BAY AREA ECONOMIC FORUM

A Partnership of the Association of Bay Area Governments and the Bay Area Council

THE FORUM REPORTS

A series of discussions on vital issues concerning the Bay Area

Volume Three Number One

Technology and the Economy:

Why the Bay Area is the Global Technology Leader and How to Keep it That Way

THE FORUM REPORTS

Panel Discussion

City of San Jose
Spring 2001

Technology and the Economy

Why the Bay Area is the Global Technology Leader and How to Keep it That Way

In recent years the Bay Area has emerged as the global epicenter for high technology. With an unparalleled concentration of leading companies in the information technology and biotechnology industries, a wealth of entrepreneurs and small technology start-ups, and a high rate of innovation, cities and regions throughout the world look to the Bay Area as a model of successful technology development and of less-than-successful growth management. Government incentives, technology parks and other initiatives have spurred the creation of other centers around the world that are enjoying a varying measures of success in attracting technology investment and fostering indigenous innovation. Bay Area companies with global operations participate in many of these. Nevertheless, and despite the current economic slowdown, the intensity and speed of technology innovation in the Bay Area and the concentration of technology companies here remains unchallenged.

In the knowledge-based economy, innovation is the defining element that distinguishes the Bay Area from many other technology centers, and continues to attract new companies and investment despite the region's high cost of doing business. Recently Bay Area leaders representing key industries and areas of expertise met with the Bay Area Economic Forum to discuss the reasons for this intensity of technological development in the region, and why leading technology industries took root here. Equally important, they discussed the significant challenges the Bay Area must address if it is to retain its status as the world's most important center for technology innovation and development.

PRESENTERS:

Civic Infrastructure	**Honorable Ron Gonzales** Mayor City of San Jose
Technology: Why Here?	**Dr. William Miller** Herbert Hoover Professor of Public & Private Management Stanford University
Public Education	**Julius R. Krevans, M.D.** Chancellor Emeritus UC, San Francisco
Research and Higher Education	**Dr. Robert L. Byer** Professor, Applied Physics Ginzton Laboratory Stanford University
Immigrant Entrepreneurs	**Dr. AnnaLee Saxenian** Associate Professor UC, Berkeley
Venture Capital	**Mr. James Atwell** Principal Summit Partners
Challenges: Workforce	**Mr. Ruben Barrales** President Joint Venture: Silicon Valley
Challenges: Housing	**Mr. Carl Guardino** President Silicon Valley Manufacturing Group

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BAY AREA ECONOMIC FORUM

Hon. Ron Gonzales

Considering our subject, Technology and the Economy, I can't think of a better place to convene and have that discussion than here in San Jose, the capitol of Silicon Valley. Prior to coming into public service, I worked for Hewlett Packard Company and had the opportunity to learn a great deal from its former President and CEO, Lew Platt. He said that if you look at the history of companies in America, the companies that have survived over a long period of time are the ones that have figured out what's going to be the next wave, and found the point-of-departure to get on the next ladder.

Well, I think that is true of San Jose. We are in the midst of this high tech development, and it's clear that we're jumping off to a new ladder, which is the Internet. So we've moved very quickly in the direction of transforming San Jose from the capitol of Silicon Valley to the capitol of the Internet.

We have accomplished a number of objectives already. In our downtown area, we have a facility called "Mae West." It's not a movie star; it stands for Metropolitan Area Ether Net. There are two of them in the country, here in San Jose and in Northern Virginia. That's why the Virginia region is home to many dot.com companies, including AOL. Our facility in San Jose currently handles about 40% of all Internet traffic in the world. You can think of it as a port, the same way as you would think of the Port of Oakland or Long Beach. We are the major port on the West Coast and the portal to Internet traffic as it goes out to the Pacific Rim and here in the nation.

We are taking inventory of our assets like Mae West. We're mapping our fiber optics system throughout San Jose. If you're the president of a company and want to come to San Jose, we can tell you where you can go where you can plug directly into the Internet.

There are a lot of challenges a mayor faces on a day-to-day basis, and that's certainly the case here in Santa Clara County and in San Jose and the San Francisco Bay region. Most mayors spend all their time working on traffic and housing, and I try to put a brighter light on the traffic situation when I meet with constituents out in the neighborhoods, because it's usually the first topic out of their mouths, "What are you going to do about traffic?" I joke with them a little bit and tell them I've come up with the solution: that here in San Jose our unemployment rate is very low, and if we could raise our unemployment rate to about 10%, we would have fewer people trying to get from their home to their work and back in a reasonable period of time. But I just need some volunteers. Is there anyone in the audience? I only need 1 out of 10 of you to give up your job and they do chuckle. The point is that our challenges, whether they're in transportation or housing, really are the result of our successes, not our failures. Even if they are that way, they are just as challenging and just as forbidding.

> *"When high tech companies move today, they are more motivated by the quality of the work force than any other single parameter."*
>
> *-Dr. William Miller*

We have aggressively pursued a transportation system that supports our smart growth planning practices. Portland, Oregon is often held up as the region of smart growth, but in reality the City of San Jose is the largest city in the nation that has smart growth practices in our General Plan. We're protecting our greenbelt; we believe strongly in in-fill development along major transportation corridors, and our General Plan supports those strategies. More importantly, our transportation investments support those strategies. It's important to know that Santa Clara County voters were the first county voters in the State of California that actually assessed themselves a sales tax to improve transportation systems. They have consistently supported those investments because we do them wisely. They are done in an efficient way, they are done on time and they are done on budget.

We are going to continue to make about 1.3 billion dollars in traffic improvements. 55% of that money will go to expanding our light rail system, improving CalTrain, and having a commuter rail connection with BART over in the East Bay. We're expanding light rail into Milpitas, Campbell and east side San Jose, some of the areas that are most transit dependent, and we're making sure as we expand our light rail program that its purpose is to get workers to and from work. If you look at the whole system in the Bay Area, the current BART system in the East Bay and the CalTrain program in the peninsula, you see a tremendous gap between Fremont and San Jose and Silicon Valley. There is no fixed-rail in that gap, which represents the biggest traffic congestion problem in all of the Bay Area. So we've launched an aggressive program to try to make that connection happen within our lifetimes, initially with a commuter rail service like CalTrain or ACE, but eventually full BART service into downtown San Jose and Silicon Valley.

Likewise, we have a very aggressive program on housing. We're going to be spending over a five-year period $286 million of our redevelopment money to support the development of 6,000 new units of affordable housing throughout our city. I've challenged the private sector to build 1,000 units of market-rate housing in and around our downtown area. I meet monthly with our housing director, very much like you in the private sector would have your sales meetings in terms of where the orders are at and how many are in the funnel.

