California's Future Workforce:

Producing New Technology and Products for New Markets in Real Time

California Student Aid Commission
Strategic Planning Retreat

Gus Koehler, Ph.D.
Principal, Time Structures

Six Global Drivers Affect California's Future Prosperity

- **First:** Emergence of new global companies and very large markets in Eastern Europe, China, India, and South America.
- **Second:** Continuing improvements in manufacturing productivity dependent on global IT networks for research, sourcing and assembly of components, financing, logistics, and for services
- **Third:** Convergence of new enabling technologies and materials (Nano, Biotech, IT)
- **Fourth:** Migration away from petroleum-based energy to new forms of energy and of conservation
- **Fifth:** Radical changes in workforce demographics and competition to build and sustain a creative, scientifically literate workforce
- **Sixth:** Global warming changing agricultural practices and producing rising sea levels that will affect major segments of the U.S. and world's urban production and population centers

Its Not Your Parent's World!

Table 1: 20th Century Economy vs. 21st Century Economy		
Issue	20th Century	21st Century
Markets	Stable, Predictable	Emerging, Dynamic
Scope of Competition	National	Regional on a Global Scale
Organizational Form	Hierarchical	Dynamically Networked
Production System	Mass Production	Innovative-Flexible-distributed/Logistical-IT-Customer Driven
Key Factor of Production	Capital/Labor	Innovation/Ideas/IT/Venture Capital
Key Technology Driver	Mechanization	New Materials-Digitization
Competitive Advantage	Economies of Scale	Energy/Innovation/Proprietary Methods/Quality
Firm Dominance	US, European, Japanese	**US, European, Chinese, Indian, Brazilin, Korean, and new firms**
Relations Between Firms	Go It Alone	Global-Collaborative-Flexible
Worker Skills	Job-Specific	Changing, Scientific, IT Literacy/ Innovation/Collaboration
Nature of Employment	Secure	Risky at all Levels
Energy	Petroleum	Multiple Fuels/Conservation
Global Warming	Not An Issue	Disruptive and Drain on Public Resources

The Core of California's Future Competitive Advantage

New Materials + Advanced Manufacturing Technologies + **Global Logistics Systems**

+ Energy Efficiency and Emission Reduction

+ **Diverse Networks** (Research, Financial, Production, Energy, Conservation, etc) + Ubiquitous use of IT + Innovative Workforce Skills

= Proprietary Technology

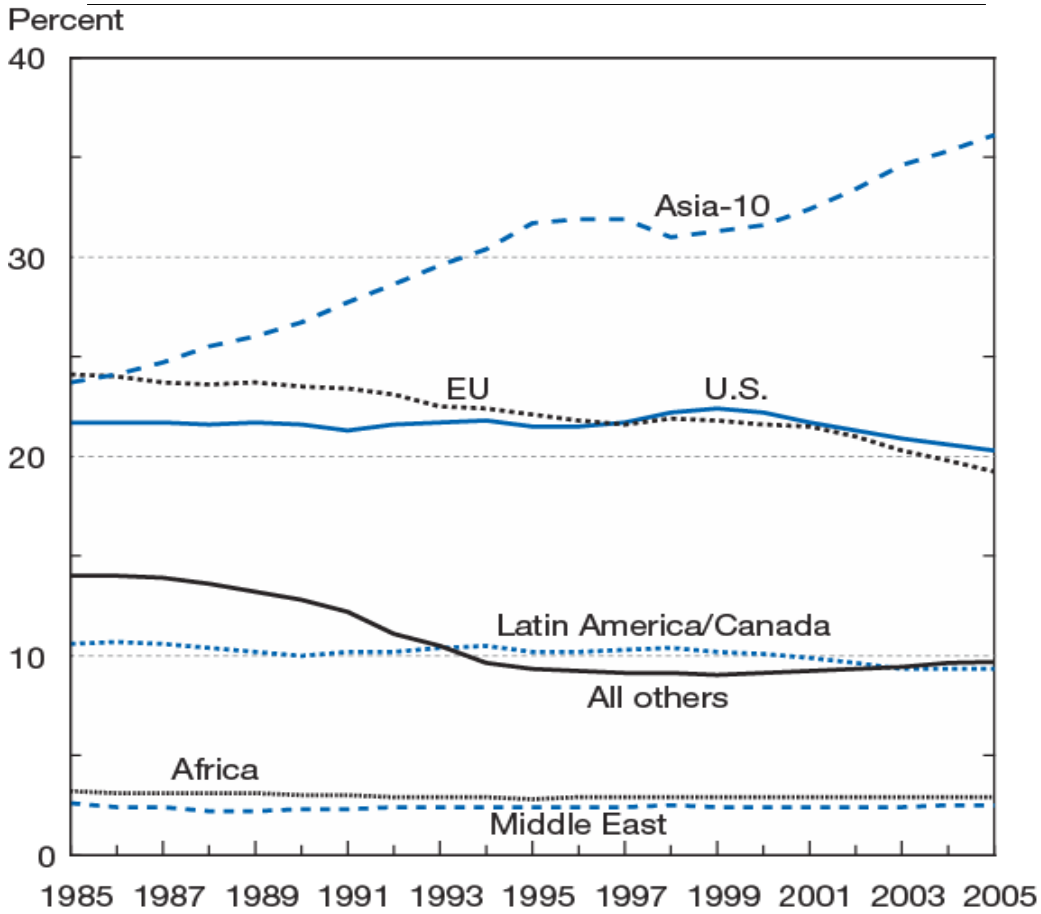
The Dynamic Innovation Triangle

Entrepreneurial Advantage: Technology, Product, Process, VC$, Logistics, Global Research-Finance-Production Networks, S&T Small Business Emergence, and IT Dominance

Knowledge Advantage: Private and Public Sector Research in IT, Bio, Nano, Energy, Manufacturing, etc, Dominance

People Advantage: Ethnically and Generationally Mixed, S&T Migrants, Evolving 21st Century Work Skills, Just-Time Life-Long Training, & Innovative and Adaptive

World GDP shares: Asia Grows, EU and US Decline



EU = European Union; GDP = gross domestic product

NOTES: Asia-10 includes China, India, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Taiwan, and Thailand. China includes Hong Kong.

http://www.nsf.gov/statistics/seind08a/mmslides/mmo-55.ppt

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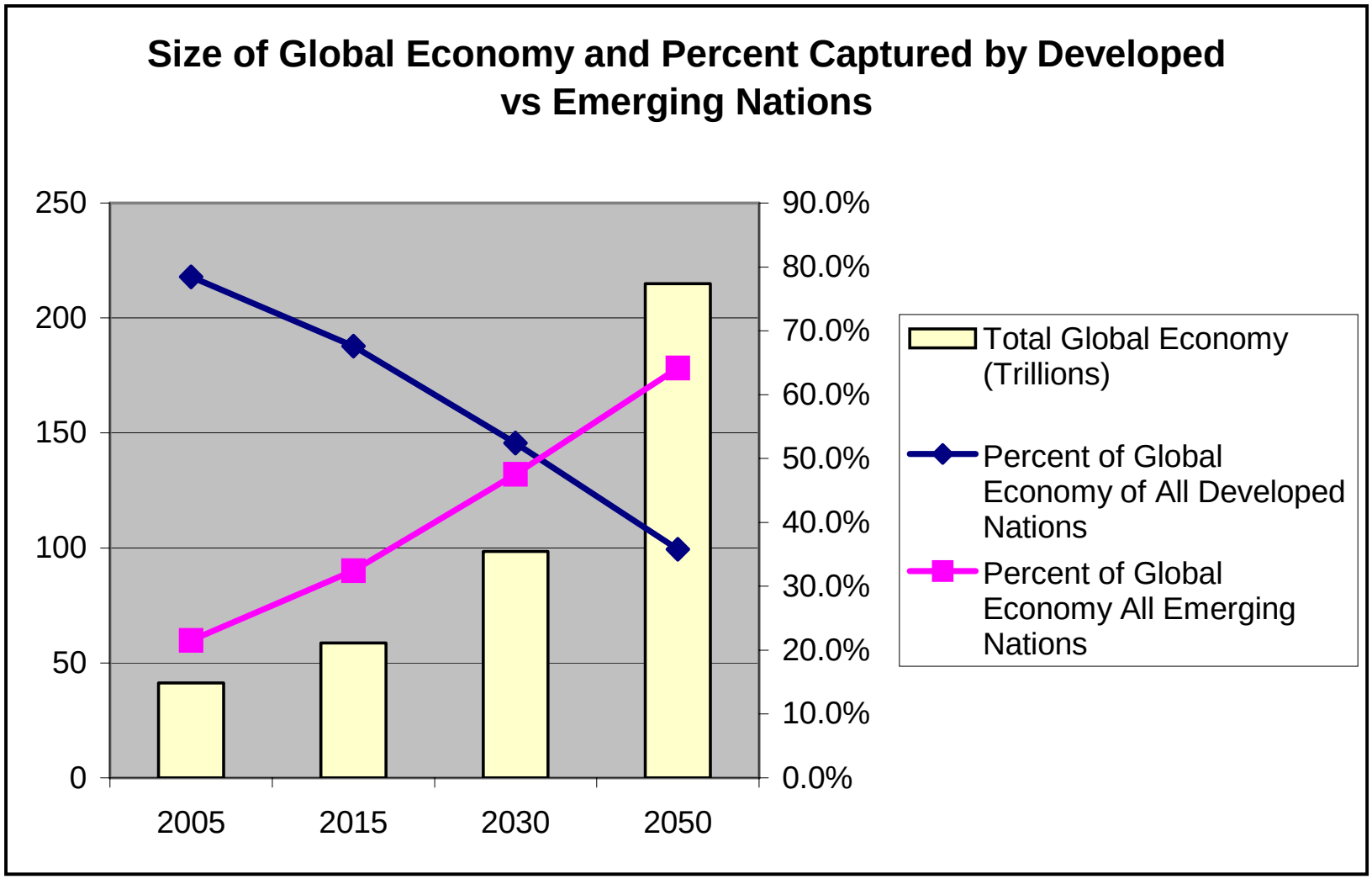
Global Market Crossover to Emerging Nation Domination



Source: Goldman Sachs and JP Morgan date interpreted by Agtmael, The Emerging Markets Century.

New Global Markets: Emerging Chinese Middle Class

- By 2004, already 52 million or twice Canada's population
- 2014: 400 to 500 million
- Chinese middle class are trend Setters (updating their cell phones, cars, foreign brand-name apparel, computers and high-speed Internet links and car-crazy).
- 12.4 million privately owned vehicles in 2003, up 25% from 2002
- Expect to sell 4.5 million cars annually by 2010

Lester Brown, *Plan B. and Asian Pacific Foundation of Canada, Feb., 2004.* http://www.asiapacificbusiness.ca/apbn/pdfs/bulletin144.pdf

Globalization: Established Multinational Companies are less Attached to their Countries

- 50 largest multinational *Manufacturing* companies had 55% of their employees and 59% of their sales outside of the home countries
- Revenue growth is coming from overseas, not domestically
- In 1988, 38 of the 64 largest *food processing* firms owned a total of 682 food processing plants in foreign countries.
  - Pillsbury, Green Giant, and Alpo pet foods are owned by a British firm, Grand Metropolitan, PLC. Nestle, based in Switzerland, operates 421 plants in 60 countries. Sixty-seven of these plants are in the United States.
- Establishing production facilities in foreign countries avoids tariff and most nontariff trade barriers. Many firms prefer producing in the foreign country for their markets rather than exporting from home.

Bureau of Economic Analysis (2006). Summary Estimates for Multinational Companies: Employment, Sales, and Capital Expenditures for 2004.

Emerging 3rd World Companies are not Small: Earnings in Million of US$

Developed	*1996*	*2005*	*Emerging*	*1995*	*2005*
Intel	5,157	8,664	Samsung	137	7,467
Nokia	711	4,493	TSMC	707	2,909
Dell	272	3,043	Hon Hai	67	1,266

Emerging Companies have #1 Global Market Share In:

Memory semiconductors	Samsung, Korea
Flat Screens	Samsung, Korea
Logic Semiconductors	TSMC, Taiwan
Electronic Contract Manufacturing	Hon Hai, Taiwan
Regional Jet Aircraft	Embraer, Brazil

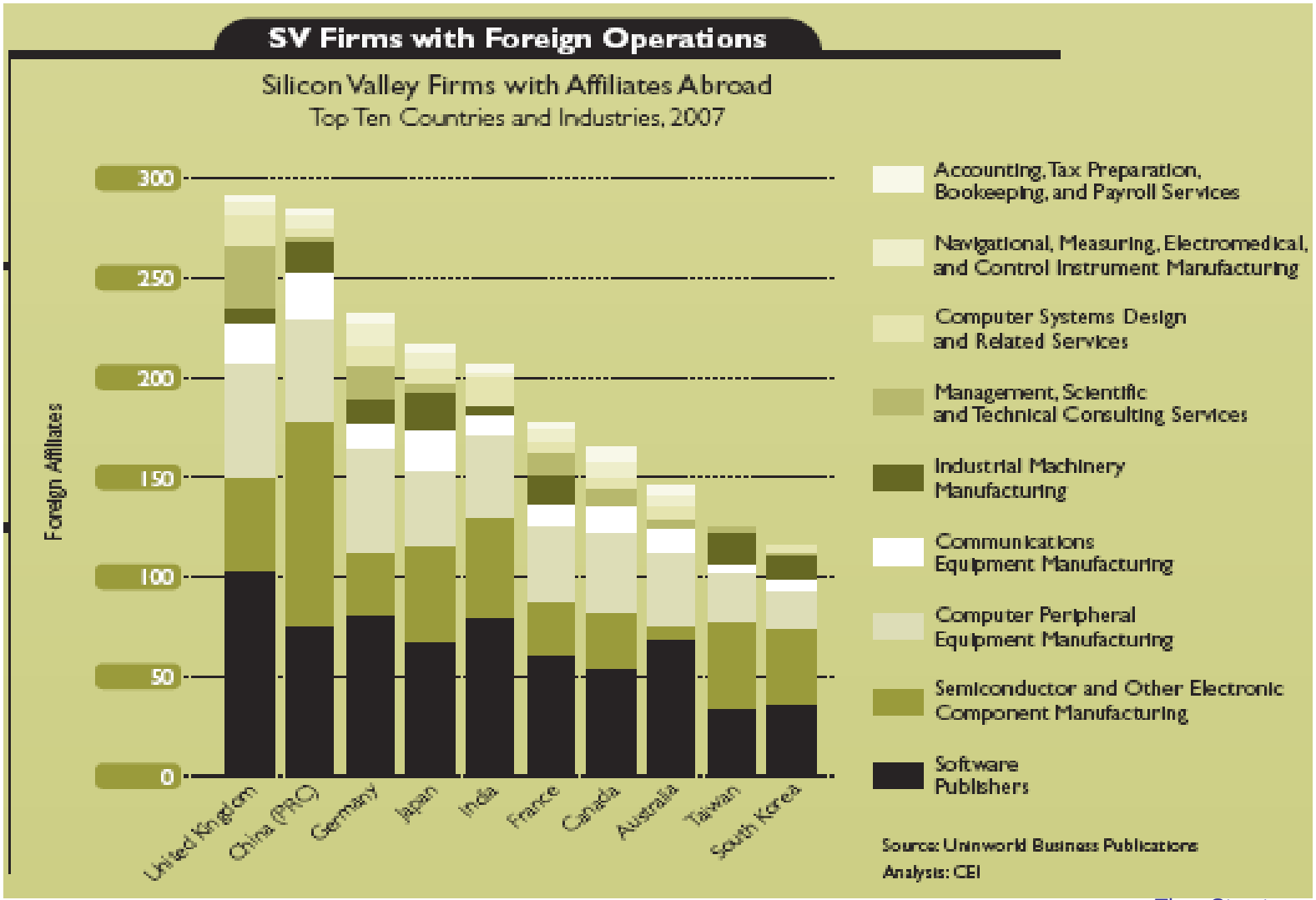
Source: Agtmael (2007). *The Emerging Markets Century.*

Current and Emerging Multinational Firm Characteristics

- Globally competitive quality, design, technology, and management
- Brand building and manufacturing for first world brands (Nike tennis shoes)
- Excellent Logistics
- Rapid response to changing markets
- Small and Medium Company acquisition savvy
- Sustained edge in use of IT
- Unconventional thinking
- Play both competitor and partner

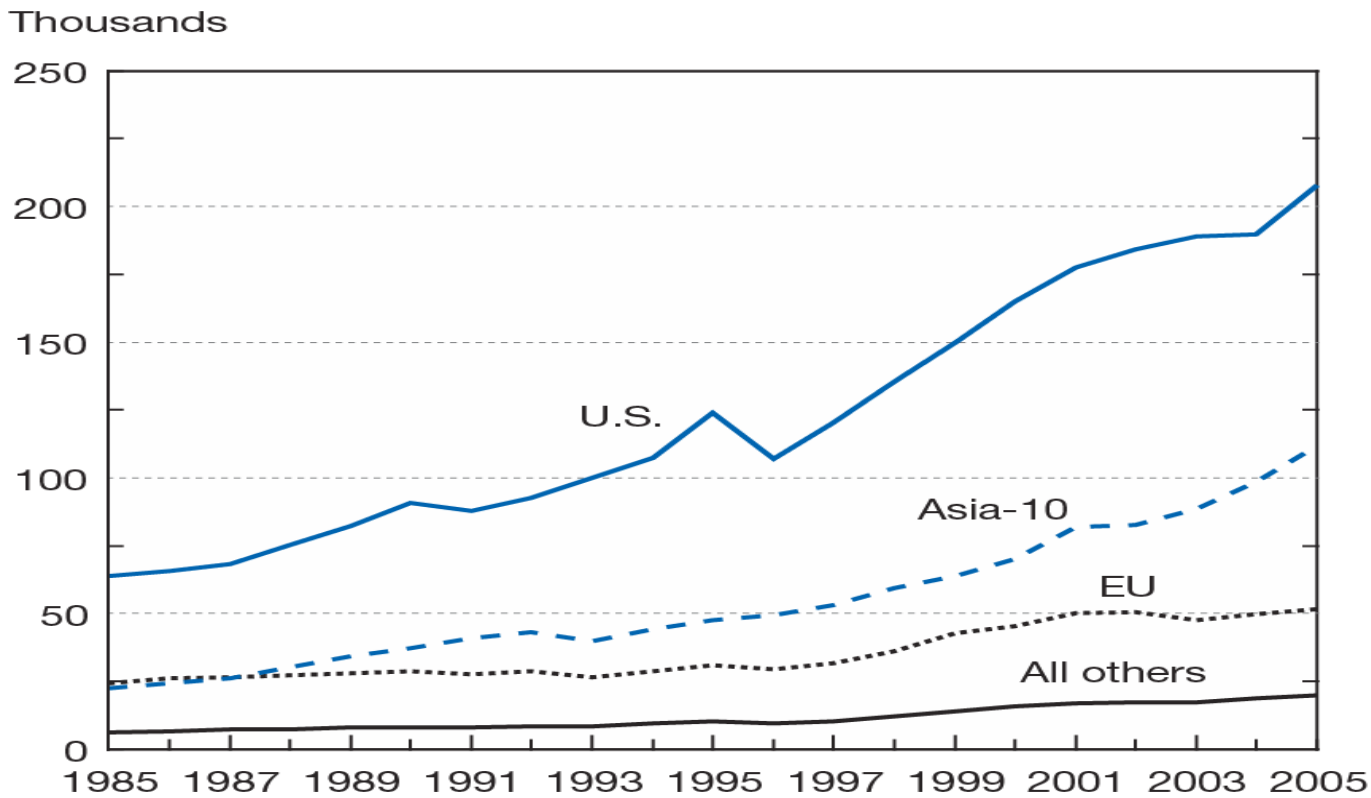
Source: Agtmael (2007). *The Emerging Markets Century*.

