're seeing here is the globalization of entrepreneurship. It's a very bottom-up process. Lots and lots of small scale entrepreneurs, venture capitalists, going back and forth and setting up entrepreneurial environments in other parts of the world. So you're seeing a very different pattern of globalization and with that will come a very different set of policy challenges for local, state, and national policy makers. Let me just mention them very quickly. We have no data about this phenomenon. So I think we should start thinking about collecting data about capital flows, people flows back and forth, and startups and a lot of different things than we've traditionally collected data about. I think there will be a whole set of challenges about intellectual property rights that arise with this traffic of people, know-how, skill, and technology back and forth across borders that we haven't even started to really grapple with. Economic development policy might also need to look different in light of this. And trade policy as well. So there is a whole realm of policy issues that are raised by this research.

Rakesh Mathur

You mentioned a company called

Junglee that I started in 1996. Actually I started it with 4 other guys who were doing their Ph.D.s at Stanford. We sold Junglee to Amazon in 1998 and all of us moved up to Seattle. Then I started another company in 1999, Stratify, which also was with a few Stanford Ph.D.s. And prior to that I had started a company called Armedia in 1994, which we sold to Broadcom.

I came to the US to study and like other people got bit by the entrepre-

"That it's so technology driven is helped by the fact that a lot of these people come here to study. 70 percent of Chinese and 60 percent of Indians come here as students."

neurial bug. I think one of the things that happens here is there are a lot of successful examples in the Indian Community and in the Chinese community. So if you've got classmates that have gone out and made something happen, it shows you that you can do it too. One thing that AnnaLee didn't say is that a third of all technology startups in Silicon Valley are started by Indians and Chinese. I think that's staggering. It certainly didn't take place in the car industry. One out of three car companies weren't started by immigrants. One out of three oil companies weren't started by immigrants.

I think we can get a feel as to why this is happening. The fact that it's so technology driven is helped by the fact that a lot of these people come here to study. 70 percent of Chinese and 60 percent of Indians come here as students. And a lot of them come here to study engineering. Clearly the implica-

"A third of all technology startups in Silicon Valley are started by Indians and Chinese. I think that's staggering."

tions of this extremely large number of companies that have been started by immigrants should be considered carefully in terms of their long-term impact to the region.

Another thing that may skew entrepreneurial success toward immigrants, is that if you've come here you've left your home, and you're a lot more tolerant to risks and are accepting of changes to your pattern of life. The Valley lives with a 97 percent failure rate; 97 percent of people, who get into a garage thinking they're going to start a company, fail. So, if you combine that with the technology nature of these companies, perhaps that leads us closer to figuring out why so many technology companies are started by immigrant entrepreneurs.

Po Chi Wu

I'm not really from Taiwan. I was born in Hong Kong and grew up in Canada and the United States. I've been in venture capital now for almost 20 years, and my first job in venture capital was to set up a subsidiary for a development bank for a government agency in Taiwan. And that, twenty years ago, was in many ways the beginning of this flow that AnnaLee has been studying. Of course, there had been students and other workers before that. But that's when the Tshinshu Science Park got started, and there was indeed a two-way flow. The flow from Asia was students and workers and some capital (rather limited amounts) and the flow back, primarily from the US, was in the form of much larger amounts of capital, technology, management, more experienced workers with business skills, and of course entrepreneurs and venture capitalists. So I was part of this pioneering group that initiated this flow.

What is also interesting throughout

my career as a venture capitalist is that I have not invested in Asian entrepreneurs. That may sound a little peculiar but I was really representing investors from Asia who were interested in learning from US models, learning how to develop technology, how to develop venture capital. So it made more sense for me, representing that money, to invest in US companies, native American entrepreneurs, and then assist them in making the appropriate ties, whether it was for offshore labor, offshore manufacturing, and of course offshore markets. So during my career as a venture capitalist, I've also been studying this flow but from a very different perspective, looking at what works and opportunities to make money.

