



STANFORD PROJECT ON REGIONS OF  
INNOVATION AND ENTREPRENEURSHIP  
THE WALTER H. SHORENSTEIN ASIA-PACIFIC RESEARCH CENTER

**“Developing Clusters for Innovation, Growth, and Value”  
infoDev Global Forum on Innovation and Entrepreneurship  
Florianopolis, Brazil  
October 29, 2009**

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# The Stanford Program

**The Stanford Program on Regions of Innovation and Entrepreneurship (SPRIE) has studied regions and clusters world wide with heaviest concentration in Asia and the US.**

**The comments that follow are largely based on these studies**



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**THE**  
A HABITAT FOR  
**SILICON**  
INNOVATION AND  
**VALLEY**  
ENTREPRENEURSHIP  
**EDGE**

EDITED BY  
CHONG-MOON LEE  
WILLIAM F. MILLER  
MARGUERITE GONG HANCOCK  
HENRY S. ROWEN

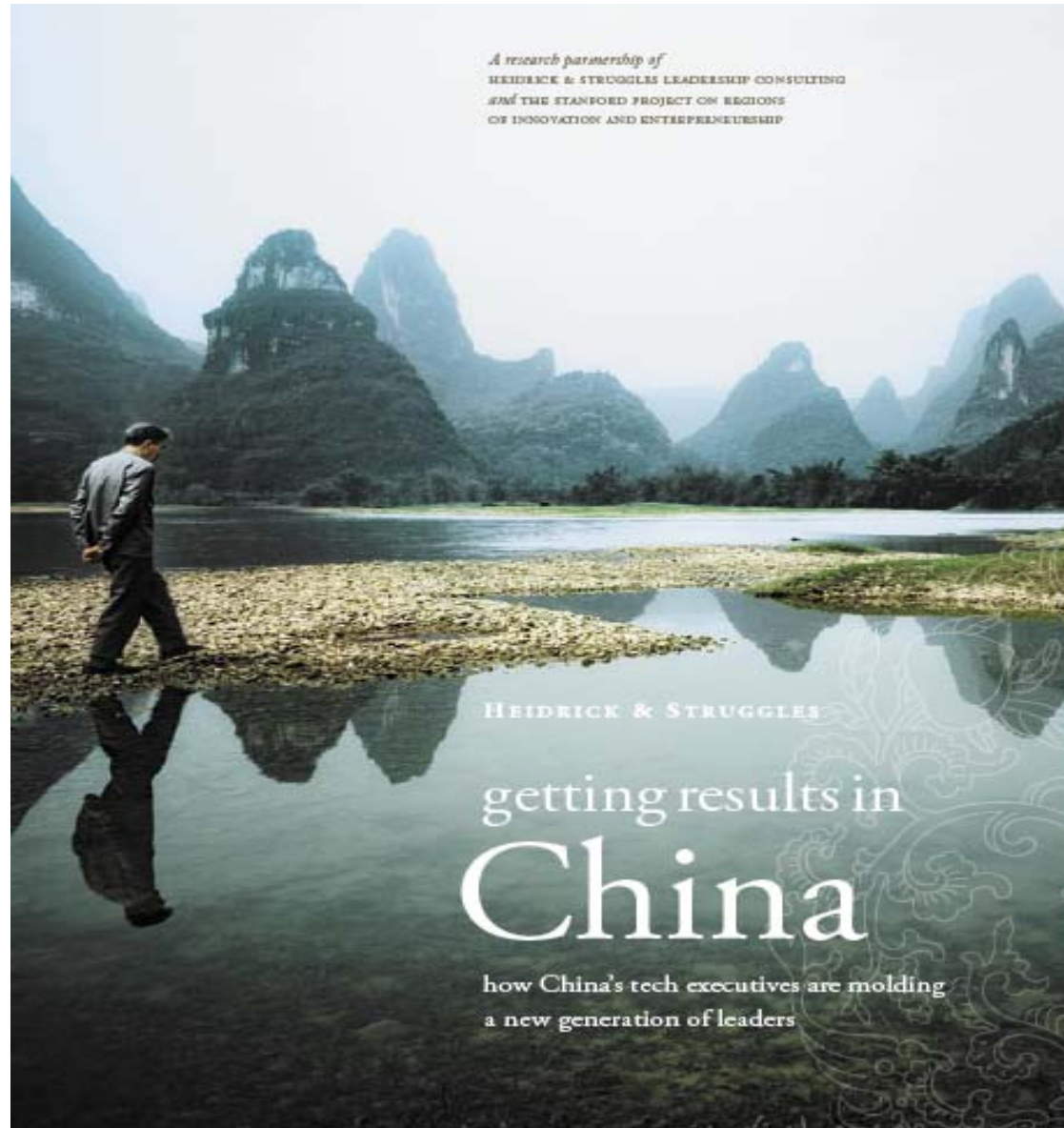
**Making**  
**IT**

THE RISE OF ASIA IN HIGH TECH

EDITED BY  
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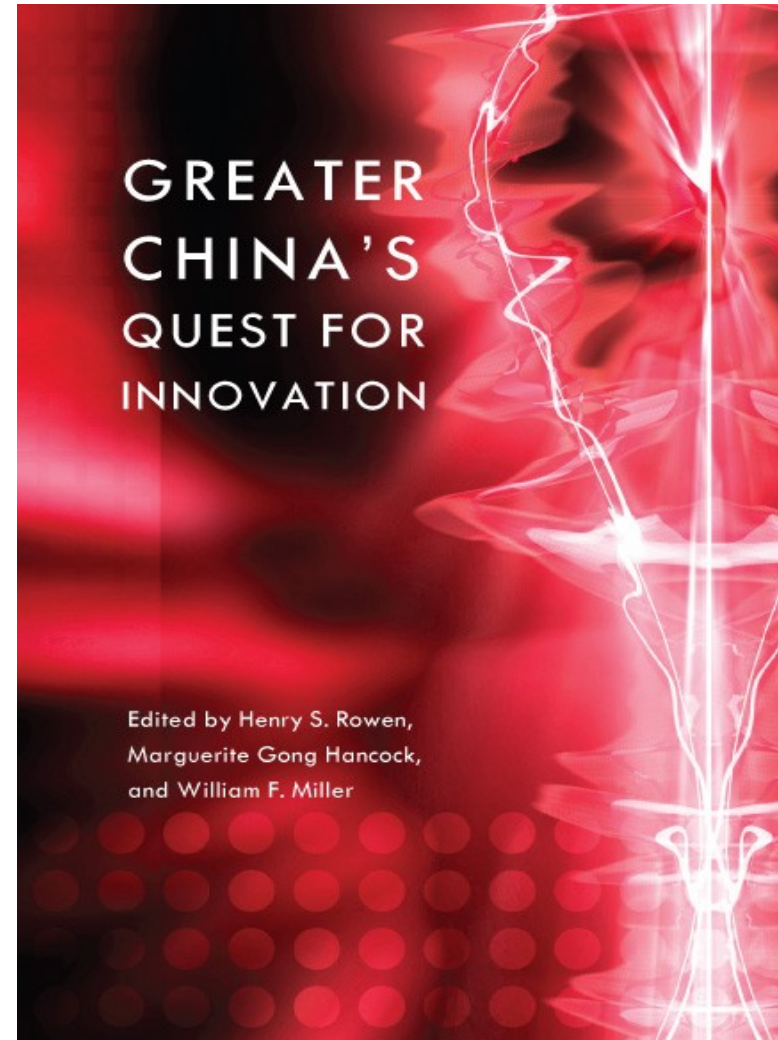
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**Coming Soon**



UNIVERSITY-INDUSTRY TIES  
IN THE U.S., TAIWAN, AND CHINA

Edited by Marguerite Gong Hancock,  
Henry S. Rowen, and William F. Miller



GREATER  
CHINA'S  
QUEST FOR  
INNOVATION

Edited by Henry S. Rowen,  
Marguerite Gong Hancock,  
and William F. Miller



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# **Business Environment**

## **Steps toward high tech development for growth and value**

- 1. The high tech economy is the growth part and the high value part of the global economy.**
  
- 2. To participate effectively in the growth and value part of the high tech economy a region must have the following:**
  - a. The fundamental resources for a high tech economy  
i.e. Research and research trained scientists and engineers that create the innovations**
  - b. Entrepreneurs who turn these innovations into business**
  - c. A “habitat”, i.e. a business, social, and political environment that facilitates entrepreneurship and breeds entrepreneurs**



