Silicon Valley Competitiveness and Innovation Project - 2015

A Dashboard and Policy Scorecard for a Shared Agenda of Prosperity and Opportunity

SILICON VALLEY LEADERSHIP GROUP

SILICON VALLEY community foundation®

svcip.com

About the SVCIP partners

For nearly 40 years the **Silicon Valley Leadership Group** has represented the public policy interests of companies in the region, and at present consists of nearly 400 member companies.

Silicon Valley Community Foundation serves as a catalyst and leader for innovative solutions to our region's most challenging problems, and through its donors awards more money to charities than any other community foundation in the United States.

Advisory Council

Additional support from:

Allied Telesis
Morgan Family Foundation
Nexenta
Silicon Valley Bank

Report Developed and Prepared by

Collaborative Economics (COECON) is a strategic advisory and consulting firm that works with clients to create breakthrough solutions for regions and communities. COECON has extensive experience helping states and regions develop innovation strategies.
www.coecon.com

Principal Researchers and Authors

Doug Henton, Chairman and CEO
Janine Kaiser, Project Manager
Kim Held, Project Manager

Report design by Bridget Gibbons

COECON
collaborative economics

A Letter from the SVCIP Partners

January 2015

Dear Friends,

Silicon Valley is one of the most dynamic centers of innovation in the world, with talented people working to invent breakthrough products and services. For many years, the Valley has been a leader in creating numerous technology advancements, economic growth and prosperity for our region. However, we have also been severely affected by economic boom and bust cycles and our prosperity is not widely shared. We have seen troubling disparities widen within our region.

That is why we've collaborated on the Silicon Valley Competitiveness and Innovation Project to develop a data-driven, overarching economic strategy to enhance and reinforce our competitive advantages in innovation. At the same time, we need to ensure that Silicon Valley residents have access to the job opportunities and prosperity linked to growth in key industries.

Public policies at the local, state and federal levels are important levers for enhancing the region's innovation economy. The SVCIP will inform a strategic, long-term policy agenda for Silicon Valley, defined as Santa Clara, San Mateo and San Francisco counties, reflecting the interdependence of businesses and workforce across the region. To benchmark Silicon Valley's relative strengths and weaknesses, the project also compares key indicators across leading U.S. innovation regions, including New York City, Boston, Southern California, Seattle and Austin.

In this first year, the SVCIP finds that highly productive, talented workers are the undisputed foundation of the region's strength in innovation and in attracting businesses, despite the region's high costs. It then identifies the critical public policy issues that need to be addressed to develop, attract and retain talent for the region's continued success. Those issues include immigration, STEM and early education, housing and transportation. R&D funding, tax policies and the cost of doing business also emerge as issues of strategic concern for the region.

Working with federal, state and local policymakers, private sector and community leaders, we will develop a shared policy agenda, with specific actions and accountability measures. We will track our progress and trends at the following: **svcip.com**.

Please join us in working together to make Silicon Valley the world's leading community in promoting both innovation and opportunity for all its residents and businesses.

Sincerely,

Carl Guardino
President and CEO
Silicon Valley Leadership Group

Emmett D. Carson, Ph.D.
CEO and President
Silicon Valley Community Foundation

Contents

Executive Summary

Silicon Valley Leadership Group and Silicon Valley Community Foundation have joined together to develop the Silicon Valley Competitiveness and Innovation Project (SVCIP) to proactively identify a data-driven, overarching economic strategy to enhance and reinforce our competitive advantages in innovation, and ensure that Silicon Valley residents have access to the job opportunities and prosperity linked to growth in key industries.

Public policies at the local, state and federal level play a key role in this economic strategy. The SVCIP will monitor trends in Silicon Valley's innovation economy to help inform a long-term public policy agenda for the region. An advisory council, comprised of CEOs, community and non-profit leaders, identified 23 competitiveness and innovation indicators to track annually with comparisons to other U.S. innovation regions.

The innovation economy encompasses a range of assets and innovation processes, as well as *innovation industries*, comprised of companies that research, develop and/or scale new technologies, uses and processes, or support the development of startup companies. The health of these industries affects the entire regional economy, helping to create direct and indirect jobs and opportunity in good economic times, and directly causing a loss of jobs and reducing demand for local services (and the jobs associated with them) during difficult economic times. For the purposes of this report, the Silicon Valley region includes Santa Clara, San Mateo and San Francisco counties.

To help benchmark trends in the innovation economy, members of the advisory council considered key innovation hubs around the country, and identified New York City, Boston, Southern California, Seattle and Austin as the key comparison regions for SVCIP. These regions shared the closest association with Silicon Valley's unique attributes, considering dimensions such as strength and growth of innovation industries, demographic profile and activity in technology commercialization and startups.

Many SVCIP indicators suggest Silicon Valley's innovation economy is currently performing well. However, several trends suggest warning signs for Silicon Valley's ability to maintain its innovation leadership role in the long term.

Innovation industries generated roughly 33 percent of Silicon Valley's annual output in 2013, and directly employed 26 percent of the workforce in the first quarter of 2014.

Innovation industries contribute significantly to Silicon Valley's overall economy. In addition to innovation industries employing more than a quarter of the workforce and contributing an even higher proportion to the region's GDP, creation of one high-tech job is estimated to help generate roughly five jobs in the service sector, ranging from physicians and teachers to restaurant workers and landscapers.[1,2]

Silicon Valley accounted for 30 percent of venture capital deals and 46 percent of venture capital investment through the third quarter of 2014.

Silicon Valley's ability to develop new technologies and businesses is stronger than other key innovation regions in the U.S., based on high levels of venture capital deals and investments, robust later-stage startup company valuations and a vast majority of the region's initial public offerings in innovation industries. Some key innovation regions, such as New York City, have seen rapid expansion in early stage funding, suggesting strengthening commercialization and entrepreneurship activities, though with a smaller proportion of investment in innovation industries.

Labor productivity was 62 percent higher in Silicon Valley than the U.S. average in 2013, while the cost of doing business index was 19 percent higher in 2012.

Silicon Valley's highly productive workforce is a key competitiveness driver, which offsets the high costs of doing business. In fact, labor productivity in Silicon Valley (defined as the San Jose metropolitan area, due to data availability) is the highest of the key innovation regions.

56 percent of Silicon Valley's STEM workforce and nearly 70 percent of its software developers were foreign born in 2013.

Immigrants are critical to Silicon Valley's success. Silicon Valley is heavily reliant on foreign-born talent in its innovation industries. The ability for companies to continue to draw science, technology, engineering and mathematics (STEM) talent from abroad is essential because of global competition, and is directly linked to the need for long-term immigration policy reform.

Only 59 percent of 3rd graders in Silicon Valley scored proficient in reading, and only 54 percent of 8th graders scored proficient in Algebra on state exams in 2013.

Educational attainment is key to accessing opportunity in the innovation economy. Wage disparity in Silicon Valley is higher than in other key innovation regions and is linked to educational attainment. There are wide ranges in K-12 educational outcomes by race and socioeconomic status in Silicon Valley. The region must continue to invest in high-quality early education and STEM programs, to ensure that U.S.-born residents are able to access opportunities in innovation industries.

Housing sale prices rose 33 percent between 2012 and 2014 (through September), and nearly 1 in 6 commuters traveled two hours or more each day in 2013, rising from 1 in 8 in 2011.

Rising housing prices and traffic congestion are eroding the region's quality of life. Silicon Valley has lost some ground to other innovation regions in terms of attracting people to relocate here, particularly U.S.-born talent, in part because of the high cost of living. The region has the most expensive housing costs and one of the worst average commute times of the key innovation regions. Continuing to draw and retain talent within the region requires reexamining barriers to housing development in order to help address soaring housing prices and ever-lengthening commute times.

Total R&D expenditure growth among Silicon Valley universities grew 9 percent between 2004 and 2012, while other regions expanded 14 percent to 42 percent. Federal R&D funding for the region's universities fell 2 percent from 2011 to 2012.

Falling investment in research and development (R&D) in the region's universities is a growing concern. Research and development funding helps to build a pipeline for innovation development and commercialization and builds our region's human and intellectual capital. Federal funding for R&D in the U.S. fell between 2012 and 2013, while other nations have ramped up their national R&D expenditures.

Taken together, SVCIP findings suggest that a critical ingredient for the continued success of the Valley is talent, and several trends, such as deteriorating quality of life, are inhibiting the region's ability to develop, attract and retain it. Declining R&D funding and the high cost of doing business are also long-term strategic issues.

To address the areas of concern, SVCIP will work with public policy, business and community leaders in the region to further develop specific public policy priorities and then hold ourselves accountable for progress over the next several years. Follow the latest progress at: **svcip.com.**

Introduction

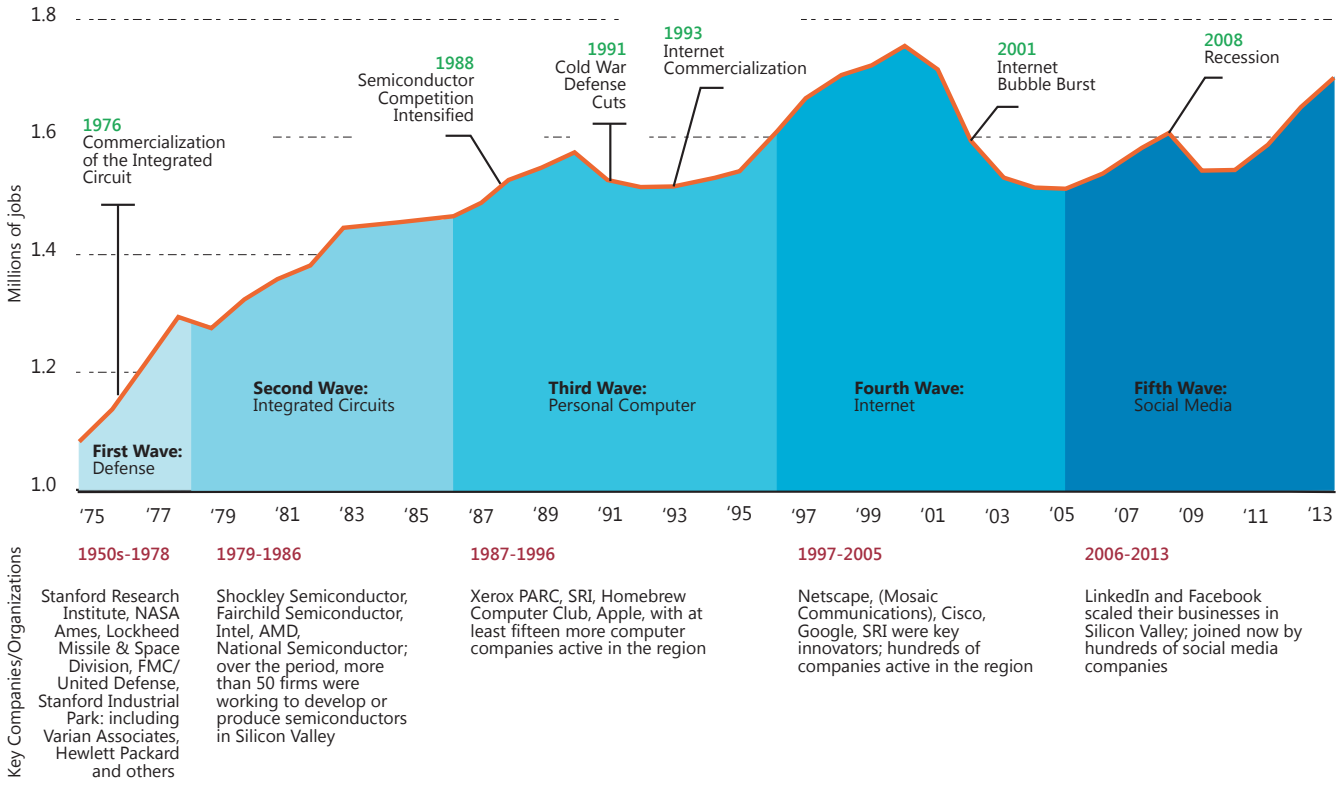
Silicon Valley is world-renowned as a leading center of innovation. Its highly skilled talent, ability to develop and commercialize technology and launch businesses is unparalleled. Many of the world's most innovative technological advances have been conceived, incubated and scaled in Silicon Valley, generating economic growth and prosperity for the region's companies and residents.

These great gains, however, have also been accompanied by severe contractions as breakthrough technologies mature, market drivers change and competition intensifies around the globe. The past 60 years of Silicon Valley's history have been characterized by successive waves of innovation driven by paradigm-shifting technology development, through a process known as "creative destruction".[3,4] In the 50s, 60s and early 70s the defense industry was a driver, followed in the mid-70s and 80s by semiconductors and integrated circuits, personal computers in the 1990s, and the internet in the late 90s and 2000s. The current wave has been led by social media, and also has been accompanied by strong growth in mobile technologies, apps, medical devices and clean energy technology. Each subsequent industry built upon the expertise, technology, capital, infrastructure and supply chain of the last.

Silicon Valley's high-tech industries are comprised of companies and universities that research, develop and/or scale new technologies, uses and processes, or support the development of startup companies. These *innovation industries* are a crucial competitive advantage of the region, and have helped the economy adapt and ultimately rebound in the wake of economic shifts.

Silicon Valley Leadership Group and Silicon Valley Community Foundation joined together to develop the Silicon Valley Competitiveness and Innovation Project (SVCIP), to proactively identify a data-driven, overarching economic strategy to enhance and reinforce our competitive advantages in innovation, and ensure that Silicon Valley residents have access to the job opportunities and prosperity linked to growth in key industries. An expert advisory council of leaders from business, venture capital, the public sector and education provided guidance on the selection of key indicators for this report as well as other key innovation regions in the U.S. for comparison purposes. While conventional definitions of Silicon Valley have focused on the southern San Francisco Peninsula and include Santa Clara and San Mateo counties, the SVCIP incorporates San Francisco county as well, taking into account the ever-deepening economic, workforce and cultural ties in the region.

Evolution of Silicon Valley



Data Source: Employment Development Department, Labor Market Information Division
Analysis: Collaborative Economics

Why focus on innovation industries?

Innovation industries are important drivers of Silicon Valley's economy, accounting for 26 percent of jobs in Q1 2014 and 33 percent of regional output (GDP) in 2013. In addition, between 1993 and 2013, GDP in innovation industries in Silicon Valley more than doubled while the rest of the economy grew 45 percent.