To keep our economy going there's not a doubt in my mind we have to improve our public education system and we have launched some very creative initiatives for our local school districts. We have had focus groups last year with teachers, principals, superintendents and parents talking about how city government might form new kinds of partnerships with the 19 school districts that serve the students of San Jose. From those focus groups we learned that we needed to help school districts attract and retain quality teachers, so we began two programs to do that. Our San Jose Future Teachers Program loans

up to $3,000 per year to San Jose high school students who are going to San Jose State, Santa Clara University or the National Hispanic University. If they come back and teach at a San Jose public school, their loan is forgiven at 20% per year, so that after five years their loan is paid off. We think that is a great investment in a San Jose kid who wants to be a teacher and hopefully return to the same school they graduated from and be a role model for the students in that neighborhood.

Once you get them here, you've got to keep them here. Everyone wants to teach in Silicon Valley. Teachers want to be exposed to this environment, the environment of the future, but they can't afford to live here. We have formed a partnership with Fanny Mae where Fanny Mae finances new home loans at 97% of the mortgage rate. We help the teachers with the 3% down payment. Again, this is one more way we can help teachers to accomplish our mission, which is to make San Jose the most teacher-friendly city in the State of California.

"Universities and research laboratories are an important part of the infrastructure for the knowledge-based economy of the Bay Area. From fundamental research, which takes place principally in the universities and in the laboratories, will come things we can't imagine."

-Dr. Julius Krevans

Whether it's finding the next point-of-departure or improving our public education system, we all know that traditional solutions won't work. Placing blame and waiting for someone else to take action just doesn't work in this region. James Morgan, President and CEO of Applied Materials, once said that business go where they are wanted and stay where they are appreciated. Our businesses expect action and we respond to it. We can't expect the explosion in our high tech economy to continue forever, but certainly we are doing everything we possibly can to make sure that businesses in San Jose know they are appreciated.

TECHNOLOGY: WHY HERE?

William Miller

When it comes to the technology economy, let me tell you why it developed here.

We have evolved a very favorable habitat for technology development. I travel to regions all over the world, and have analyzed about 20. There are a number of things I look at when I consider the sustainability of technological development. First, I look at the extent of knowledge intensity of the companies, the government, and the community. Second, is the presence of a high quality workforce. When high tech companies move today, they are more motivated by the quality of the work force than any other single parameter. Cost of labor sometimes is part of it, but it's really quality of the workforce. A third factor is a highly mobile workforce. Mobility is a way of spreading knowledge. One of the characteristics of this region is that we have collective learning. People learn together, they share knowledge across companies, across boundaries, and between institutions. And although some people decry the high turnover rate, the fact is that it's a benefit to the region due to the collective learning that goes on. California happens to have a favorable legal climate in that regard. Non-compete clauses are not legal in California, so people can spin out and compete as long as they don't take any intellectual property with them.

A climate that rewards risk taking and does not punish failure is important. That's not common in many areas. We all know stories of people who start here after one or two failures and succeed. There are reasons that can happen. People understand that somebody who had the good sense to close down a failing company had done a creditable thing, rather than keeping it going. We tend not to support things that are failing and need money, but to support things that are succeeding and can grow faster.

An open business environment is important. People will talk to competitors. There's a belief that it's a positive-sum game, that for me to win you don't have to lose. Community dynamics, the collaboration between businesses and governments, local governments and independent sectors, labor councils, the universities and others is important.

Another characteristic I look at is the ready acceptance of diversity and youth in companies and institutions. It turns out to be a great advantage here. Not only do young people get a chance, which they don't get in many environments, but there's also a great ethnic diversity in the workforce here. The fact is that if our immigrant entrepreneurs left us we would be in big trouble. We have a huge number of immigrant entrepreneurs who have come here and succeeded. The Public Policy Institute of California has done a study of immigrant entrepreneurs here between 1995 - 98. 29% of all new companies were started by either Indian or Asian immigrants.

Another criteria is the presence of venture capital- a venture capital industry that understands high-tech. There are many forms of venture capital. High-tech venture capital has a much different risk profile than other venture capital, such as leveraged buyouts, because most high tech ventures fail. There was a report a little over a year ago that indicated that from 1993 to 1998, which was a good period for venture capital, over 70% of their investments were failures. That's a very different risk profile, and very difficult for conventional banks or for many venture capitalists. That's also a reason why governments are not good partners in venture capital, because governments can't afford those kinds of failures. They can have a hundred successes and one failure and their political opponents will criticize them for that one failure. There are only two cases I know of where governments made good partners in venture capital. One is in Taiwan, where the government did invest as a limited partner, with no governance role whatever, and the other is in Israel, where the same thing happened. But where governments have tried to play a governance

role in venture capital, and I can point out lots of those, they have not succeeded.

Then there is the presence of research institutions and universities that interact effectively with industry. We have a lot of great universities in this country that interact with business, but not very effectively. By effectively, I mean an interaction that brings a co-evolution, where ideas from industry are fed into universities and conversely are fed out.

Lastly, of course, is a high quality of life in the community. High quality of life is important because high tech workers can go anywhere, and they will, if quality of life isn't good in the area.

Those are the parameters I look at when I diagram regions. I have one other that is not listed here, and it's the extent of government involvement in the region. I have an output measure, which is the number of indigenous companies that are created and the rate of formation of those companies, which is the lifeblood of an entrepreneurial community. When you look at the correlation, it's rather striking that there's a negative correlation between control by government and the formation of new companies. Government does have a very important role: the educational role and the research support role, to keep the early stage of this going. The presence of the highest quality research institutions is very important, and that usually comes from government support. So I don't want to dismiss the role of government, but when they try to get too directly involved in the industrial development, that's where it's not successful.

Julius Krevans

Dr. Miller has really woven a wonderful tapestry, much of which falls under the rubric of R&D infrastructure. As you know, we have a program at the Bay Area Economic Forum called the Bay Area Science Infrastructure Consortium (BASIC). The universities and research laboratories are an important part of the infrastructure for the knowledge-based economy of the Bay Area. The local, state and federal governments must continue to understand that, and I don't think we actually make a strong enough plea for continued federal participation in fundamental research. At least for the time being, this seems to have strong bipartisan support. If that changes then I think we have a very serious and important role, to continue to promote support for basic research. From fundamental research, which takes place principally in the universities and in the laboratories, will come things we can't imagine.

I'm not going to talk about housing, but it is part of the R&D infrastructure. I'm not going to talk about transportation, but again let me remind you that transportation is a very critical part of the infrastructure of knowledge-based industries. But let me illustrate why education is so critical. During the time I was Chancellor [at UCSF], along with Chang-Lin Tien [at UC Berkeley], the University of California spent a great deal of time trying to figure out where to put the tenth campus, the great Central Valley campus. They did a lot of studies and then a lot of focus groups, and spent a great deal of time and energy trying to figure out what were the important things which made for the success of a research university campus. And all the things we have so far talked about were in there: transportation, housing, climate, etc.