## **14 Features of a High Growth, High Value High Tech Entrepreneurial Habitat**

- **Knowledge Intensity**
- **Universities and research institutes that interact effectively with industry**
- **Favorable government policies**
- **Results-oriented meritocracy**
- **Flexible and Mobile work force(dense social networks)**
- **Climate that rewards risk-taking and tolerates failure**
- **Knowledgeable Venture Capital**
- **Open business environment**
- **Collaboration: business, government, and non-profits-local networks**
- **Specialized business service infrastructure: lawyers, accountants, etc.**
- **High quality of life**
- **Global Linkages**
- **Power of Multi –clusters**
- **Leadership to transform**



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# **Silicon Valley as a Case**

**Silicon Valley is an interesting case because it developed organically.**

**Other regions(clusters) have developed through planning and/or government actions**



# Evolution of Silicon Valley

**Silicon Valley has gone through several phases of development. Each time the region had to adjust and change. We might roughly breakout these phases as follows**

**1890-1940 Radio vacuum tube and food machinery**

**eg. Federal Telegraph Corporation, Food Machinery Company**

**1940-1960 Vacuum tube applications to instruments and defense**

**eg. Hewlett Packard, Varian Associates**

**1960- 1980 Semiconductors**

**eg. Fairchild, Intel, National Semiconductor, AMD**

**1980-1990 PCs and Workstations**

**eg. Apple, Sun Microsystems, Silicon Graphics**

**1990- 2000 Network Computing**

**eg. 3Com, Cisco , Netscape, Yagoo!, eBay, Google**

**2000- Mobile Computing, Biotech, Nanotech**

**eg. Salesforce .com, Nanosysis, Nanostellar**

**2004- CleanTech**



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# **Silicon Valley as Habitat for Innovation and Entrepreneurship**

**The Valley is a gathering place for researchers, entrepreneurs, venture capitalists, and highly skilled workers who turn new ideas into the innovative products and services that fuel the economy of the region. **Silicon Valley turns technology into business.****