One of the things that I'd like to ask is what is the next wave after what AnnaLee has been looking at? One of the areas is actually hinted at or even predicted by some of her data. There is, among the more recent immigrants, a pattern where they are not just localizing to a US model, but they can also localize to an Asian model. The reason is that they have more resources available. But the most important thing is the market. This is probably more true of Chinese than any other group. Let me give you just one statistic. The prediction was, I think for 2001 that there would be 400 million mobile phone handsets sold in China in the domestic market. Now that is really an amazing point. In the next 5 or 10 years, China is going to indeed surprise a lot of people.

Now for some areas that I think are particularly challenging for public policy and for researchers. AnnaLee mentioned one that is particularly important, which is intellectual property. Obviously there are multiple systems for patent filing, multiple criteria, and of course more people around the

world inventing new ideas and new technology. This is getting very, very complicated and promises tie up a lot of economic capital and people in legal wrangling, which is not productive. You are seeing data, particularly here in Silicon Valley, where entrepreneurs are building global companies from day one. They're not building for a specific market. They're looking at opportunities that are worldwide. And many are virtual companies. One of the big issues in the whole Internet boom was how do you tax, how do you administer, how do you create policy for a virtual company?

"You are seeing data, particularly here in Silicon Valley, where entrepreneurs are building global companies from day one. They're not building for a specific market. They're looking at opportunities that are worldwide."

Something that was not addressed here is informal capital flows, which are extremely important, particularly in entrepreneurship and particularly in the early stages of first-time entrepreneurs, because they don't have access to traditional capital or the experience to attract more professional money. Then there's something that we are kind of exporting as a cultural attitude, and that is the institutionalization of failure. I believe, looking at what has happened in Silicon Valley and the whole Bay Area, that we have created an enormous economic infrastructure based on companies that fail. This is very different than you would find in other cultures, particularly Asia. Here companies fail, people fail, but there's almost a public heroism of failure.

Hillel Rapoport

I want to slightly shift the focus of the discussion and talk about the economic

implications of brain drain for developing countries. This issue was first discussed in the 1960s and the 1970s. The position of many economists, for example Jagdish Bagwati, was extremely negative; their view was that the brain drain is a negative externality imposed on the remaining population, on those left behind. As AnnaLee mentioned, it was seen as a zero-sum game, which increased inequality at the international level — rich countries became richer, poor countries became poorer. To summarize this position I will cite a short citation from Michael Todaro, which is still a classical textbook in economic development: "The people who migrate legally from poorer to richer lands are the very ones that Third World countries can least afford to lose, the highly educated and skilled. Since the great majority of those migrants move on a permanent basis, this perverse brain drain not only represents a loss of valuable human resources but also could prove to be a serious constraint on the future economic progress of Third World nations."

It could also be, however, that developing countries benefit from migration. Two possible feedback effects often mentioned are remittances and return migration after additional capital, whether human (knowledge) or financial, has been accumulated. The evidence is disappointing. We know from household surveys that educated immigrants tend to remit relatively less than immigrants with lower skills; of course they have a higher earning potential, but they move on a more permanent basis, with their families, hence the lower propensity to remit. We know also that return migration is characterized by negative selection, and in any event the proportion of returning migrants among the highly skilled is generally not significant enough to make a difference.

But a more dynamic analyses tells a somewhat different story. For example, only 12 percent of Taiwanese Ph.D. graduates returned back to Taiwan in the 1970s. But now the figure is something between two-thirds and three-quarters. This shows also that return migration must be seen more as resulting from sustained economic growth in the country of origin.

We know that the brain drain is increasing in magnitude. Just to give some numbers, the United Nations in 1975 estimated at only 300,000 the total number of highly skilled immigrants from all Third World countries to the Western countries during the 1960s. Two decades later, the picture is different: the US census of 1990 showed that there were in the US alone 2.5 million highly skilled immigrants, excluding students. This illustrates the incredible increase in the magnitude of the brain drain. This is partly due to the introduction of quality-selective immigration policies in most western countries—US, Canada, Australia. But the major reason of course is the fact that in a context of increased globalization, human capital tends to agglomerate where it is already abundant.