> *"…the real educational infrastructure comes from our 2-year colleges, our city colleges, and San Jose State University."*
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> *-Dr. Robert Byer*

The number one issue which came out however, was K-12 education, not university education. In terms of siting a University of California research-based campus, which requires a lot of things that Dr. Miller talked about for knowledge-based industries, one of the most important was the quality of K-12 education. The preparation of a workforce is more than having classes, which put out technicians, or even universities, which put out Ph.D.'s. I think that entities such as ours, which hold themselves out as being advocates for a strong infrastructure for the economy of the region, have to be passionate advocates for the quality of K-12 education.

Six or seven years ago the Forum, in a series of sessions, tried to define what its role would be. We agreed that we would advocate that a knowledge-based economy was the future of this region. I think that decision was correct. We have done reasonably well or maybe very well. I have absolutely no comfort that just having a nice climate and a pleasant environment is sufficient to preserve a leadership role in a knowledge-based economy. We're going to have to do more than that. There are lots of places, not just in this nation but in the world, that would like to take this leadership in the evolution of multimedia, computer-based industries, biotechnology, or things we don't even know about, and I don't think this is the time to relax and congratulate ourselves on how well we are doing.

Robert Byer

While at Stanford, I followed Bill's footsteps and served as Dean of Research, which meant setting policy for the interaction of the University and its faculty members and its students and its staff with outside companies. So my view and commentary is really global.

Silicon Valley is going global now. Those of us who live and work here are being asked to assist the rest of the world in reproducing the economic marvel called Silicon Valley. As a teacher at the University, I title my presentations, "The Evolution of Silicon Valley from Hewlett Packard to Yahoo" the subtitle is "Stanford University Created Silicon Valley: Exploding the Myth."

The worldwide myth, in educational institutions at least, is that somehow a single institution was the sole purveyor of knowledge, and led to the success of this Valley. Of course we know that's not the case. One of the questions I ask audiences, whether it in Osaka, Europe or in Australia is "what fraction of the spin-off companies that came out of Stanford use Stanford technology, either directly or indirectly?" And I ask for a show of hands and almost always the audience will agree that at least half of the companies that started in Sili-

con Valley came out of Stanford or use Stanford technology. The answer is, only 1 in 12 use any technology at all from Stanford, either directly or indirectly. We got at that number by doing a very detailed survey a decade ago. So when you're down to a very small fraction of companies actually using Stanford technology, you have to ask, "Well what did Stanford contribute to the area?" What they contributed was educated students, and we're only one part of the education infrastructure in the valley.

We're the most visible perhaps. When I arrived at Stanford, it was a local, regional university and now we think of it as global. But in fact, the real educational infrastructure comes from our 2-year colleges, our city colleges, and San Jose State University. They provide the education that helps fuel the success of the companies in the valley. When I mention this to my colleagues in Europe they look at me with a blank stare, because they don't have the corresponding educational infrastructure that reaches below the research and teaching universities that we commonly think of as playing a lead role.

Another comment reflects on what Professor Miller said, and I made this very clear talking to a business group in Japan on "What are the success factors in Silicon Valley?" There are many factors that went into it and Bill mentioned a number of them. One is an entrepreneurial attitude, the ability to try things and fail but try again and succeed.

We have land resources, educated people, venture capital, a legal system and support infrastructure, and after listing these things a college student in the audience stood up and said, "Aren't you forgetting something?" I thought for a minute, looked around and noted that in that Osaka audience it was strictly monochromatic and male. Not one woman was in the audience and not one representative from outside Japan, and I remembered that I was forgetting the diversity of our workforce. It is one of the strengths in this Valley and it shows up in California more than in most parts of the world. I think that is a key element in what goes on here.

As Silicon Valley goes global, there are parts of the world where the idea is catching on quite successfully. In Taiwan they've imported Silicon Valley ideas lock, stock and barrel. Israel is going through a revolution of the same ideas right now. There are other parts of the world-Munich, comes to mind. Kyoto is creating its own little industrial park. So this idea, creating high value added jobs that have a technology base, is now a global phenomenon. We're looked to as an example of how to make it successful.

So as we look to solve the problems of this Valley and the issues that were raised in this conversation, others will look to us for how we handled these solutions. How do we go about finding the way to enhance the quality of life here in the Valley as well as the State of California so that we can provide a model for other regions that are creating similar Silicon Valleys around the world?

AnnaLee Saxenian

Probably the biggest change in the Silicon Valley economy in the past decade has been the emergence of highly skilled immigrants as entrepreneurs in the region. This has deep roots, but the immigrants didn't really become visible until the past 10 years. The story goes back to 1965 when the federal government changed the immigration law and dramatically expanded the visa quota for skilled workers, and then increased it again in 1990. That's what we know as the H-1B visa program. That stimulated an influx into the country of very bright, well-trained engineers from countries like India, China and Taiwan, who had very good engineering education at the undergraduate level but came from poor economies with very limited graduate education. This was a time in the 60's and 70's when U.S. universities were providing fellowships. So the U.S. educational system attracted hundreds of thousands of immigrants to the United States, and this coincided with the accelerated growth of the Bay Area and the Silicon Valley economy in particular. As they graduated, rather than going home where there were not many opportunities, they got sucked into the Silicon Valley labor market. By the early 1990's they represented about 30% of the region's skilled workforce.

The majority initially came through the universities. There's also a group, mainly Indians, who came directly through the H-1B visa program. But they are not the ones that are concentrated in the Bay Area, at least in Silicon Valley. Silicon Valley has really attracted very highly trained Masters and Ph.D. level engineers. This group is dominated by Asian immigrants: Indians and Chinese. Taiwanese were the first group; they were followed by the Indians and most recently by Mainland Chinese. The story of their economic progress is one where they initially felt that there were barriers to entry, glass ceilings in the big companies. They tended to mobilize around that as an issue and started to create organizations that helped one another out in the way people do in Silicon Valley, providing information about labor markets, helping to start companies, provide capital and so on. These immigrants, through these traditional ethnic self-help networks, now account for 24% of the high-tech companies started in Silicon Valley. There are actually skilled people from all over the world: Vietnamese, Iranians, Russians, Filipinos and French. Literally scores of different countries are represented in the skilled workforce, but the Indians and Chinese dominate.

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-Dr. Robert Byer

The Taiwanese case is distinctive in the sense that there has actually been something of a reverse brain drain; a lot of the accelerated development in Taiwan in the 90's was because of people from Silicon Valley who went back and helped build the high-tech industry there. However, a lot of them do remain here, for two reasons. One is that this is where the action is, this is still the center of innovation. So if you want to be at the leading edge of technol-

ogy you stay here. Secondly, the quality of life here is better than it is in Taiwan or Beijing, Shanghai or New Delhi. One of the things you see now is engineers going home to start businesses, but their families stay here.

Sean Randolph
Some of these ethnic communities, Indians for example, are reportedly developing export markets and sending capital back to their home countries, as well as attracting capital from their home countries into businesses here. Some are becoming venture capitalist themselves. Do you also see those things happening?