**Silicon Valley has multiple ecosystems interacting within a favorable habitat. This “habitat” and the multiple ecosystems it supports allows the region to adapt to waves of innovation and adjust to economic cycles.**



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# Recent developments in Silicon Valley

**Silicon Valley is in Transformation Again**



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# San Jose Mercury News

mercurynews.com PENINSULA 101

Wednesday, August 14, 2008

THE NEWSPAPER OF SILICON VALLEY 75 cents

## Valley reinvents itself – again

Tech transformed itself after bust, study finds, creating new jobs, but at the expense of middle-wage workers

By Pete Carey and Patrick May  
*Mercury News*

Santa Clara County shook off the ashes of the dot-com bust and retained its stature as one of the globe's high-tech capitals, spurred by the growth of new giants like Yahoo and Google, according to a new

federal study released Wednesday.

Though total employment is on fire. And by one measure, the valley's work force continued to be more dominated by technology than any other place in the country.

While the study covered the

period from 2001-08, and did not take into account the job losses of the past several months, it found grounds for optimism about the valley's future despite the recession. The study found the region "underwent a transformation" after the dot-com bust, shedding jobs in old-line industries while creating new, high-wage positions in brand-new fields, a trend that other economists say is likely to continue once the na-

tion's economy begins to rebound.

"The creativity in Silicon Valley has never been stronger," agreed Carl Guardino, president and CEO of the Silicon Valley Leadership Group. "Whether that's clean and green tech or numerous other technology clusters, the innovation sector is strong."

But the rebound came with a price. While average tech wages throughout the region have shot up

36 percent, that's partly due to the loss of middle-wage jobs.

Ron LaPedis, a 53-year-old consultant in San Bruno who has held a series of high-paying tech jobs, said he's not surprised.

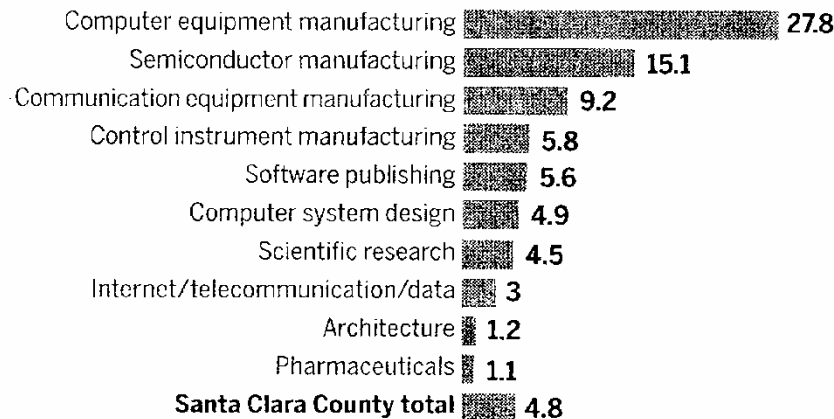
"The innovation is done here by a few highly paid people, while all the work to keep it going is overseas," LaPedis said.



## Silicon Valley tech industries still dominate

### Santa Clara County industries, 2008

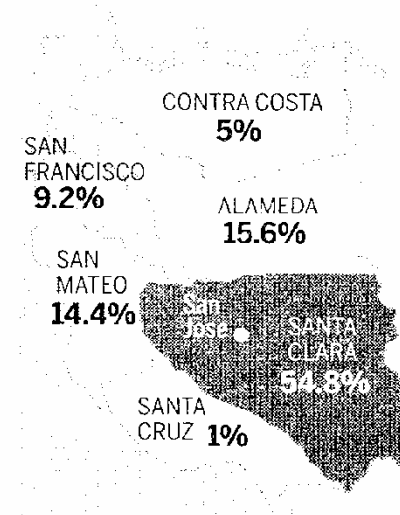
One measure of the dominance of an industry in a geographic area is the "location quotient" – a ratio comparing the proportion of the local work force employed in an industry with the proportion of the national work force employed in the same industry. For example, the proportion of employment in computer equipment manufacturing in Santa Clara County is about 28 times the national average.



Source: U.S. Bureau of Labor Statistics

### High-tech jobs distribution

By county, 2008



MERCURY NEWS

Among the findings of the study, conducted by the U.S. Labor Department's Bureau of Labor Statistics of a six-county Bay Area region defined as Silicon Valley's "high tech corridor":

- High-tech jobs are five times more densely concentrated in Santa Clara County

than in the nation as whole. The six-county Silicon Valley corridor is about three times more concentrated.

- The growth of a biotech cluster in San Mateo and San Francisco counties and the Web portal and Web search industries in Santa Clara County helped counter down-

ward employment trends.

- High-tech employment fell 17 percent, or 85,000 jobs — 65,000 of them in Santa Clara County. During the same period the national work force grew by 4 percent.

- High-tech wages grew 42 percent in Santa Clara County, from \$96,650 to \$137,330.

- The valley remained an innovation leader with 11 of the top 20 U.S. cities in new patents.