Why don't we observe strong opposition to international flows of human capital in developing countries? One reason, maybe, is that origin countries cannot do much without becoming very repressive, which has political and economic costs. Another, more optimistic, reason may be that governments realize that there may be a "brain gain" associated with the brain drain.

Two arguments help explain this. The first is that emigration may contribute to human capital formation. Early analyses of brain drain typically looked at a country's stock of human capital as if this stock were given, without considering how this stock was built. Indeed, in the presence of huge wage-

differentials, even a small probability of migration increases significantly the expected return to human capital and, therefore, fosters domestic enrollment in education.

The second positive argument is what sociologists have labeled a "positive diaspora externality", which manifests itself through the creation of trade networks. For example, for Canada it has been computed that an increase of 10 percent in the immigration from one

"Human capital tends to agglomerate where it is already abundant."

country creates trade, mostly imports but also exports, with and from that country. Similar results were shown to hold for the US. Other manifestations of the diaspora externality include knowledge and technology diffusion, and the creation of business networks. This is what AnnaLee's work is focusing on. And this is starting to change people's attitudes towards the brain drain, offering a more balanced picture than before.

What are the policy implications for the receiving and sending countries? It is clear that a developing country that would try to restrict the emigration of its highly-skilled citizens could in fact end up in the long-run with fewer educated individuals than if educated people were free to emigrate. In addition, such a country could disconnect itself from dynamic trade, business and scientific networks. From the perspective of the industrialized countries, one implication is that possible guilt feelings about stealing others' "brains" may be unjustified. The implication for immigration policy is that quality-selection in destination countries does not necessarily come at a cost for origin countries. Both host and origin countries may be better off, providing

that emigration has a strong incentive effect on education enrollment at origin, and providing that there is enough "brain circulation."

Question

Rakesh, can you just say a few words about your companies and if they have ties in India?

Mathur

Certainly. AnnaLee pointed out that India provides a good combination of low cost and skilled availability, in my case software developers. In the 1990s, probably the tightest constraint was the availability of skilled programmers in the Valley. So because I have this connection, all my companies have had design centers located in Bangalore, where we've been able to tap into a lot of great people. And I, too, have made investments in Indian start up companies.

Question

Looking at the scale of this phenomenon, roughly what percentage of the recent startups in Silicon Valley has been founded by immigrant entrepreneurs?

Saxenian

My earlier study found that about a third of Silicon Valley's startups are started by mainly by Indians and Chinese, and then a smattering by other groups. It's a huge number. We're talking many thousands of companies a year.

Question

Could you say more about the backgrounds of the people who immigrate? You mention there had been a big increase from Mainland China after 1989. Do they have different kinds of education? It seems that would have a lot of bearing on the kinds of things they do once they get here.

Saxenian

The striking thing is that although these groups have come in distinct waves, with the exception of that bifurcation in the Indian community, they're strikingly similar in background. These really are the best and the brightest from the home country, kids who made it often to very meritocratic engineering universities. So they are already self-selected, and they have come mainly because of the opening up of access in American engineering departments. Earlier, we provided a lot of financial aid, and I think we still do, for foreign students. Rarely is it funded by either the Chinese, or the Taiwanese, or the Indian government. It's almost exclusively funded by institutions here. Partly this gets back to a set of policy issues about our failure to produce native-born engineers, but in a way it has created this unintended benefit, which is that now we have this very diverse population going through our engineering universities. It's not just Stanford and MIT; people from India and China will go anywhere they can get into. For them this is a lifetime opportunity.

Question

I'm originally from Canada and spend a lot of time in the Valley. I meet Canadians everywhere. It seems this is a huge immigrant community you haven't mentioned.