Silicon Valley is Global



Silicon Valley Index, 2008

US Patent Office patent applications, by region/country: Another Race

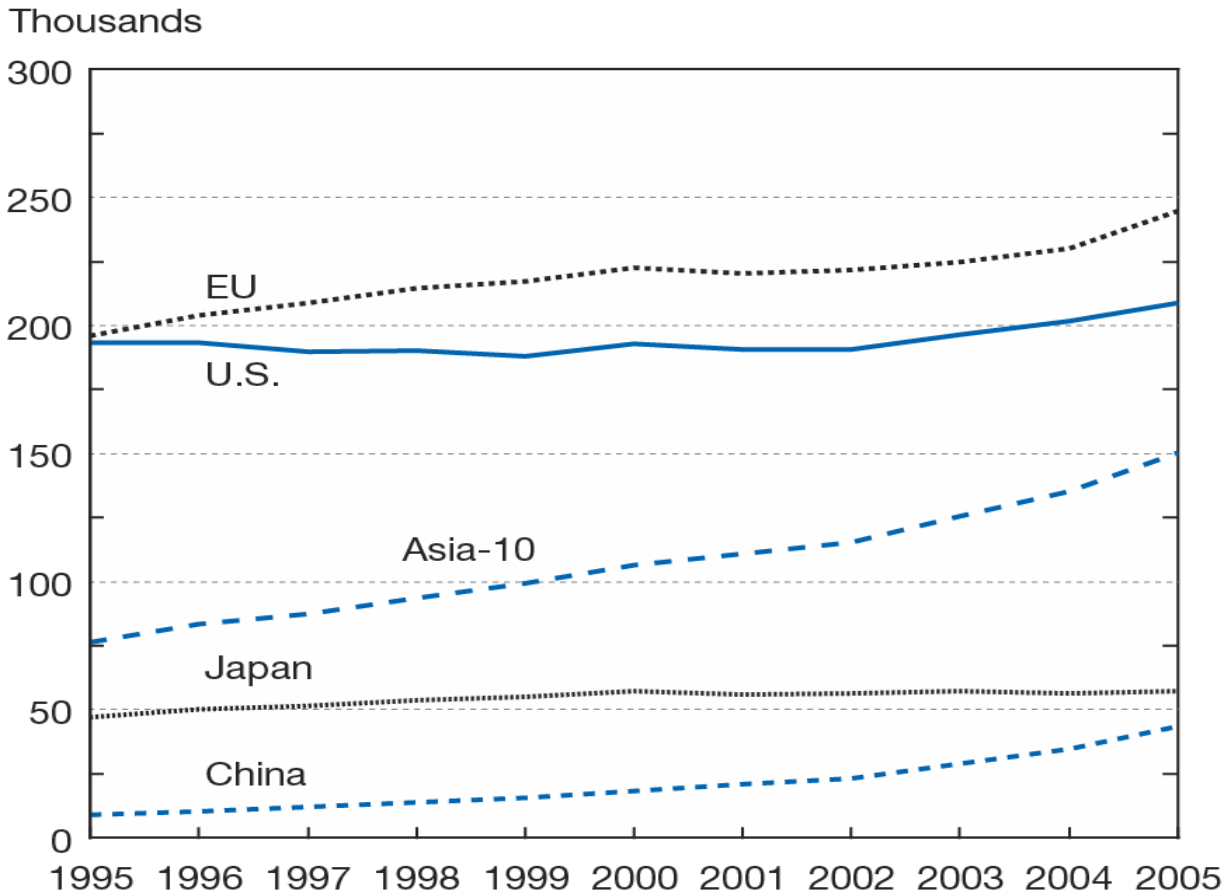


EU = European Union; USPTO = U.S. Patent and Trademark Office

NOTES: Country of origin based on residence of first-named inventor. Asia-10 includes China, India, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Taiwan, and Thailand. China includes Hong Kong.

http://www.nsf.gov/statistics/seind08a/mmslides/mmo-55.ppt

Scientific and technical articles in Peer Reviewed journals Show Intense Competition



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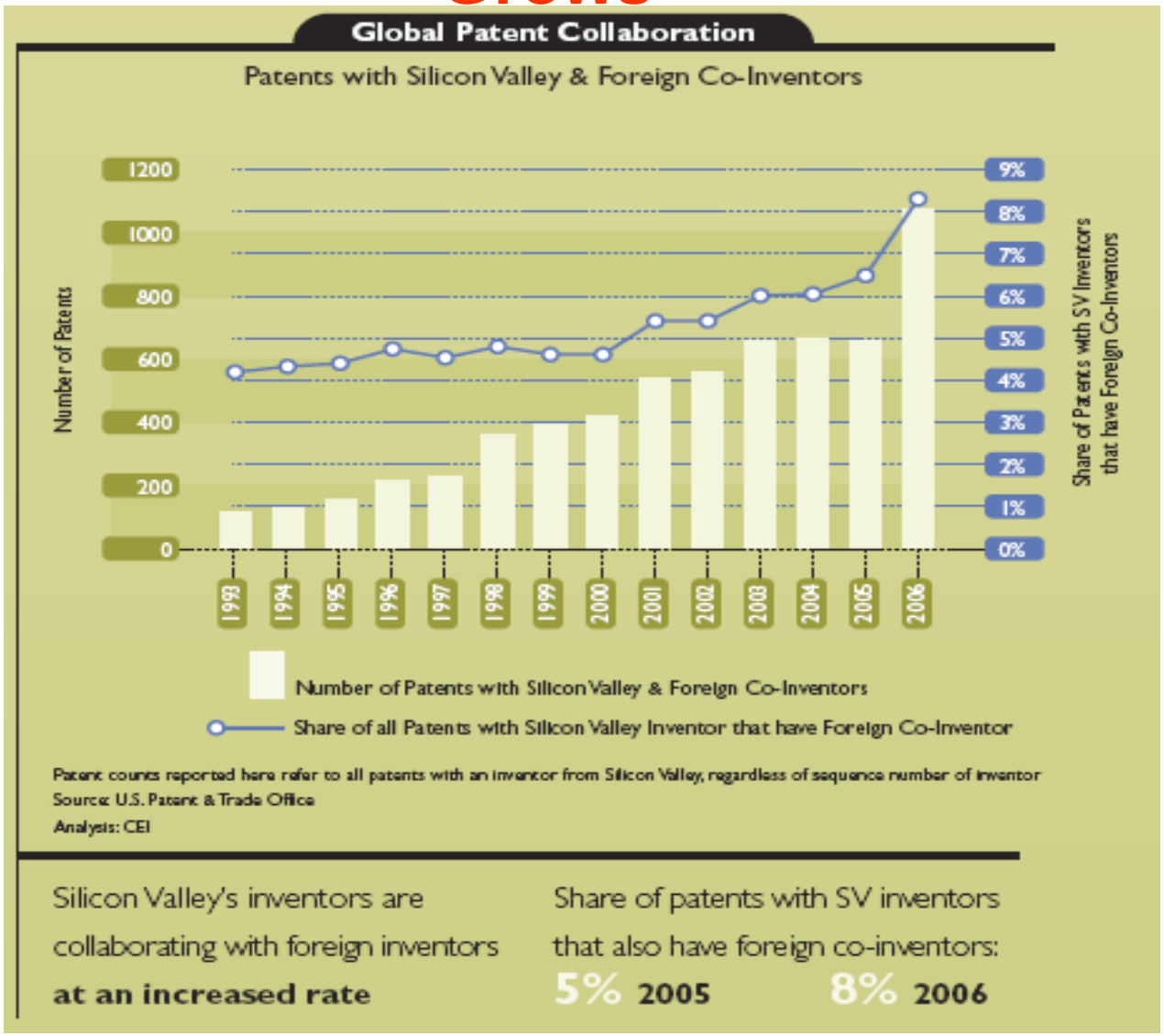
http://www.nsf.gov/statistics/seind08a/mmslides/mmo-55.ppt

Silicon Valley's Global Patent Collaboration Grows



Index of Silicon Valley, 2008.

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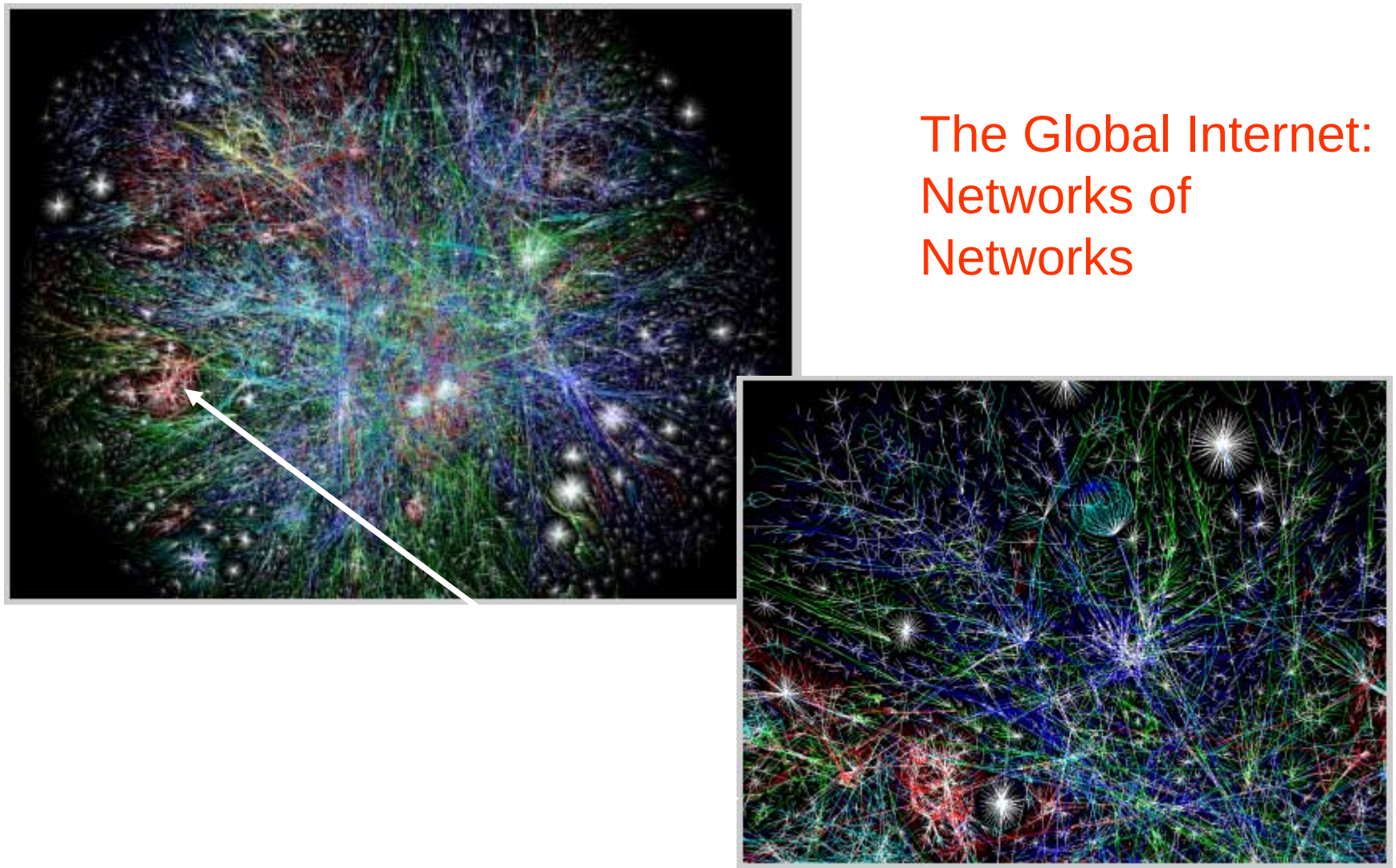
Corporate Patent Competition is Global

Private Firm Corporate Patents Ranked by Increase Over 2005			
Applicant's Name	Country	Patent Applications 2006	Increase over 2005
FUJI PHOTO FILM CO..	JP	445	339
HUAWEI TECHNOLOGIES	CN	575	326
MATSUSHITA ELECTRIC INDUSTRIAL	JP	2,344	324
TOYOTA	JP	704	305
PIONEER CORPORATION	JP	494	254
LG ELECTRONICS INC.	KR	567	238
QUALCOMM INCORPORATED	US	608	229

U.S.

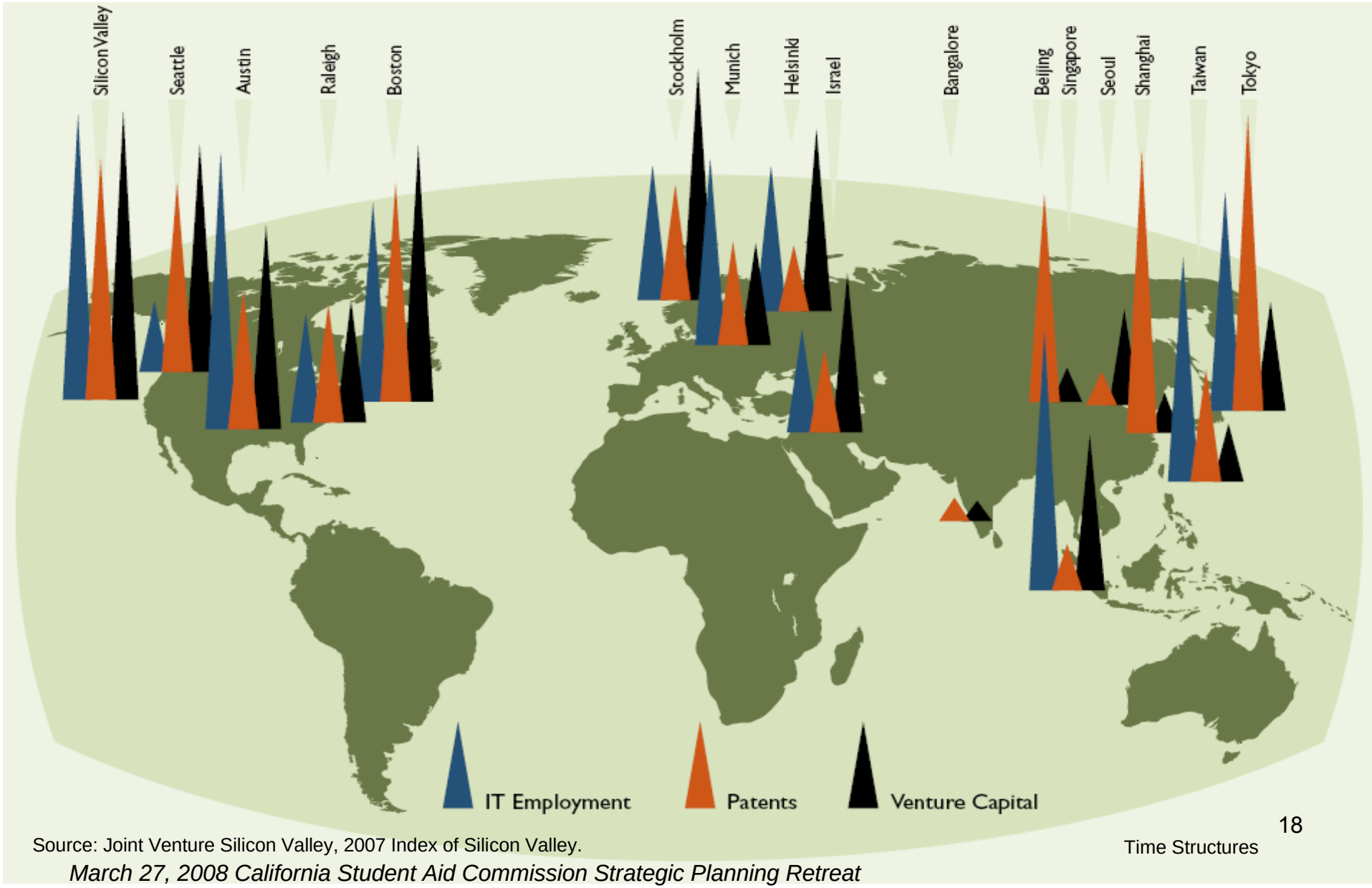
Source: World Intellectual Property Organization, 2007.

The Global Internet: Networks of Networks



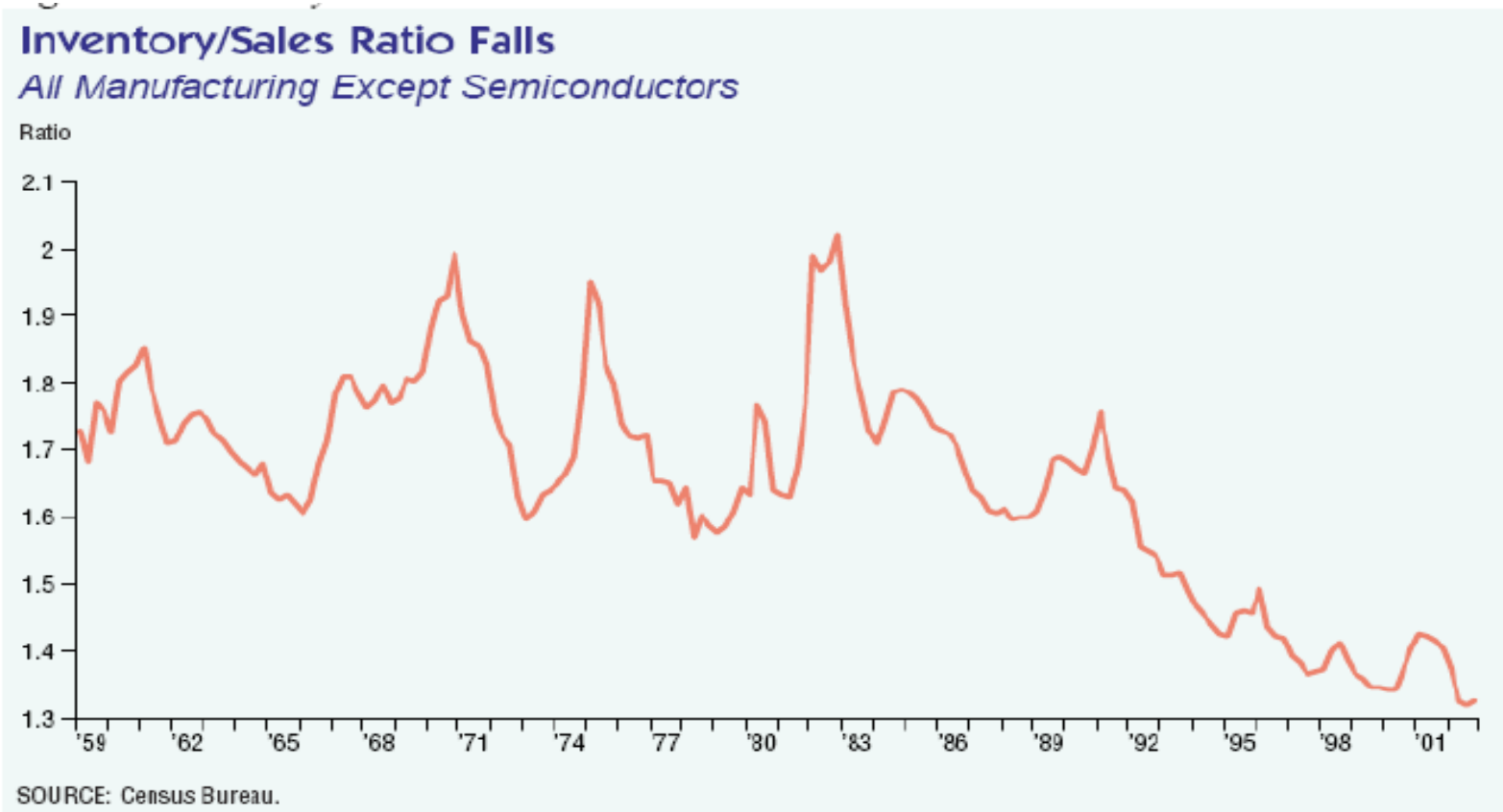
http://www.visualcomplexity.com/vc/project_details.cfm?id=70&index=10&domain=Internet

IT Global Manufacturing Network



Source: Joint Venture Silicon Valley, 2007 Index of Silicon Valley.

IT Connected World Reduces Inventory/Sales Ratio



Source: Federal Reserve Bank of Dallas, http://www.forecastcenter.com/public/guest/New%20Econ-FRB%20Dallas%20swe0303b.pdf

US Productivity is One Global Advantage

US productivity nearly doubled since the 1950s.

Manufacturing productivity outpaced the rest of the economy since 1977

US productivity Exceeded US' principal trading partners.

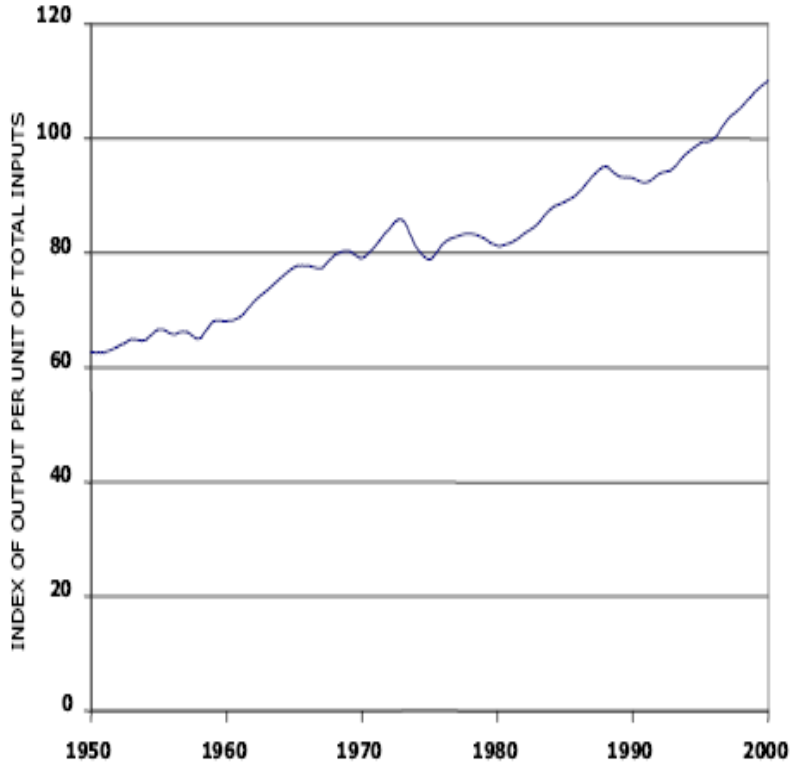


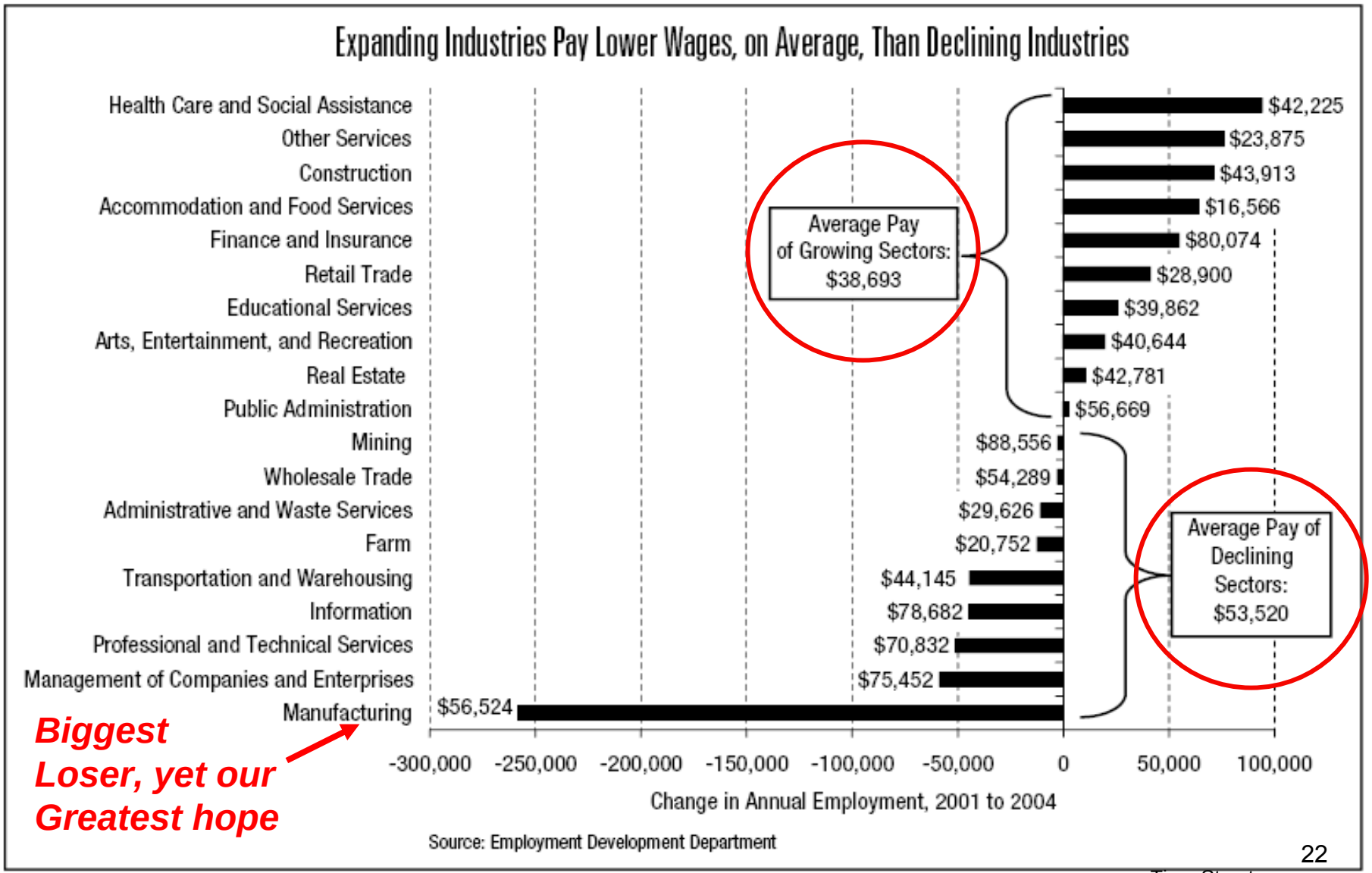
FIGURE 1-1 Multifactor productivity in U.S. manufacturing. Source: U.S. Department of Labor, Bureau of Labor Statistics.