# Changes in Silicon Valley Since 2000

## Changes in the IT Industry

**Consolidation in the mature parts of IT**

**New application areas**

**New geographical markets**

**New patterns of collaboration: Global Linkages to India, Mainland China,  
Taiwan, Israel**

**New investment patterns**

## Changes in employment patterns

## The rise of new industry clusters

**Biotech**

**Clean tech**

## Changes in focus of venture capital investment

**Technology areas**

**Geographical**

## Changes in university research



# Consolidations

**HP – Compaq 2002**

**Oracle**

**Seible Systems 2003**

**PeopleSoft 2004**

**BEA Systems 2008**

**IBM – Rational 2004**

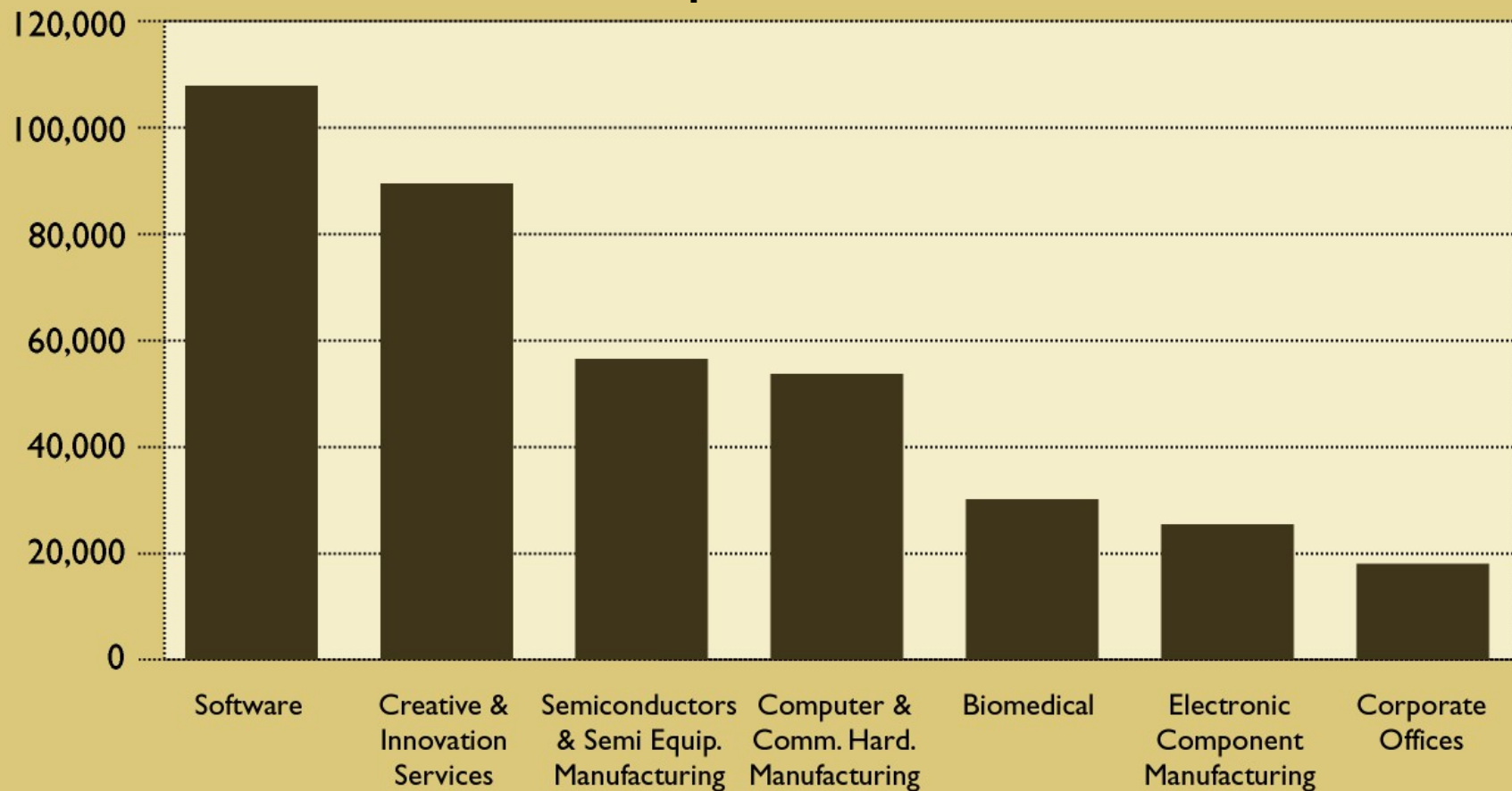