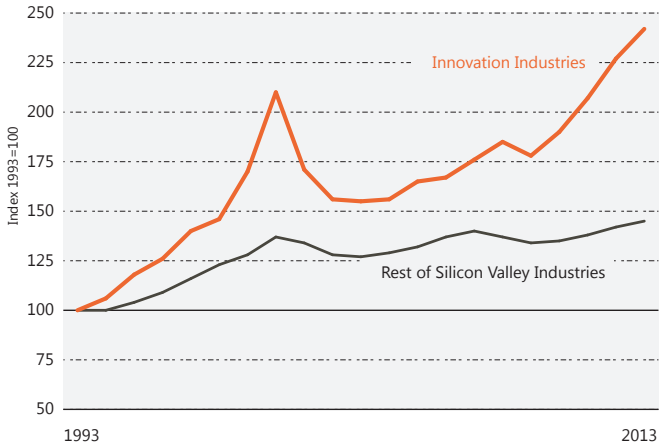
Innovation industries are comprised of companies that research, develop and/or scale new technologies, uses and processes, or support the development of startup companies. These industries typically employ a high proportion of workers with science, technology, engineering and math (STEM) educational backgrounds (Please see Appendix for additional detail).

In addition to the benefits of direct employment and output, innovation industries are estimated to generate additional indirect benefits through employment multiplier effects. Innovation industries pay comparatively high salaries, which can be spent on local services. In addition, resources generated by innovation industries can also be reinvested in the community and infrastructure to build a better quality of life within the region. Taken together, the creation of one high-tech job is estimated to lead to five new services jobs elsewhere in the economy.

- Two out of the five new service jobs **are estimated to be in skilled/higher education services jobs, such as doctors, dentists and teachers**.
- Three out of the five require less-than-Bachelor's education levels, **such as cab drivers, wait staff and landscaping crews**.[5]

Silicon Valley Growth in Output

Innovation Industries and Overall Economy
Silicon Valley, 2003-2013



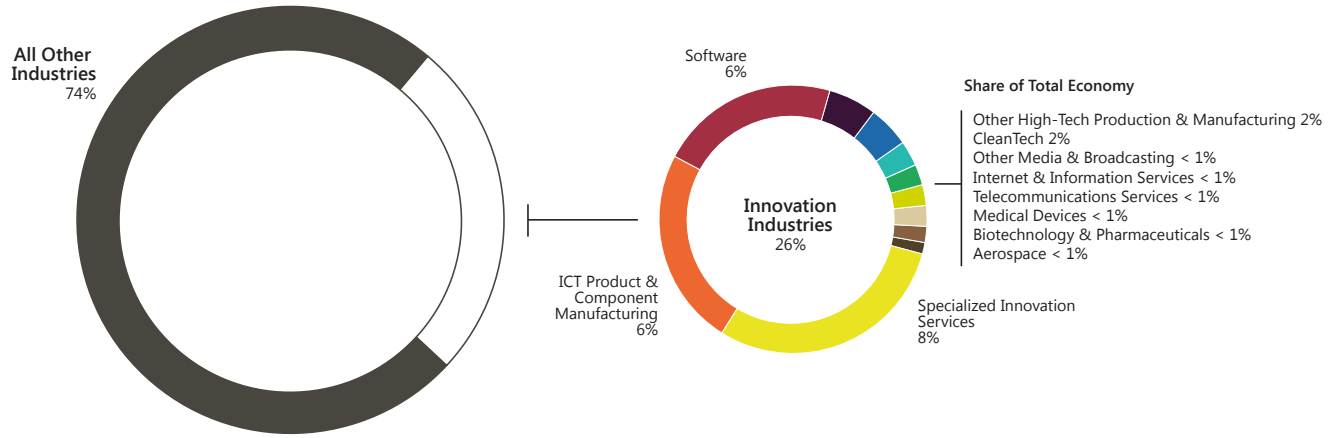
Data Source: Moody's Analytics
Analysis: Collaborative Economics

Innovation Industries	
	Biotechnology & Pharmaceuticals
	Clean Technology*
Information Communication Technology Services	Software
	Telecommunications Services
	Internet & Information Services
High Tech Manufacturing	Medical Devices
	Information Communication Technology Product & Component Manufacturing
	Aerospace
	Other High-Tech Production & Mfg
	Other Media & Broadcasting
	Specialized Innovation Services

* Clean technology (such as technologies for energy generation, resource efficiency and energy storage) data are limited, and is included where possible.

Silicon Valley Employment

Detailed Innovation Industries and All Other Industries, Q1 2014



Data Source: Institute for Exceptional Growth Companies
Analysis: Collaborative Economics

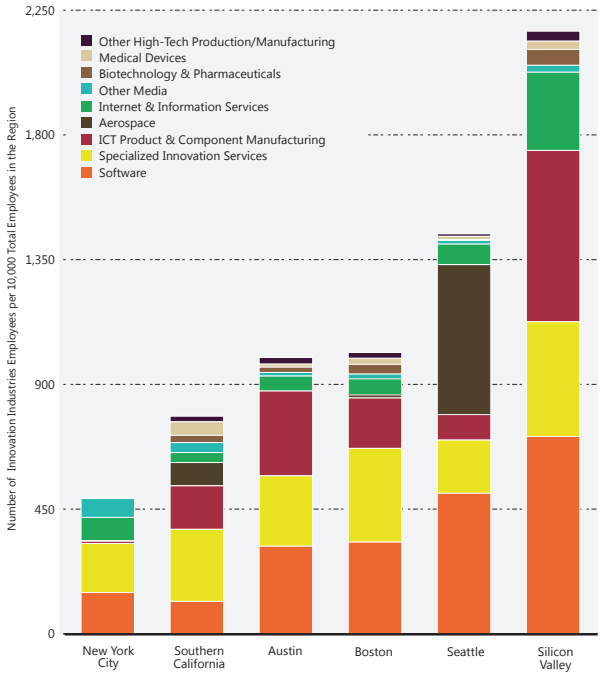
Comparison Innovation Regions

The SVCIP evaluates trends in Silicon Valley over time, as well as in comparison to other key innovation regions in the U.S. Regional comparisons serve as a benchmark on progress, and highlight opportunities for the region to learn from the progress, policies and challenges of the others. While Silicon Valley far outpaces other innovation regions on some measures, such as venture capital funding, the other innovation regions have different strengths in innovation industries, talent and quality of life, and in many cases, are out-competing or gaining ground on Silicon Valley.

SVCIP advisors identified New York City, Boston, Southern California, Seattle and Austin as the key U.S. innovation regions, taking into account strength and expansion of innovation industries, and activity in technology commercialization and startups. Other regions that were considered included the San Francisco East Bay, Washington D.C., Chicago, the city of Los Angeles, Denver-Boulder, Salt Lake City, Research Triangle, Atlanta and Twin Cities. Ultimately the advisors chose to focus on a few of the strongest U.S. innovation regions.

Employment in Innovation Industries

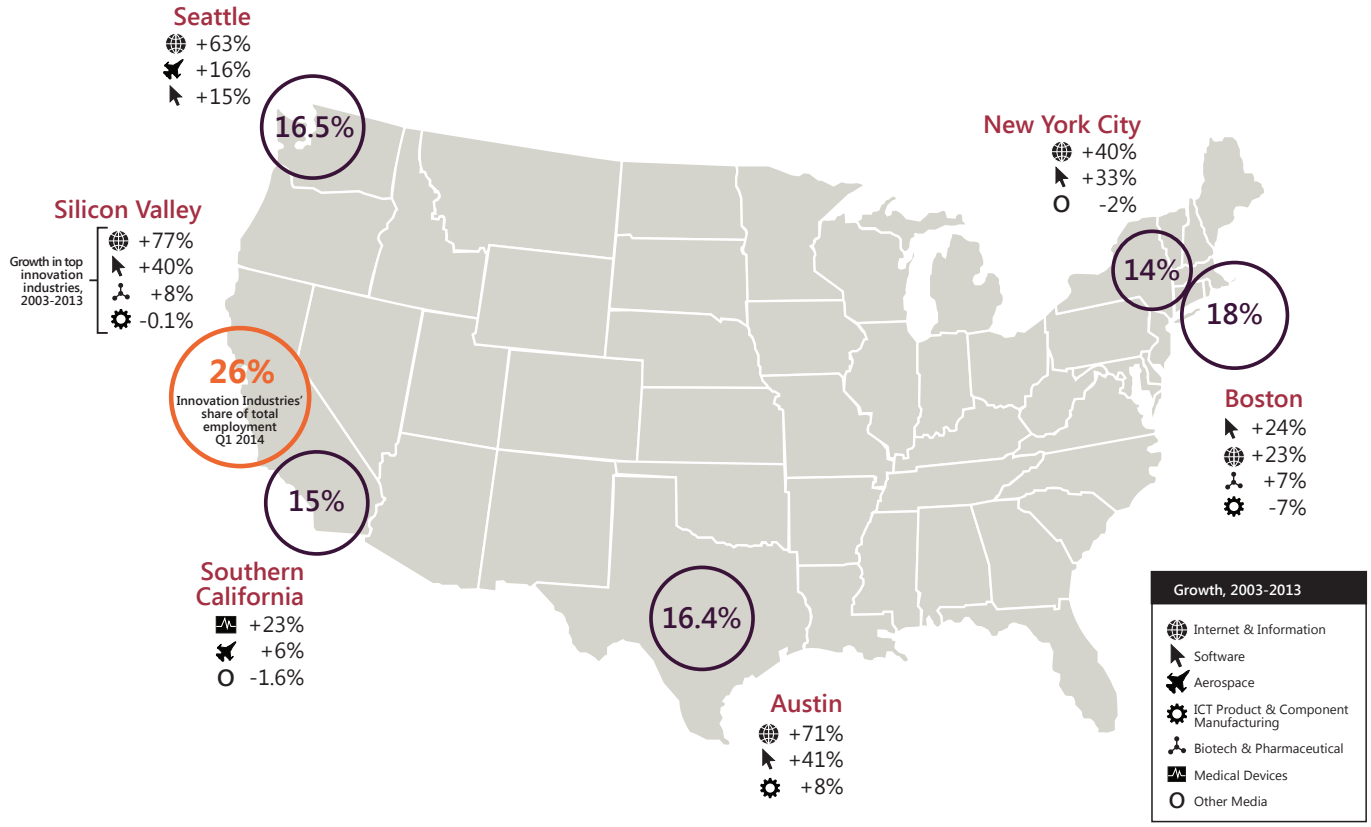
Per 10,000 Workers in Overall Economy
Innovation Regions, 2013



Data Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages Analysis: Collaborative Economics

Growth and Share of Detailed Innovation Industries in Key Innovation Regions

Employment Growth in Top Innovation Industries, 2003-2013, and Share of Total Regional Employment, Q1 2014



Data Source: Bureau of Labor Statistics Quarterly Census of Employment and Wages, Institute of Exceptional Growth Companies
Analysis: Collaborative Economics

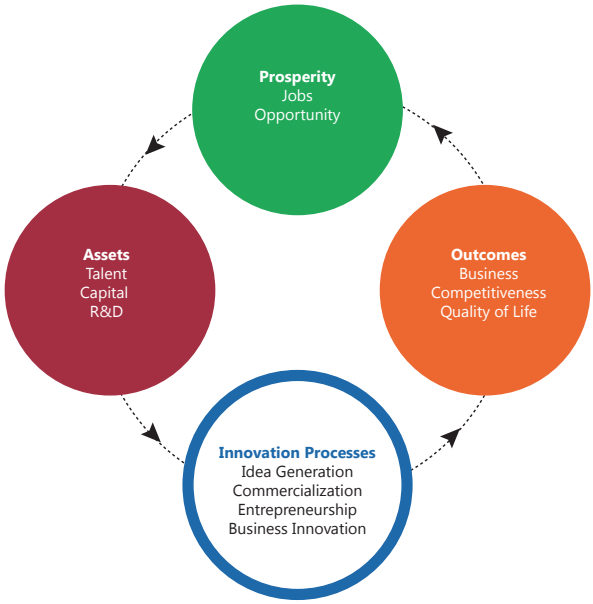
SVCIP Dashboard of Indicators

Silicon Valley's innovation economy can be thought of as four mutually-reinforcing domains: assets, innovation processes, outcomes and prosperity.

- **Assets,** include talent, capital, research and development, and universities, which are critical inputs for innovation;
- **Innovation Processes,** include idea generation, commercialization, entrepreneurship and business innovation, which involve iterative interactions between talented individuals and other assets and help to drive technology improvement and productivity;
- **Outcomes,** include business competitiveness and quality of life, which influence businesses' choices to expand jobs within the region and talent's choices to reside there versus elsewhere; and ultimately,
- **Prosperity,** includes jobs and opportunity, which in turn enhance the region's assets.

To track the status of each of these domains within the innovation system, SVCIP developed a dashboard of indicators to observe trends in Silicon Valley's innovation industries, and compare progress across the key innovation regions.

Vital Innovation System



			Strong and Gaining Ground	Needs attention, losing ground to other regions	Critical need for attention, trending down
ASSETS	Talent	STEM Talent Pool	●		
		Change in Educational Attainment		●	
		STEM Degrees Conferred		●	
		International Talent		●	
		Talent Migration			●
	Capital	Venture Capital	●		
		Early Stage Investment	●		
	R&D	Universities' R&D Expenditures			●
INNOVATION PROCESSES	Idea Generation	Patents	●		
	Commercialization	Follow-On Investment by Stage		●	
	Entrepreneurship	New Companies Launching	●		
		Establishment Churn in Innovation Industries	●		
	Business Innovation	Company Pre-Exit Valuations		●	
		Exits: Initial Public Offerings	●		
OUTCOMES	Business Competitiveness	Cost of Doing Business			●
		Labor Productivity	●		
	Quality of Life	Home Prices			●
		Commute Times			●
PROSPERITY	Opportunity	Preschool Enrollment			●
		Reading and Algebra Proficiency			●
		Income Inequality and Economic Mobility		●	
	Jobs	Employment in Innovation Industries	●		
		Regional Output in Innovation Industries	●		