Saxenian
Yes, all of those things are happening in different degrees for different countries. In the Taiwanese case the bridge is very tight. India and China are partially happening. For India, only in the past two years are you seeing more people going back and investing capital in India, and a few more people are going back to start businesses there. The dominant story in the Indian case is how they are using positions here to set up software development or programming facilities in India, largely to take advantage of lower cost programming skills. There are some people from China who have gone back from Silicon Valley, and China is very aggressively promoting its high-tech sector. Because of the political and economic uncertainties in China, however, people are less willing to go back there at this moment.

Randolph
Do the foreign entrepreneurs tend to be in technology across the board or concentrated in IT, biotech or telecom?

Saxenian
When I look at my data, Indians were more concentrated in software, and Chinese more in hardware, which largely reflects language skills if nothing else. I think that's diversified recently. You're seeing a lot of Chinese in Internet startups and there are certainly some very sophisticated Indians in the hardware design sector. For biotech, the mainlanders tend to be more concentrated there for reasons I'm not entirely sure of.

I see this contribution to the skills base and entrepreneurship here in the Valley continuing. One of the things that could potentially slow it down or limit it is obviously the high cost of living here. It's harder and harder now for a young graduate to come and buy a house in the Bay Area and Silicon Valley, although people tend to double, triple and quadruple up and figure out ways to make it work. I do think you will see a growing reverse flow. China is aggressively courting its engineers to come back and India is doing the same.

One more comment on the H-1B visa program. The Bay Area is getting the best and the brightest. These immigrants end up generating tremendous wealth and jobs by starting companies. If you geographically break down the H-1B's you will find that the ones that are coming straight over rather than coming through graduate schools are in other parts of the country. Those coming through the university system are more highly-skilled and therefore will attract the kind of wages that you have to pay to get anybody to be here right now.

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> *-Dr. AnnaLee Saxenian*

Essentially, the kinds that are coming with technical skills are lower-level programmers, often because they can be paid less than U.S. programmers. Those people are going to places like Texas or Chicago, where you can employ large numbers of people for a relatively lower wage. Lower wages in the Bay Area can't be sustained for very long. That's not to say those kind aren't coming to the Bay Area, but a lot of Indians here-49% of these H-1B's-are working for Indian companies that are consulting to American companies. The lower paid ones are going elsewhere.

James Atwell
Let me add something about the role of Venture Capital. PricewaterhouseCoopers does a study every few years on the role of venture capital in the economy. The number that jumps out at you first and foremost is job creation. Venture-backed companies have historically doubled the number of jobs within the company every year. By comparison, there has been a 2% decrease in Fortune 500 companies. The study also shows where R&D dollars are spent, and most of the innovation in technologies for businesses and consumers alike happens in smaller venture-backed companies, as compared to big business. So innovation, R&D, job creation.

We've had many companies come through, and many are people with dreams and ideas and visions who are looking for ways to make that work. We've had 200 companies created through our firm and the majority have been successful. So venture capital is helping entrepreneurs do something that helps push technology forward. Our firm does 90% technology companies, and of the 90% the majority fall into communications, software or Internet infrastructure. We have a few biotech companies, but very few. We stay away from the dot.com industry. A year ago, we were questioning why we did that and today are happy we did.

Randolph
Why did the venture capital industry become so concentrated in the Bay Area rather than starting up in New York, Boston or someplace else?

Atwell
I've asked myself that question. Some of the innovation got started here early on and there was a bit of a herd mentality. Venture capital arguably got started by Queen Isabella who funded Christopher Columbus. In the 15th Century, she gave Columbus some money to find America, so arguably that was the first venture capital deal. In the 1950's and '60's, when venture capital activity got started, they did some deals here. Today most of the smart people who have created companies have

migrated here. If you look at the numbers, about 40% of all venture capital in the U.S. is located here because the companies are here.

90% of the companies I look at are in the Bay Area. It is a very competitive environment today as to evaluation but there are just so many good deals here. This is where the bright ideas, good companies and good people are. Periodically, people ask you to name good companies that were funded east of the Mississippi, and it's hard to do that. You've got AOL and a few others, but clearly the magnitude of the companies is here. Also there is a time factor in looking at a company in Pittsburgh. That's a day's flight there, and a meeting day, so 2 days are gone. When you look at a company here, that's a 2-hour meeting; you can look at 4 companies in that timeframe. That's really what it's all about. Last year alone, we saw 20,000 business plans and we funded 19 companies. That's one out of every thousand. We have offices here and in Boston. The Rocky Mountains are sort of the division line: we do everything west, they do everything east. My personal opinion is that there's just more activity here. There are good deals back there, but they're scattered.

Randolph

Companies from all around the world come here to plug in with venture capital. I've also read that venture capitalists, after they get involved in a company that is located elsewhere, will encourage them to locate here. Is that so? Do companies come from elsewhere to see you, and if that happens is there any tendency to pull them into the region to be closer to VC management?

Atwell

I think the main reason for a company to be here is not to be close to us but to be closer to people and opportunities. But it's a dual-edge sword. I was meeting with an overseas company looking to locate somewhere in the U.S.; they're from Australia. They have a sales office in Las Vegas, and are contemplating where to put their company. We talked about the Valley and they had two reasons not to come. The first was housing cost, and the second was that they would be afraid that if they moved all their good people here other companies would raid them. So, they were looking for a place like Portland or Las Vegas. Their feeling was that their product and their company are dynamic enough that people will come to them. That is in fact what they've seen at home, but when you're at the top of the charts overseas, it doesn't mean you're at the top of the charts in the U.S.

Housing and transportation are big issues; they fall under cost of living. Particularly for people who are coming here for the first time and have everything they've got sunk into a company. We face it in all industries. The American Dream is owning a house: coming up with 20% down on a medium priced home of $600,000, that's a big chunk of money.

Randolph

What do you think prospects are for venture capital growth outside the U.S.?

Atwell

Most of my competitors are locating people either in the Far East or Europe right now. We've done a few deals offshore. They're a lot harder to do because in some cases - Israel for example - it takes most of the day to get there. But we're going to designate a percentage of the fund to be able to do deals offshore. They will be small, but we have an interest in looking at deals in Europe. When there's a hotbed of companies, we feel that in order for us to see it we probably need to put some people there.

CHALLENGES TO CONTINUED BAY AREA LEADERSHIP

Ruben Barrales

The thing you closed on is important. One of the most important economic issues for Silicon Valley today is the development of a quality workforce. Joint Venture started during the worst recession since the great depression, in the early 90's, and the focus was and continues to be economic development. Economic development was all about jobs, attracting jobs, growing jobs and retaining jobs here in Silicon Valley. A very funny thing happened to us on the way to the new millennium: since 1992, Silicon Valley has seen a net increase of more than 275,000 new jobs. In spite of that, there has been a significant cooling of job growth since 1997. In 1999 for example, the region gained just over 21,000 new jobs. That was a slowdown from 1998 of 36,000 new jobs, which was in itself a slowdown from a 1995-1997 growth spurt. The growth has been largely in the software cluster. The average wage overall in Silicon Valley was up last year by 5.1% to about $53,700 dollars annually. That's 59% above the national average, which is closer to $33,700.