**Google – YouTube 2006**

**Microsoft attempt at Yahoo 2008(not over yet)**

# ECONOMY

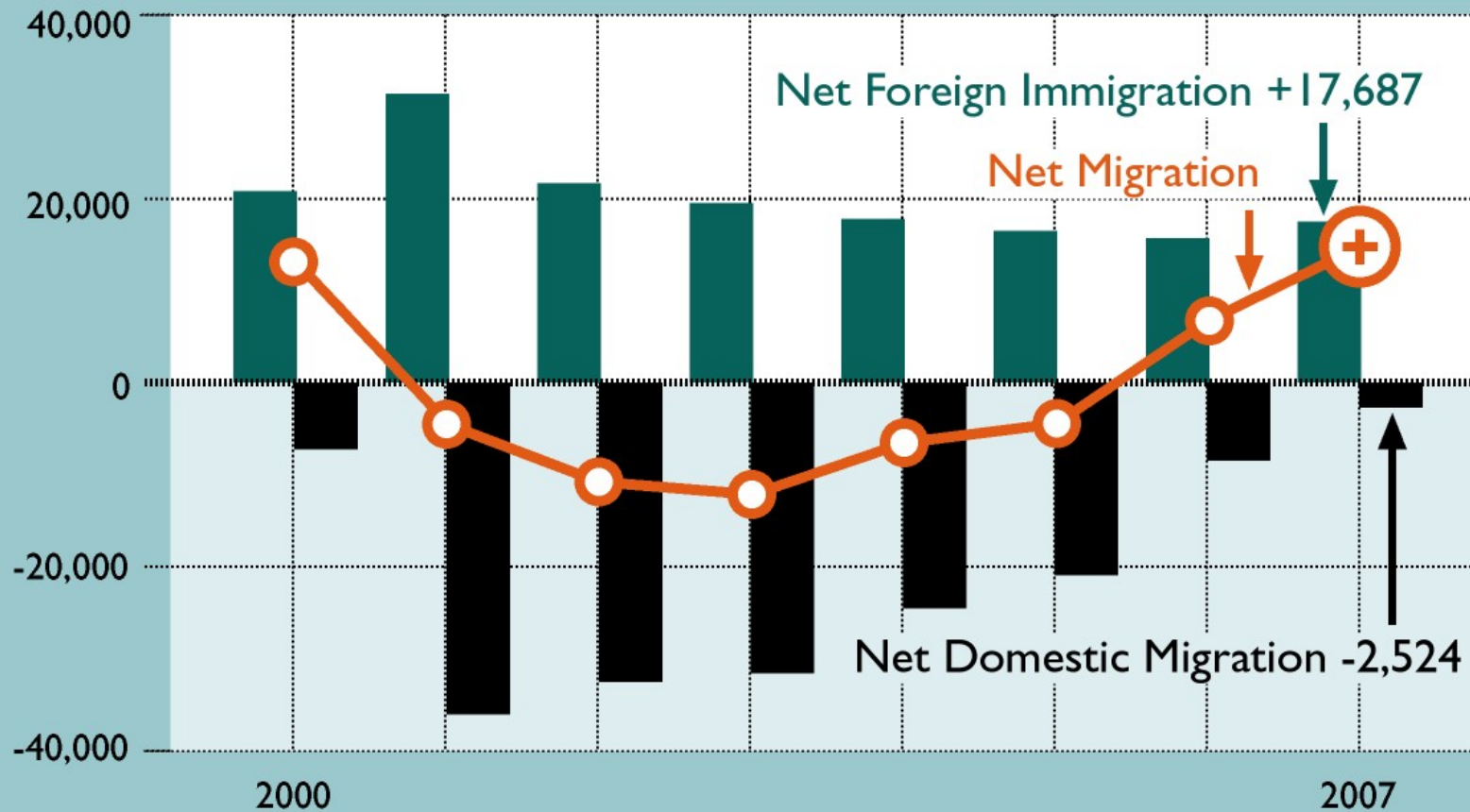
## Industry Cluster Employment

Fourth quarter 2006



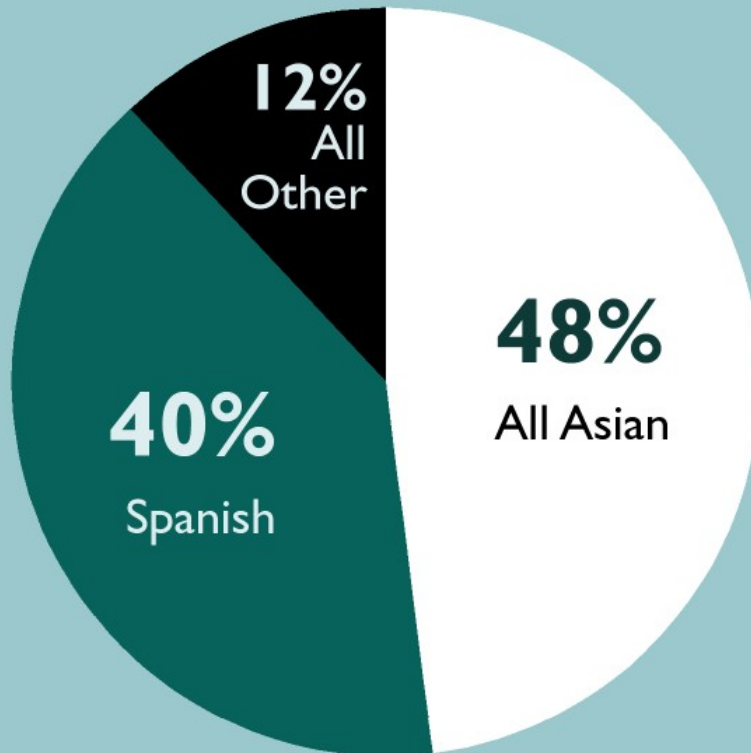
# PEOPLE

## Net Migration Flows Santa Clara & San Mateo Counties



# PEOPLE

## Language Spoken at Home, other than English Santa Clara & San Mateo Counties



Speaks Language  
Other than English

Silicon Valley **48%**

California **43%**

United States **20%**



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## **New Industries – Biotech and Nanotech**