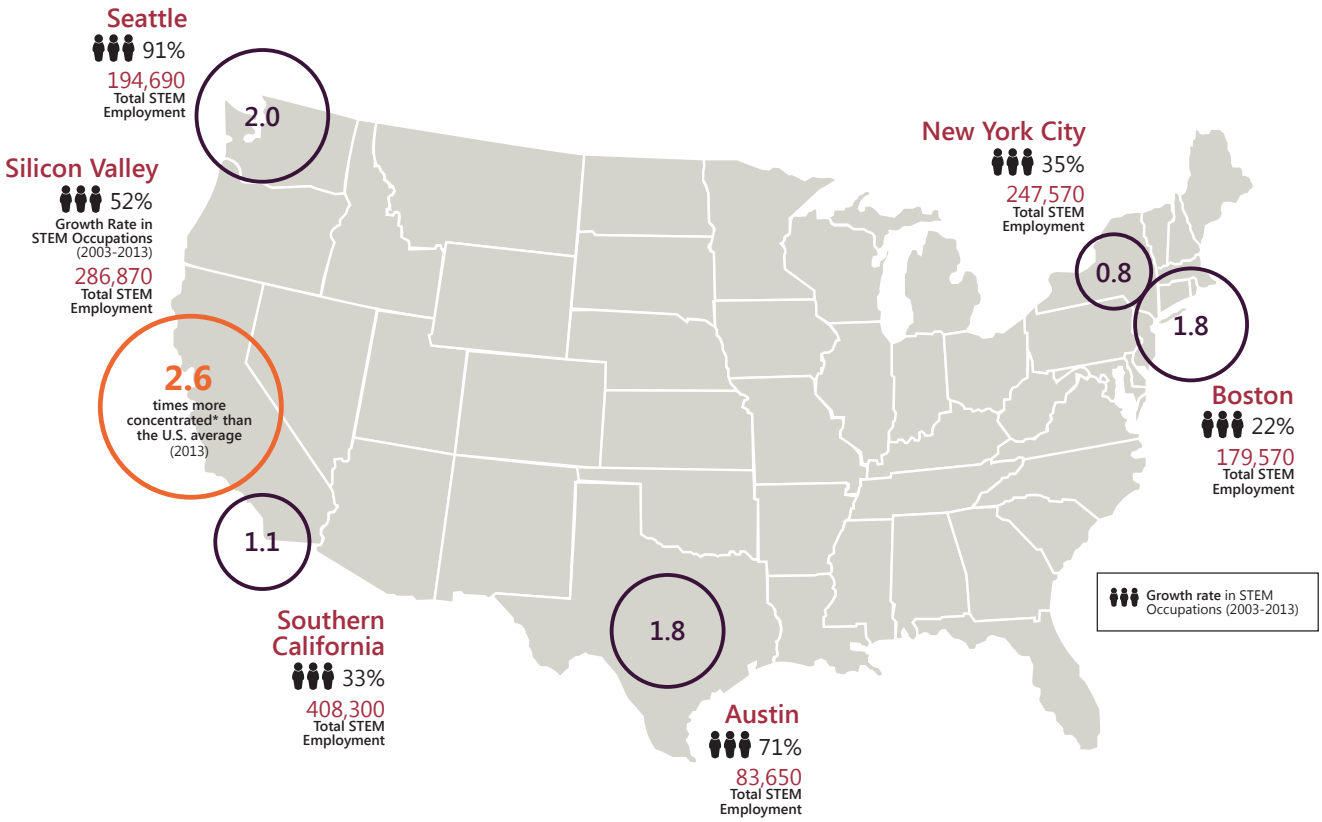
Assets: Talent

A specialized, educated talent pool is essential for innovation industries to thrive. Companies in innovation industries seek skilled individuals to research, develop, improve and scale technologies and processes. Access to a large, highly educated STEM workforce within a region provides a competitive advantage for companies in innovation industries.

At present, one of Silicon Valley's key strengths is its highly specialized, highly educated talent pool: 71 percent of companies surveyed by Silicon Valley Leadership Group reported that access to skilled labor was a top strength of the region.[6] International talent plays a particularly important part in meeting demand for specialized workers in Silicon Valley; the region has comparatively high immigration rates, and a very high share of foreign-born workers in STEM fields. In contrast, U.S.-born individuals, particularly those with Bachelor's degrees, have been moving to Austin and Seattle at higher rates than Silicon Valley in recent years.

Talent Pool for Innovation Industries

Concentration, Jobs and Growth in High-Tech STEM Occupations, 2003-2013



*Concentration refers to the share of STEM jobs in the regional economy, in comparison to the national share of STEM jobs. A concentration of greater than 1.0 means that the region is more concentrated than the national average, and suggests a more specialized workforce. Concentrated is calculated as (STEM Jobs in Region/Total Jobs in Region)/(STEM Jobs in Nation/Total Jobs in Nation).Note: Based on data constraints, regional definitions reflect MSA, rather than county definitions. Please see Appendix for details.
Data Source: Bureau of Labor Statistics, Occupational Employment Statistics
Analysis: Collaborative Economics

Silicon Valley has the second largest total number of STEM workers with a Bachelor's degree or higher of the innovation regions, and has the highest STEM share of the workforce for the size of its overall regional economy.

In 2013, 56 percent of Silicon Valley's STEM workers with a Bachelor's degree or higher were born outside of the U.S., the highest of the key innovation regions.

Seattle and Austin both expanded jobs more rapidly than Silicon Valley in STEM occupations between 2003 and 2013, though they started with a significantly lower base.

Silicon Valley's STEM workforce was over three times larger than Austin's in 2013.

International Talent
Foreign Born Share of Population in STEM Professions, with a Bachelor's Degree or Higher, 2013

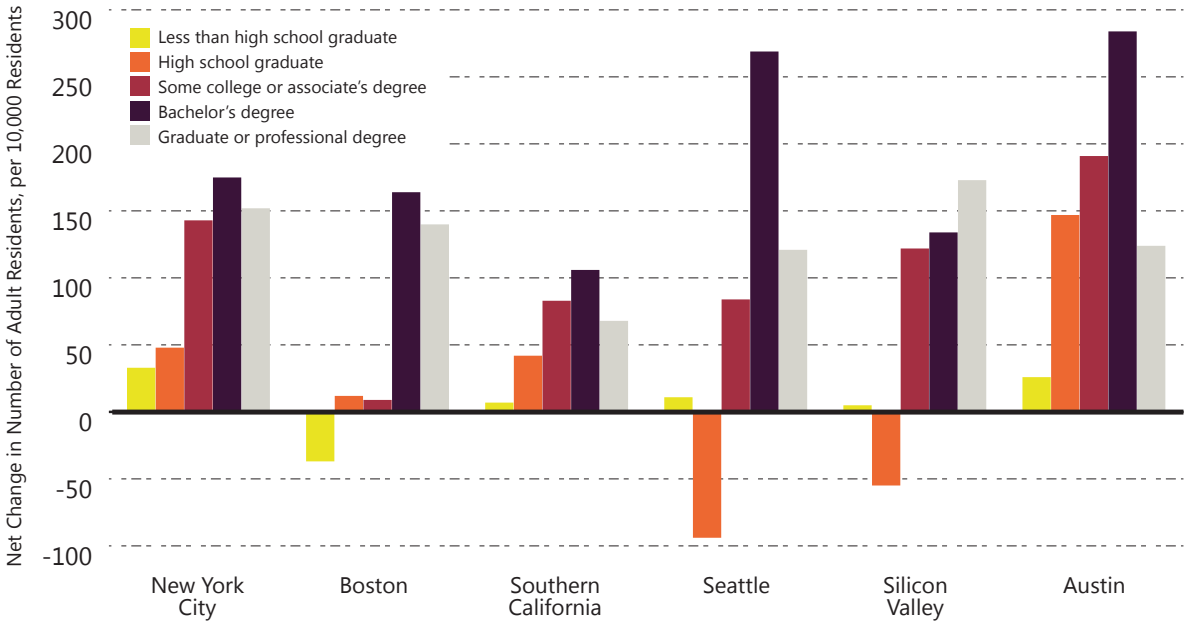
	Foreign Born Share	In-State Born Share
Silicon Valley	**56%**	**21%**
Southern California	44%	29%
New York City	**44%**	**30%**
Seattle	37%	19%
Boston	34%	31%
Austin	31%	27%

Data Source: U.S. Census Bureau, PUMS
Analysis: Collaborative Economics

Only one out of five STEM workers in Silicon Valley was born in California, a higher proportion than Seattle, and less than all other innovation regions. Boston had the highest proportion of its STEM workforce born in-state, 31 percent born in either Massachusetts or New Hampshire.

Population Change by Educational Attainment Per 10,000 Residents

Innovation Regions, 2011-2013



Note: Based on data constraints, regional definitions reflect a metropolitan statistical area rather than counties. Please see Appendix for details.
Data Source: U.S. Census Bureau, American Community Survey, reflects adult population 25 and over
Analysis: Collaborative Economics

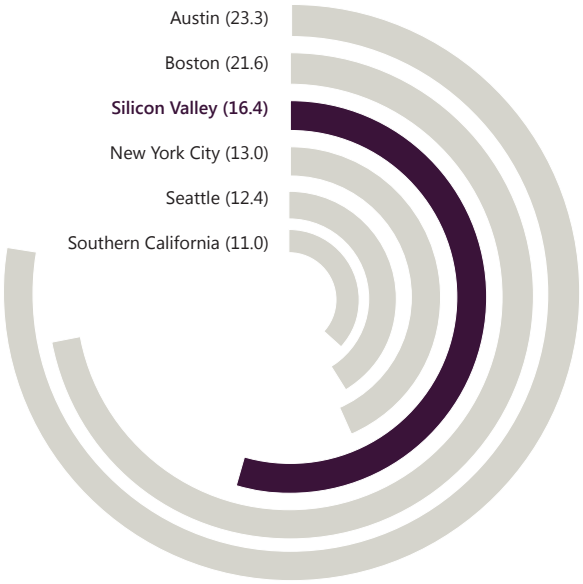
The number of Silicon Valley residents with a Master's degree or higher rose 9.5 percent from 2011 to 2013, the highest number of new residents relative to total population of the key innovation regions.

Austin saw the highest growth in residents with Bachelor's degrees (+11 percent), a significant increase in relation to its total population.

Between 2008 and 2013, STEM Bachelor's and graduate degrees conferred by Silicon Valley universities increased by 16 percent, lagging growth in New York City, Seattle (both +35 percent) and Boston (+22 percent).

STEM Degrees Conferred Per 10,000 Residents

Innovation Regions, 2013



Growth in STEM Degrees Conferred 2008-2013	
New York City	35%
Seattle	35%
Boston	22%
Southern California	18%
Silicon Valley	**16%**
Austin	16%

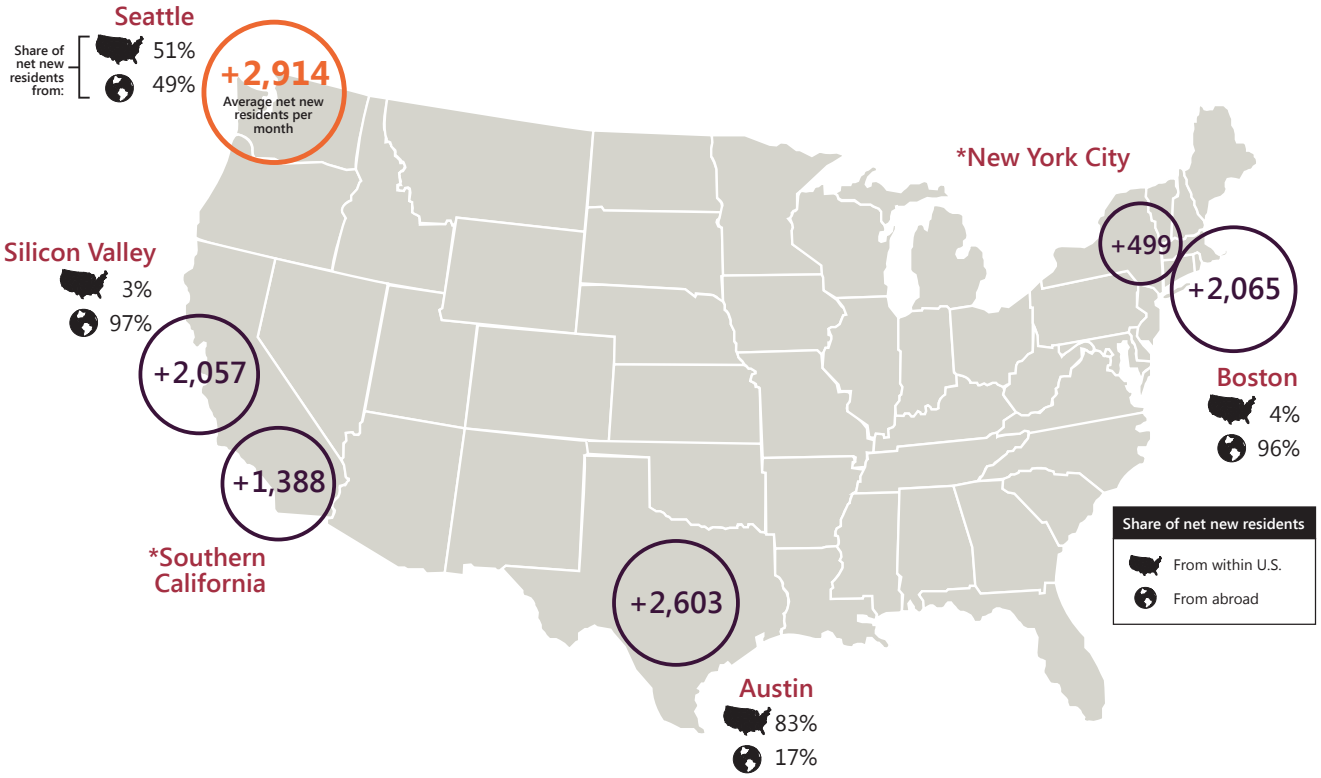
Silicon Valley ranked third among the key innovation regions in STEM degrees conferred when adjusting for regional population in 2013, and grew more slowly than most innovation regions between 2008 and 2013.

While ranked in the middle of the innovation regions in terms of total STEM degrees conferred, for STEM graduate degrees, Silicon Valley ranks higher, 7.4 degrees per 10,000 residents, lagging only Boston at 9.9 degrees conferred.

Note: Data are based on first major and include bachelors, masters and doctorate degrees. Data Source: National Center for Educational Statistics, IPEDS
Analysis: Collaborative Economics

Migration Flows

Average Net New Residents Per Month
Innovation Regions, 2013



*Growth is purely from abroad.
Data Source: U.S. Census Bureau Population Estimates
Analysis: Collaborative Economics

Seattle, Austin, Boston and Silicon Valley experienced the highest influx of average net new residents per month in 2013.

In Silicon Valley, 3 percent of net new residents moved from other parts of the U.S. and 97 percent moved in from abroad, while in Austin, 83 percent previously resided in other parts of the U.S.