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>
> *-James Atwell*

What we've seen in Silicon Valley during the 90's, and now going into this new century, is the shift from quantitative growth to qualitative growth, in terms of the type of work, and type of employment and wages. The best indicator of this is what we call " the secret sauce of Silicon Valley," which is the value added per employee, our best way to measure productivity. Subtract the companies' cost for materials, inputs, contract services from the revenue earned from its products, and that is what we basically consider the productivity, or value added per employee. Except for bioscience, the value added in the Silicon Valley cluster is higher than the national average. Value added per employee has been on a rise since 1993. It's driven by innovation, process improvements and industry and product mix. We have seen those increase substantially over this last decade and it all allows for higher wages.

I also want to mention the Internet cluster analysis that we did recently. It's an analysis of the Internet industry in eight

different regions of the country. We asked executives of "Internet companies" one question: "Does location matter in the new economy?" The answer is "yes," for some of the reasons cited by the two previous speakers, and I want to share with you the top seven reasons given by Internet companies for their choice of location: 7) educational institutions. Those institutions in the Silicon Valley make a tremendous difference in providing leadership and workers for the new economy; 6) venture capital. Sometimes it is considered much, much higher in terms of location;

> *"One of the most important economic issues for Silicon Valley today is the development of a quality workforce."*
>
> *-Ruben Barrales*

5) Proximity to customers (which was probably the number one reason for location for "old economy" enterprises); 4) infrastructure; 3) proximity of non-core businesses. For example in New York it would be advertising, in Los Angeles it would be media; 2) founders ties to location; 1) talent was the number one reason for location decision for Internet companies. Nationally, that number was about 75% for talent as being the most important factor. For Silicon Valley Internet executives, it's 85%, so it's even more important here than in other places. That's why for Joint Venture economic development is no longer focused on job development, it's about the development of people in Silicon Valley.

Of course we want to measure what that means. Only about 60% of Silicon Valley's high tech workforce is local and one-third of the workforce of Silicon Valley's high tech companies are people recruited from other areas to move into the area at premium costs. You see them every day commuting from outside the region into Silicon Valley; or their positions are left unfilled, which is also very costly. The reasons are: limited supply of qualified candidates (qualified being the key, thought this is becoming less of a problem), and high housing costs and high wages (which makes it harder for smaller companies to compete).

Within the workforce gap, we've identified six of the skill clusters that are in highest demand. They do not all require Ph.D.'s or advanced engineering degrees. Some of these are skilled jobs that people in Silicon Valley can be trained for. People who may be under-employed today could help fill this gap.

We also wanted to focus on our indigenous workforce here, and surveyed local 8th to 11th graders. We asked them some basic questions about their awareness of high tech jobs. We found that students in Silicon Valley are more familiar with a farmer's job than any high tech job in Silicon Valley. When asked which course it would be important to take to be able to have a career in high technology, most students didn't know and only 15% identified math as being possibly important. This leads us to the issue of the "digital divide," which is much more than access to computers and the Internet, but access to opportunity in the new economy.

Carl Guardino

Each year I sit down with as many of our member companies' CEOs as I can and I ask a very simple question: for your company, here in Silicon Valley, what are the key issues that impact your ability to remain healthy and competitive? The number one response is not that taxes are too high, or that government regulations are too stringent, as important as those issues are to some. The number one response is homes affordable to working families. Not just their own employees, but to everyone who makes up the fabric of our Valley. This is followed very closely by transportation, which my CEOs remind me constantly never to de-link. Our housing, transportation, and land use issues are three legs of the same stool. Following those issues, very closely, is K through 12 education, as was mentioned by Dr. Krevans, and the environment in terms of air, water and land.

We're looking at the next quarter century and unless we provide a climate that is not only good for businesses but also good for employees who want to live and work in this community (in industries where they can pretty much live and work anywhere in the world) then we are not going to be sustainable in the long-term.

That's why I'm so excited about the work the Bay Area Economic Forum does and the opportunity to continue to partner with you one these vital issues. Let's look at each of those with a spotlight on Silicon Valley. Transportation: California-wide, as we learned last year, we are facing a funding gap in ten years alone of $118 billion. In the nine-county Bay Area, according to the Metropolitan Transportation Commission, we lose about $3.5 billion a year moving goods, services and ourselves at speeds below the speed posted during commute times. In Santa Clara County alone, the heart of Silicon Valley, we lose on any given workday, as individual commuters, 30,000 hours, stalled below the speed limit. It's an incredible challenge.

At the state level, we believe that allowing as much local control and accountability as possible is key to helping meet our transportation challenge. Here in Santa Clara County, we were the first in California to pass one of those transportation sales taxes for a dedicated use in 1984. We said it would last 10 years and then go away, and we kept our word. It did. We said it would build improvements, and it did. It was a wonderful model. It was followed by 17 other counties out of 58, representing 80% of all Californians, and it raised 20 billion dollars in locally specific projects, all being delivered on time and on budget. A great tool. That was changed with a Supreme Court decision in 1995. A lot of us had to make tough decisions if we still wanted local control, accountability and flexibility, so in 1996 we went back to our voters, and passed a general sales tax but for specific transportation improvements. By political will we passed what is known as Measures A and B and are delivering another $1.4 billion in local improvements. The challenge for the rest of the state is that they haven't been successful. Those who have tried to climb the su-

per-majority mountain since 1995, there have now been seven, have all lost. We were hoping the Governor would be able to embrace this approach [constitutional amendment SBA3], but he felt he could not support it because of his pledge to the voters that he would not support a tax increase. We don't see it as a tax increase. That's an honest disagreement.

The other item I would mention on transportation is a 12-month study we did reaching out to 15 counties in what we call the "super region" of the Bay Area. The nine traditional counties and six neighboring counties: Santa Cruz, San Benito and Monterey and in the Central Valley area, San Joaquin, Stanislaus, and Merced. We did a 15 county needs assessment that focused on the commute corridors leading into and out of the area. Scary stuff. Ten years from now, we'll have a 50% increase in traffic on those 4 corridors, with no increase in funds identified.

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> *-Carl Guardino*

We have the results on our website. It's called Mobility for the new Millennium, at www.svmg.org, and it goes into detail about what we think we need to do to address those challenges in each corridor, how much each improvement will cost, etc. That's what we will continue to drive home with you as our partners. Why are they making those long commute trips? Because of the other issue you asked me to touch on briefly, and that's housing. According to Fannie Mae nearly 8 out of 10 of us, if we were shopping for that first home today, couldn't even afford a resale home let alone a new home. So a lot of these young folks who come to us to rent; they can't afford to buy. If you're shopping for a 2 bedroom, 1 bathroom apartment in Silicon Valley today, on average, you're going to pay more than $1,750.00 a month and we have less than a 3% vacancy rate. So there is not only a lack of affordability, there's no availability. The supply is greatly outstripped by the demand.