Global loss of Manufacturing Jobs to Productivity IT and Other Increases: California is not alone

Country	1990	2004	1992-2003 productivity growth	1992-2003 change in manufacturing jobs
United States	18.0%	11.8%	57%*	-13.6
Japan	24.3%	18.3%	54.3%	-25.7%
China (estimates - see paper)			60.0%	-18.0%
Germany	31.6%	22.7%	35.1%	-21%
United Kingdom	22.3%	14.9%	35.9%	-18.1%
France	21.0%	16.3%	58.0%	-10.9%

William A. Ward Clemson, Manufacturing Productivity and the Shifting US, China, and Global Job Scenes—1990 to 2005, University Center for International Trade Working Paper 052507, (August 4, 2005)

California is Losing High Paying Jobs



Biggest Loser, yet our Greatest hope

Time Structures

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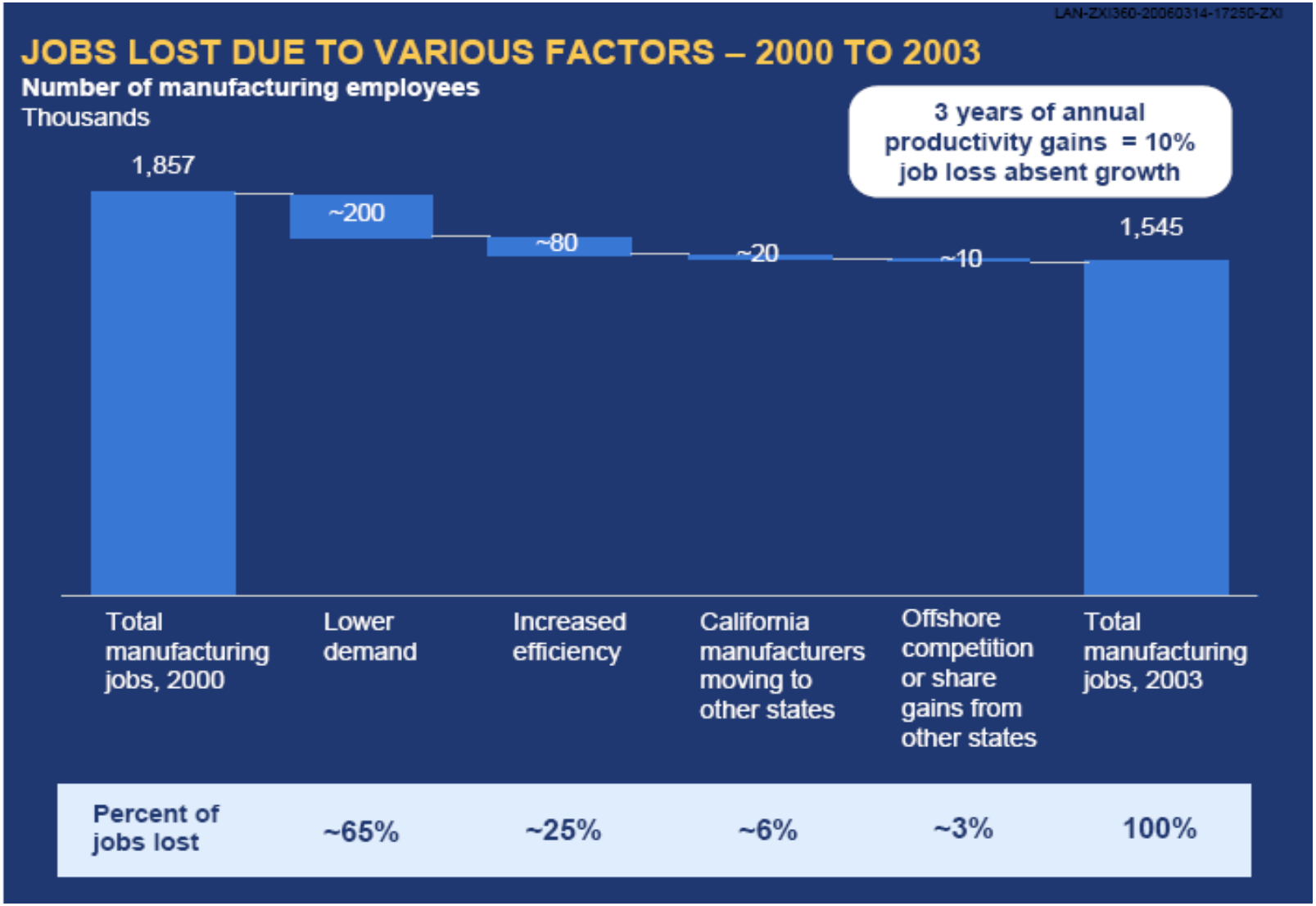
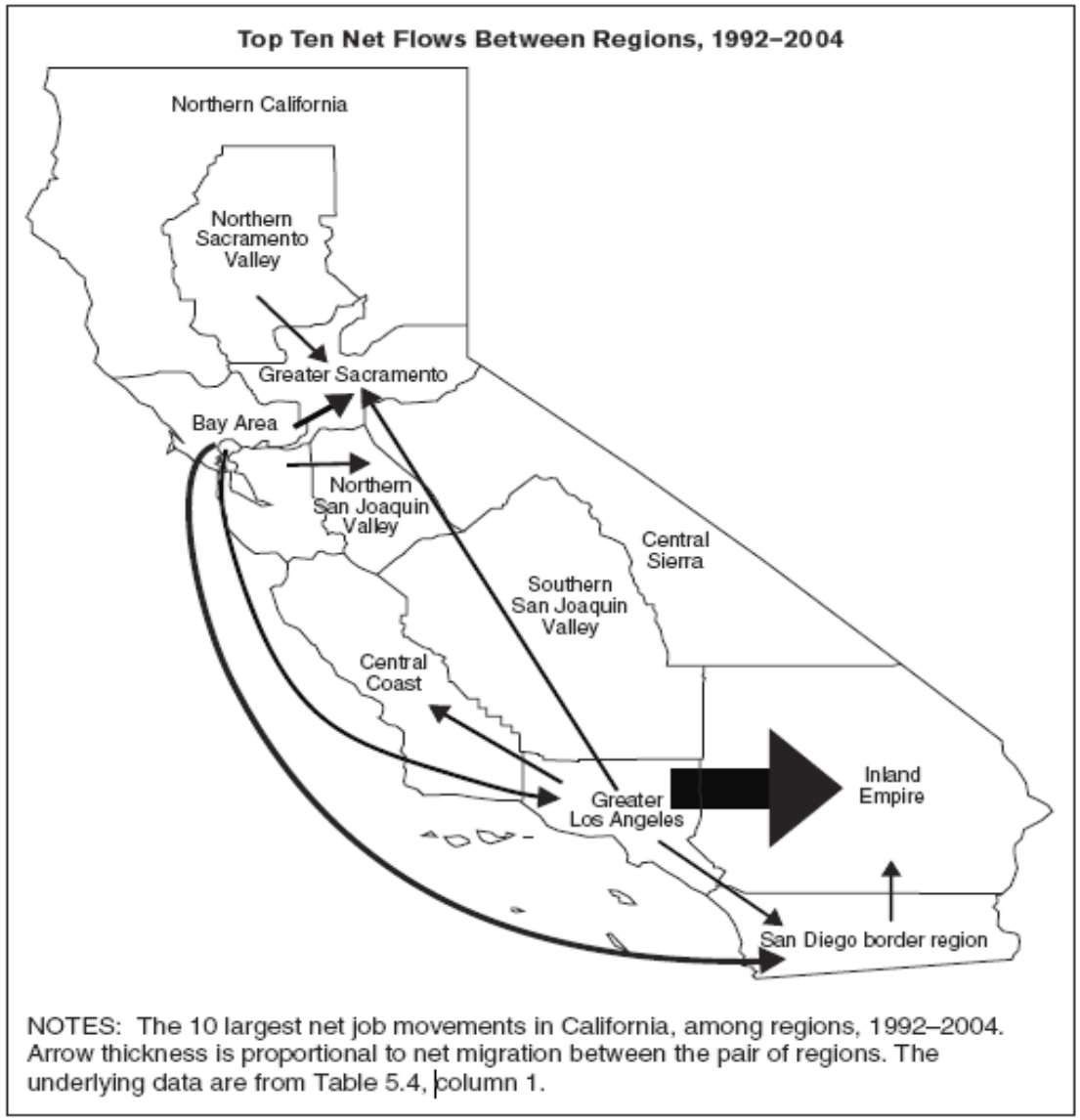
BUT Job Loss is Not Only Due to Low Wages but to Factories Closing

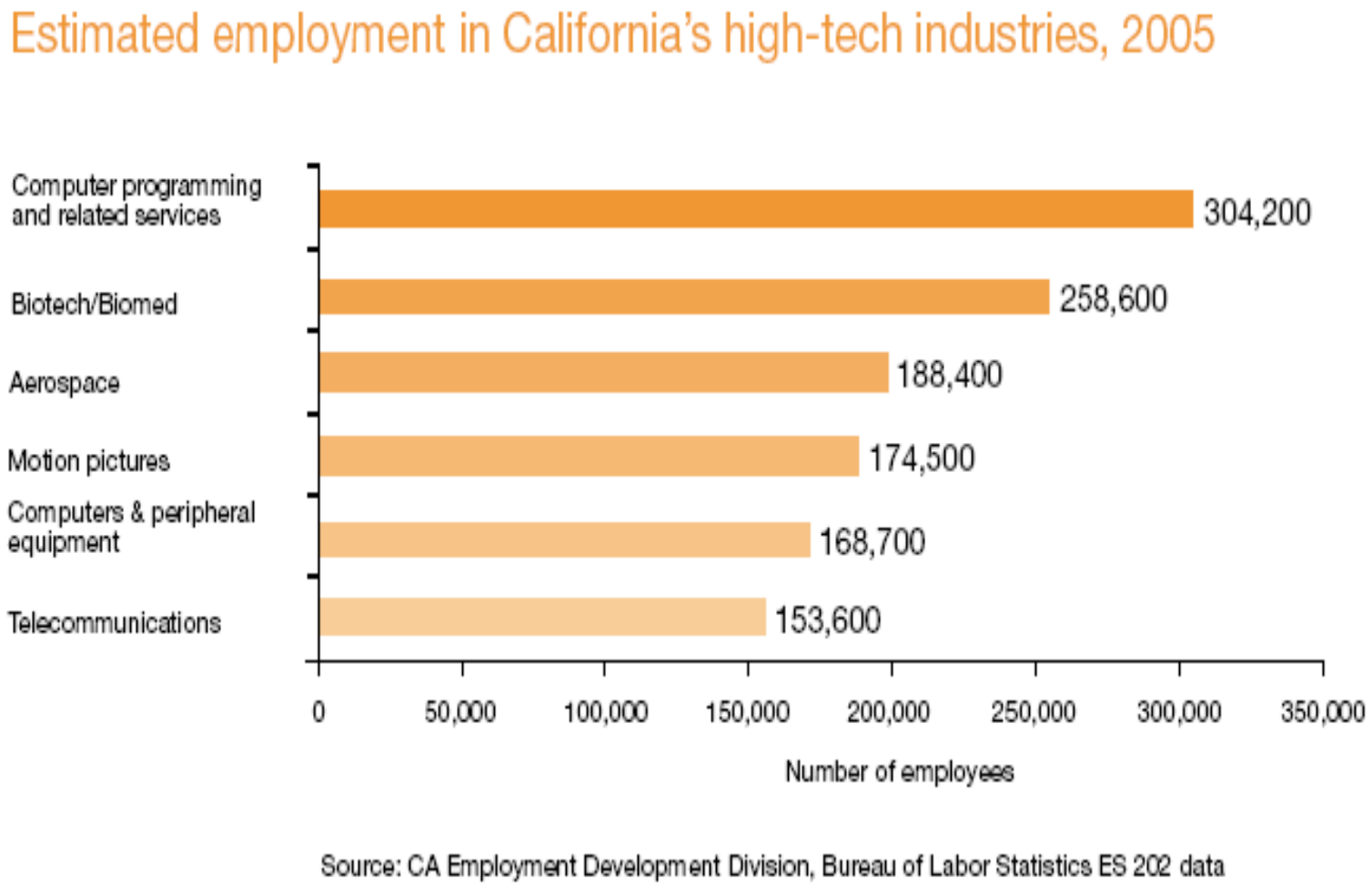


Source: McKinsey and Company, CalEd Conference, 2006.

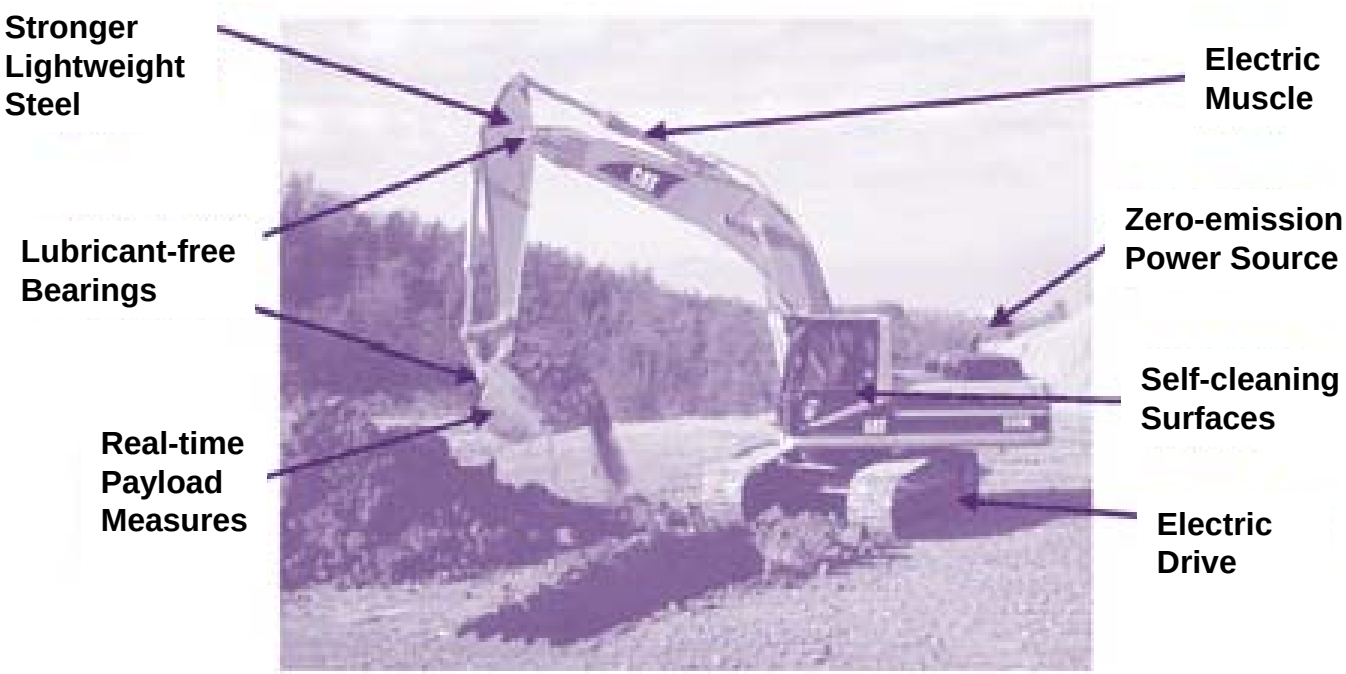
Firms Are Moving Around the State, Not Out



California is Highly Invested in High-Tech Employment

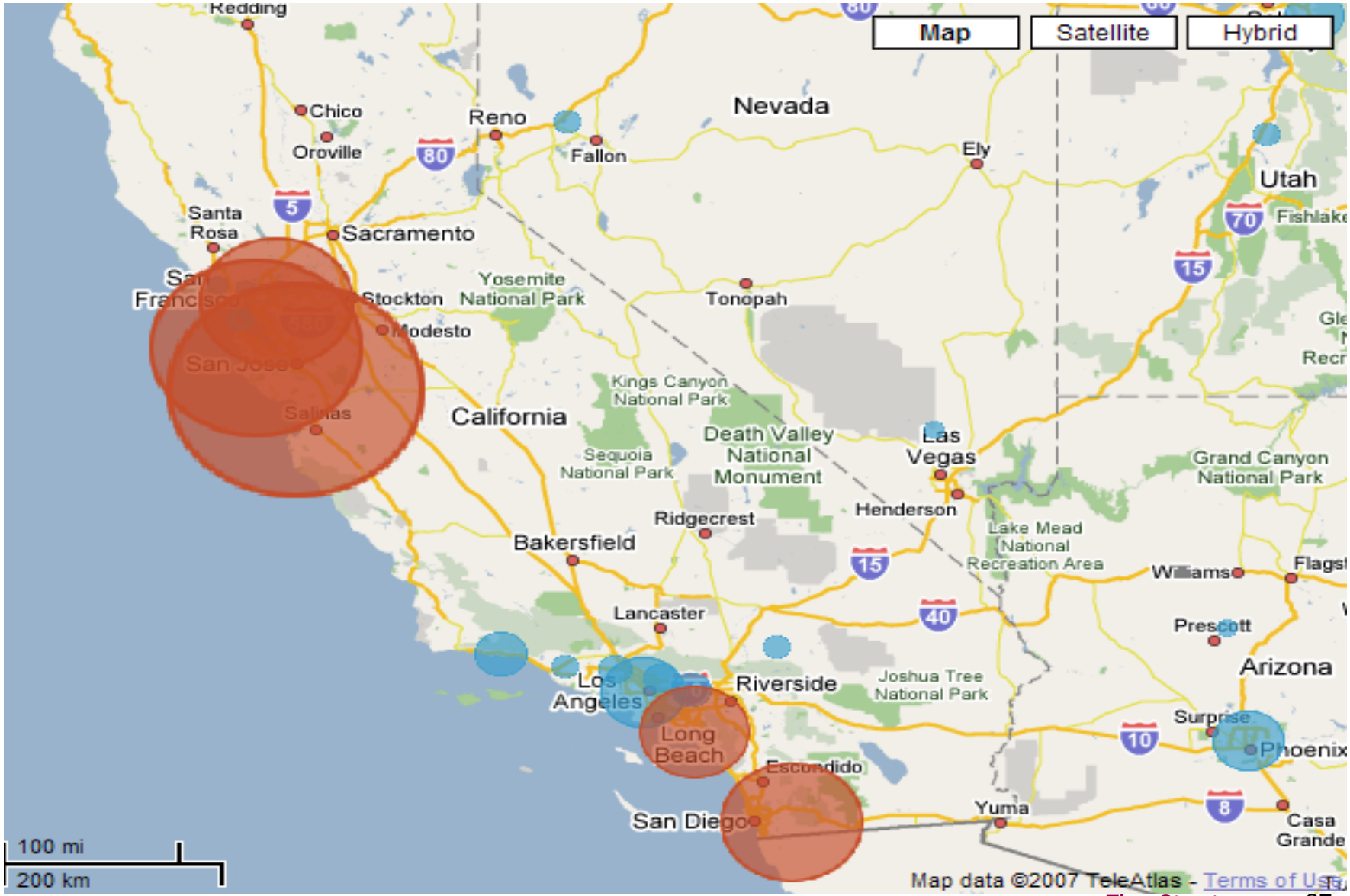


Materials Revolution: Nanotechnology Changes Everything



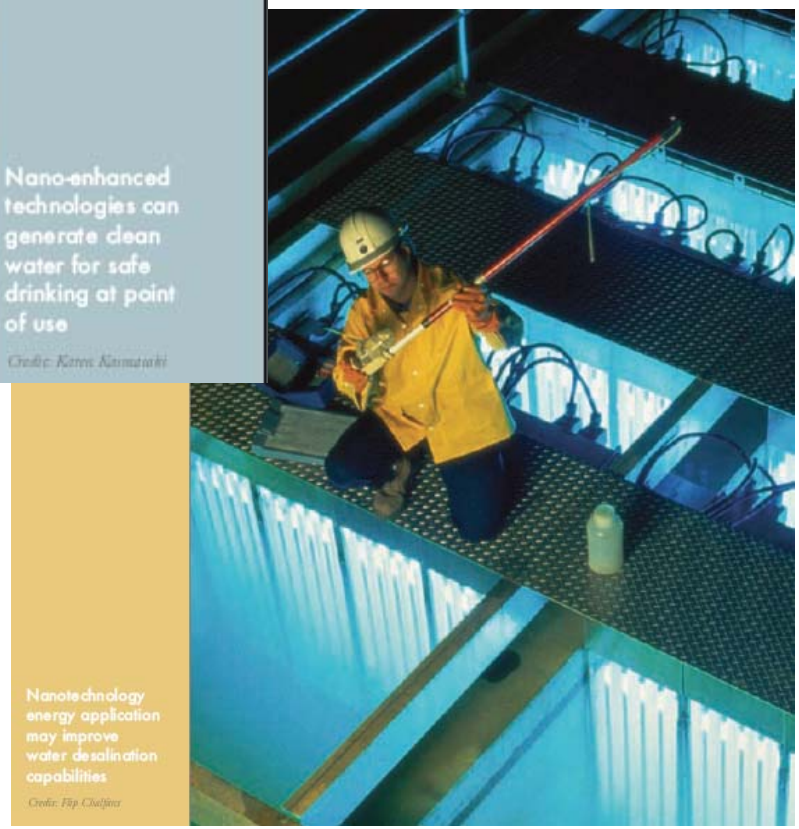
Source: Caterpillar Inc.