Assets: Risk Capital

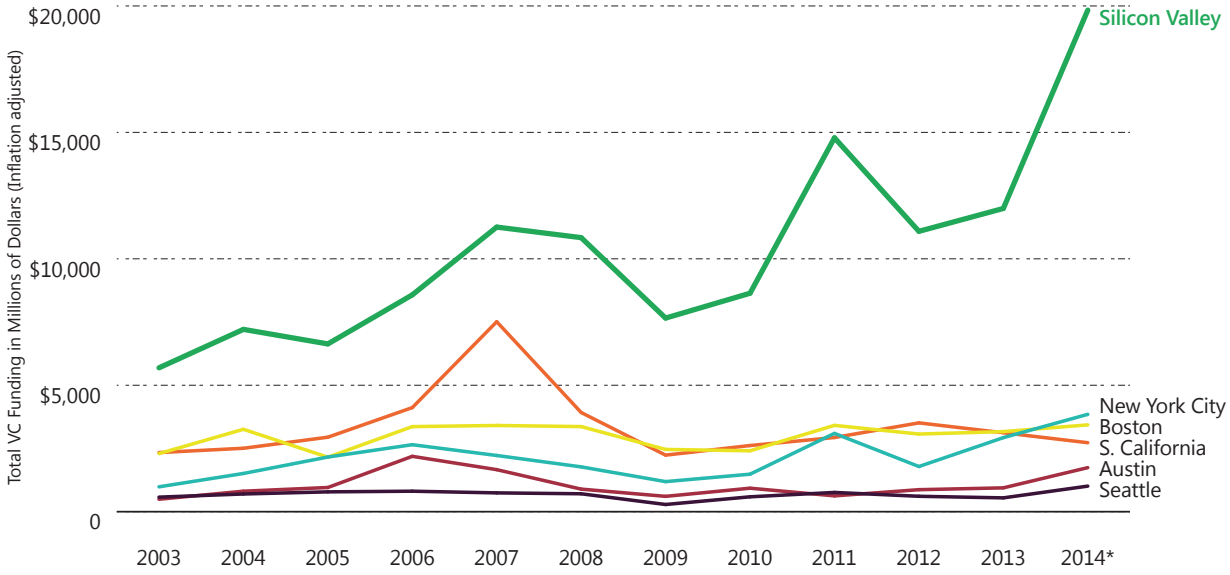
Risk capital enables scaling and growth of early stage businesses. High-risk investments, such as venture capital (VC), angel investment and other forms of early stage equity and debt, facilitate startup company development by providing funding to hire workers and secure necessary assets before companies are able to access traditional bank loans. Investment funding and deal levels in regions and industries are leading indicators of potential company and employment growth.

2014 was a very strong year for VC investment across the U.S., though quarterly changes suggest some deceleration. U.S.-based venture capital firms raised $23.7B in the first three quarters of 2014, a higher amount than the prior five full years.[7] Though strong quarters in terms of VC fundraising levels, Q2 and Q3 2014 progressively declined from Q1 2014, which was the highest fundraising quarter since Q4 2007.[8] The ability of venture capital firms to raise funds from institutional and other investors is a precursor to venture capital investment activity in subsequent quarters. Strong fundraising activity translated to strong VC investments in 2014 across the majority of the innovation regions.

Silicon Valley has traditionally been a leader in VC investments, and remains dominant among the U.S. innovation regions in terms of levels of funding. Other regions, such as New York City, have seen substantial growth in recent years, particularly in investment in very early stage companies.

Total Venture Capital Funding

Innovation Regions, 2003-2014*



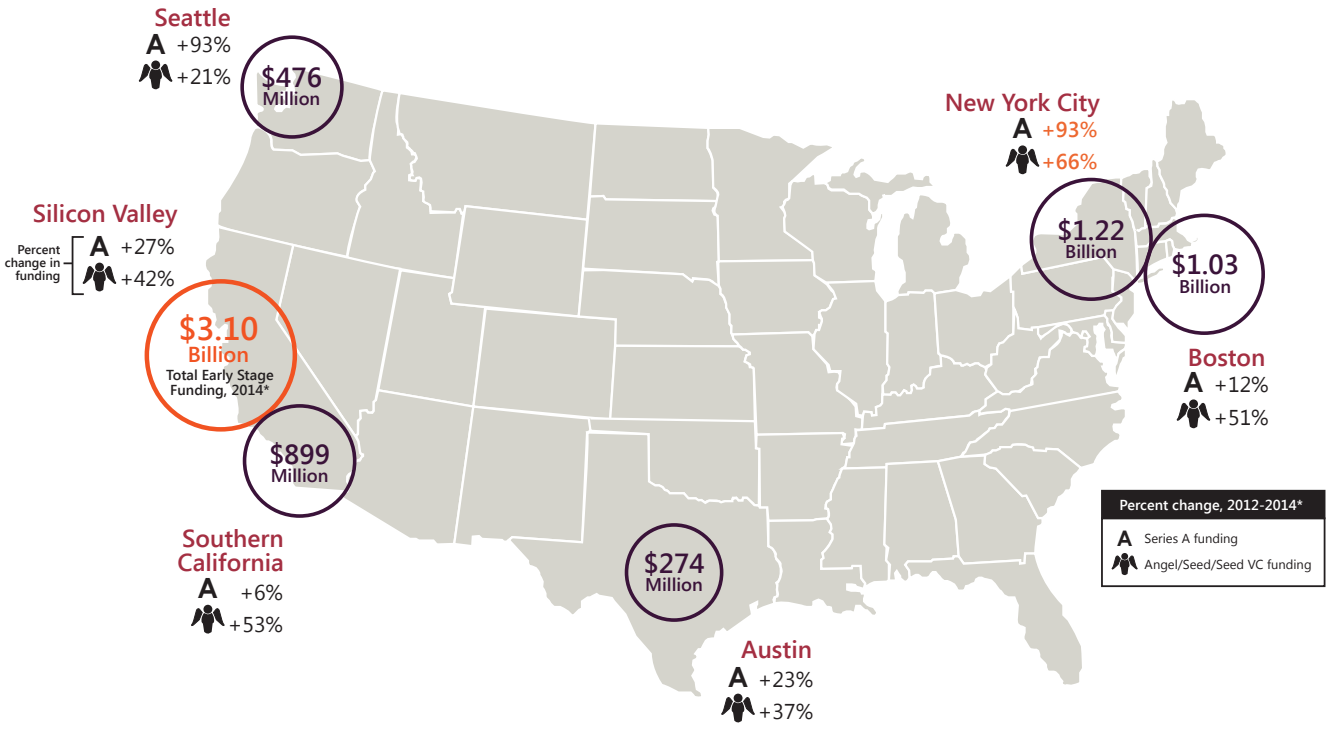
*Data through November 10, 2014.
Data Source: CB Insights
Analysis: Collaborative Economics

Silicon Valley accounted for 30 percent of venture capital deals in the U.S. in 2014 through Q3, and 46 percent of total U.S. investment levels.[9]

Though Silicon Valley's venture capital investment declined roughly 30 percent in Q3 2014 from the prior quarter, 2014 investment levels were already 65 percent higher than full year 2013 as of November 10, 2014.

Very Early Stage Funding

Angel/Seed and Series A Investments
Innovation Regions



*Data through November 10, 2014.
Data Source: CB Insights
Analysis: Collaborative Economics

Very early stage funding to New York City-based startup companies has risen sharply in recent years, with Series A investment increasing 93 percent between 2012 and 2014 (through early November) to roughly $800M, and Angel/Seed/Seed VC funding increasing 66 percent to $425M over the same period.

Series A investment levels in Silicon Valley were triple those of New York City ($2.46B in 2014, through November), and Angel/Seed/Seed VC investments were roughly 50 percent higher ($630M).

Seattle also observed a surge in Series A investment over the same period, though from a much smaller base.

Assets: Research and Development

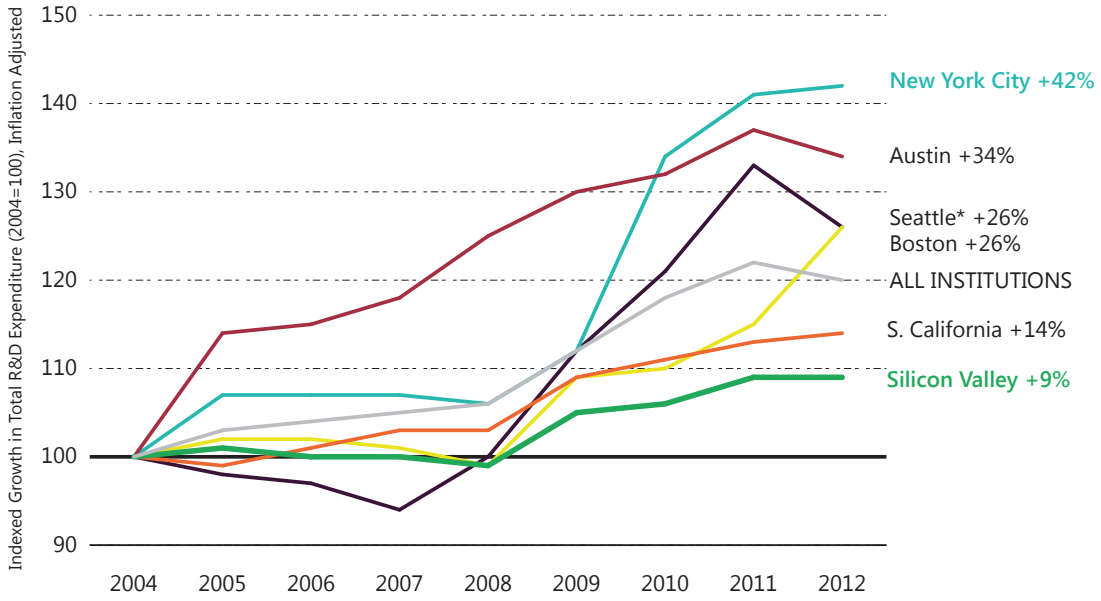
Research and development (R&D) activities help to seed technology development in the long term. R&D expenditures represent longer run investments in innovative concepts, process improvements and products. Universities, federal labs, private research institutions and business R&D and design departments comprise the collective research and development assets of the region.

At present, macroeconomic trends are influencing R&D activities in the U.S., which are trickling down through the innovation regions and may affect innovation leadership in the long run. Federal R&D, an important source of funding for basic and applied research, fell 9 percent between 2012 and 2013, and was down 5 percent specifically for non-defense R&D over the same period to its lowest level since 2001.[10] Simultaneously, other countries are investing heavily in R&D, in many cases both via government and the private sector; over 4.3 percent of South Korea's overall GDP went to R&D in 2012, and Finland, Germany, Sweden, Taiwan and Japan all invested more heavily as a proportion of GDP than the U.S., which invested 2.8 percent.[11]

While Silicon Valley's universities and national labs have high levels of R&D expenditures compared to other innovation regions, the growth in those expenditures has lagged behind. Business and institutional R&D activities are also an important influence in Silicon Valley, with many companies opting to locate their research, development and/or design centers in the region.[12]

Growth in R&D Expenditures

Innovation Regions, 2004-2012 (Index 2004=100)



Total R&D Expenditures 2012	
All Institutions	$67.9B
S. California	$4.3B
Silicon Valley	**$2.9B**
New York City	$2.7B
Boston	$2.7B
Seattle	$1.2B
Austin	$770M

*Due to data constraints, Seattle's index growth path 2004-2010 is proxied by federal R&D funding levels to University of Washington, 2010-2012 indexed growth reflects total R&D expenditures within the region
Data Source: National Science Foundation
Analysis: Collaborative Economics

Silicon Valley's universities' total R&D expenditures grew the most slowly among the innovation regions (+9 percent since 2004), while New York City universities increased R&D expenditures 42 percent over the same period, and Austin increased 34 percent.

From an absolute funding level, Silicon Valley's public and private universities (also including University of California, Berkeley) lag behind only Southern California - $2.9B versus $4.3B in Southern California.

Federal R&D funding to Silicon Valley universities fell 2 percent between 2011 and 2012, mirroring declines in several other innovation regions.

Innovation Processes

Innovation processes leverage the economy's assets in talent, capital and R&D to translate ideas into commercial products and services. Innovation processes include idea generation, commercialization, entrepreneurship and business innovation. While these processes can be viewed as sequential steps in bringing new technologies to commercial fruition, most often they are iterative and non linear. As activities rather than tangible assets or outcomes, processes cannot be measured directly and are estimated by their intermediate outputs. These proxies include the following:

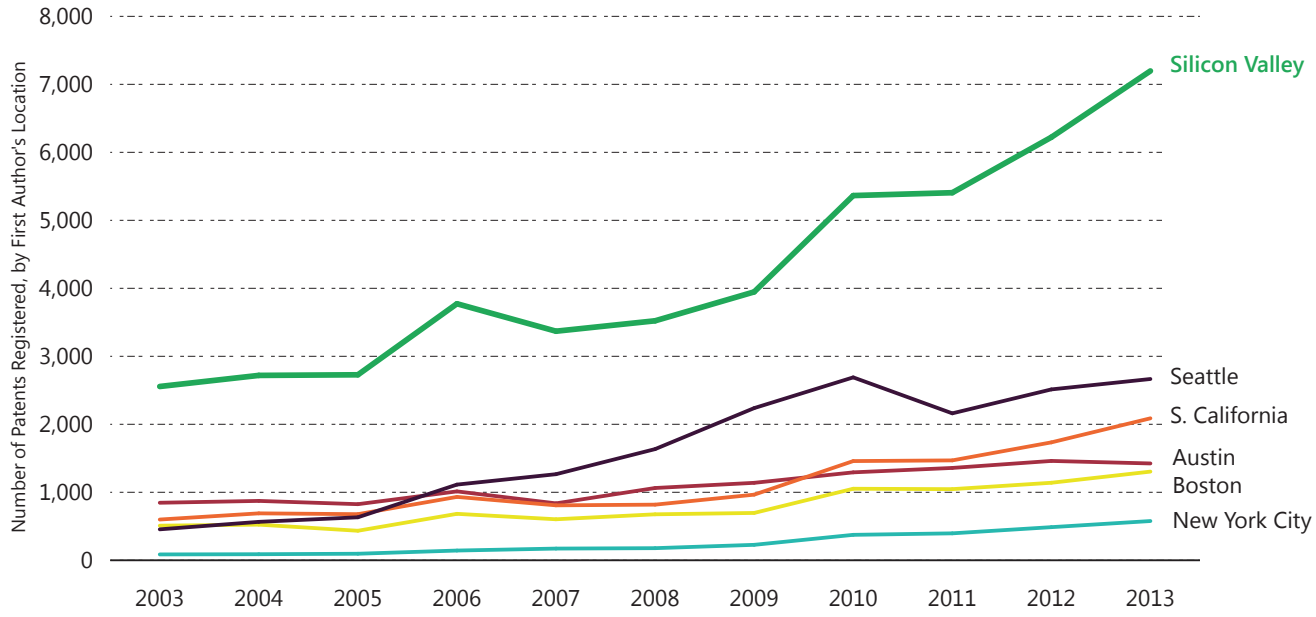
- Intellectual property developed through patents, for idea generation;
- Ability of companies to scale with follow-on venture investment, for commercialization;
- Number of new companies formed, for entrepreneurship; and,
- Valuations of companies, for business innovation.

Innovation processes are at the core of Silicon Valley's leadership in innovation industries. The region has historically been a world leader in commercialization and entrepreneurship, building on its strong risk capital and talent assets. Silicon Valley continues to demonstrate strength in its ability to scale technologies, although rapid growth in very early stage funding in recent years has intensified competition among startup businesses for later rounds of funding. Among companies able to secure follow-on investments, valuations for late stage, pre-exit companies are at recent highs.