Saxenian

There are lots of people from everywhere. There are people from Armenia; I'm Armenian-third generation. If I go sequentially, after Chinese and Indians come Koreans, Vietnamese, Filipinos, and other Asian groups, before you get to the Western Europeans. But the other thing is that Canadians mix right in. This is what happens with the British too, and even Germans and French to some extent. They're less likely to create these pro-

fessional networks because they're less likely to feel like outsiders. So part of the process of mobilizing these ethnic networks is a process of feeling like outsiders and then turning to one another for social and professional support. I think Canadians are too much like us.

Question

Could I ask the panel's perspective on the downsizing, the weakness of the economy in the Valley? Are the ethnically owned businesses we've discussed here facing stresses, strains, and pressures to repatriate? And with technicians in Hyderabad or Bangalore today, what are the impacts in those centers of the downturn here?

Mathur

The majority of the companies that AnnaLee talked about are really American companies started by immigrants. So they're all American companies. So there's no repatriation because the investment is mostly Silicon Valley capital. Now there's also another set of companies. You had

"The recession here has fueled, or accelerated the process of Mainlanders going home to start companies, because growth in China's economy has actually been stronger."

quite a percentage of Indians who came here through what AnnaLee calls bodyshopping. There's a very successful Indian software industry based in centers like Hyderabad and Bangalore, and they've made use of the fact that in the late 1990s there was a dramatic shortfall of technical talent in Silicon Valley. And they've been able to supply into that. Now, these are also the first people to be laid off. So before you lay off your own employees, you always downsize in consultants. So

that set of companies has definitely felt the impact of the downturn.

Wu

A number of Asian investors who have invested in companies here, and who tend to invest in Asian entrepreneurs, have due to their own financial difficulties at home in Asia had more difficulty continuing to support their companies here. It's not really repatriation of capital, but it leaves the companies that are established here with a bit more uncertainty.

Saxenian

I want to add one more thing about the general impact of the recession. Ironically, I think what's happened in the Chinese community is that the recession here has fueled, or accelerated the process of Mainlanders going home to start companies, because growth in China's economy has actually been stronger. So people are going back. One of the things that Dr. Wu alluded to is the creation of a triangular set of ties between Silicon Valley-based overseas Chinese, and Taiwan with its manufacturing capacity, and the Mainland, especially the Shanghai region. You're seeing flows of people and skill and capital on all three edges of that triangle, which I think supports this notion that China will become increasingly part of the world economy. With India, people kept saying that all this stuff would disappear and it hasn't.

Question

I recently took part in a discussion in Sacramento about the state's role in the international economy and trade and there was no mention of the kind of activity you're talking about. And I was wondering in terms of state policy, whether it's a help or hindrance or whether it's immaterial, whether there's anything the state could do, or whether they should just stay out of

the way and let it happen.

Wu

Actually states are quite active in encouraging this two-way flow. I know the state of California has representatives in Southeast Asia and in Taiwan and they do help US companies. They help entrepreneurs move in this direction as well. And they help with investors. They're actually quite helpful. I think it's probably better to have state governments do it than federal government. And I think in terms of the sponsors of this event, this is part of what they do and I would encourage that.

Mathur

One of the things the state might do, is to build strong ties with a few apex organizations that represent the Indian and Chinese entrepreneurial networks. The Indus Entrepreneurs (TIE) is certainly such a group.

Saxenian

Yes. I would say local and state governments should be building more ties to these professional associations across the board, because they have insight into what's going on in those communities that are generating so much wealth and business activity.

Question

My question relates to the point that was just made. What are the implications of this for regional development more generally? I was particularly struck by the contrast, or the similarity that you're finding between the mobility patterns of immigrants and some of the same findings that you talked about in Regional Advantage. There, what you were talking about was a set of networks and mobility patterns of both workers and entrepreneurs whereby the benefits were largely contained within Silicon Valley. The focus was on the transference of skills, ideas and

knowledge, the notion that we're all in this together, and that this was very important for the development and success of Silicon Valley. Now you're talking about a situation in which there's a certain amount of leakage of those skills and knowledge and in fact direct competition by foreign startups with Silicon Valley. And so I'm wondering whether you think there might be some other policy implications that might make us look at it differently?