Nanotechnology Locations



http://www.penmedia.org/maps/mappage.html

Nanotech and Water Purification

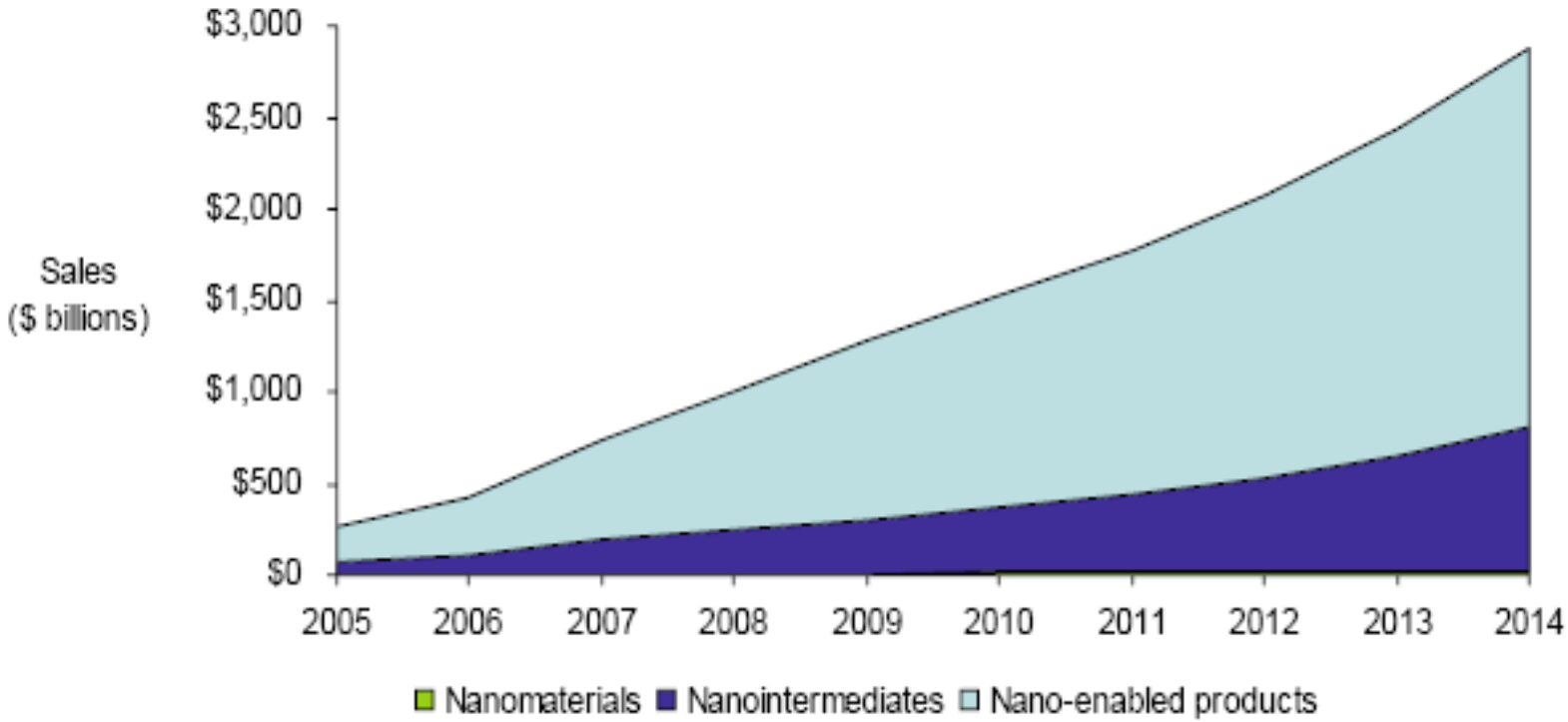


Different Scales addressed with different applications.

Source: Nanofrontiers, Woodrow Wilson International Center for Scholars, 2007.

Nanotechnology will impact $2.9 trillion worth of products across the value chain by 2014

Sales of products incorporating nanotechnology, 2005 to 2014



Forecast based on Lux Research's value chain ontology, secondary research, and more than 100 interviews with executives, thought leaders, and academics. Projections were triangulated from bottom-up, top-down, analogical, and third-party market estimates, as well as advanced evolutionary models.

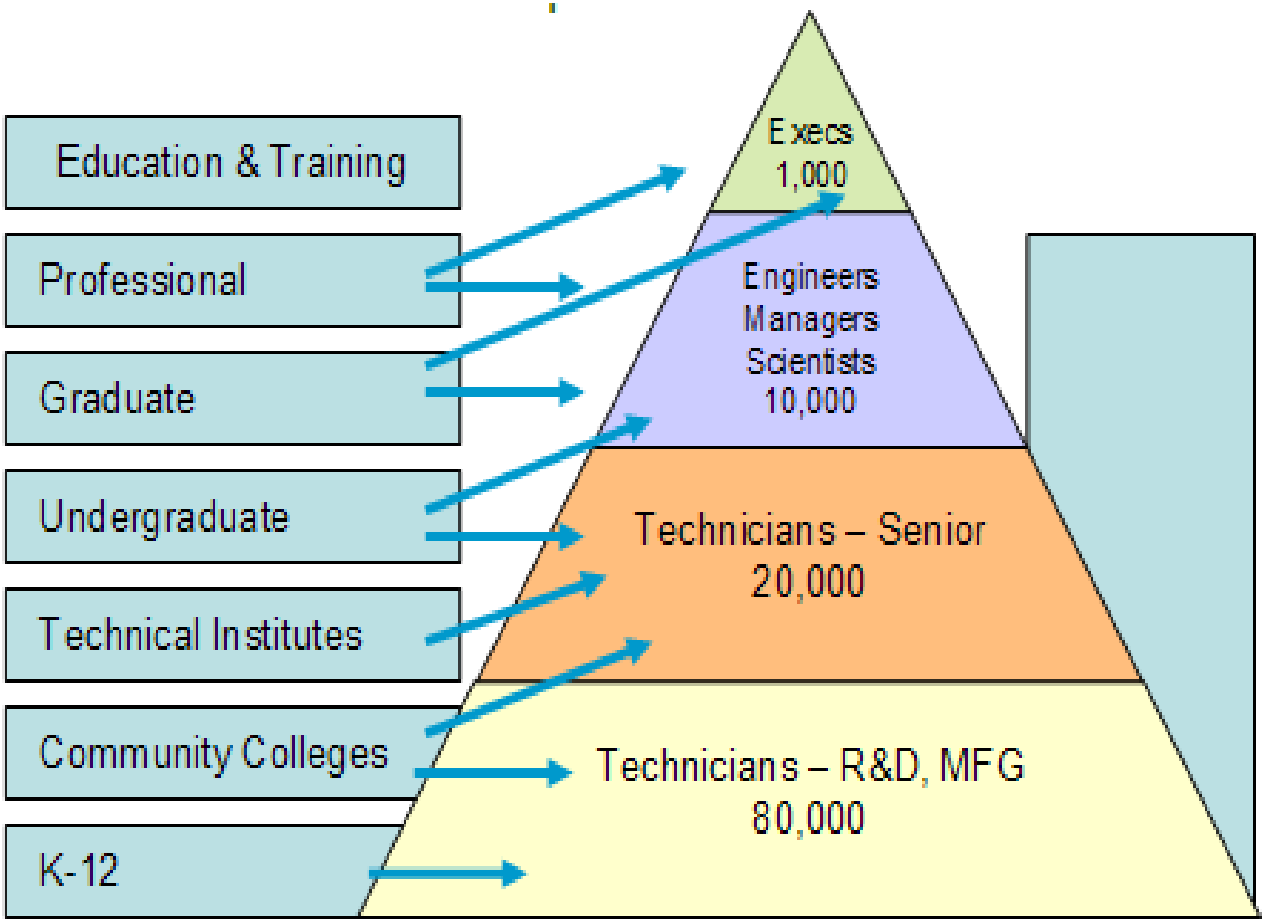
Source: Lux Research Report "Sizing Nanotechnology's Value Chain"

State Nano-Mems Innovation Ranking

State	Score
• California	100
• New Mexico	44.8
• Mass.	43.3
• Michigan	34.2
• Texas	26.5
• New York	24.8

Source: Small Times, Vol.7, No. 1, 2007

Nanotech Related Employment: 226,800 California Jobs by 2015



Source: Adolfo Nemirovsky (2005). *nanoEducation and Training Forum*
http://nanosense.org/documents/nanoed05/presentations/NanoCareersAdolfo.ppt#1

California's Workforce is Not Ready

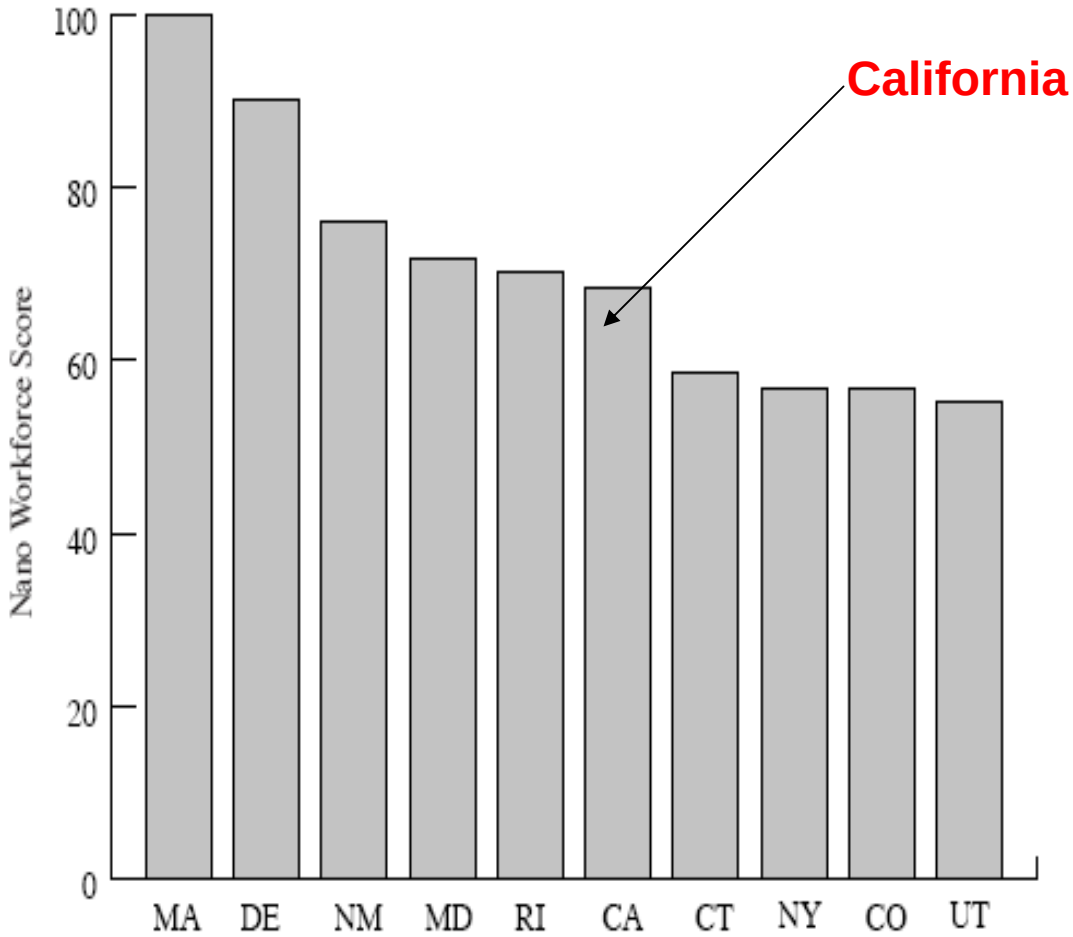
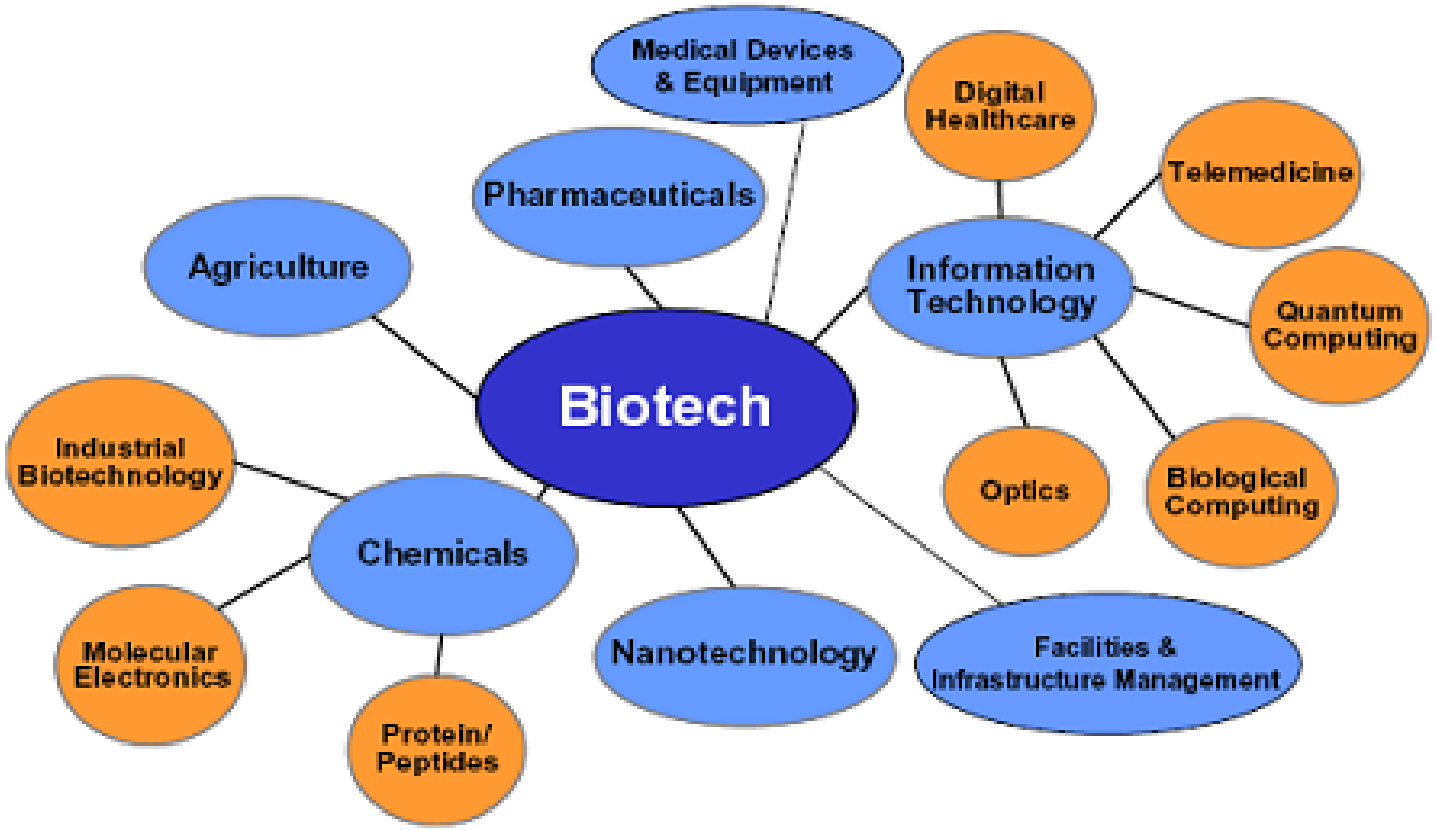


Figure 5.6: Ranking of Top Ten States by Nano Workforce Score (2003)
Source: Adapted from Stuart and Forman [68]

Converging Technologies: The Evolving 21st Century Biotech Industry



California Dominates Top 20 NIH Cities Receiving Biotech Research Funding (1994)

1. Boston
2. New York
3. Baltimore
4. Philadelphia
5. Seattle
6. La Jolla
7. Los Angeles
8. San Diego
9. Chicago
10. San Francisco
11. Houston
12. Pittsburgh
13. St. Louis
14. Ann Arbor
15. Durham
16. Cambridge
17. New Haven
18. Chapel Hill
19. Stanford
20. Atlanta

Source: NIH last city ranking at: http://grants1.nih.gov/grants/award/awardtr.htm

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California is Strong in all Biotech Clusters (2002)

Ranking US Life Science Clusters (2002)			
Pharmaceuticals Manufacturing	**Instruments Manufacturing**	**Medical Devices Manufacturing**	**Research**
1. Philadelphia	1. *Bay Area*	1. Minneapolis-St. Paul	1. *Bay Area*
2. *Los Angeles*	2. Boston	2. *Bay Area*	2. Houston
3. Newark, NJ	3. Bridgeport	3. *Los Angeles*	3. Boston
4. Middlesex-Sommerset-Hunderson	4. *Los Angeles*	4. Boston	4. Washington D.C.
5. Chicago	5. *San Diego*	5. Chicago	5. *Los Angeles*
6. *Bay Area*	6. Indianapolis	6. St. Louis	6. Cincinnati

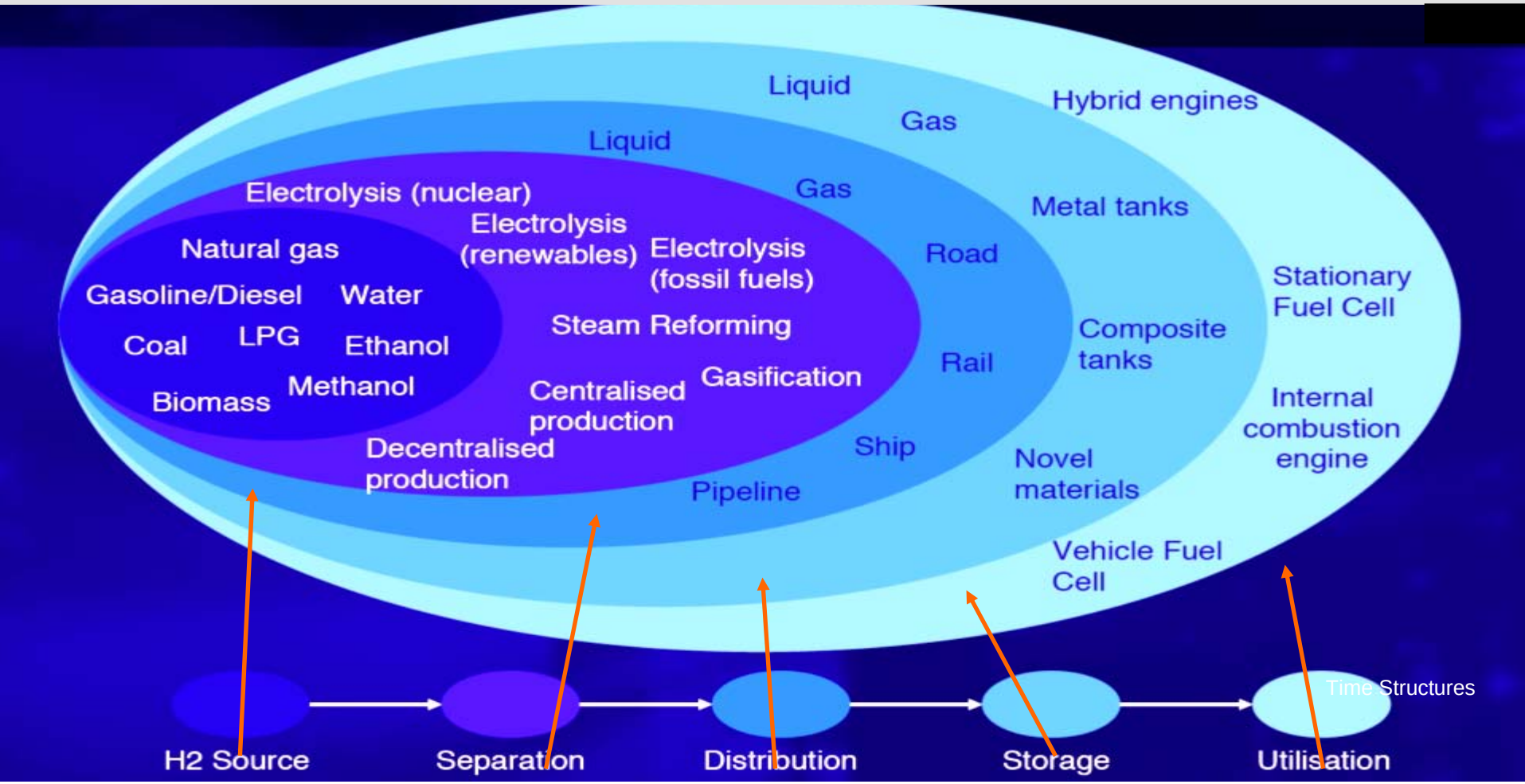
Source: California Trade and Commerce Agency, 2002.

Where Biotechnology Companies and Jobs Are In California

Concentration of Biotechnology Companies and Jobs by California Region (2003)			
Region	**Employment**	**Companies**	**Research Institutions**
Bay Area	85,600	699	31
Sacramento	5,000	98	2
Ventura/Santa Barbara	12,000	131	
Los Angeles	47,500	322	22
Orange County	31,300	317	1
Inland Empire	7,300	82	1
San Diego	27,800	502	18

Source: California Trade and Commerce Agency, 2002.