IDEA GENERATION

Patent Registrations

Computers, Data Processing and Information Storage
Innovation Regions, 2003-2013



Data Source: USPTO Custom Data Extracts
Analysis: Collaborative Economics

The total number of patents registered annually by Silicon Valley inventors nearly doubled between 2003 and 2013 to nearly 18K, the highest of the innovation regions.

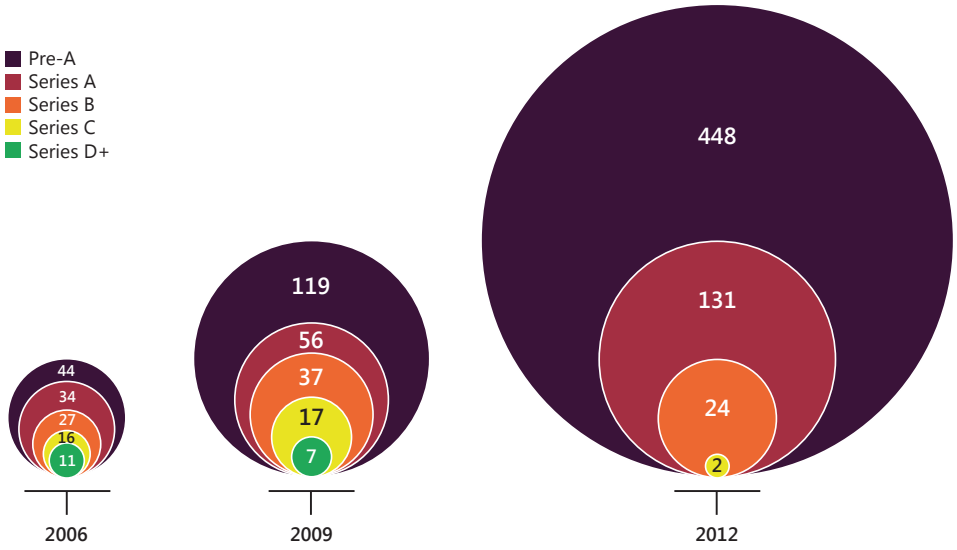
Silicon Valley observed particularly strong gains in patents for computers, data processing and information storage technologies, cumulatively registering roughly 47K patents between 2003 and 2013.

Seattle's total patent registration growth was fastest of the regions; annual registrations more than tripled over the decade, though ranked behind Silicon Valley, Southern California and Boston in total number of patents registered.

COMMERCIALIZATION

Progression of Early Stage Investment*

Silicon Valley Based Startups - For Companies that Launched in 2006, 2009 and 2012



*Reflects follow-on venture capital investments into start up companies, which secured their first Seed, Angel or Seed VC investment in 2006, 2009 or 2012.
Incorporates investment data through H1 2014.
Data Source: CB Insights
Analysis: Collaborative Economics

HOW TO READ THIS CHART: Investments by series tracks venture-backed startup companies that launched in the selected year through subsequent rounds of funding. Pre-A investments include Angel, Seed and Seed VC investments, and are typically smaller investments to support the business in its very early stages. Subsequent series, A through D and above, tend to be progressively larger investments to help further develop and scale the enterprise. "2012" reflects companies that received pre-A investments in 2012, and then tracks any subsequent rounds funding that the companies in the 2012 cohort obtained through November 10, 2014.

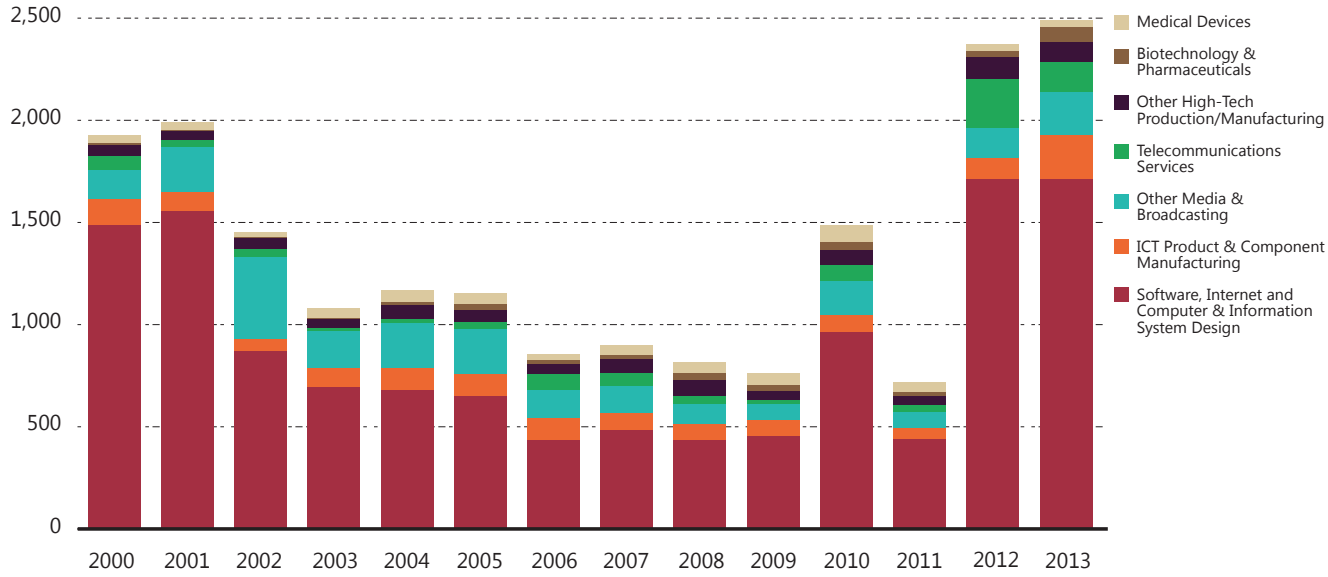
While the sheer number of Series A deals is higher among companies that launched in 2012 versus 2009, only 29 percent of startup companies in Silicon Valley that received Pre-A investment in 2012 were able to obtain subsequent Series A investment, compared to 47 percent in 2009. This experience is mirrored in New York and Boston, though at a smaller scale.

While Angel, Seed and Seed VC investments have been relatively abundant in the region in recent years, companies working to demonstrate and commercialize their technologies through successive rounds of investment have faced strong competition.

ENTREPRENEURSHIP

New Companies Launched

Innovation Industries
Silicon Valley, 2000-2013



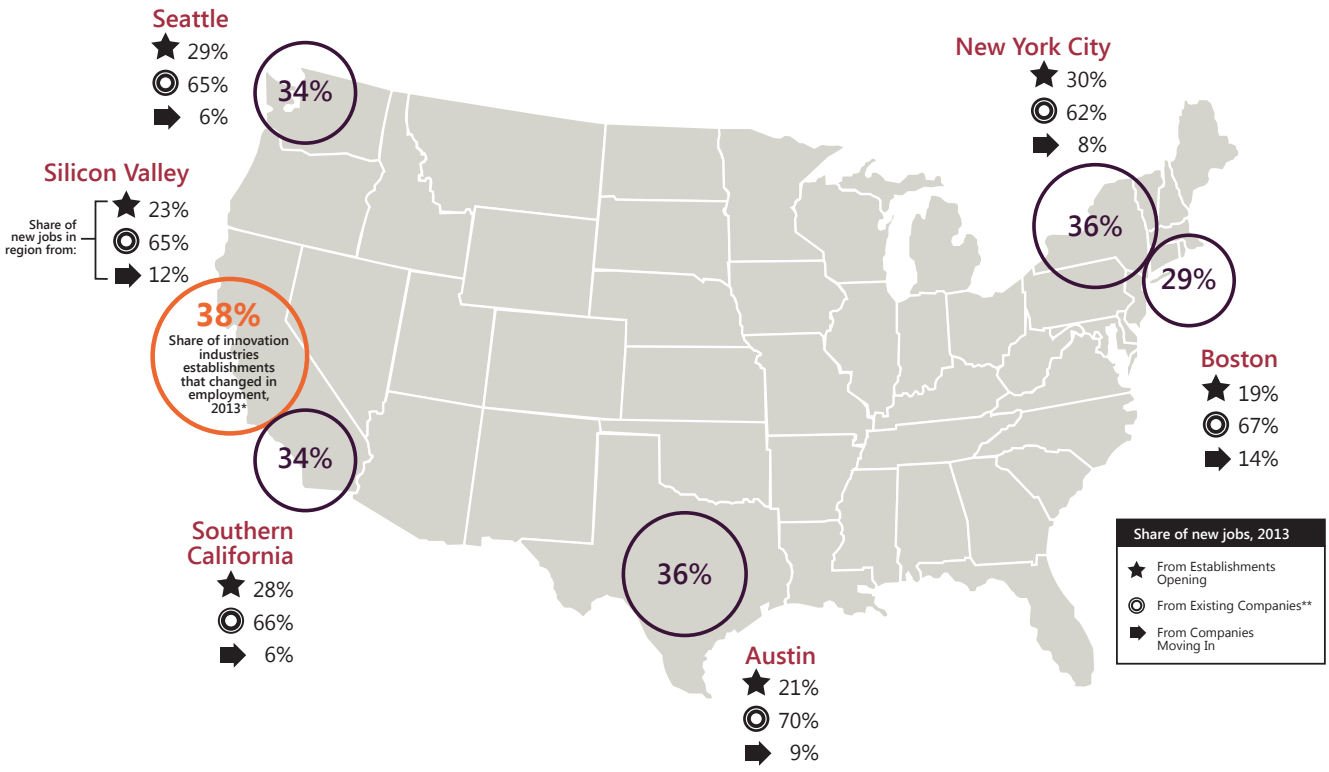
Data Source: National Establishments Time Series Database, Institute for High Growth Industries
Analysis: Collaborative Economics

Entrepreneurship in innovation industries encompasses a range of new companies launched in the region. While some companies are new technology/product startups that are higher risk and receive venture funding in order to scale, others are firms in a more conventional business, such as IT services providers, which are able to secure traditional bank loans.

2,400 new companies in innovation industries opened on average in 2012 and 2013 in Silicon Valley, compared to roughly 2,000 average companies in 2000 and 2001, the most recent historical high. In 2012-13 and 2000-01, respectively, 70 percent and 78 percent of these companies were in Software, Internet and Computer/ Information System Design.

Employment Dynamics in Innovation Industries

Innovation Regions, 2013



*Companies that Opened, Expanded, Contracted, Closed or Moved as a share of Total Companies in Innovation Industries, 2013.
**Includes Expanding Jobs at Existing Facilities and Jobs at New Facilities of Existing Companies
Data Source: Institute for Exceptional Growth Companies
Analysis: Collaborative Economics

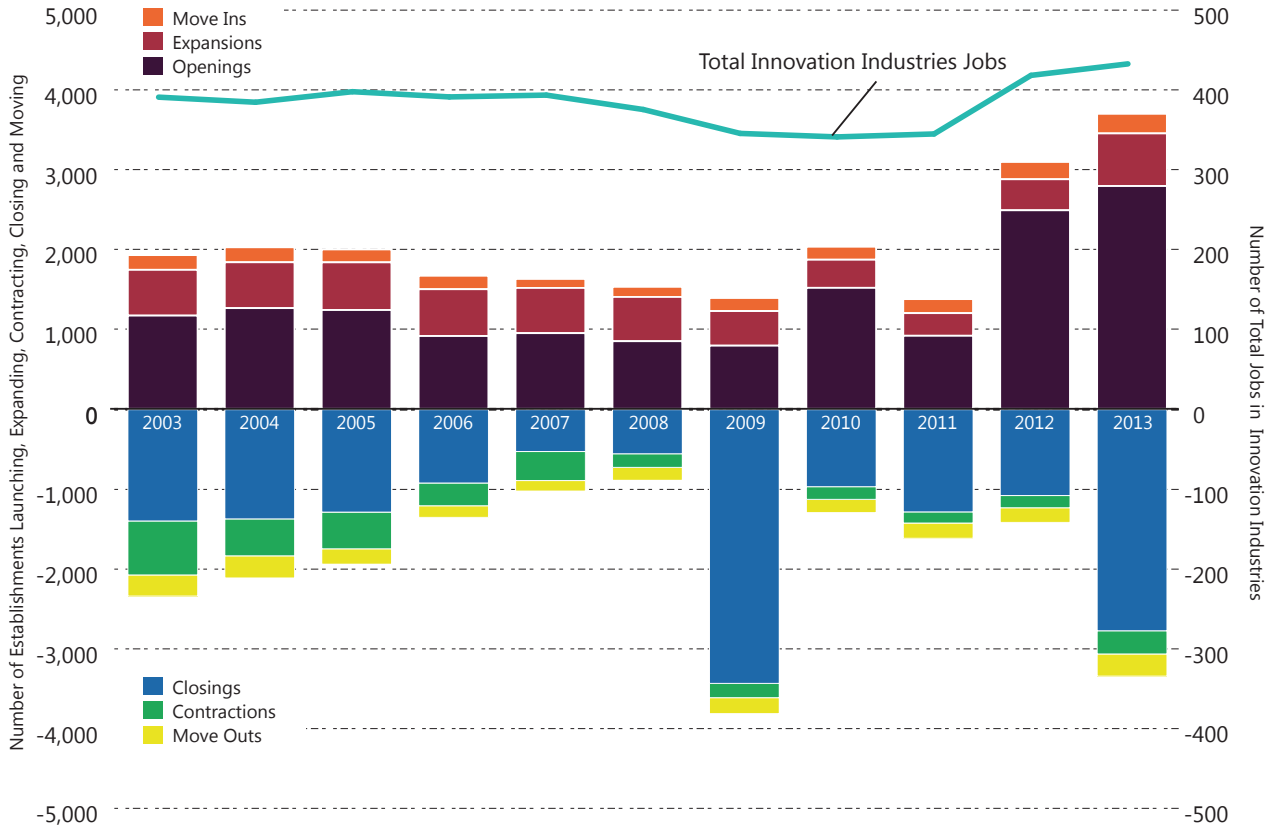
While Silicon Valley experiences high levels of new company formation, firm destruction or contraction is also common. Silicon Valley's innovation industries are highly dynamic – expanding, contracting, opening, closing, moving – at the highest rates of the innovation regions.

In 2013, 38 percent of business establishments within the innovation industries hired or fired workers.

65 percent of Silicon Valley's job growth in innovation industries in 2013 was generated from existing companies expanding and 12 percent from companies moving their operations into the region.

Establishments Opening, Expanding, Closing, Contracting & Moving, & Total Jobs

Silicon Valley, 2003-2013



Data Source: Institute for Exceptional Growth Companies
Analysis: Collaborative Economics

Roughly 3,000 establishments in innovation industries opened or moved into the region in 2013, but the region gained a total of around 500 establishments in net, as 2,500 establishments also closed or moved out.