Saxenian

I've been wanting to say something about that. First off, you're absolutely right, that essentially what I'm seeing is that the Silicon Valley model of entrepreneurship and information sharing is being replicated within these communities and it is being transferred

"The Silicon Valley model of entrepreneurship and information sharing is being replicated within these communities and it is being transferred globally."

globally, not to all of India or China or Taiwan, but to pockets where they are creating their own little clusters. So these things do take place within communities. But I don't think this is a story about competition between clusters. Remember in the mid-80s, Silicon Valley was going to go down the tubes because Japanese semiconductor companies were stealing the memory business from us? We're seeing a very different pattern of global ties now. These are actually complementary businesses. They are defining new niches that aren't being served here. So you're getting software that feeds into US-defined systems. You're also getting manufacturing capability that in Taiwan and increasingly in China surpasses the capability we have in the US, but is combined with the architecture and design capabilities from the US. So essentially you're see-

ing a division of labor globally with different specializations around the world. You're seeing Israeli companies defining network security products that complement the products that are being built in other places.

It's possible that this could evolve into head-on competition. But the one thing that stops that is this disintegration, this unbundling of IT production. The head-on competition happens when everybody has to have a national champion, or an IBM, and everybody has to build all of these products from the ground up. Now because you can do different things in different places and recombine them anywhere, you actually have less danger of that head-on competition. I think this is actually mutually beneficial in the sense that you're building up centers of expertise all over the world that are developing other regional capabilities and sources of innovation that can also benefit the US economy.

Question

I can't resist bringing in a story from the other night. One speaker, an Indian entrepreneur, was addressing the question of call centers, and perhaps you know about this phenomenon in India. United States call centers have traditionally been in the Midwest. Why? Because they have a nice neutral accent. They're friendly people. And they talk to you about the latest football scores. He was pointing out that there's actually a training program to teach Indians how to speak with a Midwest accent and to take orders. This is mind boggling. I mean Land's End. You dial the number, you get a person on the telephone, you're thinking you're talking to someone in Kansas, and they're actually sitting somewhere in India.

Mathur

At Amazon.com, a lot of our call centers are handled by a company called Daksh, which is in New Delhi. These people who answer the phones speak with neutral accents because they're trained. They take on personas and American names. The person you speak to in New Delhi, might act out a persona of an "average" person in say, Rochester, New York. As part of this he would need to know a lot local information, such as little league baseball scores of teams based in Rochester.

Saxenian

For a lot of Indians, a call center job is a great job. Whereas for most Americans, it's a very dead-end job and there's high turnover.

Lyon

But I don't want it to go unnoticed that there might be a little competition between the folks in Kansas and the folks in India.

Question

As an Indian working for the British Consulate, I am interested to understand whether your survey included other kinds of startups, like in the field of biotechnology.

Saxenian

It does include biotech. And there's data in the report about the proportion that are in biotech. There aren't huge numbers of biotech startups in the valley, compared to these other kinds. There are, however, huge numbers of Mainland Chinese working in biotech right now. For some reason, the Mainland government, in the 1980s, decided to educate lots of people in biology. They thought that was the future. So I suspect that will become more important.

Question

I'd just like to add one more comment about the competition idea, because there are really a couple of different aspects. One is that because we are in a global economy it is inevitable that there is competition. And competition is not from the company down the street, or in the next state. It is from anywhere in the world. And what that means in terms of policy and education is that there must be more inspiration and more motivation to keep evolving, to continue using your own unique strengths, whatever they may be: software in India or whatever we have here. We have more creative people; we have markets. There are lots of different ways of looking at this issue. But the issue is not to say, let's try to figure out how can we deal with competition in some sort of a policy, but rather look to yourself to see how you are going to evolve and grow. And it's

"Rather than closing the boundaries because you feel there's competition or trade barriers, what you want to do is educate your people to compete more effectively, and therefore all these centers of specialization can evolve more rapidly."

not really because of competition, but because that's what you want to do to improve your own life.