New Fuels: Hydrogen will Require New Production and Infrastructure Facilities



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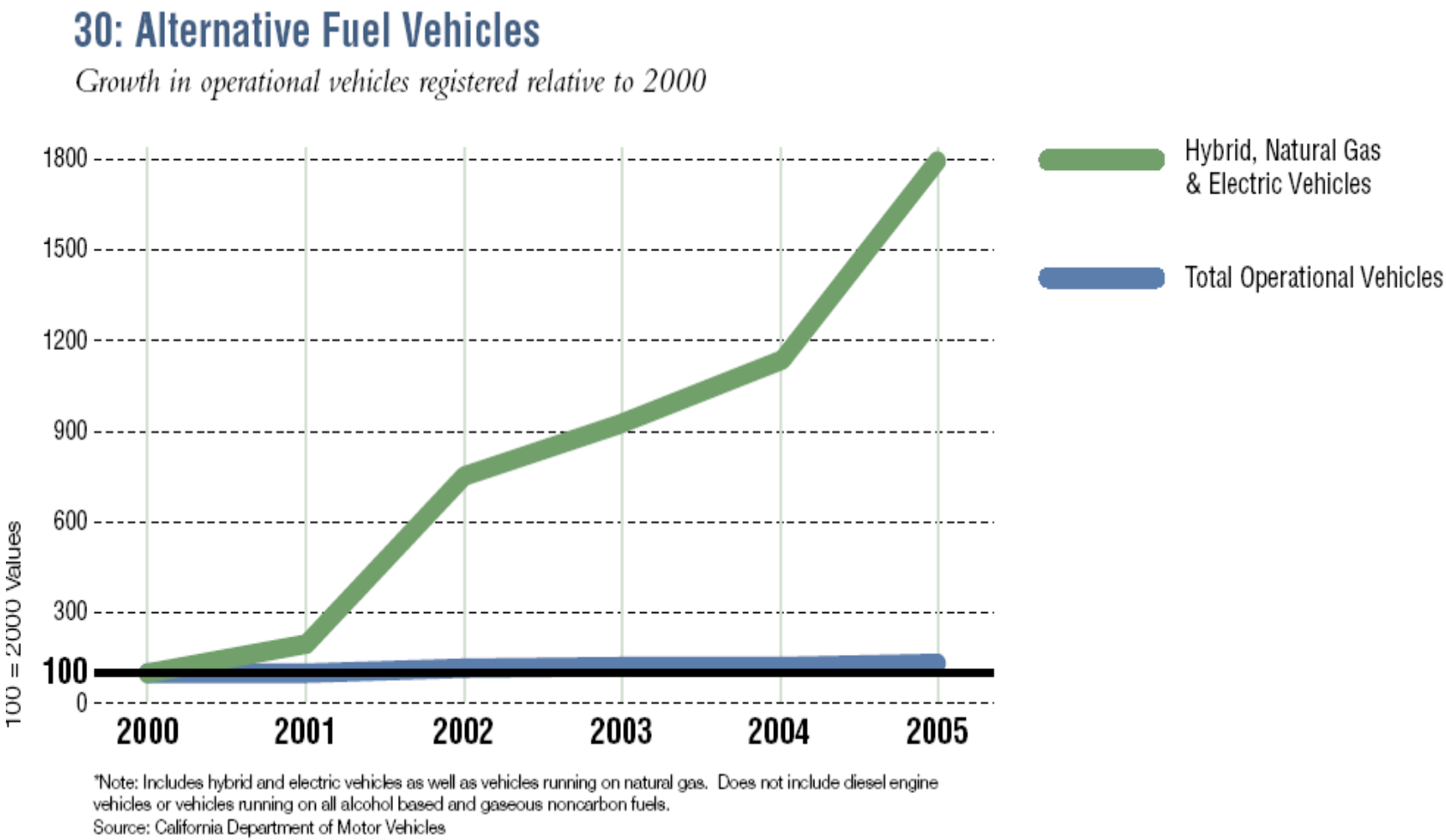
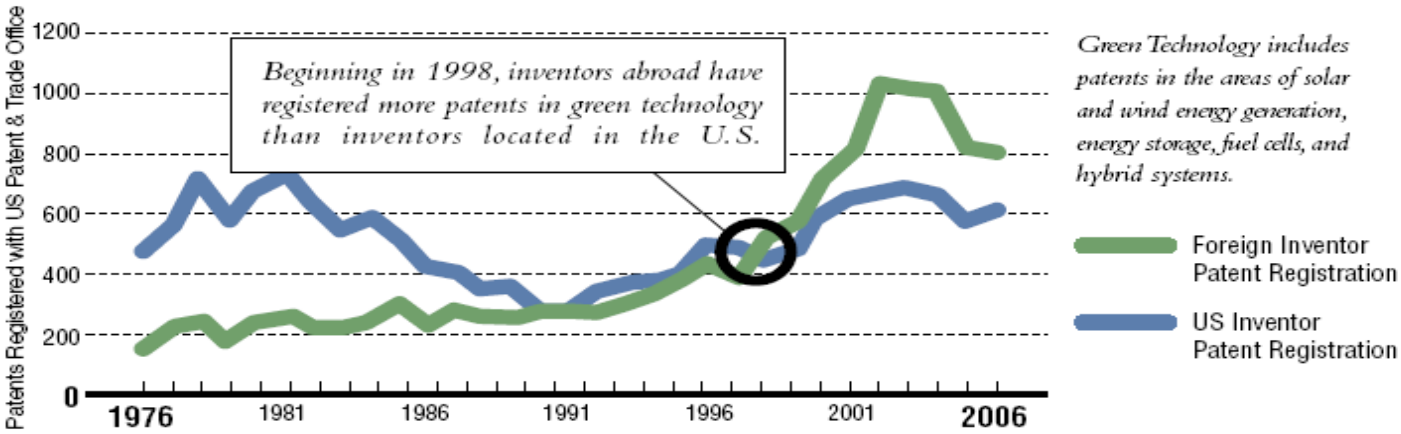
Alternative Fuel Vehicle Market Grows



http://www.next10.org/pdf/GII/Next10_FullFindings_EN.pdf

Green Technology Patent Registration

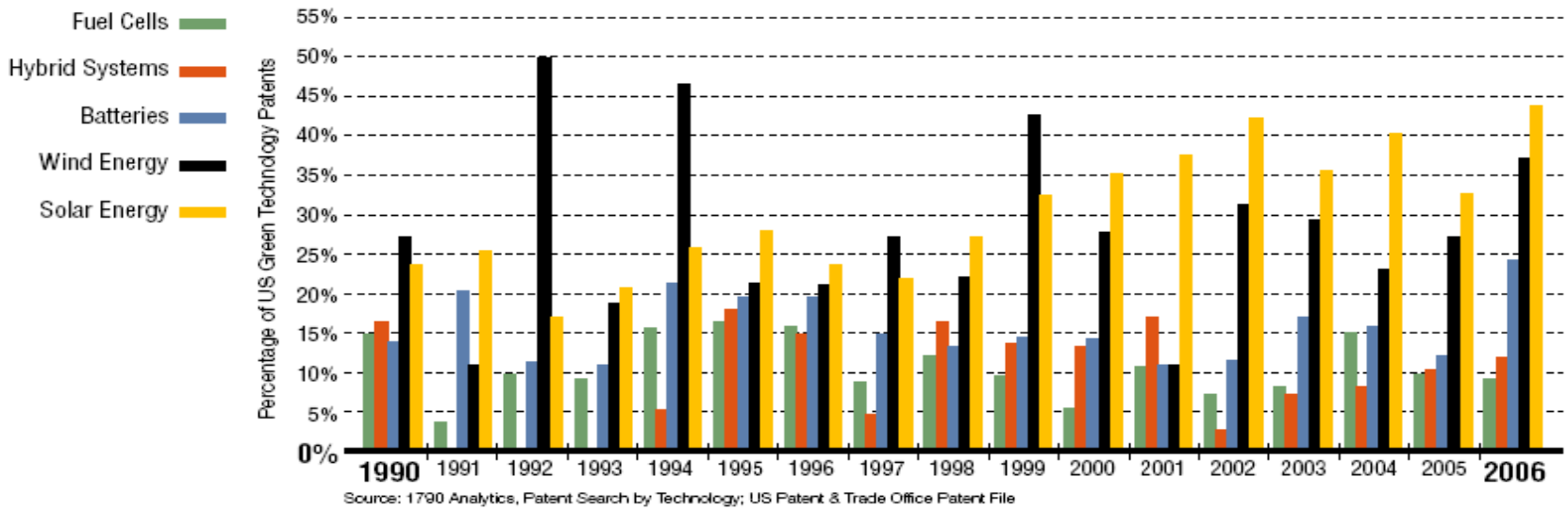
By primary inventors in U.S. and abroad



Source: 1790 Analytics, Patent Search by Technology; US Patent & Trade Office
Analysis: Collaborative Economics

Patents by Green Technology

California share of U.S. green technology patents



Source: 1790 Analytics, Patent Search by Technology; US Patent & Trade Office Patent File

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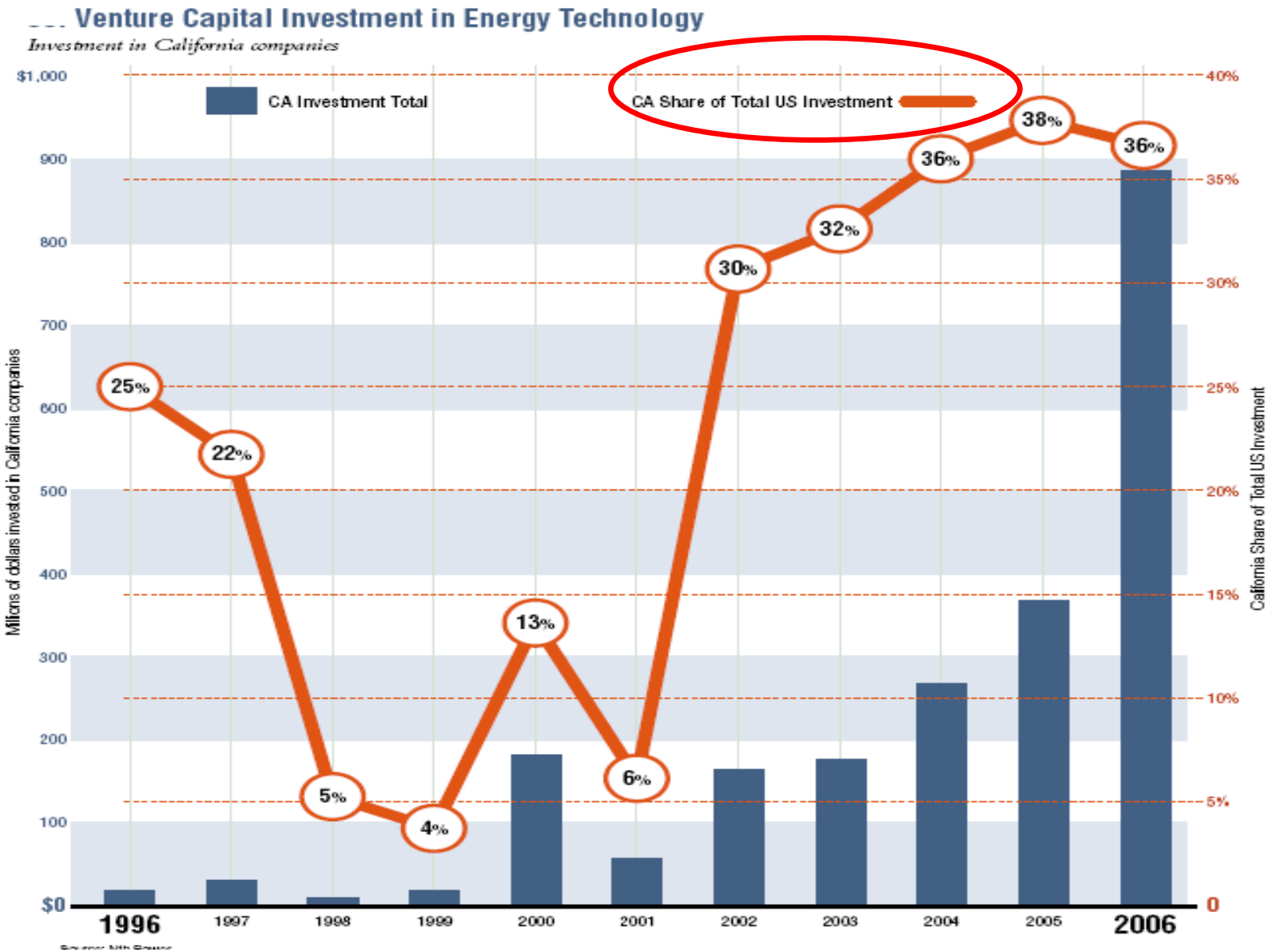

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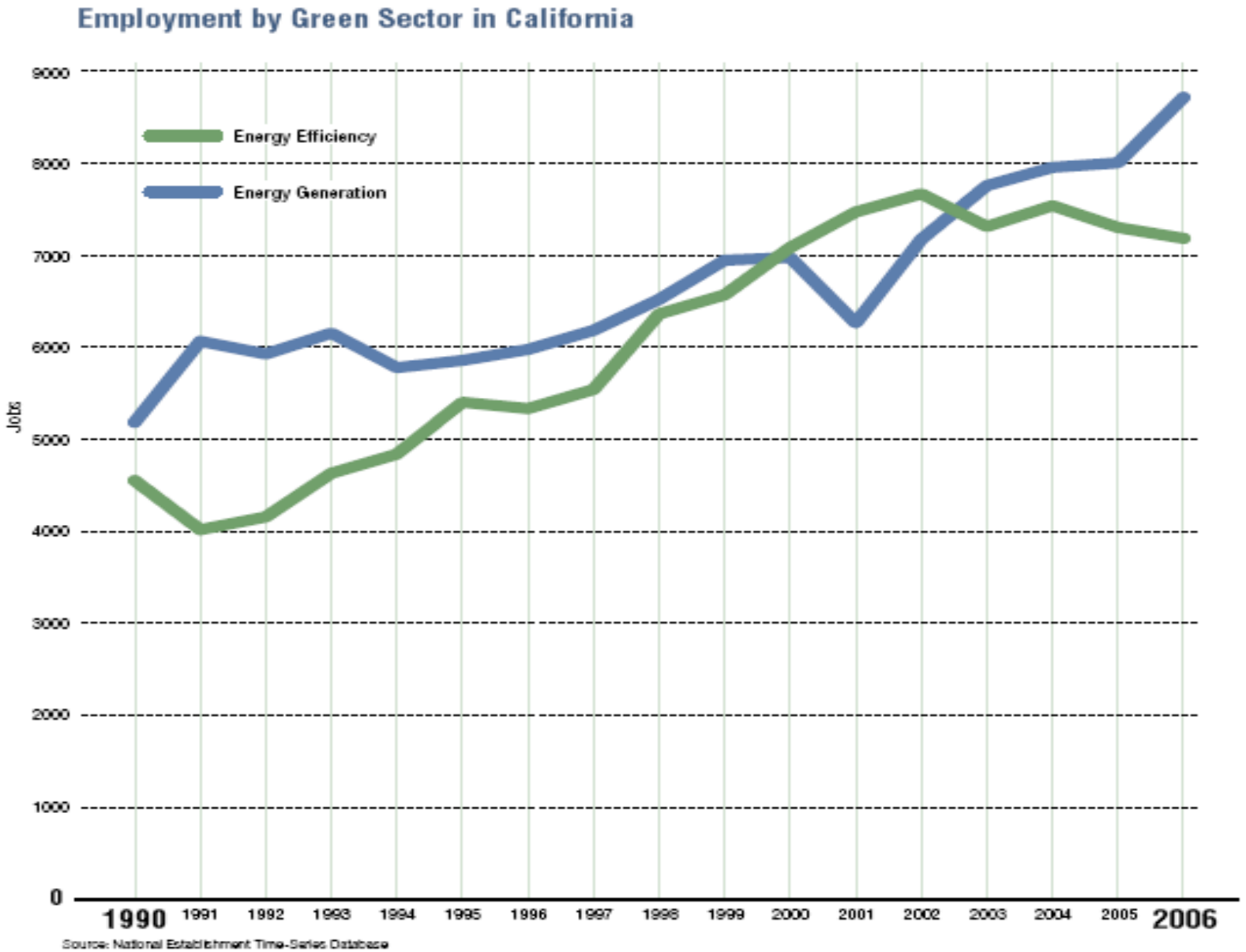


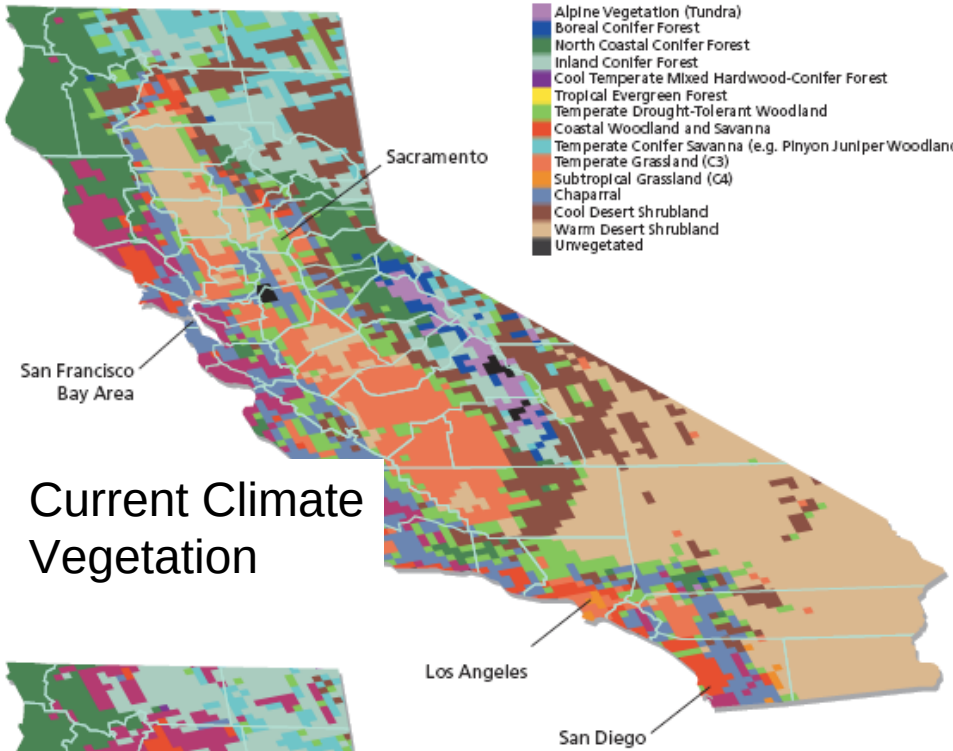
http://www.next10.org/pdf/GII/Next10_FullFindings_EN.pdf

Movement, Fuels, and ITS Jobs

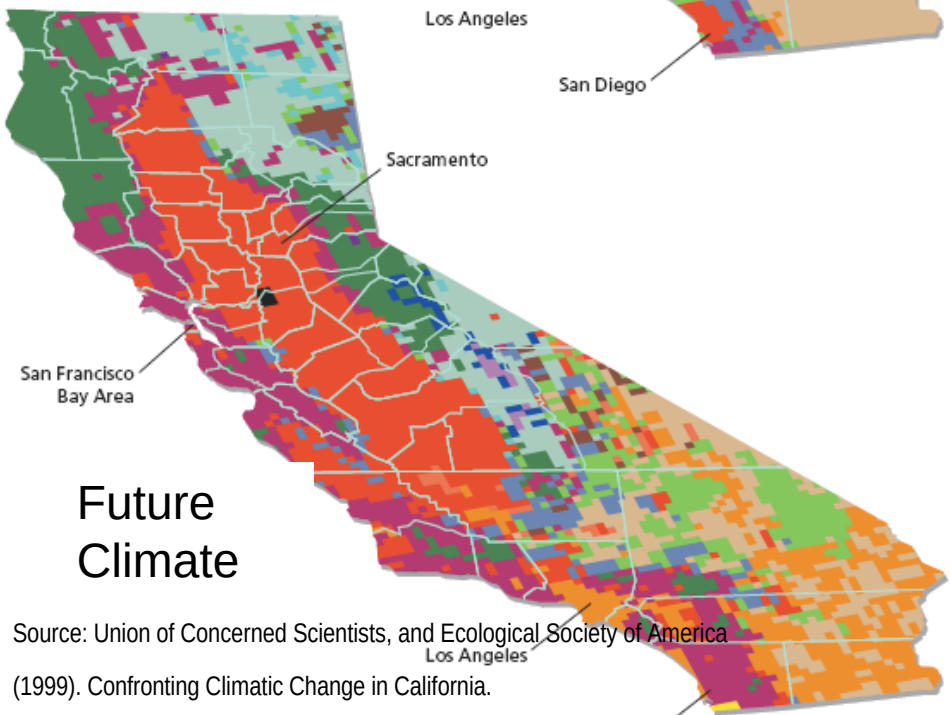
Alternative Fuels
Government (State Infrastructure Deployment, operations, and maintenance)
Government (City, County Deployment, Operations, and Maintenance)
Transit and Ground Transport
Transportation Related Manufacturing and Maintenance
Transportation Support Activities
Autonomous Vehicles 4,000 to 5,000 business @ 20 employees in 20 yrs
Goods Movement Logistics
Warehousing and Supply Chain

	2005	2008	2010	2015
Gross Total	660,560	766,250	905,210	1,050,043

Source: LMID & Time Structures



Current Climate Vegetation



Future Climate

Source: Union of Concerned Scientists, and Ecological Society of America (1999). Confronting Climatic Change in California.

Global Warming WILL Change Vegetation and Climate:

- Agriculture Will Change
- Urban Energy Use Will Increase
- Coastal Flooding will be a problem
- Many Opportunities for New Technology and Occupations

Summary of Future High Tech Jobs: Industry Conversion and New Technology

New Technology:	*2002*	*2004 or 2005*	*2006 to 2008*	*2010 or 2012*	*2015*	*Total Job Growth*	*Percent +*
Existing Manufacturing Sectors (LMID)	**1,638,200**			**1,665,000**		**26,800**	**1.6%**
ATTi: ITS & Logistics		**660,000**	**766,000**	**905,000**	**1,000,000**	**340,000**	**51.5%**
Life-Sciences		**116,100**	**121,100**	**154,800**		**38,700**	**33.3%**
MEMS		**18,000**		**22,000**	**30,000**	**12,000**	**66.7%**
Nanotechnology						**226,800**	**95%**

Source: Time Structures

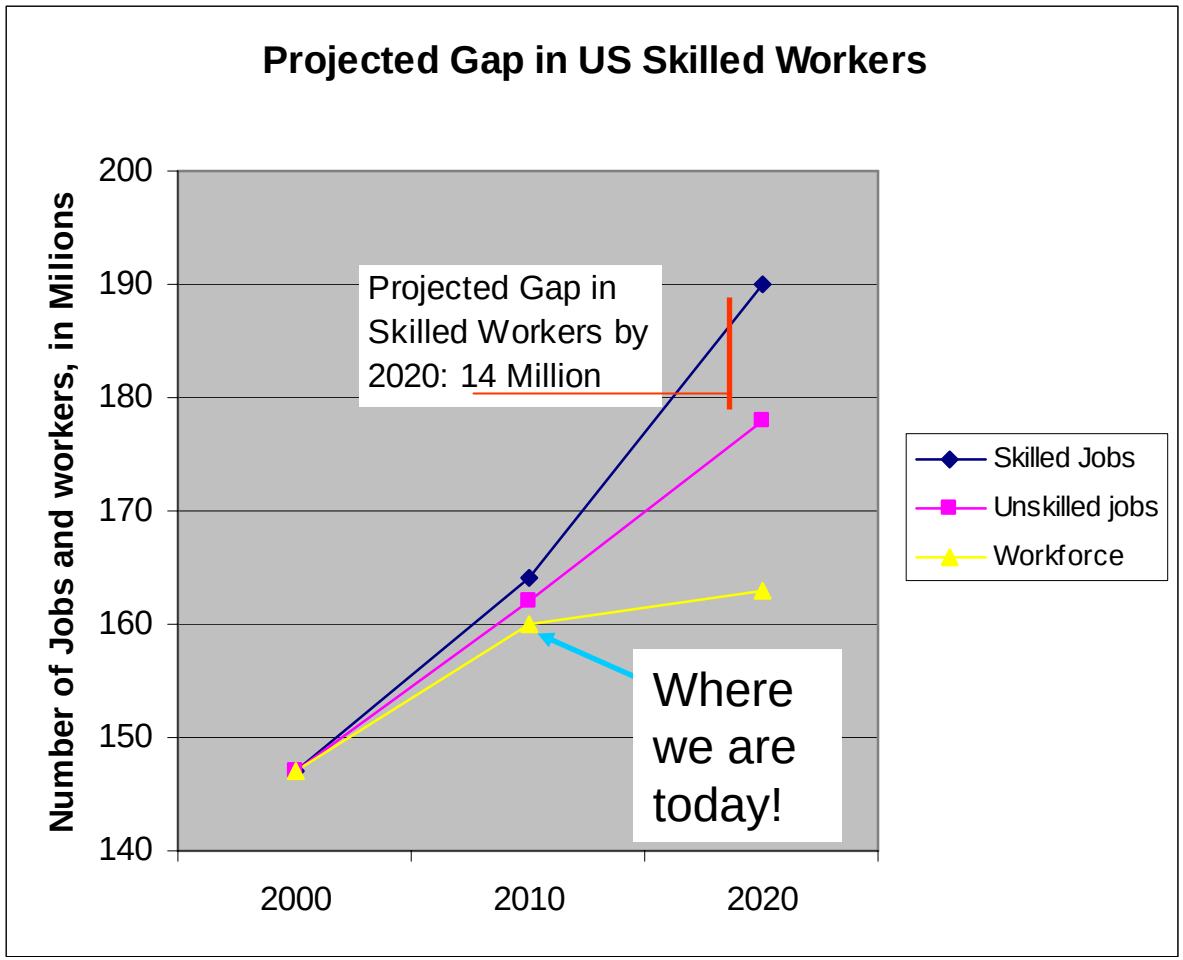
Additional California Job Projections

The Center for the Continuing Study of the California Economy projects the following new and replacement jobs by sector for 2014:

- Nursing: 55,000 new and 50,000 replacement
- Production: 50,000 new and 250,000 replacement Construction: 175,000 each for new and replacement; and
- Repair: about 80,000 new and 125,000 replacement.