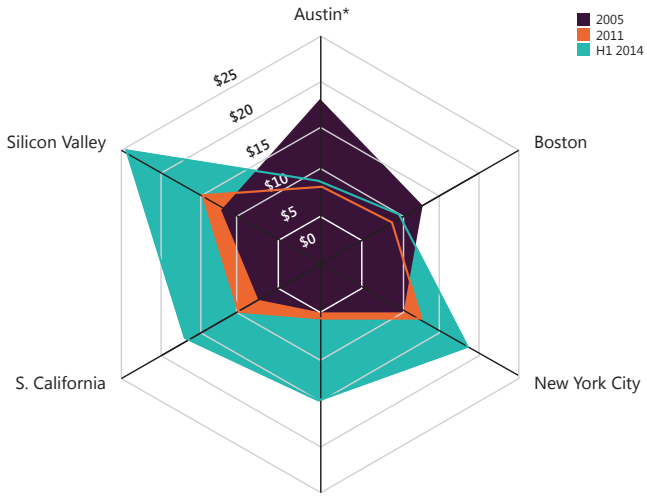
The continuous churning of companies and jobs, while disruptive, also can help to enrich the expertise and networks of workers in innovation industries.

In aggregate, Silicon Valley gained 92.5K net jobs in innovation industries between Q1 2011 and Q1 2014.

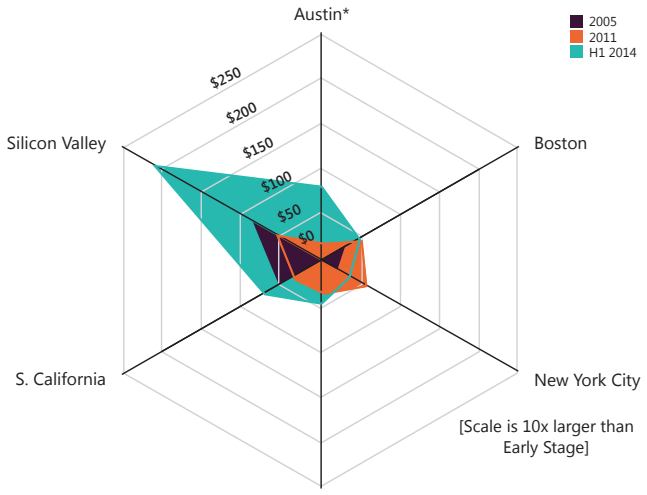
BUSINESS INNOVATION

Median Valuation of Early and Late Stage Start-Up Companies

In Millions of Dollars, Inflation Adjusted
Innovation Regions - 2005, 2011 and H1 2014



EARLY STAGE



LATER STAGE

*Late Stage data not available for Austin and Seattle in 2005.
Note: "Early Stage" corresponds to valuations during Seed, Series A and Series B investment rounds, while "Late Stage" corresponds to subsequent investment rounds.

Data and Analysis: Pitchbook Data, Inc. July 2014.

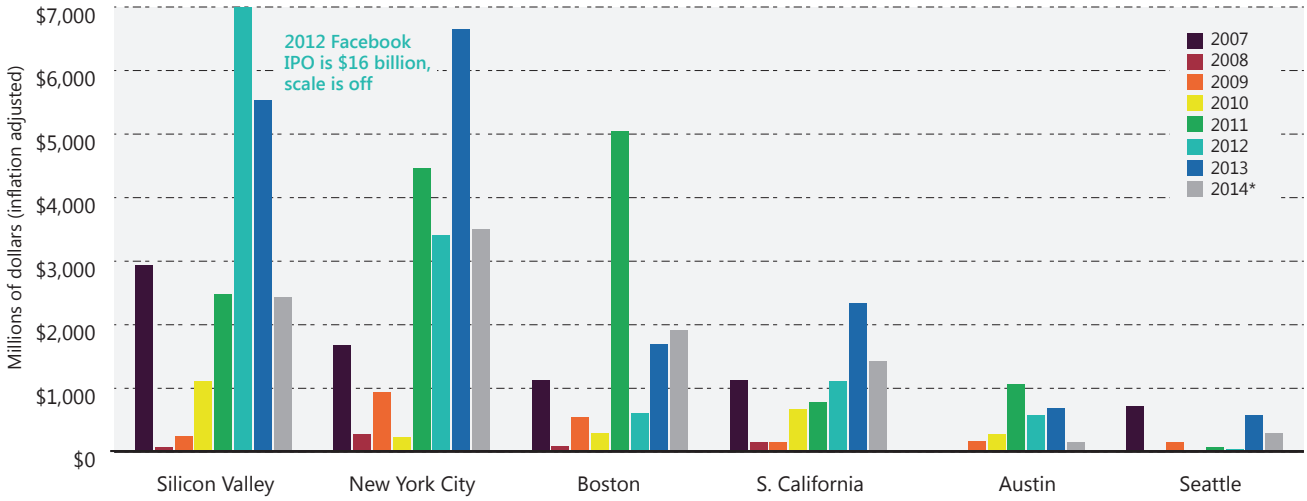
HOW TO READ THESE CHARTS:
Valuations are estimates of startup companies' worth, in this indicator, evaluated before a subsequent round of investment ("pre-money"). A higher median regional valuation suggests companies in the region are larger, worth more and have been better able to secure past investment. However, very high median company valuations raise concerns about over-valuation/ overheating in the market. "Early Stage" startups are companies that have secured Seed/Seed VC or Series A investments, while "Later Stage" startups refer to companies that received Series B investment or later. Companies included in this indicator have not exited (e.g. through an initial public offering, merger/acquisition, etc).

While there is significant churn of firms within Silicon Valley, late stage venture-backed companies are generating high valuations in innovation industries.

In the first half of 2014, the median pre-money valuation of late stage startups based in Silicon Valley (Series B and above) was $211M, compared to $60M in 2011, and significantly higher than other innovation regions.

Value of IPOs

Innovation Regions, 2007-2014*



*Data through November 10, 2014.
Data Source: CB Insights
Analysis: Collaborative Economics

While Silicon Valley has historically led in generating value for equity holders from Initial Public Offerings (IPOs), in 2013 startups in New York City collectively generated 20 percent more value than Silicon Valley firms, led by Voya Financial ($1.27B), Riverstone Energy ($1.20B) and Coty (~$1B).

However, among startup companies in innovation industries, Silicon Valley led in value generated by IPOs.

22 out of 24 Silicon Valley IPOs were in innovation industries, versus 4 out of 17 IPOs in New York City.

While more Boston-based startups went public in 2014 through November 10, valuations were lower than both New York City and Silicon Valley.

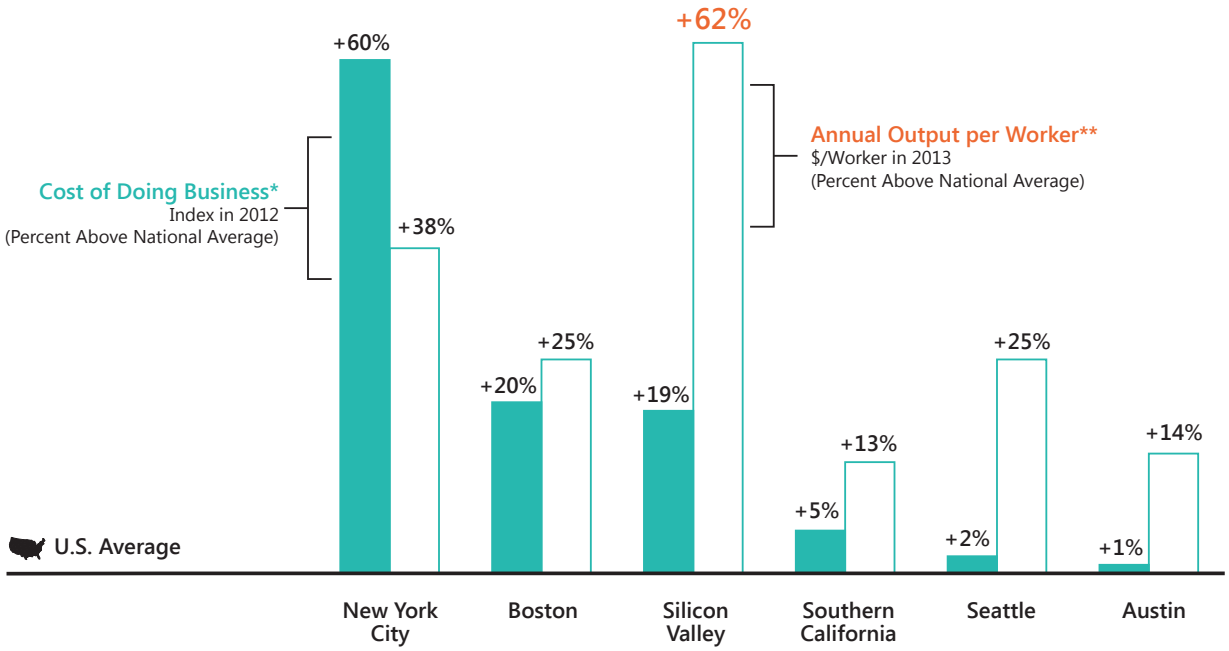
Outcomes and Prosperity: Business Competitiveness

Once a product or process is commercially viable, companies face decisions about where to scale production, involving tradeoffs between productivity and costs to operate a business. Costs, such as labor, real estate and regulatory burden, play an important role in a company's location decisions, though are frequently not the ultimate decision drivers. Particularly in innovation industries, access to highly productive talent, proximity to suppliers and end markets and connection to robust R&D infrastructure in a region have potential to outweigh comparatively high business operations costs.

Though Silicon Valley is an unequivocally strong location for commercializing technology and starting a business, it is also a comparatively expensive location in terms of high labor, real estate and business operations costs.[13] However, Silicon Valley's labor productivity (proxied by output per worker) is also the highest of the innovation regions, and encourages companies to locate within the region, particularly for their R&D and design activities.

Cost of Doing Business and Worker Productivity

Compared to the U.S. Average
Innovation Regions, 2012 and 2013



Note: Because of data constraints, New York City is proxied by the New York City metro area, Silicon Valley by the San Jose metro area and Southern California by the Los Angeles metro area.
*Cost of Doing Business is composite index; percentage difference is based on index values
**Calculated as GDP per worker, holding industry employment mix constant, and excluding real estate. Percent difference is based on dollars per worker. See Appendix for details.
Data Source: Moody's Analytics, BEA, BLS
Analysis: Moody's Analytics and Collaborative Economics

Silicon Valley's major metro areas, centered around San Jose and San Francisco, demonstrate extremely high output per worker (a rough approximation of labor productivity) in 2013 compared to the U.S. average, 62 percent above and 65 percent above, respectively.

The Cost of Doing Business Index ranges widely among the innovation regions: Austin's costs are 1 percent higher than the U.S. average, and New York City's are 60 percent higher. In relation to the U.S. average, San Jose's business costs are 19 percent higher, and San Francisco's are 17 percent higher in 2012.

Companies are acting on the productivity and cost balance in the region. In Silicon Valley, 1,260 existing establishments in innovation industries expanded employment, opened a new facility or moved into the region in 2013, accounting for 77 percent of total new jobs generated in these industries.

Outcomes and Prosperity: Quality of Life and Opportunity

Quality of life factors underlie innovation regions' ability to educate, attract and retain a world-class talent pool. Housing costs, commute times and local education systems (including Pre-K and K-12) all influence talent's perception of a region as a desirable place to live and build a career. High home sale prices and rental costs force workers to live farther from their place of work, lengthening commute times, and compounding traffic congestion, especially in regions with limited public transportation.

Silicon Valley's quality of life factors have deteriorated in recent years, in part a consequence of strong growth in innovation industries, and the industries bolstered by it. Housing costs have increased markedly and time spent commuting rose.

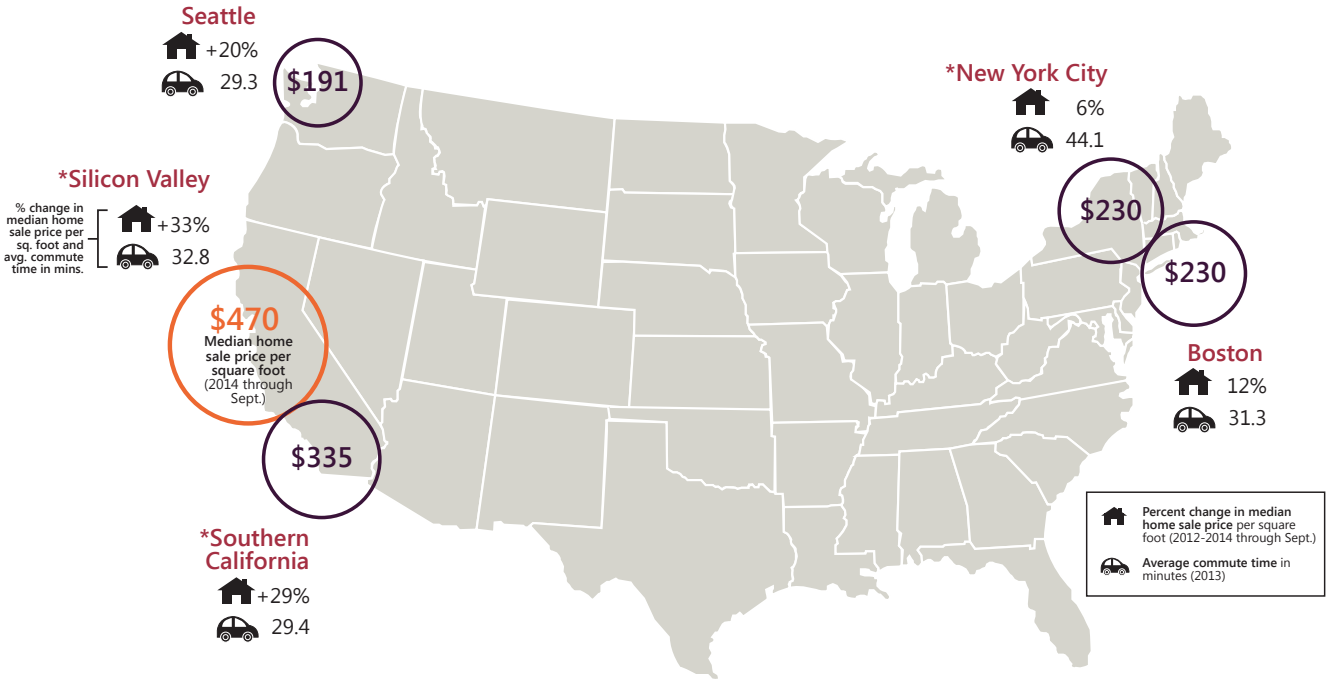
Regional education systems underpin locally born residents' ability to access opportunities within innovation industries. In addition to influencing the attractiveness of the region to talent, Pre-K and K-12 education systems are pivotal to the ability of locally born talent to access opportunities within innovation industries, and form an important backbone for Silicon Valley's talent competitiveness in the long term. High-quality Pre-K and K-12 education lays the foundation for skills needed to work in innovation industries, especially STEM related roles. Preschool attendance, 3rd grade reading proficiency and 8th grade Algebra proficiency have been linked to improved economic outcomes in the long term, including educational attainment and future earnings.[14,15,16,17]

In Silicon Valley there is wider income disparity than other innovation regions, and significant differences in math and reading proficiency by race and socioeconomic status. Slightly above half of Silicon Valley's students are proficient in reading and Algebra. Only about one in five STEM workers in Silicon Valley was born in California, let alone born within the region.