Saxenian

I want to underscore that. Rather than closing the boundaries because you feel there's competition or trade barriers what you want to do is educate your people to compete more effectively, and therefore all these centers of specialization can evolve more rapidly.

Question

Given proposed changes in immigration law after 9/11, I was wondering if any of the panelists had ideas on

what the comments of our US senator about restricting the number of people coming in on student visas, or regulating them more closely, might do to the whole immigrant entrepreneur phenomenon that we're seeing in Silicon Valley.

Mathur

I think certainly safety and national security have to come before technological innovation. If America becomes increasingly unsafe, it will hurt not just our economy California but a lot of innovation and growth at a global level. I hope that the next 10 years aren't in the realm of horror stories. But if security falls apart, immigration, student visas, are all secondary issues.

Saxenian

I think a lot of the policy talk has been very misplaced. There's no evidence or sign of any threat from India or China, or Indians or Chinese here.

Question

I have a question for Dr. Saxenian. Have you had a chance to do much research into the actual economic impact that immigrants have made in this country? In Silicon Valley, there's been a tremendous impact as our Asian population exceeds 52 percent. And during the recession in the early 1990s, this population was just phenomenal in getting jobs and adding revenues to our local economy and creating new opportunities. And that in turn has generated even more businesses for our high-tech sector, because some of these high-tech companies actually bought-out these new technologies that were created.

Saxenian

I haven't looked at the local level. The report that I did prior to this looked at the Bay Area and tried to estimate the impact in terms of job creation and value creation, and it's substantial. As

Rakesh said earlier, one-third of the technology companies in Silicon Valley are started by immigrants and I forget the exact data but it's a sizeable amount of wealth creation and job creation. It's very important and often not considered when we talk about immigrants stealing our jobs. I know that the impact is especially heavy in places like Fremont and Milpitas, where the most recent wave of immigrants have landed.

Question

Your research shows this is a relatively recent phenomenon. Could it disappear just as quickly?

Saxenian

I don't think so. One of the things that we've learned is that it has continued in spite of the recession. And in fact in some places like China, you've seen even more brain circulation since the onset of the recession. This is partly because the Chinese economy has fared rather better than the US economy; so more people are going back to find opportunities there. Even in the case of India, where there is a concern that American Fortune 500 companies won't need as much Indian software development, you see some drying up of venture capital and things like that, but the phenomena itself is very well entrenched. And in Taiwan, you've seen it weather recessions fine.

Question

Is Silicon Valley the only place in the United States where this is happening?

Saxenian

No. You're seeing it in Seattle too. You're seeing it in the Boston area. Anywhere you have a concentration of skill and immigrants. But this is the biggest one. The universities obviously help.

Question

In integrating into the previous, existing Silicon Valley networks, are the immigrants maintaining two network levels?

Saxenian

I think both things are going on. Rakesh can probably speak more directly to this, but my impression is that they participate actively in their own ethnic networks, and especially as they start growing companies they also have a lot of incentive to participate in the mainstream networks. This can't remain an ethnic phenomenon. And I think there's a lot of recognition in the Valley that if you remain just within the ethnic community, you're cutting yourself off from growth opportunities. So you see people participating in both.

Mathur

Technology companies are not an ethnic phenomenon. I know a lot of people from India, but then I know a lot of venture capitalists and lawyers and marketing folks and sales folks from all over the world. The microcosm that we live in has all this diversity embedded in it, so you have a bunch of different networks.

Saxenian

The point is that there is a role for the ethnic networks, but it's not an exclusionary role. In this survey, we asked what association meetings they go to, and they all go to both.

Question

Do you have any idea of the top 10 things immigrants aren't finding here that are important to them?

Saxenian

Cheap housing. I would be interested in hearing Rakesh's comments on this also. One of the challenges that immigrants face, just like anybody who moves in from outside of the Valley, is that transportation is congested and

housing is costly and they can't find people to work in their companies. I don't think they face unique challenges.