Source: Center for the Continuing Study of the Economy, 2006 report.

Projected Jobs May NOT Occur Because of Workforce Skills Gap



Source: D. Ellwood/Aspen Institute, 2005.

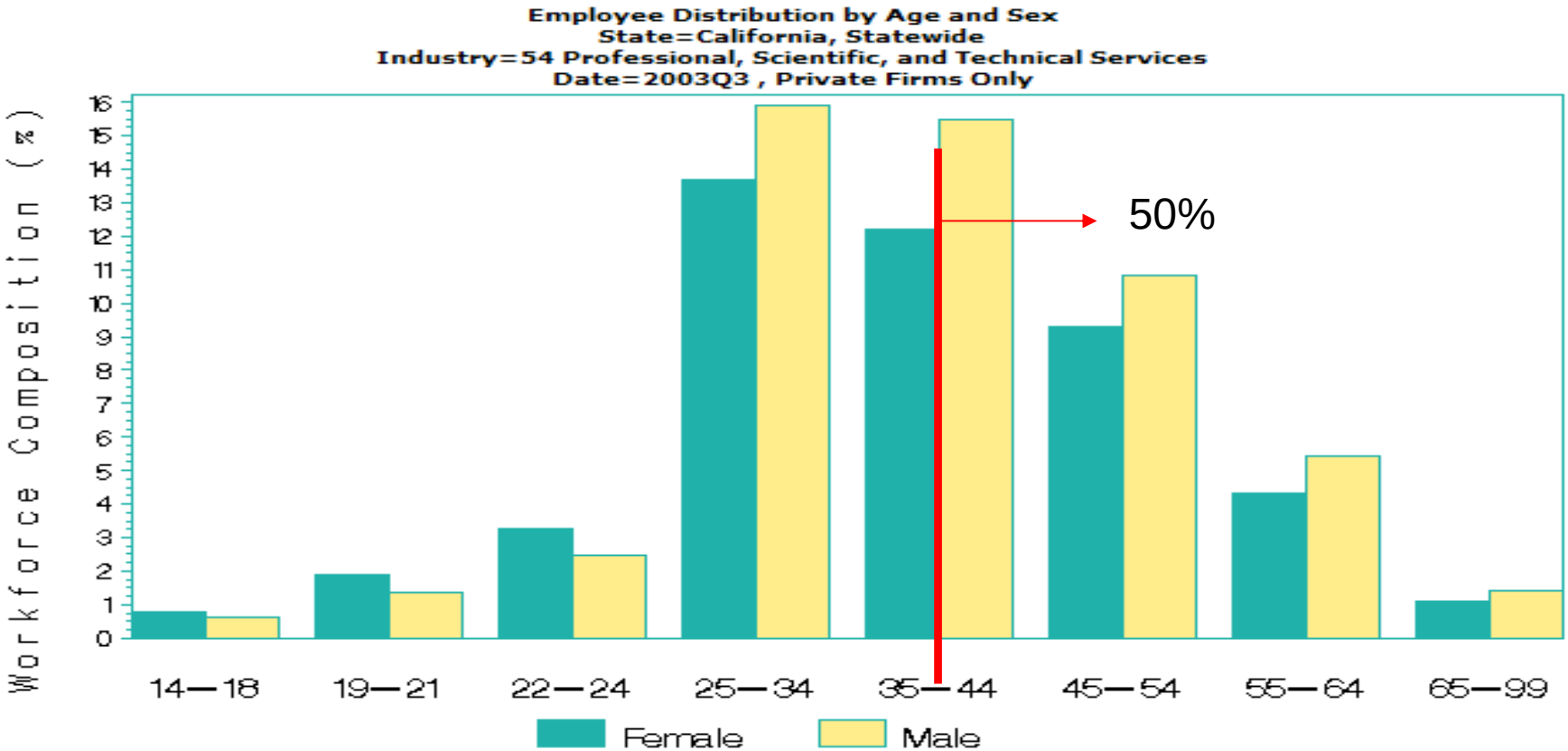
The Workforce Challenge

- Today:
  - California needs an additional 650,000 associate and above degrees in adult population age 25-44 to keep up with world's top nation's performance (Canada for example).

- By 2025:
  - California will need 278,000 adults with some college
  - 2,457,000 with a Bachelors
  - 994,000 with a graduate degree to fill jobs

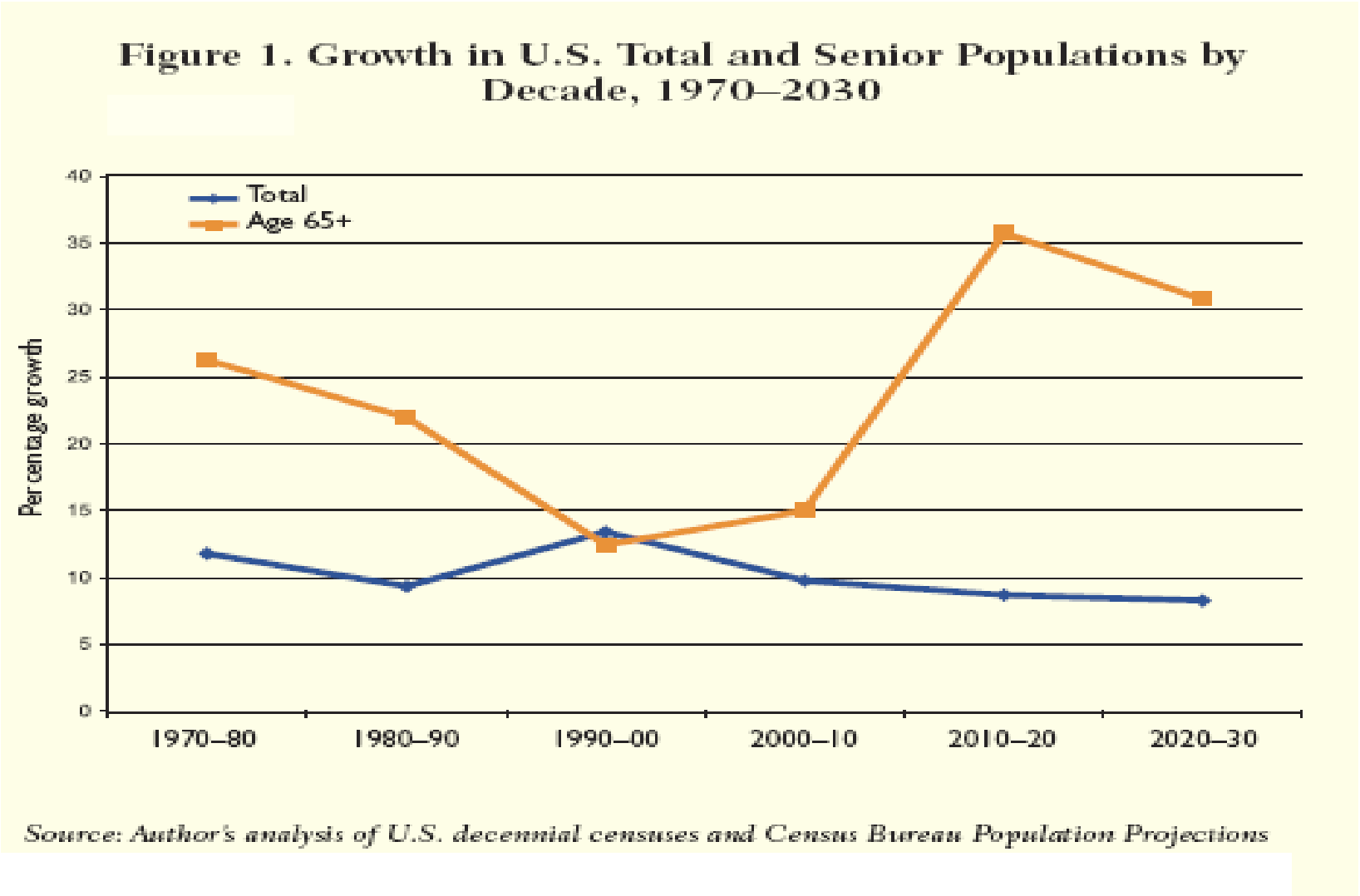
U.S. Census Bureau, 2005 ACS; OECD.
Hans Johnson and Deborah Reed (2007). Can California Import Enough College Graduates to Meet Workforce Needs? Population Trends and Counts, Vol. 8, No. 4, May.

Technical and Professional Workforce is Aging



Source: LMID and Time Structures

Retirement of Skilled Workers will Accelerate



Source: Mapping the Growth of Older America, Brookings, at: http://www3.brookings.edu/views/articles/200705frey.pdf

Skill Needs of Jobs in California (All Ages), by Educational Attainment

	Number of Jobs	
	2005	2025
Not a high school graduate	2,592,000 (17%)	3,079,000 (16%)
High school graduate	3,348,000 (22%)	3,671,000 (19%)
Some college	4,571,000 (30%)	4,849,000 (25%)
Bachelor's degree	3,167,000 (21%)	5,624,000 (29%)
Graduate degree	1,458,000 (10%)	2,452,000 (12%)
Total number of jobs	15,135,000	19,676,000

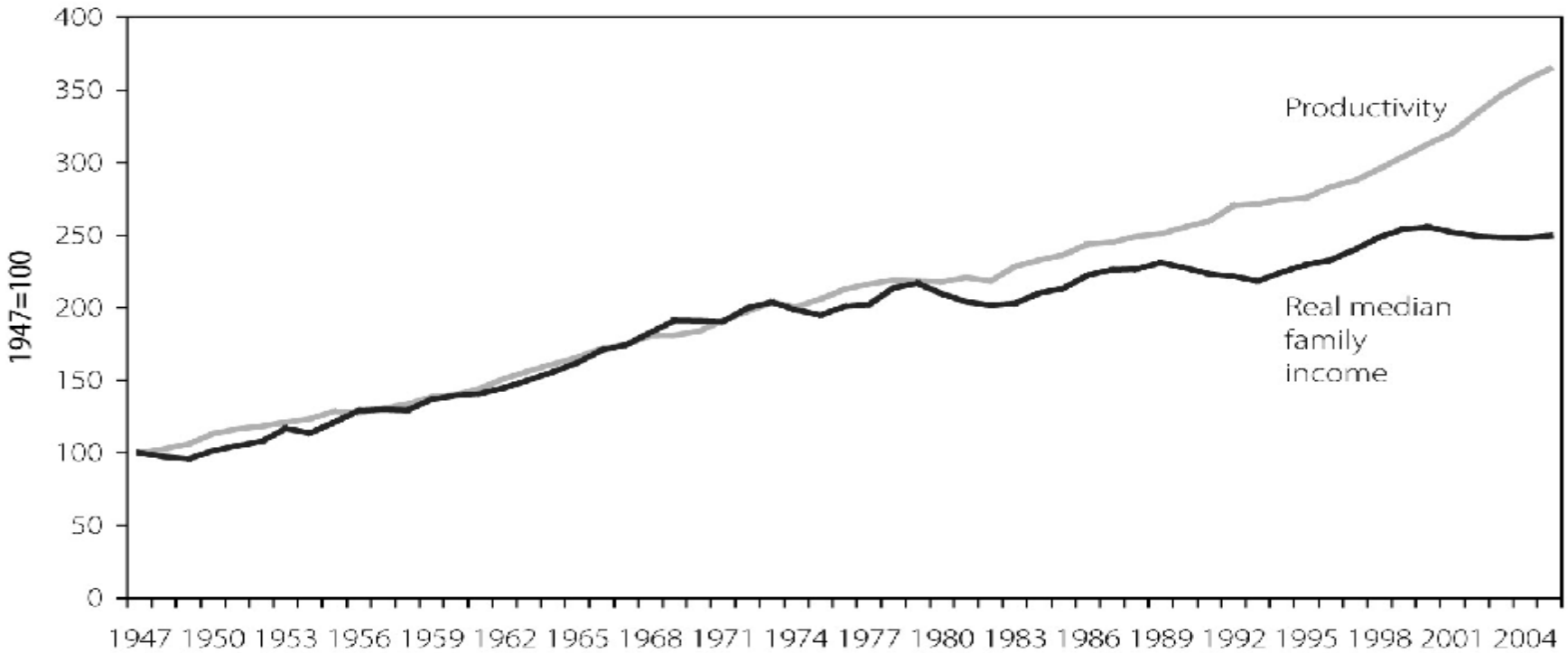
Sources: Authors' calculations using industry projections from the California Department of Transportation (2005) and worker education from the 1995 and 2005 *Earner Study of the Current Population Survey.*
Notes: See the textbox for our calculation methods. Percentages may not sum to 100 percent because of rounding.

20th vs. 21st Century Entry Level Workplace Literacy Skills

- **General literacy** vs. ***Science literacy***
- **Arithmetic literacy** vs. ***Math literacy***
- **No computer literacy** vs. ***Advanced computer literacy***
- **Basic shop equipment** vs. ***Scientific laboratory equipment***
- **Conversational English** vs. ***Specialized technical English***
- **Follow instructions** vs. ***Innovation and problem solving***
- **No writing and analysis** vs. ***Technical report preparation and interpretation***
- **Individual job responsibility** vs. ***Capacity to form and innovate in mixed groups***
- **One-time learning of advanced competencies** vs. ***Life-long learning of different advanced competencies***

Two California Groups Must Respond: Incumbent Workers and Latinos
1. Middle Class Incumbent Workers

Productivity and real median family income growth

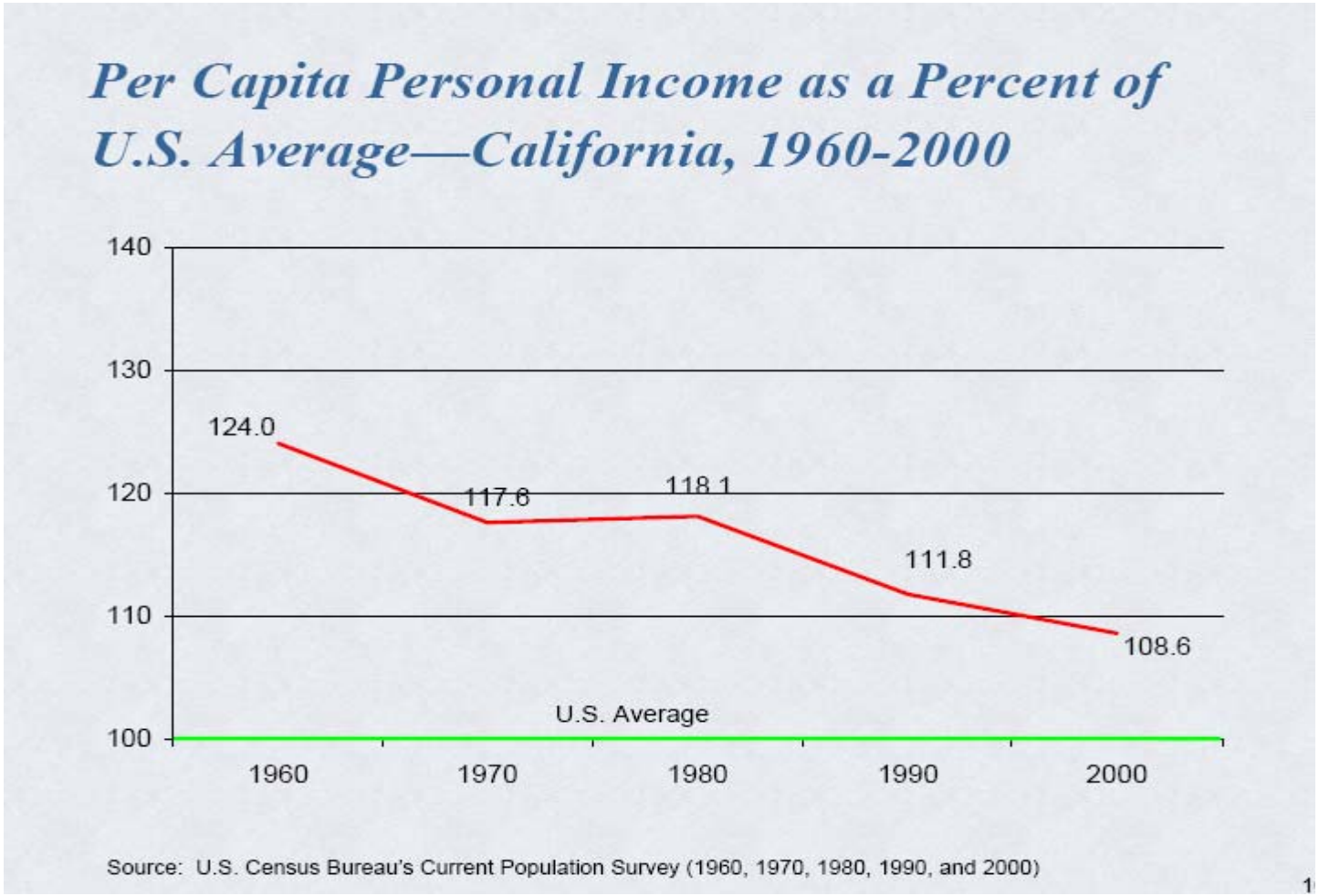


Source: Authors' analysis of U.S. Census Bureau and U.S. Bureau of Labor Statistics data.

Figure 1E from: Mishel, Lawrence, Jared Bernstein, and Sylvia Allegretto, *The State of Working America 2006/2007*. An Economic Policy Institute Book. Ithaca, N.Y.: ILR Press, an imprint of Cornell University Press, 2007.

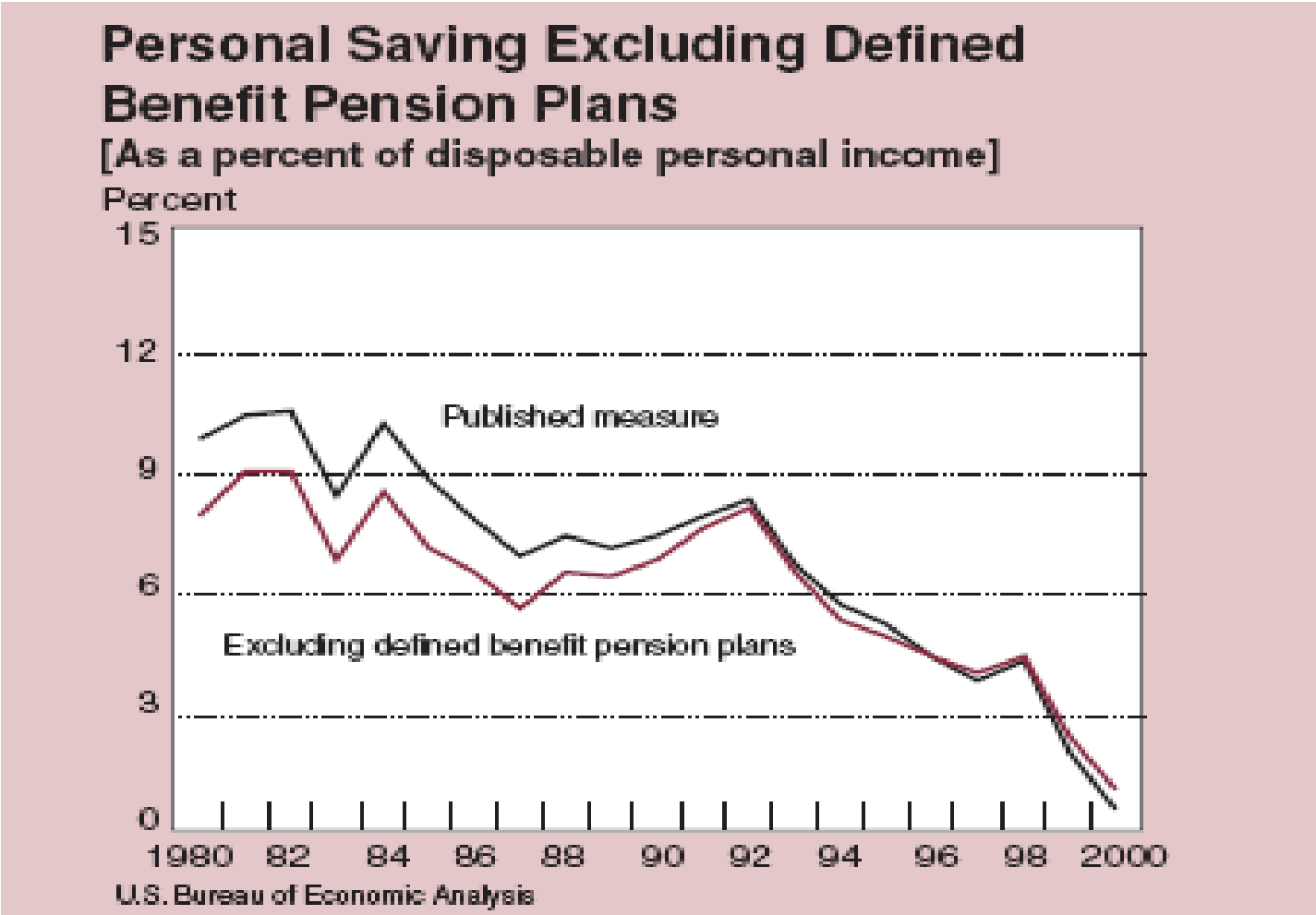
EPI

Life Long Training and College for Children is At Risk as Overall Per Capita Income Falls



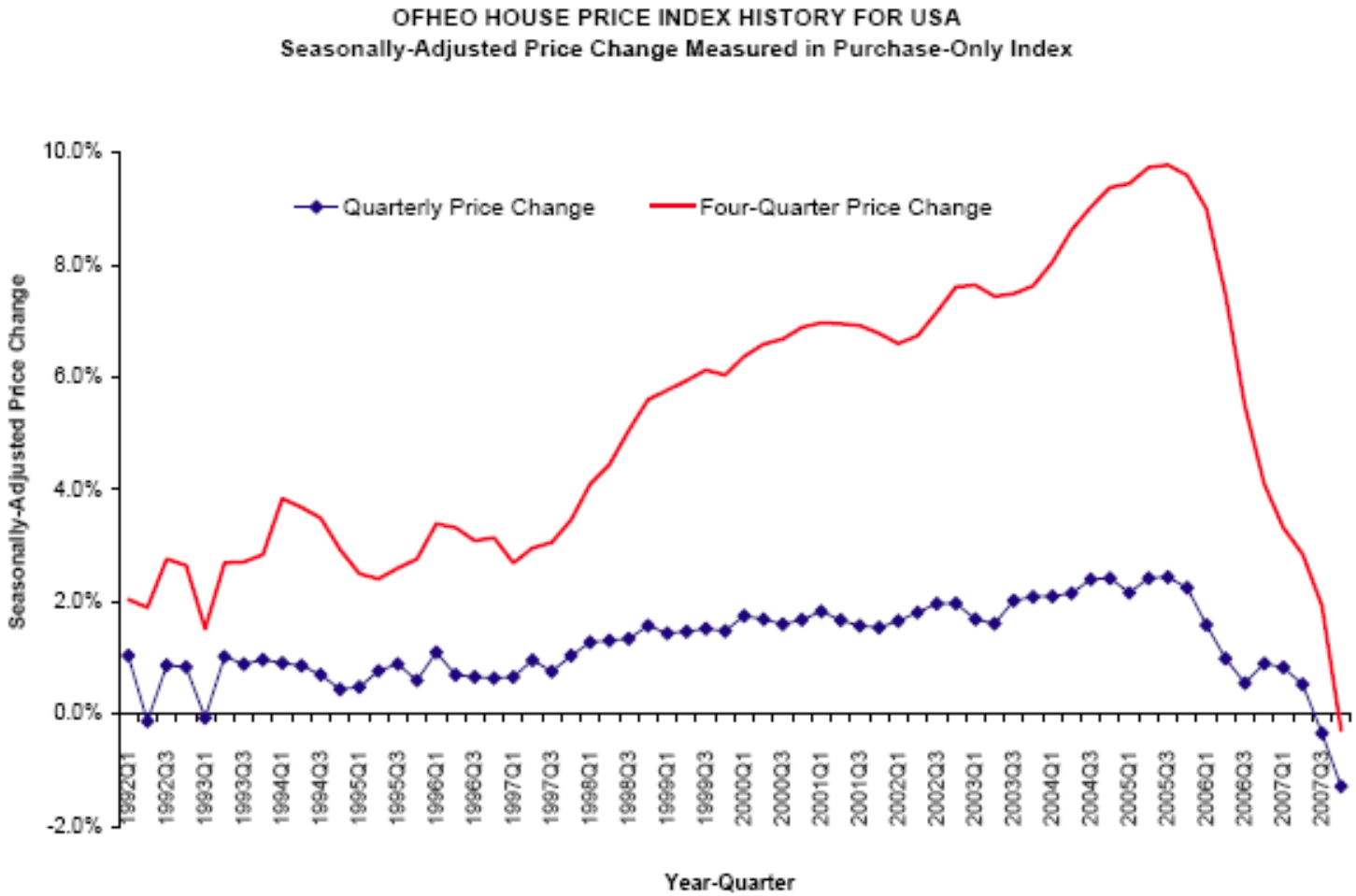
NCHEMS, 2006

Personal Savings are Nonexistent



Source: BEA, Alternative Measures of Personal Income, 2002.