In terms of solutions, at the state level we'll work with the Governor. At the local level, we spent two years with the Greenbelt Alliance and our friends at the Association of Bay Area Governments, putting together a document called Creating Quality Neighborhoods. It's an inventory of every vacant and redevelopable parcel in all 21 Silicon Valley cities in a 3 county area. It was a huge document. Now it's time for sales and marketing. We have started going out to cities to encourage them to strategically consider rezoning from commercial and industrial to residential, so that they can provide homes for the workers that we are recruiting, or more often, as Ruben said, who grew up here and find that they can't afford to live in the same community in which they were raised. So the inventory of our vacant land is part of the solution.

A second creative approach is that we have established with our community partners Silicon Valley's first housing trust fund. This is a pretty ambitious goal. We want to raise in a 24-month cycle $20 million dollars. $20 million sounds like one house in Los Altos Hills, but there is good news. $20 million, leveraged with the private development and state and federal funds it attracts, is about $200 million in home opportunity, and with the $200 million initially invested in 5,000 families, because most of the funds are given out in the form of loans rather than grants. We help 5,000, they pay it back, and we help thousands more with just the $20 million initial capital.

That is for three critical needs categories: 1) first-time home buyers, 2) affordable rental homes, 3) and the most needy amongst us, including homeless shelters and subsistence. Now why does a high tech group think about homeless shelters and subsistence? Unless we care about the people who wait on us in restaurants and theaters and gas stations, as well as teachers and fire fighters and peace officers, we're not going to succeed. We have to care about everyone who lives and works here or who wants to.

Another issue is construction defects litigation. If you're not familiar with this, in California today nearly 4 out of every 5 condos, townhouses, and planned unit developments are either sued or threatened with lawsuits. It's got to the point where they're not being built in California because insurers won't insure, developers won't develop and sub-contractors won't build an attached product. In this expensive market, however, this is the only way you're going to get into an entry level home, or any home ever, in a for sale capacity. My feeling is that there are three things to do: 1) improve the building codes for condos and attached units; 2) have third party inspection; and 3) do some kind of insurance pool (everybody putting money into something like self-insuring).

DISCUSSION

Miller

Something has come home to me a number of times as I work in other regions. I have a wonderful example of a failure, a great plan that failed in the implementation. This is what was called MFP in Adelaide, Australia; it had a terrible name, Multi-Function Pullets. Their whole plan was based on environmentally sound urban living combined with knowledge and research. What better could you want? But it was a failure because the community dynamics weren't there. The community wasn't involved. It was a somewhat elite group of people who were trying to do all this planning. All these great ideas became a political football with the state government of South Australia. The universities came into it very late, and there wasn't a process. One of the great things about Joint Venture and others like the Manufacturing Group is that they've adopted processes

and are very inclusive, and directed toward implementing ideas. That's very important, and it's something that goes on here that doesn't go on in many other regions.

Lenny Mendonca

We can maintain our position as the center of the new global economy. The challenge is that, as Dr. Krevans said, without a much more activist view of how we maintain that lead, there are several other places around the world that would like to assert that position. I think an interesting question for how we do that is how can we channel all of the knowledge, talent, capital, etc. coming into this region, and generate the next generation of leadership in promoting the development and advancement of the economy.

It would be extremely interesting to see if there are other opportunities to use that capital and the talent and knowledge that is here, to work on some of the constraints that all the speakers spoke of, to enable the continued growth of productivity in this area. These are not new economy constraints. They're old economy constraints. It's transportation, it's housing, it's education. The venture capital industry has had a terrific track record of figuring out where there are new economic opportunities, making a big difference and being rewarded from it. I'm intrigued about whether there may be entrepreneurial private sector opportunities to deploy some of that money in ways which will produce good returns on capital and advance the economy as a whole. So my question for the group is "Are you seeing any of that occurring? Are there entrepreneurial new ideas that are not of the vein that Dr. Miller described that never work (which is government deciding what they are and managing the project), but with government as a limited partner, in the venture capital analogy, promoting innovation and new ideas to solve some of the challenges?"

Miller

At the two hundredth anniversary of the United States, the Economist magazine asked Malcolm Loveridge to spend a year in the United States and at the end of that year write up a summary. His basic thesis was to compare the United States at its two hundredth birthday to what England was like in the latter part of the nineteenth century, and then he asked, "Why did England fail?" And he said they failed because they made success vulgar. So adding to Lenny's question, I would ask my colleagues, how do we keep from making success vulgar? How do we keep the powerful anti-growth people in the world from succeeding? You asked whether there was a movement or any kind of increase in numbers of the venture capitalists and entrepreneurs that contribute in this community, and the report that Ruben has in his hand shows that charitable giving has increased in the Valley year by year. So we do see this increase. There has been a burst of activity on their part because they've got a lot of money, a lot of stock. Joint Venture names every year a David Packard Civic Entrepreneurs Award to people who make civic contributions. Our way is to recognize those people, encourage them and they'll continue to do more.

> *"According to Fannie Mae nearly 8 out of 10 of us, if we were shopping for that first home today, couldn't even afford a resale home let alone a new home."*
>
> *-Carl Guardino*

Barrales

John Chambers points to education as the way. We identified, as the most important issue in the Valley, workforce development and talent. You're going to see models like the Cisco Academies and Oracle type academies using the new technologies to train a larger number of people to be qualified to work in these companies. I'll tell you the constraint that we have when we identify those skill clusters that are in highest demand in Silicon Valley today. We had a meeting recently with the leaders in IT companies in Silicon Valley, along with the four chancellors of the community college districts, and the IT folks said "we need UNIX and C+ programmers; we can't get enough." The four chancellors said, "we have had hundreds of people signed up for UNIX and C+ courses and we canceled those courses because we can't find instructors." The model of 40 students to 1 instructor in different community colleges doesn't work any more given the demand, but something like a Cisco Academy where you can teach virtually may be another way.

Krevans

I'm very worried about part of the answer to the question that Lenny first posed. It's wonderful to encourage philanthropy, but what we have to do is find a way to support the continuing creation of jobs and then the continuing creation of the right people, and ensure that they can continue to live here and get those jobs. Silicon Valley has created a lot of jobs, but you can't build housing with the current opposition to growth, and somewhere I think we have to take on the central issue: that if we become stagnant we are not going to stay where we are; we're going to go down and someone else who is willing to grow in an orderly sustainable fashion is going to take our place as the economic leader. Now maybe that's what we want. They stopped building railroads in England in the last half of the 19th century because it scared the hounds and the foxes.

Mendonca

One thing I see lacking in this discussion and other discussions is that we don't seem to be looking at technology as a solution to the problems that technology has caused. We talked about housing and transportation as the major problems, for the region, yet my premise is that with the advancement of broadband teleconferencing, and changes in the way people work, those might over the next 10 or 20 years very well be the solutions to our problems, where the employee of Cisco and other high tech companies can live in the Central Valley and telecommute, and get ev-

erything they need on-line and maybe come into the 'mother ship area' of the Bay Area once a week or so. I'd like to hear from the group if they see this happening. I think there's no way we're ever going to provide the housing with the limitations we have here. We're never going to be able to buy or build enough freeways and transportation and maybe technology is going to be a big part of the solution of the problem.