At the same time, economic mobility in Silicon Valley is the highest of the 50 largest metro areas in the U.S., meaning that individuals born in the region have higher odds of improving their economic status than in other regions.[18] Economic mobility is measured in this case by the likelihood that someone born into a low income family (in the 20th income percentile) would rise into a high income bracket (80th income percentile) in adulthood. While relatively high mobility estimates suggest that Silicon Valley has long-term strength in the ability of residents to improve their economic conditions from generation to generation, strong Pre-K and K-12 education systems are essential to continuing this trend.

Median Home Sale Price Per Square Foot, 2012-2014** and Average Commute Times, 2013

Select Innovation Regions



*Because of data constraints, Silicon Valley home sale prices are proxied by San Jose, New York City's by New York Metro Area, Southern California's by Los Angeles
**Through September 2014
Data Source: Zillow, American Community Survey - 1 Year Estimate
Analysis: Collaborative Economics

Silicon Valley has the most expensive and fastest rising median housing sale prices per square foot of the key innovation regions. Since 2012, following the housing market bottom across the innovation regions, median Silicon Valley home sale prices rose 33 percent. Prices actually began to rise in Silicon Valley in 2010, before home prices recovered in the other innovation regions.

The average commute time of workers in Silicon Valley also rose most quickly of the innovation regions in recent years, by 8 percent between 2010 and 2013. Nearly 1 in 6 commuters working in Silicon Valley traveled two hours or more each day in 2013, rising from 1 in 8 in 2011.

Economic Mobility

Innovation Regions, 2013

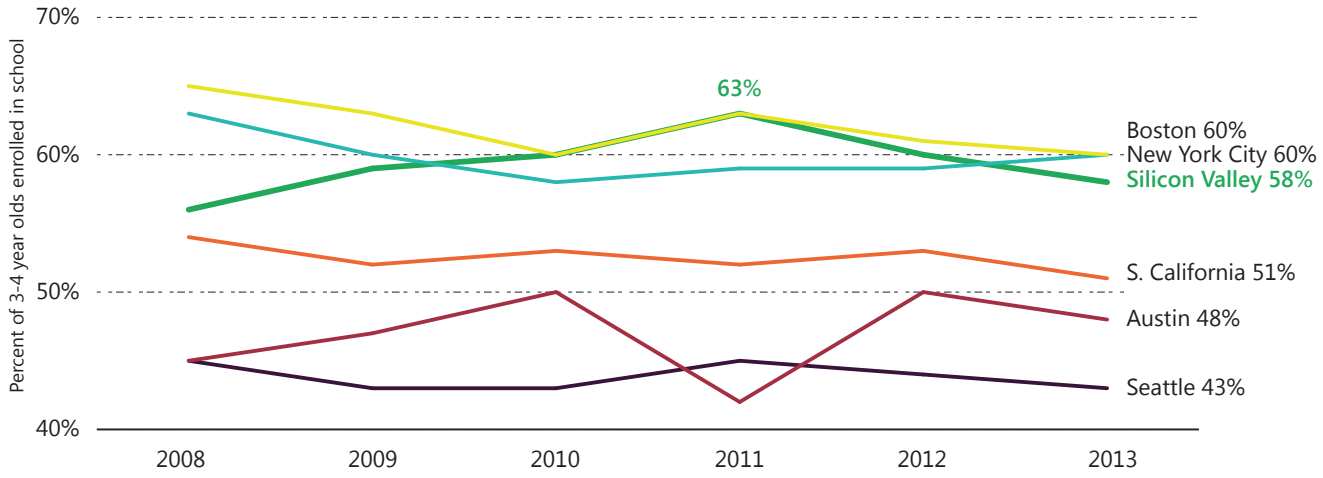
	Income Gap between 75th and 25th Income Percentiles, 2013	Odds of Reaching Top Fifth of the Income Distribution when Starting from the Bottom Fifth
San Jose	**$67,090**	**12.9%**
San Francisco	**$53,330**	**12.2%**
New York	$47,590	10.5%
Boston	$45,410	10.5%
Seattle	$44,250	10.9%
Los Angeles	$42,900	9.6%
Austin	$35,120	6.9%

While the San Jose and San Francisco metro areas have the highest gaps between the 75th and 25th income percentiles of the innovation regions, the region also had the highest economic mobility. One in 8 people born into the lowest income bracket in San Jose are estimated to reach the top 20th percentile in adulthood, versus roughly 1 in 10 in New York and Boston, and only 1 in 14 in Austin.

Note: Income Gap based on regional MSA, Odds of Reaching Top Fifth figures based on Commuting Zone. Details in Appendix.
Data Source: Chetty, Raj et al, The Equality of Opportunity Project, 2013, Bureau of Labor Statistics, Occupational Employment Statistics.
Analysis: Collaborative Economics

Preschool Enrollment

Share of 3-4 Year Olds Enrolled in School
Innovation Regions, 2008-2012



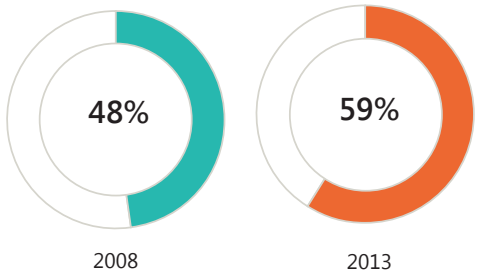
Data Source: American Community Survey
Analysis: Collaborative Economics

K-12 Education Proficiency Scores

Silicon Valley, 2008 and 2013

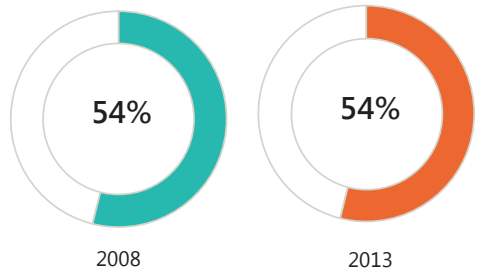
Third Grade Reading

Percent of third graders scoring proficient or higher on Reading/Language Arts exam



Eighth Grade Algebra

Percent of eighth graders scoring proficient or higher on Algebra I exam



Data Source: California Department of Education - STAR Results
Analysis: Collaborative Economics

58 percent of 3-4 year olds in Silicon Valley were enrolled in a preschool program in 2013, down from 63 percent in 2011. Enrollment was 60 percent in New York City and Boston in 2013. Participation in preschool has been empirically linked to improved student outcomes in math, reading and language.[19]

In 2013, 59 percent of Silicon Valley's 3rd grade students scored proficient or higher on the state reading/language arts exam, an improvement from 48 percent in 2008. 54 percent of 8th graders enrolled in an Algebra I course scored proficient or higher on the state exam in 2013.

Public Policy Levers

Public policies play a critical role in helping to shape Silicon Valley's innovation system. A primary goal of the SVCIP is to organize public, private and community leaders around a policy agenda to enhance and reinforce our competitive advantages in innovation, and ensure that Silicon Valley residents have access to the job opportunities and prosperity linked to growth in innovation industries. This section highlights priority policy issue areas identified through the SVCIP Dashboard, and potential policy actions in each area. While entrepreneurship, commercialization and risk capital remain strong in the region, there are potential concerns around talent, quality of life and research and development. Specific core policy actions will be identified in collaboration with regional leaders, and will be tracked on an ongoing basis on the following website: **svcip.com.**

There is a wide range of public policies at the federal, state and local levels that directly and indirectly address potential challenges in Silicon Valley. SVCIP is pursuing a targeted approach to address policy areas such as shaping and reinforcing the regional labor supply, and investing in research and infrastructure in Silicon Valley. The SVCIP will not focus on broad-strokes macroeconomic policies, such as monetary or trade policies that target demand for products and services.

High-Skill Immigration

Silicon Valley's strength in innovation industries is derived in large part from having one of the strongest and most specialized talent bases in the world. Immigration is pivotal to this strength; in 2013 more than half of the STEM talent in the region was born outside of the U.S. At present, U.S. immigration laws restrict the number of high-skill entrants to the U.S., and involve long periods of delay and uncertainty in processing. While the region's universities, companies and startup culture are magnets for foreign talent, each year thousands of tech workers and other professionals return home because of immigration restrictions and delays.

Permanent reform around high-skill immigration is needed for the long-term health of Silicon Valley, without which the region faces issues including:

- **Forgoing access to highly-skilled talent** that could strengthen local companies; and,
- **Encouraging immigrant entrepreneurs to start their companies abroad** rather than within the region because they were unable to remain within the U.S.

QUICK FACTS
HIGH-SKILL IMMIGRATION

56 percent of scientists and engineers in Silicon Valley were born in a foreign country in 2013.[20]

43.9 percent of startups in Silicon Valley were founded by foreign-born entrepreneurs in the 2006-2012 period, down from 52.4 percent during 1995-2005.[21]

Policy Action Examples at the Federal, State or Local Level

Immigration policy has been a controversial federal issue for decades, in part due to debate surrounding pathways to citizenship for undocumented immigrants. President Obama's announcement of an executive order in November 2014 underscores the congressional gridlock and challenge in effecting permanent legislative reform in this area. While overall immigration issues are important to Silicon Valley's and California's broader economies, the health of innovation industries in particular is more closely tied to high-skill immigration reforms. There are multiple relevant areas for possible policy action, including the following examples:

- **Permanently raise the quota for high-skill immigrants in green cards, O1-A, H-1B and E2 visas, which permit U.S. employers to temporarily employ foreign workers in specialty occupations, or foreign-born entrepreneurs to work and raise money within the U.S. for a business venture.** While President Obama's executive order targets highly skilled immigrants currently residing in the U.S. (including university students), future legislative action should increase quotas for additional high-skill categories.
- **Reduce processing time, uncertainty and administrative roadblocks for high-skill immigrants interested in obtaining a visa or permanent residency.** In 2014, the U.S. Department of Homeland Security proposed rulings on several of these issues, including exempting families of high-skill immigrants from the visa cap, and allowing currently employed immigrants to continue working in the U.S. while their paperwork is under review. Many issues remain, however, such as clearing the existing backlog of applications.

Education: STEM Education and High-Quality Pre-K

Educating and retaining home-grown STEM talent is critical to the economic health of Silicon Valley in the long term. At present, there is a gap between demand for talent in innovation industries and local supply of these workers, evidenced by company reports about the challenge of finding talent and the very large foreign-born workforce. The local education systems, starting in Pre-K and continuing through high school and post secondary education, are not preparing enough students for the STEM fields in demand in the region.

Improving education outcomes (particularly STEM) is important for Silicon Valley's long-term success for several reasons, including:

- **Reducing reliance on foreign-born or other U.S.-born talent,** who are more vulnerable to policy changes and/or cost of living increases in the region;
- **Increasing access of the locally born population** to job opportunities in innovation industries; and,
- **Narrowing the achievement gap among females and minorities** in STEM fields.

Policy Action Examples at the Federal, State or Local Level

Improving STEM and early education are important federal, state and local issues, and various entities have taken steps to improve student outcomes in these areas. A few key policy action area examples are as follows:

- **Augment funding of public preschool education programs, particularly targeting at-risk populations.** Attending high-quality preschool has been empirically shown to improve students' social-emotional development and outcomes in math, reading and language.[25] State-level legislative efforts in 2014 were largely unsuccessful, but the State Legislature is slated to consider a number of early learning policy items in 2015, in addition to the recent announcements by the White House to increase federal investments in this space.
- **Increase student opportunities to engage with STEM in K-12 schools through the implementation of the Common Core curriculum and the Local Control Funding Formula.** The region has the opportunity to align with and support statewide initiatives such as the STEM blueprint, outlined by the State Superintendent of Public Instruction's STEM Task Force in May 2014, and the federal 5-year plan to advance STEM education outlined in May 2013.
- **Reinforce systematic industry and education partnerships around STEM,** such as scaling programs around industry participation in schools, internships, guest lecturers and work-based experiences.

QUICK FACTS
EDUCATION

58 percent of Silicon Valley's 3-4 year olds were enrolled in preschool in 2013, down from 2011's enrollment and lower than Boston and NYC in 2013.[22]

59 percent of Silicon Valley students scored proficient or higher on the state 3rd grade reading assessment in 2013, an improvement from 2008. There was a wide gap in achievement by ethnicity; only 35 percent of Hispanic and Latino student passed this exam in 2013.[23]

54 percent of students that took the Algebra I exam in 8th grade passed it, holding steady from 2008.[24] Passing Algebra I is an important admissions criterion in the University of California/ California State University systems.

Transportation and Housing

Underlying the region's ability to attract and retain top-notch talent are quality of life considerations. While factors such as mild weather and culture continue to be a significant draw for talent, aspects of Silicon Valley's quality of life have deteriorated in recent years, with increasing housing costs and traffic. U.S.-born workers are particularly responsive to these rising costs of living, seen by falling migration rates from other states into Silicon Valley, and a rise in domestic migration into lower cost innovation regions such as Austin and Seattle.

High cost of living and increasing commute times are issues for Silicon Valley for several reasons, including:

- **Reducing the attractiveness of the region** for drawing and retaining talent;
- **Shifting the balance between worker productivity and labor costs from a business perspective.** While Silicon Valley's labor productivity is currently high enough to warrant compensating workers for the higher cost of living, rapid increases in living costs and the associated increase in wage requirements places pressure on businesses in the region; and,
- **Pressuring the ability of residents not employed in high-compensation jobs** to find housing within the region

Policy Action Examples at the Federal, State or Local Level

While policy action must be taken at the local level to address housing and transportation issues, the state and federal government also have roles to play in investing in critical transportation infrastructure and helping to develop more affordable housing. Key example policy actions for Silicon Valley include the following:

- **Mobilize business voices in support of additional housing development in the region.** Businesses can play a key role in testifying about the importance of additional housing development during the local government review processes for new construction.
- **Advocate for a permanent funding source for affordable housing** at the state level.
- **Invest in transportation infrastructure and housing across cities within the region to promote livable cities,** aligning with regional planning efforts such as Plan Bay Area developed by MTC in 2013 as required by SB375.