For the first time since the Federal Reserve started tracking the data in 1945, the amount of debt tied up in American homes now exceeds the equity homeowners have built.



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Factors Affecting Hispanic's Choices

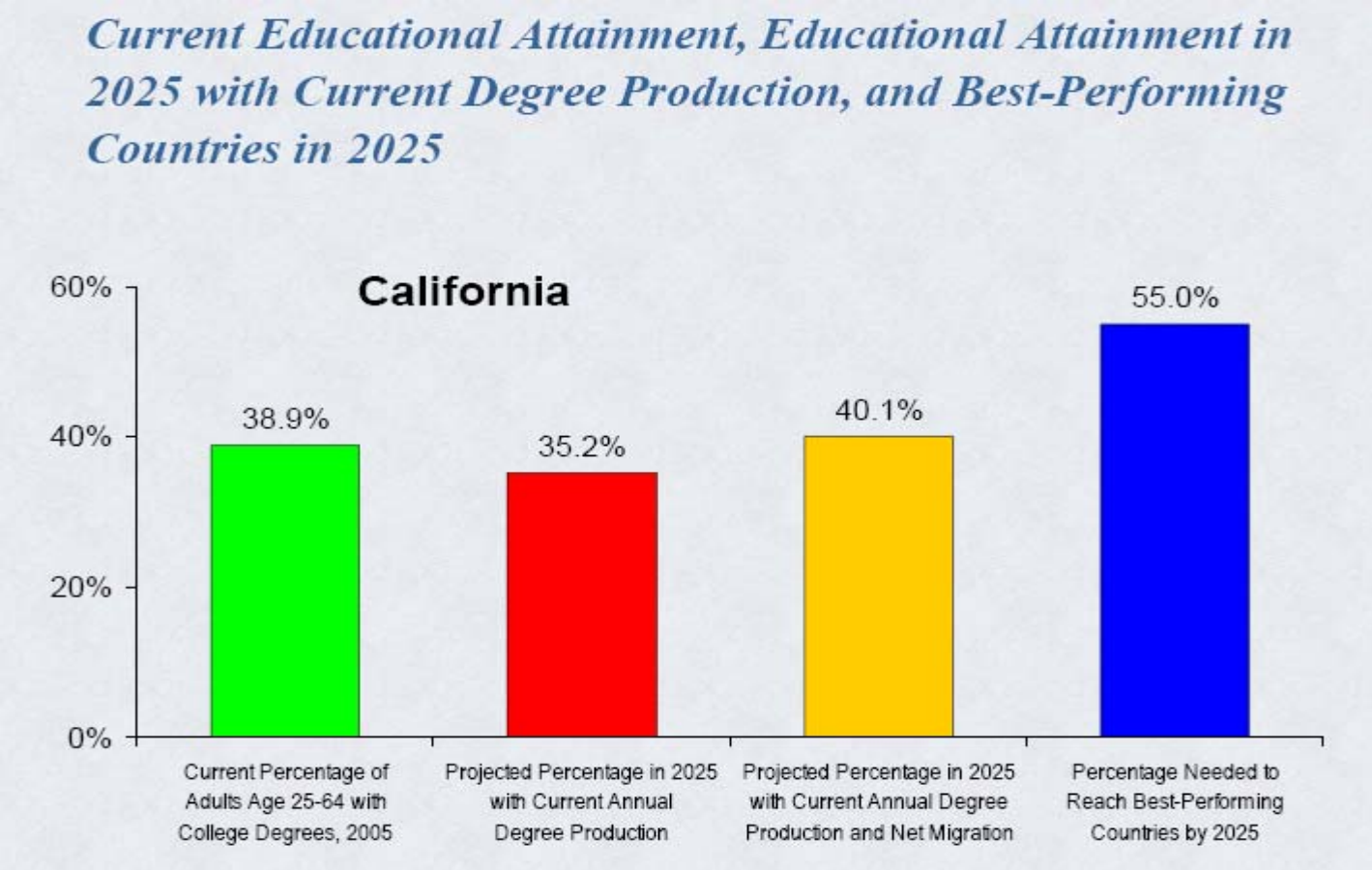
Financial Burden to Pay for College Varies Widely Among Different Income Families in California

A CLOSER LOOK AT FAMILY ABILITY TO PAY	Average family income	Community colleges		Public 4-year colleges/universities		Private 4-year colleges/universities	
		Net college cost*	Percent of income needed to pay net college cost	Net college cost*	Percent of income needed to pay net college cost	Net college cost*	Percent of income needed to pay net college cost
Income groups used to calculate 2006 family ability to pay							
20% of the population with the lowest income	$12,800	$8,188	64%	$10,144	79%	$24,876	194%
20% of the population with lower-middle income	$28,520	$8,708	31%	$10,927	38%	$24,715	87%
20% of the population with middle income	$48,420	$9,171	19%	$11,997	25%	$24,469	51%
20% of the population with upper-middle income	$77,357	$9,321	12%	$12,250	16%	$24,687	32%
20% of the population with the highest income	$135,136	$9,352	7%	$12,376	9%	$25,382	19%
40% of the population with the lowest income	**$20,660**	**$8,448**	**41%**	**$10,536**	**51%**	**$24,796**	**120%**

*Net college cost equals tuition, room, and board, minus financial aid.

- Little information about technology related jobs and income
- Family responsibilities for support or child care
- Little knowledge of how to obtain financial support or deal with college
- Little knowledge of what it takes to get a degree

California cannot meets its High Tech Education Goals with Immigrants



NCHEMS, 2006

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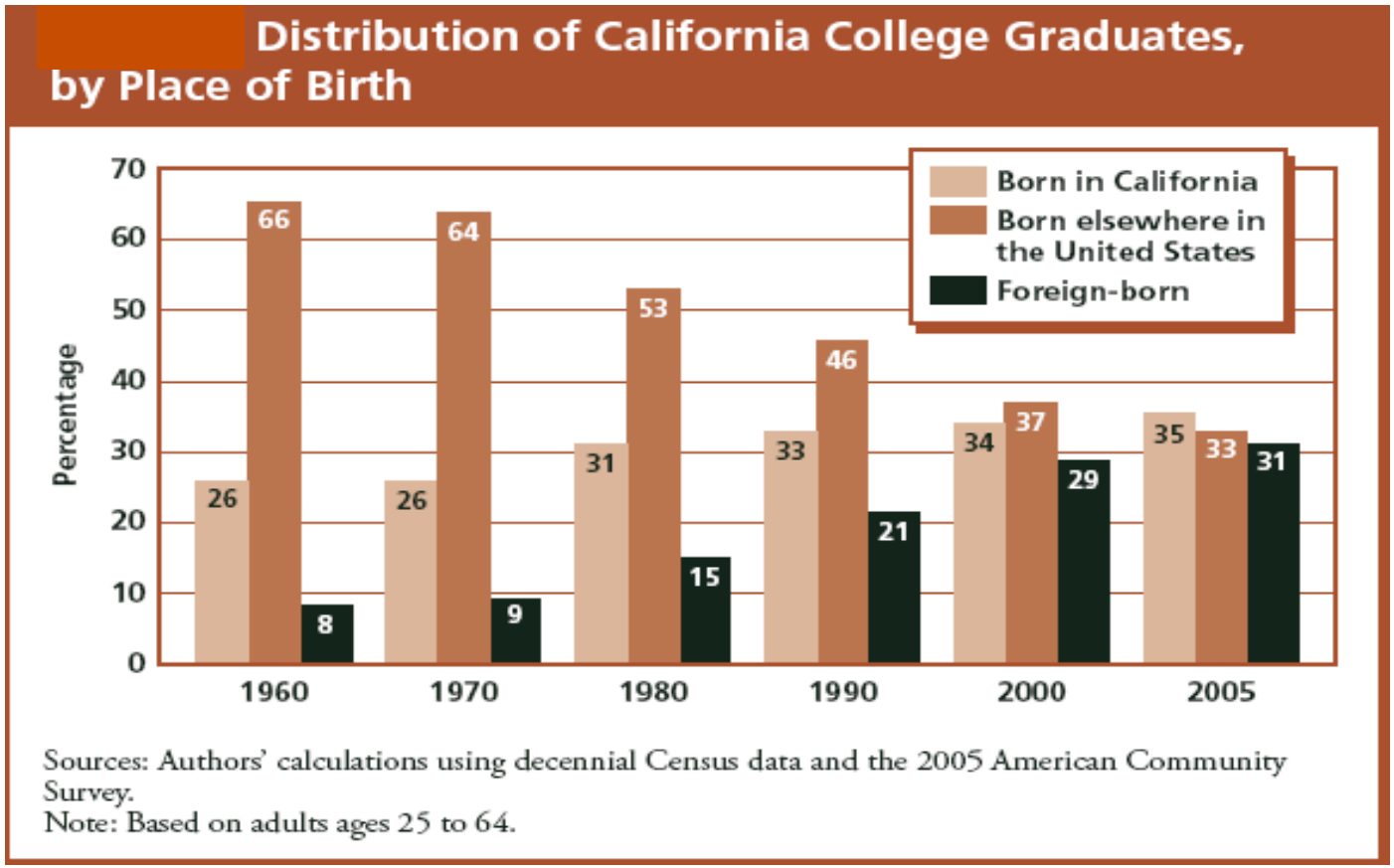
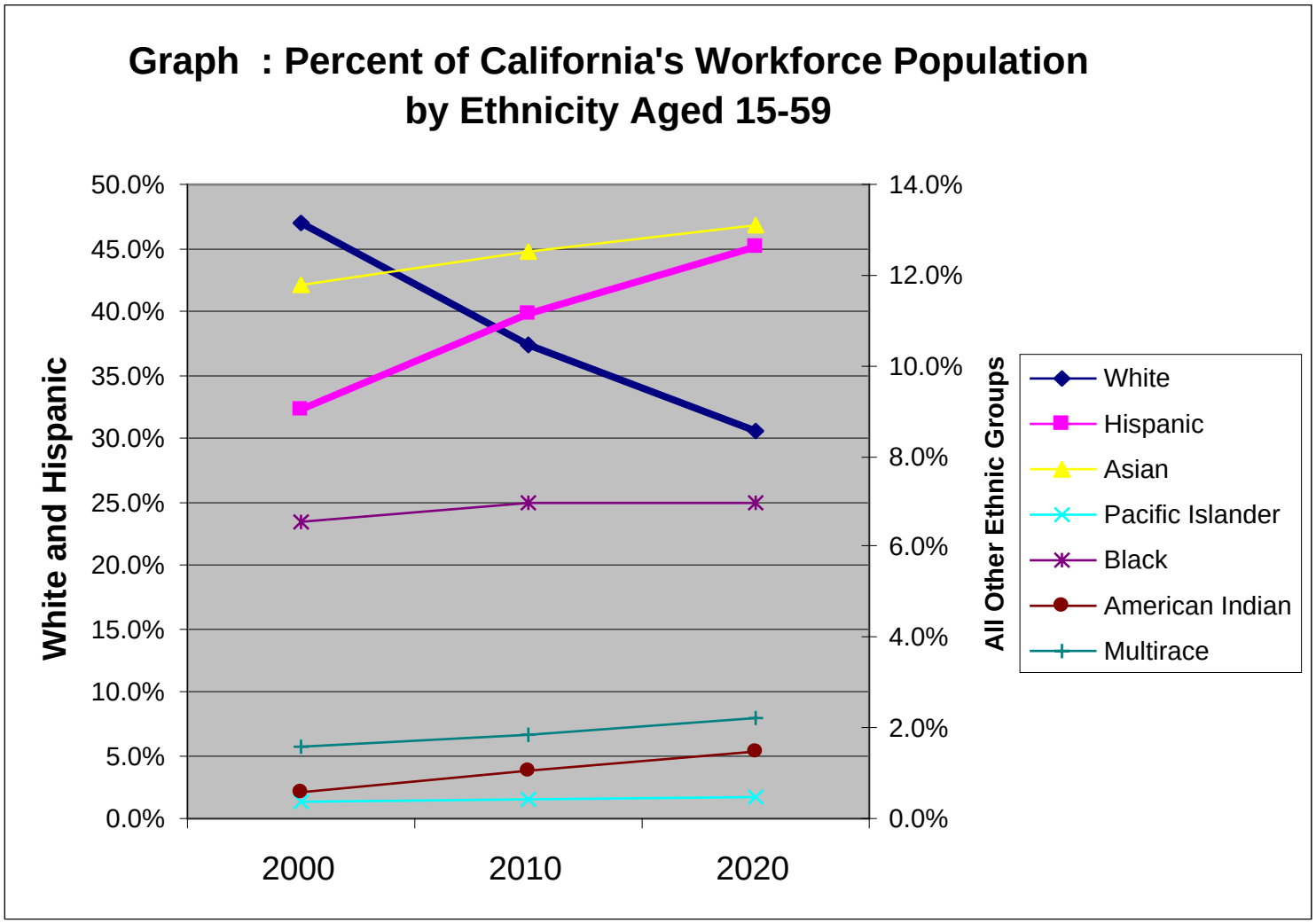
Foreign and Domestic Immigrant College Graduates are Decreasing Faster than Home Grown are Increasing



Hans Johnson and Deborah Reed (2007). Can California Import Enough College Graduates to Meet Workforce Needs? Population Trends and Counts, Vol. 8, No. 4, May.

Latinos Will Dominate 2020 Workforce: Our Second Hope



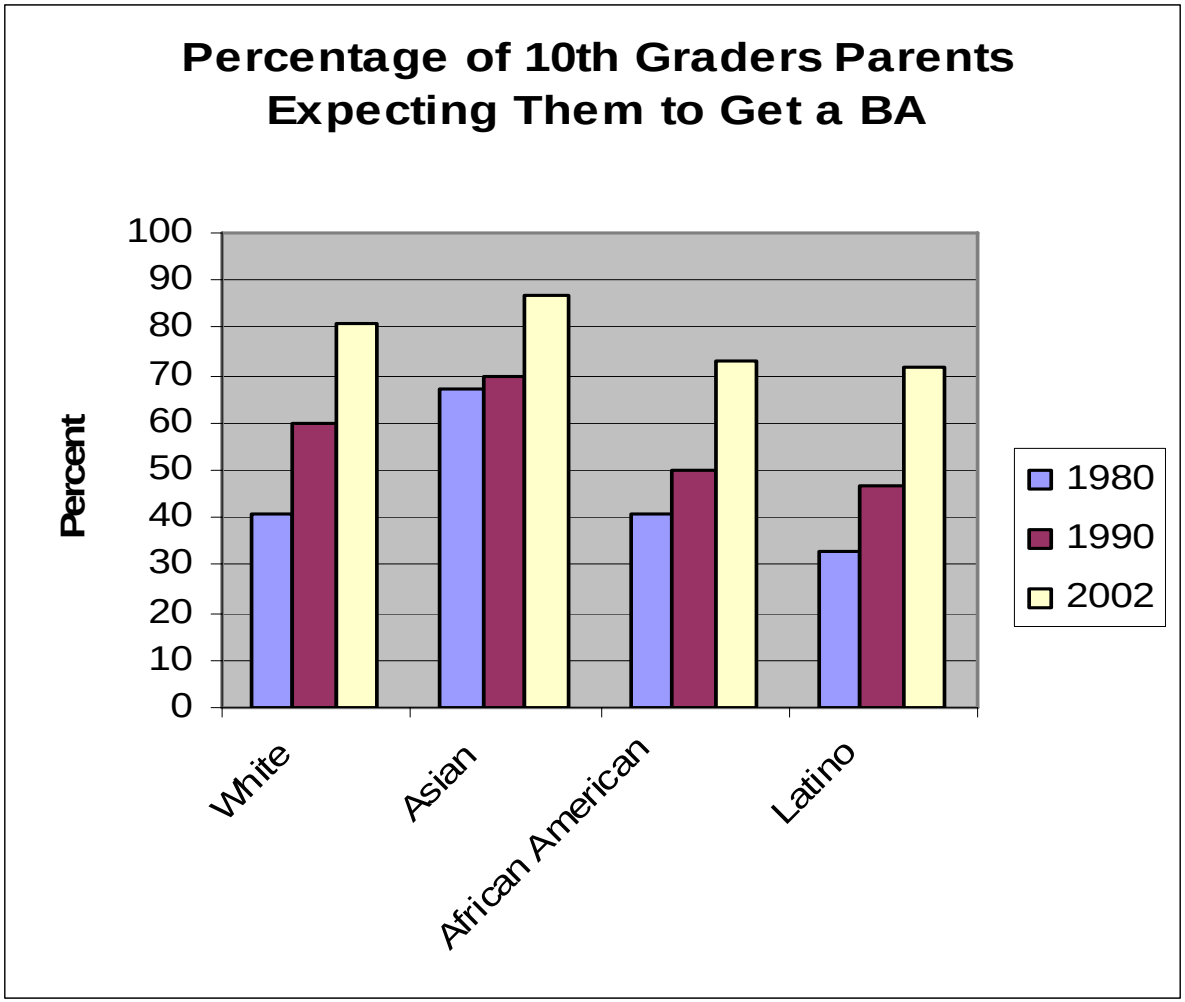
Time Structures 59

Source: CA Dept. of Finance and Time Structures

Latinos are OVER HALF of all Students Passing the California High School Exit Exam for Mathematics and English Language Arts for Grade 11 (2005)

	Female	Male	Total	Black	American Indian Alaskan Native	Asian	Filipino	Hispanic or Latino	Pacific Islander	White	Total Ethnicity Defined
Math Pass	29398	31760	**61,158**	6681	560	3709	1461	**31,587**	496	15853	60347
Math %	48.1%	51.9%		11.1%	0.9%	6.1%	2.4%	**52.3%**	0.8%	26.3%	
English Pass	28594	33177	**61,771**	7148	604	4226	1486	**31,004**	574	15893	60935
English %	46.3%	53.7%		11.7%	1.0%	6.9%	2.4%	**50.9%**	0.9%	26.1%	

All Parents Value Education

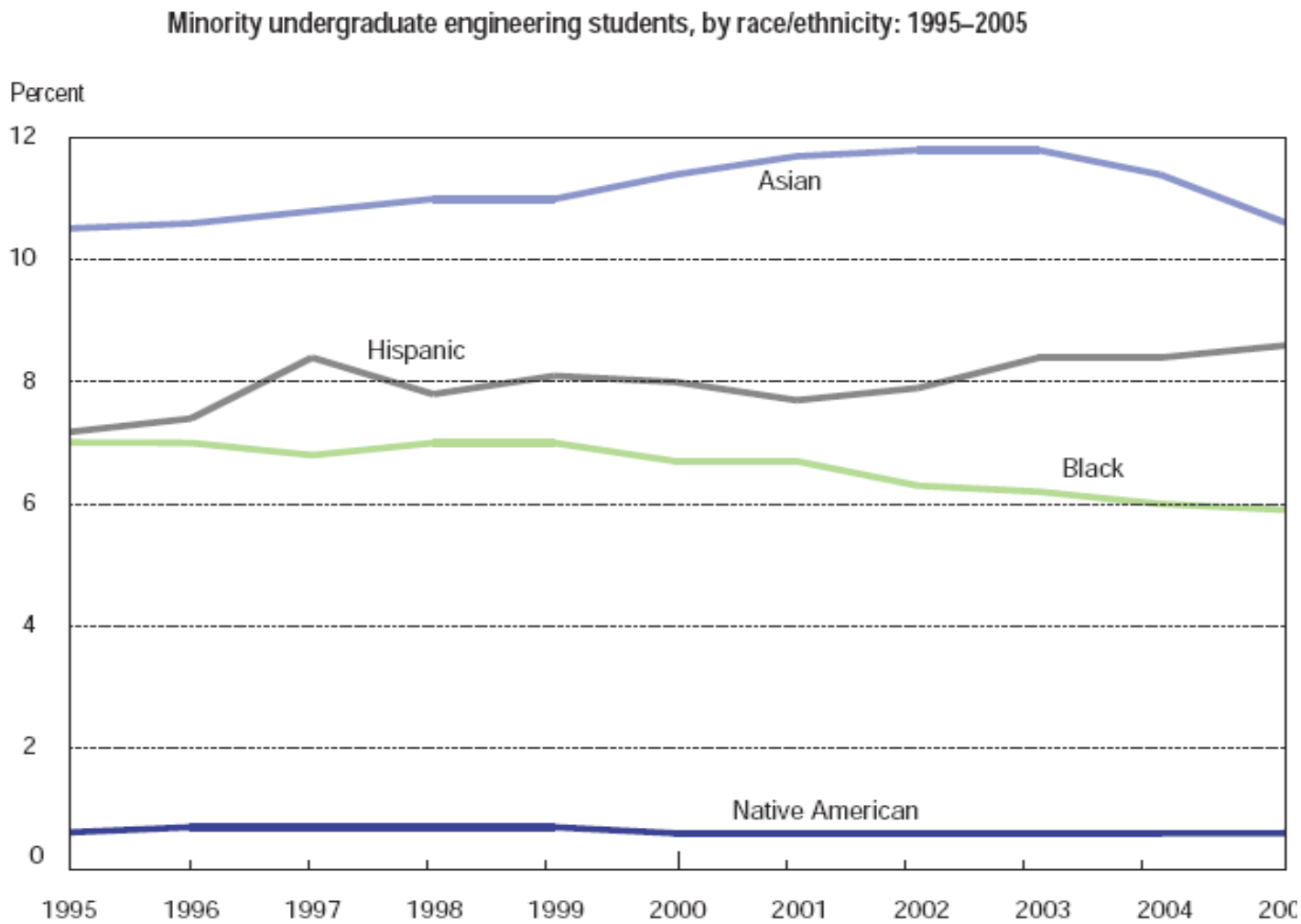


Source: US Dept. of Education, 2004.