> *"These are not new economy constraints. They're old economy constraints. It's transportation, it's housing, it's education."*
>
> *-Lenny Mendonca*

Barrales
It's happening.

Sunne McPeak
Well, I think Lenny raises a great question and I'll just respond by saying that we think you need to do all of it, and accelerate the deployment of advanced telecommunications and information technology and have that infused into the thinking about mobility. That's not part of the state's discussion right now. As an example, regarding the Governor's Commission on Building for the 21st Century, we spent at the Bay Area Council about 90 days at the end of 1999 formulating a policy position to get to that commission; they too are looking for some traction but have transportation and technology separated. Jim Callaway was sitting on that commission and we were trying to recommend that in terms of transportation it's not just the hardware, the highways or public transit, but an outcome where telecommunications and information technology make the real difference.

Miller
Just a comment on this point. As Ruben said there are a lot of efforts to help diffuse the workforce. There's an interesting report from the Milken Institute on the conglomeration of high tech communities in the United States. What they showed is that there is a disconglomeration in manufacturing and services, so there will be a practical solution using communications in lieu of transportation. But it's still the case that the highest value added work is done face-to-face- the deal making, the design and the creative aspects- and we're agglomerating in that regard. More and more of what we do is high value; that's the reason for the value added per employee going up. If the Bay Area is to succeed as a continued agglomeration of this talent, there will be a lot more that occurs face to face, because that's where the talent is.

But to be able to capture the value from that talent, we have to have the legal and regulatory framework that will allow us to extend that outside the local area in things like the protection of intellectual property, the continued openness of trade, the ability of talent to come here, as opposed to shutting off the borders and closing down visa limits. I think those are as or more important to the continued development of the Bay Area than a lot of other things.

Krevans
Let me take that question because the California Council on Science and Technology, which was established in 1988 by the teaching and research universities in the state, has been working hard to try to understand issues of California workforce: do we educate our own, are we importing a high quality talented workforce, and what does it mean for the state as a whole and its technology based economy. Recently the Council created a report called, California Report on the Environment, and it's meant to be the science and technology indicator for the State of California and be published on an every other year basis. What was discovered, and it's really quite extraordinary, is that California does not educate the number of citizens it needs to sustain its economy, and falls short by about half a million a year. That's a huge deficit, and the only way we can sustain the economy that we're enjoying now is to import our educated citizens. That might have worked in the past, but my best guess is that it won't work too much longer. We're a great place to come to, but given all of the other constraints in regions like this Valley, there are other places in the world you can now go to and produce your economic miracle. We need to invest broadly in California, so we have a sustained economic region as opposed to one where we borrow heavily from outside the region to sustain our growth.

Cynthia Murray
One of the old economic constraints is our government and the way it is structured. So, if we are moving to a new economy, don't we need a new form of government that supports what we need as a society? My fear as a governmental representative trying to introduce change and seeing what's happening in business, is that political gridlock is so impervious to change and it's so hard to get government to respond in the time in which people need it to respond, that I think we're going to become superfluous.

Abraham Lowenthal
To what extent does the success of the Bay Area depend on two factors that haven't been mentioned directly: first, the strategic and the political capacity to secure at the regional, state, national and the international level favorable policies and second, the capacity to understand rapidly changing international realities that may impinge on the economic sectors that are important here? How strong is the infrastructure for focusing and developing those capacities of a more political nature?

Barrales
In many ways, the industry is just getting off the ground in terms of having an influence in those areas. We talk about government adapting to the new economy. In some ways the new economy leaders need to adapt to the old way of getting things done in Washington, and I think we're starting to do that in terms of political contributions or involvement at that level. Until recently the high-tech industry was

a minor player at the federal level, so I think there is more that needs to happen. For example, we're focusing our attention on an indigenous workforce: to train people here to take these jobs. In terms of government policy, I can't imagine a policy that would say somehow that we want to limit smart people coming to this country. It just doesn't make sense.

> *"If we become stagnant we are not going to stay where we are, we're going to go down and someone else who is willing to grow in an orderly sustainable fashion, is going to take our place as the economic leader."*
> *-Dr. Julius Krevans*

Randolph

That's in part why the Economic Forum continues to work on international trade issue and supports the Bay Area Science Infrastructure Consortium (BASIC), to give a regional focus to those larger public policy issues. I wanted to ask Dr. Byer one more question. You were talking about the education infrastructure of the Valley being especially important at the community college and San Jose State level. It sounds like there is a bifurcation of human capital needs. You've got programmers, and then you've got engineers and senior managers. There are terrific stories about the companies created by Stanford graduates. How do you see that dynamic working? I also know there is an issue with Stanford about the cost and availability of housing and how that affects your ability at the university to attract the best faculty and the people who eventually start these companies.

Byer

The problem that Stanford faces is the same one companies face in the Valley in trying to attract someone from outside this region. To attract a faculty member at Stanford or even an assistant professor is now next to impossible. For the first time in 30 years there is no available housing for sale by Stanford faculty members to others coming on campus. This has never happened before. When faculty members look around the region they find that the housing cost is so high that they can't afford to move into the area. So Stanford is being impacted by the things that were mentioned here. I mentioned the other educational institutions because they really are an important substrata on which the higher education universities are constructed.

Question

If we look at the definition of Silicon Valley about 10 years ago, it would have been Santa Clara County, around Palo Alto and so on. Recently when I look at reports from different groups, they have this kind of amorphous map that is pushing up to San Mateo, pushing to Southern Alameda and shortly will be pushing out to eastern Alameda. What will the physical limit of Silicon Valley be in 5 or 10 years? With Cisco moving to South San Jose and so forth, will we see a map of Silicon Valley 10 years from now pushing into Scotts Valley, which it already is, or San Benito, Merced, and San Joaquin.

Miller

Yes, I think you're right. It's inevitable. When Joint Venture first defined a kind of geography of Silicon Valley, it was based on industry clusters. And the original definition of the Valley would be all of Santa Clara County, San Mateo County to Highway 92 and then the Tri-City area of Southern Alameda County. If we were to do another analysis today and base it on industry clusters, and remember this was done in the early '90's before the Internet, you'd have to look at phenomenal growth up and down the Bay: Multimedia Gulch, Marin, the Pleasanton area and out further. So if we were to do a new analysis with the same criteria Silicon Valley has clearly expanded. Like the physical development of the Bay Area, the high technology industry is spreading out.