**Bay Area has the largest cluster of biotech companies in the world**

**Number two in size of cluster is Boston**

**Number three in size of cluster is San Diego**

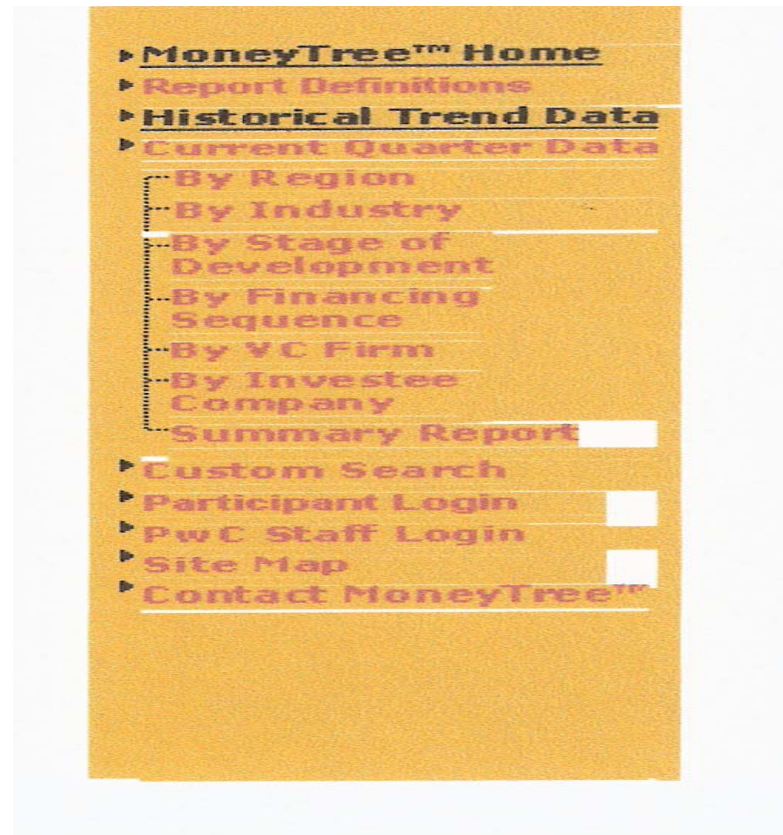
**Bay Area now has the largest collection of nanotech companies in the US. The Bay Area has 4% of the US population and 10% of the nanotech companies.**



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# Pricewaterhousecoopers Money Tree

[www.pwcmoneytree.com](http://www.pwcmoneytree.com)





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Historical Trend Data

Parameters Defined  
 All

Graph shows:

Year-Qtr	Amount	% of Total	Deals
Q1 1995	\$1652M	0.39%	497
Q2 1995	\$2481M	0.59%	453
Q3 1995	\$1633M	0.39%	421
Q4 1995	\$1862M	0.44%	468
Q1 1996	\$2301M	0.54%	573
Q2 1996	\$3041M	0.72%	656
Q3 1996	\$2410M	0.57%	585
Q4 1996	\$3087M	0.73%	758
Q1 1997	\$2951M	0.70%	760
Q2 1997	\$3550M	0.84%	760
Q3 1997	\$3593M	0.85%	740
Q4 1997	\$4270M	1.01%	895
Q1 1998	\$3924M	0.93%	851
Q2 1998	\$5329M	1.26%	899
Q3 1998	\$5072M	1.20%	911
Q4 1998	\$5847M	1.38%	991
Q1 1999	\$6142M	1.45%	909
Q2 1999	\$10681M	2.52%	1305
Q3 1999	\$12680M	2.99%	1418
Q4 1999	\$22512M	5.31%	1863
Q1 2000	\$27636M	6.52%	2128
Q2 2000	\$27187M	6.42%	2103
Q3 2000	\$25556M	6.03%	1920
Q4 2000	\$21389M	5.05%	1743
Q1 2001	\$12487M	2.95%	1282
Q2 2001	\$10918M	2.58%	1214
Q3 2001	\$8131M	1.92%	1005
Q4 2001	\$7773M	1.83%	982
Q1 2002	\$6597M	1.56%	841
Q2 2002	\$5864M	1.38%	850
Q3 2002	\$4403M	1.04%	692
Q4 2002	\$4385M	1.04%	722
Q1 2003	\$4211M	0.99%	704
Q2 2003	\$4837M	1.14%	742
Q3 2003	\$4737M	1.12%	719
Q4 2003	\$5493M	1.30%	787
Q1 2004	\$5212M	1.23%	716
Q2 2004	\$6121M	1.45%	852
Q3 2004	\$4939M	1.17%	694
Q4 2004	\$5846M	1.38%	842
Q1 2005	\$5036M	1.19%	732
Q2 2005	\$6293M	1.49%	829
Q3 2005	\$5841M	1.38%	791
Q4 2005	\$5753M	1.36%	815
Q1 2006	\$6343M	1.50%	880
Q2 2006	\$7077M	1.67%	962
Q3 2006	\$6580M	1.55%	911
Q4 2006	\$6334M	1.50%	952
Q1 2007	\$7450M	1.76%	867
Q2 2007	\$7377M	1.74%	1051
Q3 2007	\$7791M	1.84%	1002
Q4 2007	\$8022M	1.89%	1064