Mathur

Well, the Bay Area is a terribly difficult place to live in unless you've lived here for a long while. There are not too many houses here that cost less than half a million dollars. I think single immigrants probably find it easier. If you don't need a house and you can rent an apartment, it probably works to the advantage of somebody younger who's not as well set.

Saxenian

I think that some of the younger folks are going to end up feeling more of a pull to go back home, precisely because the housing market is such a challenge for people here. You can go back to India and have people waiting on your every need and live in a middle class neighborhood very well.

Question

I work for Santa Clara County and we conducted a study looking at immigrant groups. We found that the overriding concerns were wage levels and housing. Those were the two big ones of all groups combined. But I have a question regarding brain circulation. In terms of measuring the impact inside India, do you think the impact of Indian entrepreneurs from the US in India has been greater than that of Indian entrepreneurs in India? And secondly, do you feel that the brain circulation in India has impacted inequality in India?

Saxenian

On the last one, I think it has the potential to exacerbate inequality, both spatially and across individuals. My biggest fear about India right now is that you're going to see enclave economies that are essentially export-

ing, and that have very little connection to the domestic economy. One difference between India and China is that Chinese companies are serving the domestic market, so they are by nature creating domestic linkages. Most of these Indian companies are serving American or European clients. So you can see a concentration of skill that is connected better to Silicon Valley or to the US, than it is to the rest of India. There are so many smart people there, I suspect there are ways around that. But it's a potential danger. I don't know how to measure the impact.

Mathur

It's a great question. A lot of the Indian companies tend to be in software and as AnnaLee says, the US and the West in general is a great consumer of software and software services. So a lot of Indian technology companies tend to be software exporting companies. A majority of them, again, have been started by Indian entrepreneurs who have gone to the same set of schools, maybe have even studied here and gone home like several of my friends. It helps them to have people like me in the US, in terms of finding out where new trends are, where businesses are, etc. It gives them that linkage. What's going on is good for that set of software companies as well as for the American companies that are founded by Indian entrepreneurs. In terms of whether software by itself will lift the entire Indian economy, I think the numbers don't say that. Unless a hundred million people can become programmers, software development will have a small local impact. But other operations like call centers also have potential.

Question

I was fascinated when you were talking about brain circulation and was wondering whether immigrants returning to their home country is motivated by

altruism or is it purely economic?

Saxenian

Almost universally economically motivated. There's some altruism, once they get rich and old. But we asked a question, why would you go back? What would be the main factors influencing your decision to go back? Number one for every group was professional opportunity. And that's what I've learned through interviews too among the Taiwanese. Once there were professional opportunities that were at least comparable to the ones they have here, they were happy to go back. And this feeds into this notion that you often have to have a little growth in order to get people to go back. You have to have enough professional opportunity; then they say, well I could actually do better in China, or Taiwan, than I do here.

Question

Does this phenomenon occur with Russia or Eastern Europe?

Saxenian

It's happening. With Russia, first of all there are fewer immigrants, although you find a lot of Russian software developers here. But going back is not very attractive yet. There are tons of Iranian entrepreneurs here, but going back to Iran is not very attractive either. So you have to have a place where you really feel there's some stability and an opportunity to make money.

Lyon

I want to leave you with a thought. When it comes to understanding California's economy there's a fellow by the name of Carey McWilliams who wrote some wonderful books back in the 1940s, and I quoted him in the forward to AnnaLee's first PPIC publication. McWilliams called California "the edge of novelty" and remarked that Californians have become so used

to the idea of experimentation, they've had to experiment so often, that they are psychologically prepared to try anything. "Waves of migrants and immigrants over the past 150 years of California's history have been attracted to our edge of novelty in California." I think one of Dr. Saxenian's stimulating conclusions is that this phenomenon of immigrant entrepreneurs isn't something that's a recent phenomenon for California. This really goes back to the Gold Rush.



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