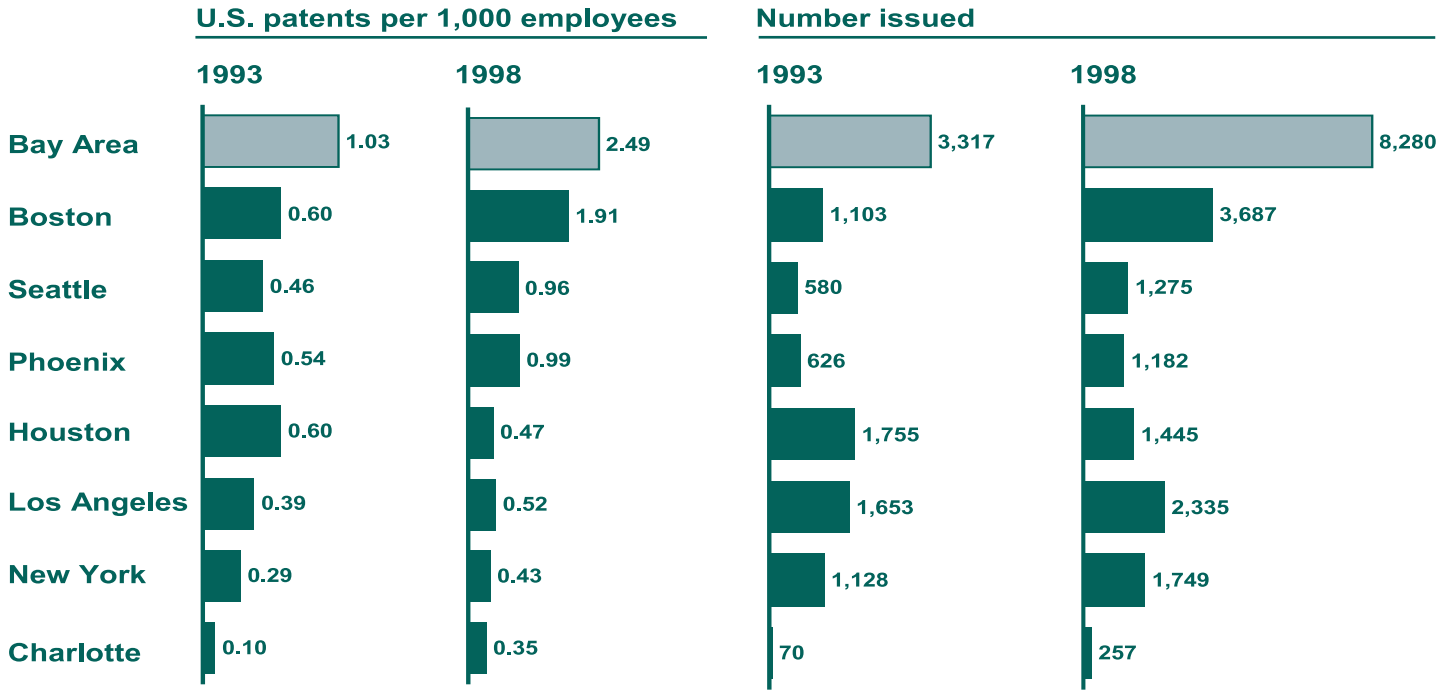
Murray

Companies don't want to go where there's not a concentration of workers, because the workers themselves say they want to have the flexibility to move around to different companies, and why should they come to Marin County where there's only a few companies. So that is another thing to look at. Workers pretty much drive where the companies want to locate.

Miller

I want to go back to something that Julie raised about whether somebody else will take over leadership. There is a lot of entrepreneurship around the world. These other technology centers are terrific and we need to interact with them. I would also comment is that they are not any better at solving these problems than we are. Actually their community dynamics are not nearly as good as the community dynamics here. I spend a lot of time with people in Austin Texas; they can't get their act together on these issues and here in this room we have people from Marin and from all over. So we have a much better shot at solving some of these problems than most other communities.

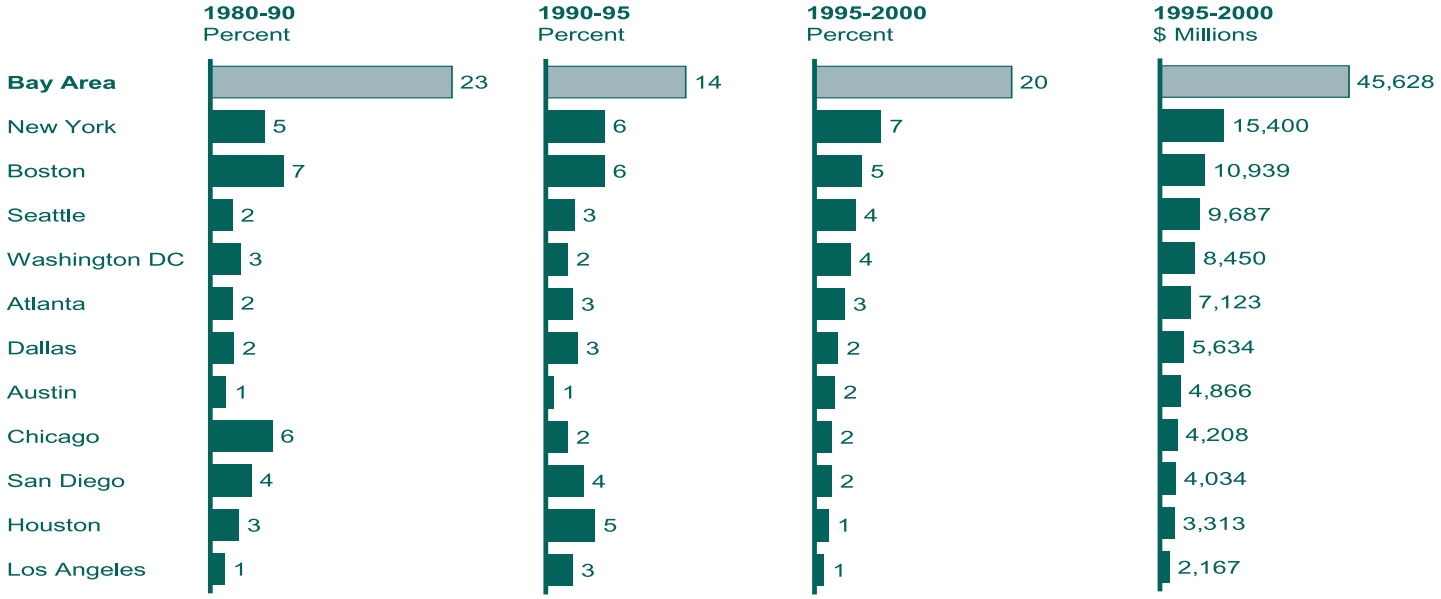
PATENTS ISSUED IN THE BAY AREA



Geographic distribution is based on the 1st-named inventor Source: U.S. Patent and Trademark Office; McKinsey analysis

BAY AREA'S LEAD IN VENTURE CAPITAL

Percent; $Millions



Source: Venture Economics; McKinsey analysis

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A Partnership of the Association of Bay Area Governments and the Bay Area Council

The Bay Area Economic Forum, a partnership of business, government, academic, and community leaders sponsored by the Bay Area Council and Association of Bay Area Governments, develops and implements programs to strengthen the region's competitive economy and quality of life.

Published by:
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