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Q1 2008	\$7654M	1.81%	1006
Q2 2008	\$7559M	1.78%	1059
Q3 2008	\$7190M	1.70%	980
Q4 2008	\$5674M	1.34%	884
Q1 2009	\$3191M	0.75%	603
Q2 2009	\$3674M	0.87%	612



Data provided by Thomson Reuters

### Investments by Industry / Q2 2009

Industries Defined	Total \$ Invested	Average \$ Per Deal	Deals
All	\$3,674,427,000	\$6,003,966	612

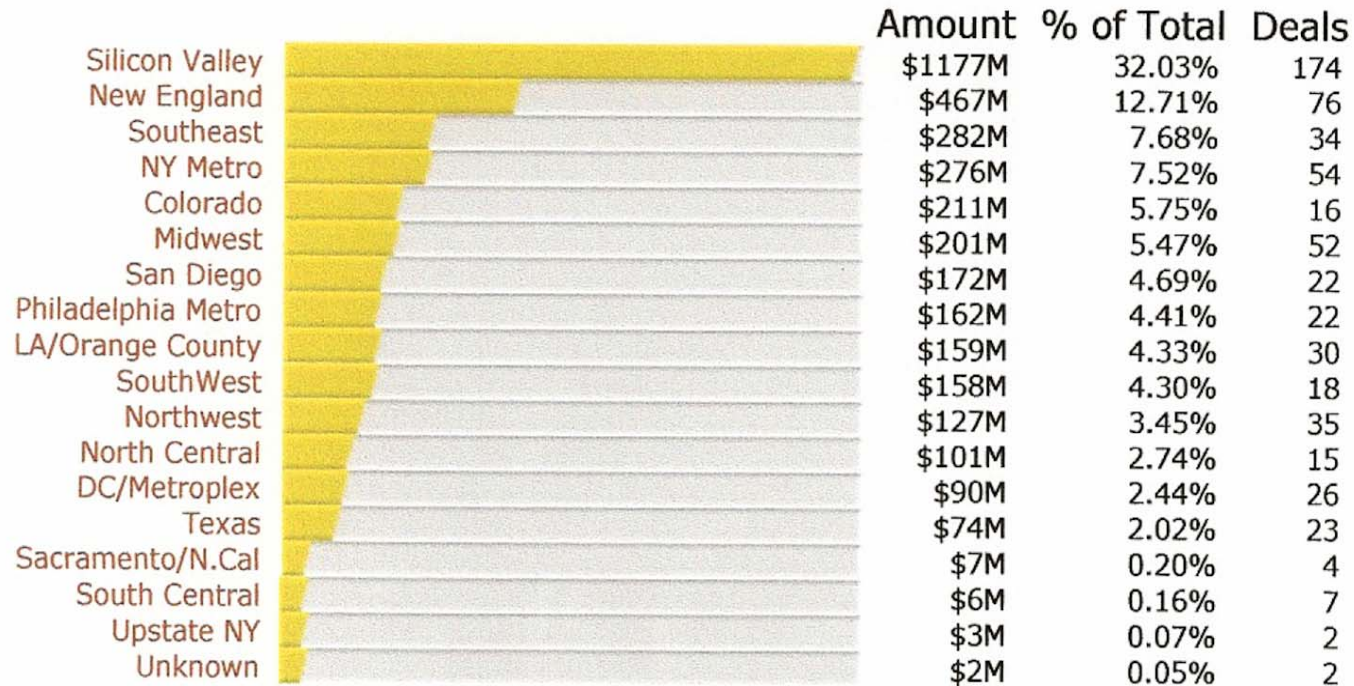
	Amount	% of Total	Deals
Biotechnology	\$888M	24.17%	85
Software	\$644M	17.53%	135
Medical Devices and Equipment	\$628M	17.10%	75
IT Services	\$295M	8.03%	44
Industrial/Energy	\$287M	7.80%	53
Networking and Equipment	\$180M	4.91%	27
Semiconductors	\$170M	4.63%	27
Computers and Peripherals	\$132M	3.58%	15
Media and Entertainment	\$116M	3.15%	52
Telecommunications	\$95M	2.58%	26
Electronics/Instrumentation	\$85M	2.30%	14
Business Products and Services	\$50M	1.35%	15
Consumer Products and Services	\$44M	1.18%	15
Healthcare Services	\$23M	0.62%	7
Retailing/Distribution	\$18M	0.48%	5
Financial Services	\$16M	0.43%	11
Other	\$6M	0.15%	6