Hispanic and Latino Students Scoring Basic to Advanced in Science (California STAR, 2006)

Subject	Grade 9	Grade 10	Grade 11
Biology	39,226	62,978	20,406
Chemistry	494	16,471	21,165
Physics	2,124	1,058	6,157

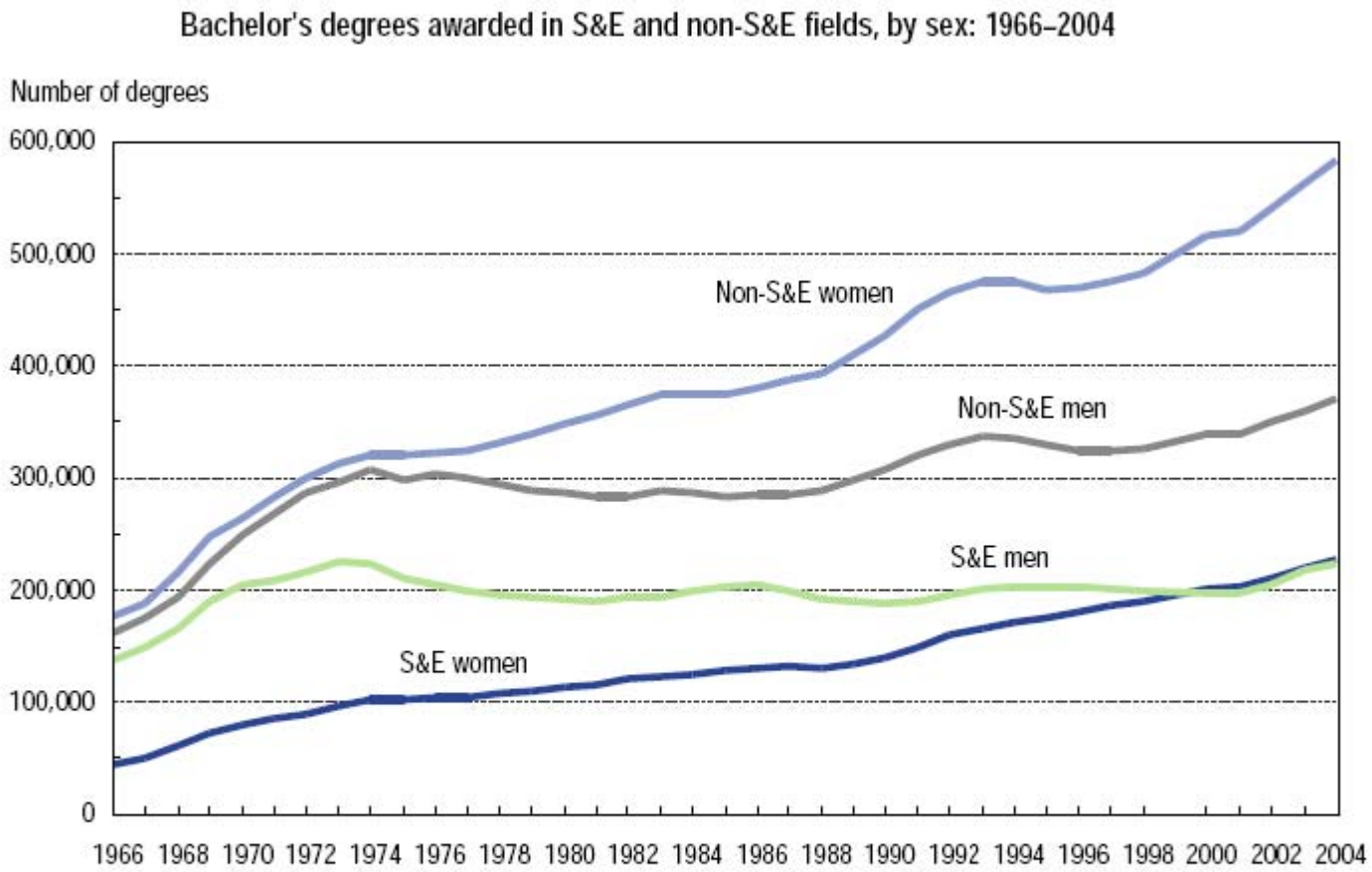
Hispanics are an Increasing Portion of Degrees



NOTE: Race/ethnicity breakouts are for U.S. citizens and permanent residents only.

SOURCE: Engineering Workforce Commission, Engineering & Technology Enrollments: Fall 2005 (Washington, DC, 2006).

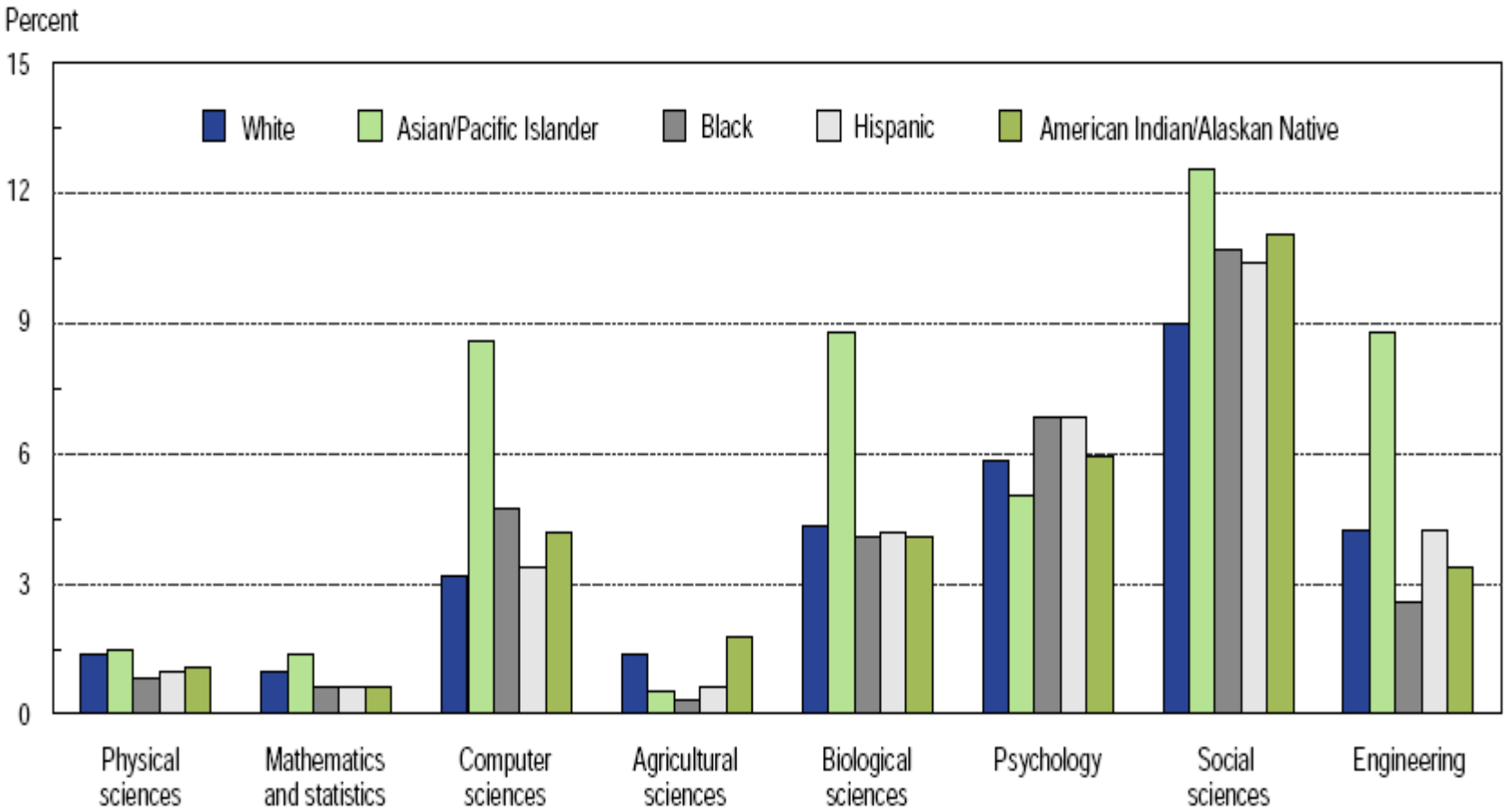
More Women Are Graduating



NOTE: National data not available for 1999.

SOURCE: National Science Foundation, Division of Science Resources Statistics, special tabulations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, Completions Survey, 1966–2004.

Bachelor's degrees awarded to racial/ethnic groups in S&E fields: 2004



NOTE: Percents refer to percentage of each racial/ethnic group earning degrees in a given field. Physical sciences include earth, atmospheric, and ocean sciences.

SOURCE: National Science Foundation, Division of Science Resources Statistics, special tabulations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, Completions Survey, 2004.

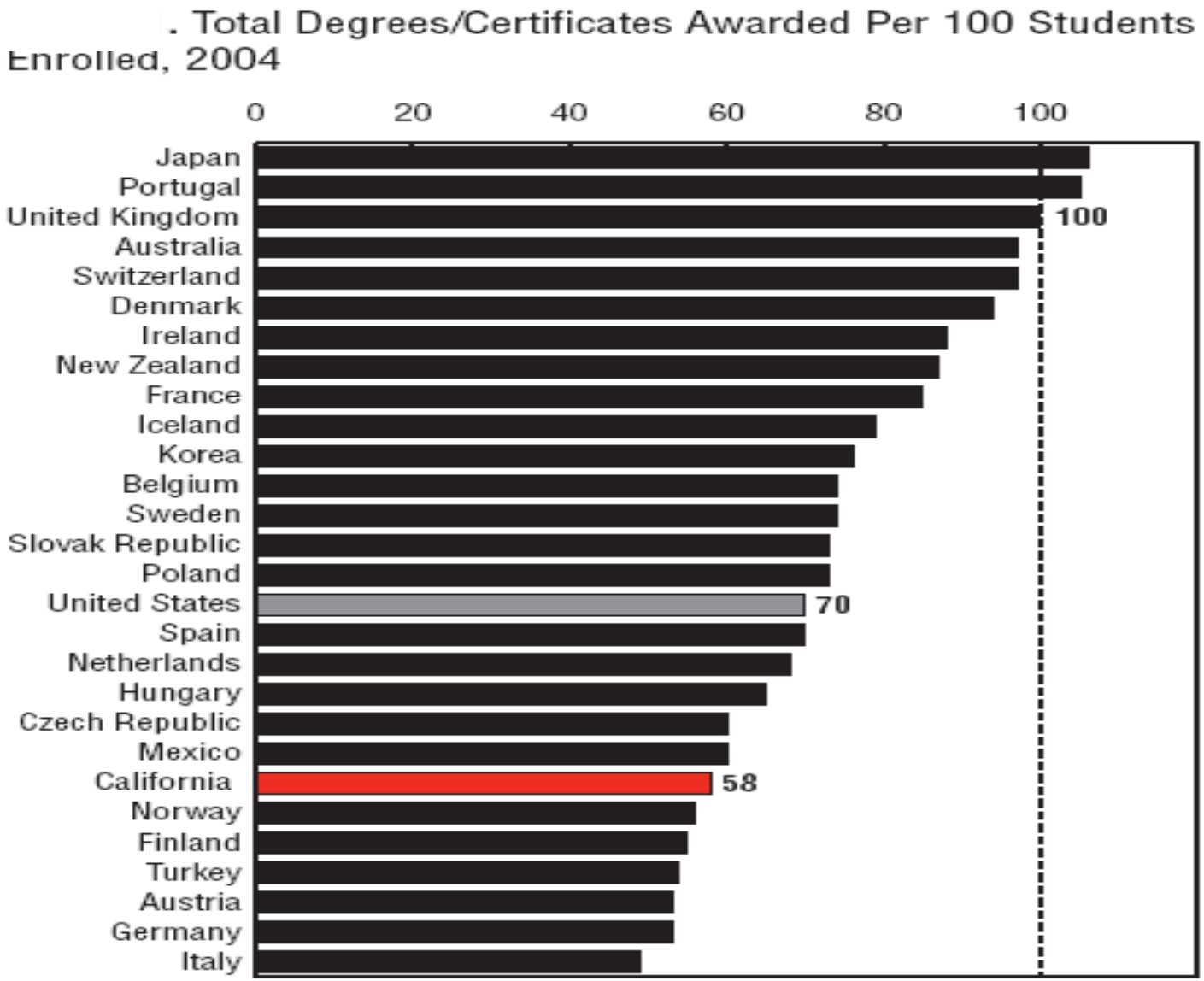
PREPARATION	CALIFORNIA		Top States 2006
	1992*	2006	
High School Completion (20%)			
18- to 24-year-olds with a high school credential	78%	87%†	94%
K–12 Course Taking (35%)			
9th to 12th graders taking at least one upper-level math course	29%	48%	64%
9th to 12th graders taking at least one upper-level science course	16%	20%	40%
8th grade students taking algebra	14%	39%‡	35%
12th graders taking at least one upper-level math course	n/a	24%	66%
K–12 Student Achievement (35%)			
8th graders scoring at or above "proficient" on the national assessment exam:			
in math	16%	22%	38%
in reading	22%	21%	38%
in science	20%	18%	41%
in writing	20%	23%	41%
Low-income 8th graders scoring at or above "proficient" on the national assessment exam in math	5%	10%	22%
Number of scores in the top 20% nationally on SAT/ACT college entrance exam per 1,000 high school graduates	98	146	237
Number of scores that are 3 or higher on an Advanced Placement subject test per 1,000 high school juniors and seniors	104	190	217
Teacher Quality (10%)			
7th to 12th graders taught by teachers with a major in their subject	51%	68%	81%

In 2006 California Lagged Behind Top U.S. States In 13 Math and Science Areas of Academic Preparation

Performance has Improved Over 1992.

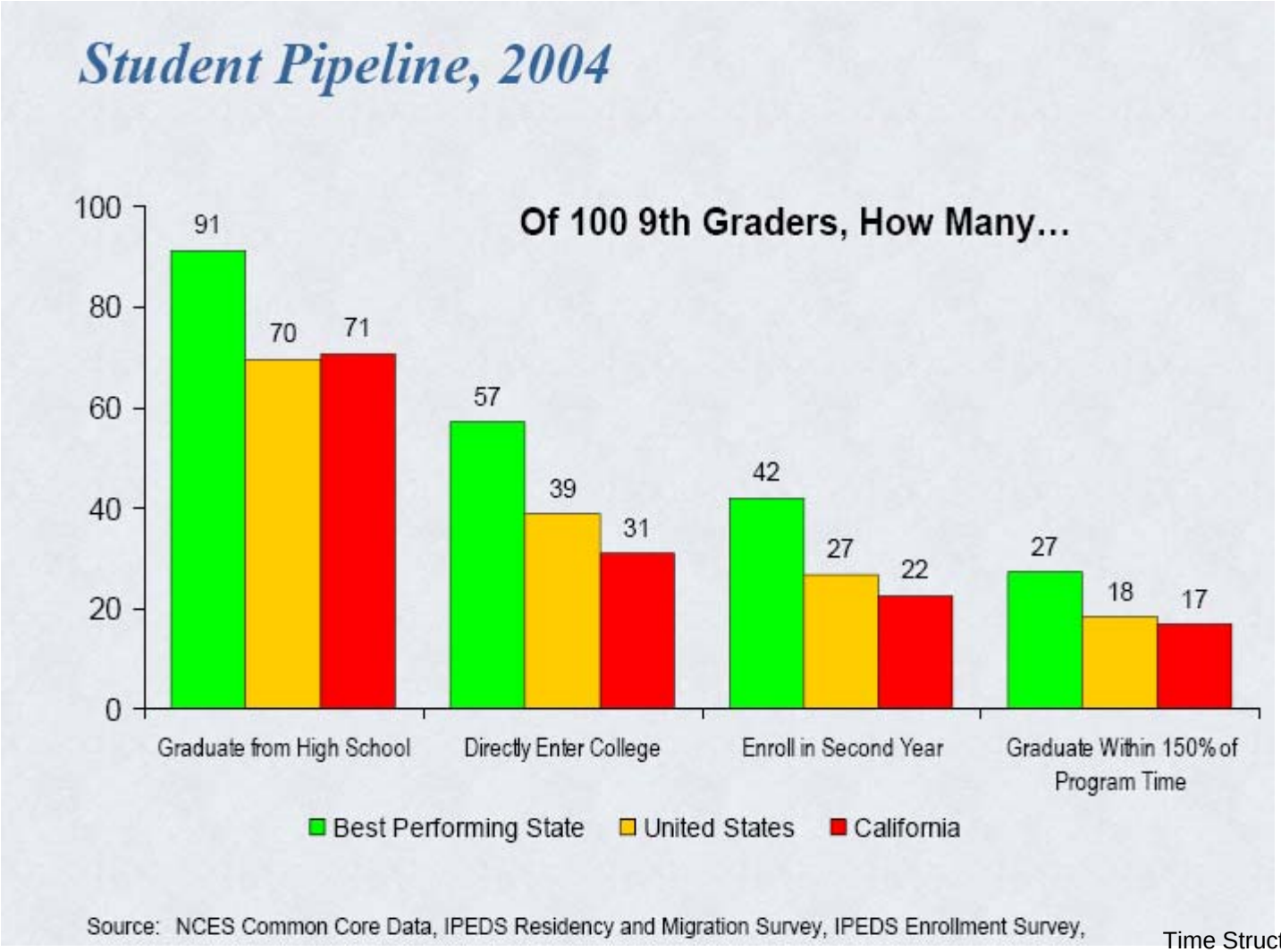
Source: The National Center for Public Policy and Higher Education, (2006) "California: Measuring Up".

California Certificate and Degree Completion Rate Is Low



Source: The National Center for Public Policy and Higher Education, "Measuring-up 2006." http://measuringup.highereducation.org/_docs/2006/statereports/CA06.pdf

California is Behind in Producing College Graduates on Time



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Economic and Workforce Development Challenges

- LEADERSHIP must anticipate and respond quickly to:
  - Emerging technologies
  - Identify and launch new funding efforts
  - Support changing business functions
  - Continuously train workers
- Leadership must be fully NETWORKED and flexible to:
  - Shift quickly to emerging technologies, new training, and business functions
  - Act as a network to mobilize resources to meet technology, business and workforce needs
  - Create flexible regional and state resources to support College and University vocational education and degreed programs
  - Be globally aware, connected and relevant

Who we are:

A research company that brings together the right team to define, solve and organize a practical response to time-driven public policy issues.
(WWW.Timestructures.com)

We use expert networks to identify organizations to co-venture with:

- Universities: Community Development Program, UC Davis, The Center for Economic Development, California State University, Chico, Institute for Law and Philosophy, University of San Diego Law School.
- Consulting firms: Bina Consulting, International Technical Service, Holden Research, Umbach Consulting, and US Field Research.
- Complex systems experts: New England Complex Systems Institute, Association for the Study Chaos in Psychology and the Life Science, the Santa Fe Institute, and National Laboratories.
- Study of time experts drawn from the International Association for the Study of Time and affiliated organizations.

We co-venture with people that have unique expertise:

- Stephen Guerin, Red Fish, Santa Fe, NM, autonomous and other Agent simulations
- Barbara Adam, University of Cardiff, United Kingdom, Sociology of time
- Donald Chou, physicist and mathematician, Ex Chief of Research, Rockwell
- J.T. Fraser, world renown time expert, Founder International Society for the Study of Time
- Ken Dozier, University of Southern California, Los Angeles, technology transfer, time-ecology network research
- Don Jennel, University of California, Santa Barbara, Geography Department
- Kevin J. Dooley, Professor of Supply Chain Management, School of Business, Arizona State University
- Clarence Mitchell, CM Consulting, Sacramento, computer programming and data
- Stephen J. Guastello, Professor of Psychology and mathematician at Marquette University
- Guenther Kress, Professor of Public Policy, California State University, San Bernardino

Recent Projects:

- Research consultant, California Redevelopment Association: examples: eminent domain, ROI, multiple agency surveys, foreclosures, etc.
- Quantitative, leadership, and network evaluation for a performance driven management system , Economic and Workforce Development, Chancellor's Office, California Community Colleges
- Racing for the Future, WIRED WIB Tool Kit, California Council on Science and Technology
- Status of California's nanotechnology industry cluster, California Council on Science and Technology
- Training for Nanotechnology, International Association of Nanotechnology

Examples of Recent Proposals

- Latino Bridge to Clean Technology, University of Baja / San Jose Evergreen community College
- NSF: A Dynamic Time Ecology Theory of Effective Emergency Response
- Redevelopment: Building Green Affordable Housing, California Redevelopment Association

Contact: Gus Koehler, Ph.D, President at: 916-564-8683 or Gus@timestructures.com or www.timestructures.com