# Silicon Valley Leads the Way

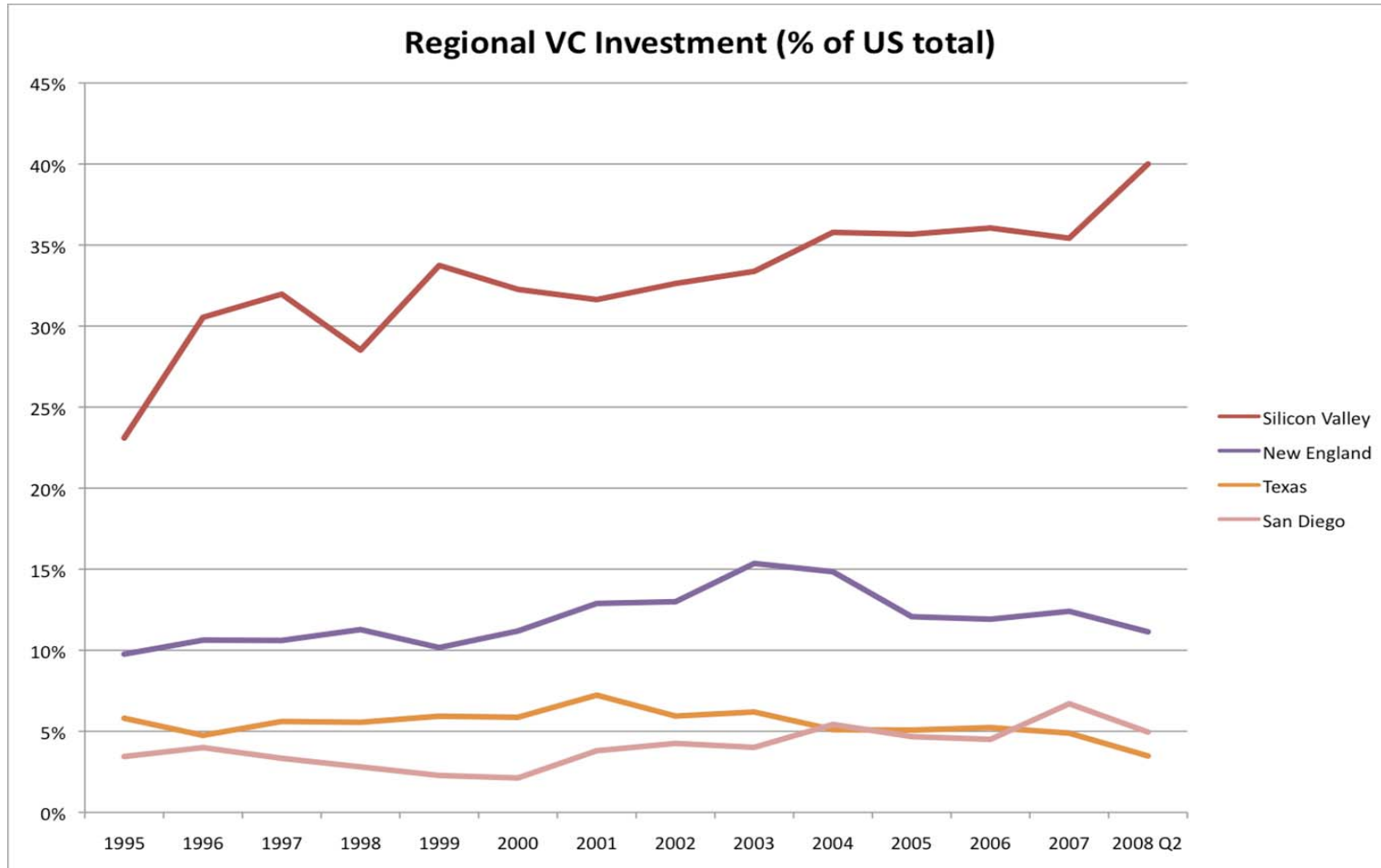
## Investments by Region / Q2 2009

Regions Defined	Total \$ Invested	Average \$ Per Deal	Deals
All	\$3,674,427,000	\$6,003,966	612





# VC Investment: Regional Comparison





# Bio and Medical Equal Software

## Investments by Region / Q2 2009

Regions Defined	Total \$ Invested	Average \$ Per Deal	Deals
Silicon Valley	\$1,176,747,600	\$6,762,917	174

	Amount	% of Total	Deals
Software	\$336M	28.60%	40
Biotechnology	\$186M	15.85%	15
Medical Devices and Equipment	\$164M	13.90%	16
Semiconductors	\$124M	10.50%	18
Networking and Equipment	\$83M	7.02%	11
Electronics/Instrumentation	\$64M	5.46%	5
Industrial/Energy	\$58M	4.94%	12
Media and Entertainment	\$50M	4.26%	19
Telecommunications	\$34M	2.85%	9
IT Services	\$33M	2.81%	13
Computers and Peripherals	\$30M	2.51%	4
Healthcare Services	\$6M	0.50%	1
Other	\$3M	0.30%	3
Consumer Products and Services	\$2M	0.18%	2
Retailing/Distribution	\$2M	0.14%	1
Financial Services	\$2M	0.13%	1
Business Products and Services	\$1M	0.08%	4



# Clean Tech

## **Investments:**

**CleanTech investments in Silicon Valley rose 94%  
2006 to 2007 to reach \$1,100,000,000**

**CleanTech investments in Silicon Valley amount to  
62% of CleanTech investments in California and  
21% of such investments in all of US**

## **Employment:**

**Since 2000 the number of “green” jobs has risen  
41% in Silicon Valley, compared to 17% for the  
rest of California**

**43% are in energy generation and 39% in energy  
efficiency**

**Reference: The 2008 Silicon Valley Index, <[www.jointventure.org](http://www.jointventure.org)>**



## **Changes in the Venture Capital Industry**

Less money to invest

Going to smaller funds

Phase out of many VC funds

Restructuring existing VC funds

New forms of venture investing