QUICK FACTS
QUALITY OF LIFE

65 percent of Silicon Valley CEOs surveyed in 2013 reported employee housing costs as one of their top five challenges for doing business in the region.[26]

Housing sale prices increased 33 percent in Silicon Valley (proxied by San Jose) between 2012 and 2014 (through September), and the price per square foot was higher than all other main innovation regions in 2014.[27]

Average commute times in Silicon Valley rose faster than other innovation regions, +8 percent between 2010 and 2013, versus +5.5 percent in Seattle, and +4 percent in Austin.[28]

Commuters in Silicon Valley (proxied by San Jose) wasted 84 hours per year for a half-hour commute in 2013 from delays from traffic congestion, lagging only Southern California (proxied by Los Angeles) at 90 hours per year.[29]

Research and Development

Long-term investments in R&D, particularly federal R&D funding, in Silicon Valley have played a crucial role in developing many of the region's most successful commercial technologies. The U.S. Department of Defense, especially the Defense Advanced Research Projects Agency, and the National Institutes of Health played key roles in helping to generate massive commercial industries in Silicon Valley, including in integrated circuits, internet and biotechnology. Investing in R&D at universities, national laboratories and companies is also critical for building intellectual and human capital in the region, which is essential for growing and retaining high-skilled talent.

Falling R&D funding to Silicon Valley is an issue for a range of reasons, including:

- **Reducing Silicon Valley's pipeline of basic and applied research,** which may translate to fewer innovations and breakthrough technologies; and,
- **Eroding the region's (and nation's) leadership in research and innovation,** as other countries simultaneously ramp up R&D funding.

Policy Action Examples at the Federal, State or Local Level

R&D policy is primarily a federal and state issue, but universities and the private sector have a role to play locally in Silicon Valley as well. Core policy action examples include the following:

- **Develop a single regional voice in Washington, D.C. on federal R&D funding,** expanding the coalition of supportive businesses and organizations. While the White House has suggested commitments to augmenting federal R&D, Congress has not authorized addition funding.
- **Promote and strengthen permanent R&D tax credits at the state and federal levels**, and a permanent state R&D equipment tax exemption.

QUICK FACTS
RESEARCH & DEVELOPMENT

Federal R&D funding to Silicon Valley's universities fell 2 percent from 2011 to 2012.[30]

In the U.S. overall, non-defense federal R&D funding fell 5 percent between 2012 and 2013, to its lowest level since 2001.[31]

Cost of Doing Business and Regulation

Business competitiveness derives from a balance of productivity and costs. Many of the policy issues discussed in this section focus on enhancing the talent pool, labor productivity and access to employment opportunities in Silicon Valley. The other key consideration in business competitiveness relates to reducing costs and barriers to expanding businesses within the region.

Silicon Valley is an unequivocally strong location for launching and scaling a business, and offers clear benefits for locating R&D, design and prototyping centers. However, large-scale production, manufacturing and/or operations facilities face additional tradeoffs in terms of real estate, labor, tax and regulatory costs. Commercial-scale production establishments offer benefits to the region, including employing a more diverse workforce in terms of education and training backgrounds.

Comparatively high business costs and regulatory barriers in Silicon Valley are an important issue for a variety of reasons including:

- **Among companies considering expanding into the Valley,** these impede expansion or opening of large-scale production/operations facilities due to higher real estate, labor and tax costs and regulatory burden, in comparison to other regions; and,
- **Among businesses deciding whether to continue operations in the region,** these erode profitability and pressuring the ability to remain in business in the region.

Policy Action Examples at the Federal, State or Local Level

Cost of business and regulatory issues have important dimensions at the state and local level. A policy action example includes the following:

- **Modernize the California Environmental Quality Act** (CEQA) to reduce hurdles to development and business expansion that are in accordance with the environmental protection intent of the law.
- **Promote fairness in business property tax valuations** by working with County Assessors to improve the auditing process, and make valuation tables more reasonable and transparent.

QUICK FACTS
COST OF DOING BUSINESS

Silicon Valley (proxied by San Jose) was the 4th highest cost metro region in the U.S. in which to conduct business in 2012.[32]

On an index basis, office rental costs in San Jose were estimated to be 11 percent above the U.S. average, 7th highest in the U.S., lower than New York City and Boston.[33]

San Jose's state and local tax costs were roughly 3 percent below the U.S. average in 2012 on an index basis, though were higher than Boston, Austin and Seattle. This figure does not incorporate opportunity costs of regulatory processing time.[34]

Conclusion

Silicon Valley Leadership Group and Silicon Valley Community Foundation launched the SVCIP to proactively identify a long-term public policy agenda in Silicon Valley, anchored by quantitative trends, and aimed at enhancing the region's competitiveness and innovation fundamentals. While Silicon Valley has many strengths, the region's continued ability to attract, retain and develop talent, as well as improve pathways to participation in innovation industries for local residents, are critical to its continued economic success.

The *Silicon Valley Competitiveness and Innovation Project-2015* represents a first step in identifying key policy issues to address in the near term. Going forward, specific core policy actions will be identified in collaboration with regional public and nonprofit leaders to develop a Silicon Valley policy agenda. Over the next several years, regional stakeholders will work with policy makers and hold the region accountable for progress on that agenda, working together to promote a robust, inclusive economy for all of the Valley's residents.

Track the progress of SVCIP at the following website: **svcip.com.**

Endnotes

1. Moretti, Enrico. The New Geography of Jobs. 2012.
2. Hathaway, Ian, Patrick Kallerman. "Technology Works: High-Tech Employment and Wages in the United States." Bay Area Economic Institute. December 2012. https://s3.amazonaws.com/engine-advocacy/TechReport_LoRes.pdf Note: Study estimates 4.3 jobs added in services sector for a new high tech job, within the margin of error of Moretti's work, which estimates roughly 5 jobs added.
3. Schumpeter, JA. Capitalism, Socialism and Democracy. New York, NY: Harper Torchbooks. 1942.
4. Schumpeter, JA. The Theory of Economic Development. Piscataway, NJ: Transaction Publishers. 1982 [1934].
5. Moretti, Enrico, Per Thulin. "Local Multipliers and Human Capital in the U.S. and Sweden." IFN Working Paper. 2012.
6. "CEO Survey 2013." Silicon Valley Leadership Group. http://svlg.org/wp-content/uploads/2013/03/CEO_Survey_2013.pdf
7. National Venture Capital Association. "VC Fundraising Stats for Q3 2014." October 4, 2014. http://www.nvca.org/index.php?option=com_content&view=article&id=344&Itemid=103
8. National Venture Capital Association. "VC Fundraising Stats for Q1 2014." http://www.nvca.org/index.php?option=com_docman&task=cat_view&gid=56&Itemid=317
9. CB Insights. Venture Capital Database. https://www.cbinsights.com/
10. Advancing Science, Service Society, based on OMB and agency R&D budget data. May 2014 http://www.aaas.org/page/historical-trends-federal-rd#Disc
11. OECD, Main Science and Technology Indicators Database. 2013. http://www.oecd.org/sti/msti.htm
12. Malone, Michael. "Why Silicon Valley Will Continue to Rule the Tech Economy: Human talent and research and design labs are arriving to dominate the new era of devices." Wall Street Journal. August 22, 2014. http://www.wsj.com/articles/michael-malone-why-silicon-valley-will-continue-to-rule-the-tech-economy-1408747795
13. "Cost of Doing Business Index." Moody's Analytics. May 2014.
14. Yoshikawa, Hirokazu , Christina Weiland, Jeanne Brooks-Gunn, Margaret R. Burchinal, Linda M. Espinosa, William T. Gormley, Jens Ludwig, Katherine A. Magnuson, Deborah Phillips, Martha J. Zaslow. "Investing in Our Future: The Evidence Base on Preschool Education." October 2013. http://fcd-us.org/sites/default/files/Evidence%20Base%20on%20Preschool%20Education%20FINAL.pdf
15. Long, M. C., D. Conger & P. Iatarola. "Effects of High School Course-Taking on Secondary and Postsecondary Success." American Educational Research Journal. 2012. http://aer.sagepub.com/content/49/2/285.short
16. Joensen, Juanna Schroter., & Helena Skyt Nielsen. "Is there a Causal Effect of High School Math on Labor Market Outcomes?" Journal of Human Resources. 2006. http://ftp.iza.org/dp2357.pdf
17. Lesnick, Joy, Robert M. Goerge, Cheryl Smithgall, Julia Gwynne. "A Longitudinal Analysis of Third-Grade Students in Chicago in 1996-97 and their Educational Outcomes." Chapin Hall at the University of Chicago, Annie E. Casey Foundation. 2010. http://www.chapinhall.org/sites/default/files/Reading_on_Grade_Level_111710.pdf
18. Chetty, Raj, Nathaniel Hendren, Patrick Kline, Emmanuel Saez. "Where is the Land of Opportunity? The Geography of Intergenerational Mobility in the United States." 2012. http://www.equality-of-opportunity.org/ and http://obs.rc.fas.harvard.edu/chetty/mobility_geo.pdf
19. Yoshikawa et al, 2013.
20. U.S. Census Bureau, Public Use Microdata Sample. 2013.
21. Wadhwa, Vivek, AnnaLee Saxenian and F.Daniel Siciliano. "Then and Now: America's New Immigrant Entrepreneurs, Part VII." Ewing Marion Kauffman Foundation; 2012. http://www.kauffman.org/~/media/kauffman_org/research%20reports%20and%20covers/2012/10/then_and_now_americas_new_immigrant_entrepreneurs.pdf
22. U.S. Census Bureau, American Community Survey, 2013.
23. California Department of Education, STAR test results
24. ibid
25. Yoshikawa et al, 2013.
26. "CEO Survey 2013." Silicon Valley Leadership Group. http://svlg.org/wp-content/uploads/2013/03/CEO_Survey_2013.pdf
27. Zillow. Median Sale Price per Square Foot. September 2014.
28. U.S. Census Bureau, American Community Survey, 2013.
29. "TomTom Americas Traffic Index." TomTom. 2014. http://www.tomtom.com/lib/doc/pdf/2014-05-14%20TomTomTrafficIndex2013annualAme-mi.pdf
30. National Science Foundation. Academic R&D Expenditures by Institution. 2004-2012.
31. Advancing Science, Service Society, based on OMB and agency R&D budget data. May 2014 http://www.aaas.org/page/historical-trends-federal-rd#Disc
32. Moody's Analytics. Cost of Doing Business Index. May 2014.
33. ibid
34. ibid

General References

Key U.S. Innovation Regions Definitions		
Region Name	"Principal Definition County-based"	"Alternate Definition MSA-based (where county data unavailable)"
Silicon Valley	Santa Clara, San Mateo and San Francisco counties	San Jose-Sunnyvale-Santa Clara, and San Francisco-Oakland-Hayward MSAs
New York City	New York, Richmond, Kings, Queens and Bronx counties	New York-Newark-Jersey City, NY-NJ-PA MSA
Boston	Norfolk (MA), Plymouth (MA), Suffolk (MA), Middlesex (MA), Essex (MA), Rockingham (NH) and Strafford (NH) counties	Boston-Cambridge-Newton, MA-NH MSA
Southern California	Los Angeles, Orange and San Diego counties	Los Angeles-Long Beach-Anaheim and San Diego-Carlsbad-San Marcos MSAs
Austin	Bastrop, Caldwell, Hays, Travis, and Williamson counties	Austin-Round Rock MSA
Seattle	King, Snohomish and Pierce counties	Seattle-Tacoma-Bellevue MSA

Inflation Adjustment

Inflation-adjusted figures are converted into first half of 2014 dollars using the U.S. Consumer Price Index (CPI) of all urban areas, published by the Bureau of Labor Statistics.

Population

Per capita indicators use county-level population data from the U.S. Census Bureau, Population Estimates Branch.

Silicon Valley Employment Waves

The "Evolution of Silicon Valley" employment indicator reflects yearly total employment averages for Santa Clara, San Mateo and San Francisco counties, obtained from California Economic Development Department, Labor Market Information Division. Innovation paradigm wave and timing estimates are derived from A Profile of the Valley's Evolving Structure in "The Silicon Valley Edge: A Habitat for Innovation and Entrepreneurship." Stanford, California: Stanford University Press, 2000, by Doug Henton.

Innovation Industries Overview

Innovation Industries Definition

The definition of Innovation Industries used in this report is based on Bureau of Labor Statistics literature surrounding "super" and "medium" high-tech employment, which include 15% or more of the workforce in scientific, engineering, and technician occupations. Specific NAICS codes were identified and classified through definition review and various sources (Hecker, 2005; Massachusetts Department of Workforce Development, 2007; TechAmerica Foundation, 2013; Helper et al, 2012). Specialized Innovation Services and Other Media were included to account for regions' innovation capacity - social infrastructure and intellectual supports that encourage/enable entrepreneurship in regions, including scientific and engineering research services, venture capitalists, patent attorneys, designers, and select business services providers.

NAICS Classifications for Innovation Industries are as follow – for 3-4 Digits and 6 Digits

3-4 Digit NAICS	Description (2012)
Biotechnology & Pharmaceuticals	
3254	Pharmaceutical and Medicine Manufacturing
Medical Devices	
3391	Medical equipment and supplies manufacturing
Aerospace	
3364	Aerospace Product and Parts Manufacturing
Information Communications Technology Product & Component Manufacturing	
334	Computer and electronic product manufacturing
3353	Electrical equipment manufacturing
3359	Other electrical equipment and component manufacturing
Software	
5112	Software Publishers
5415	Computer Systems Design and Related Services
Internet and Information Systems	
5161	Internet Publishing and Broadcasting
519	Other Information Services
5179	Other Telecommunications
5181	Internet Service Providers and Web Search Portals
5182	Data Processing, Hosting, and Related Services
Other High-Tech Production/Manufacturing	
3251	Basic Chemical Manufacturing
3252	Resin, Synthetic Rubber, and Artificial Synthetic Fibers and Filaments Manufacturing
3332	Industrial Machinery Manufacturing
3333	Commercial and Service Industry Machinery Manufacturing
Other Media	
515	Broadcasting (except Internet)
Specialized Innovation Services	
5416	Management, Scientific, and Technical Consulting Services
5417	Scientific Research and Development Services

6 Digit NAICS	Description (2012)
Biotechnology & Pharmaceuticals	
325411	Medicinal and Botanical Manufacturing
325413	In-Vitro Diagnostic Substance Manufacturing
325414	Biological Product (except Diagnostic) Manufacturing
325412	Pharmaceutical Preparation Manufacturing
Telecommunications Services	
515210	Cable and Other Subscription Programming
517110	Wired Telecommunications Carriers
517210	Wireless Telecommunications Carriers (except Satellite)
517911	Telecommunications Resellers
517410	Satellite Telecommunications
Internet & Information Services	
519130	Internet Publishing and Broadcasting and Web Search Portals
518210	Data Processing, Hosting, and Related Services
541513	Computer Facilities Management Services
541519	Other Computer Related Services
517919	All Other Telecommunications
Software	
334614	Software Reproducing
511210	Software Publishers
541511	Custom Computer Programming Services
541512	Computer Systems Design Services
Other Media & Broadcasting	
512110	Motion Picture and Video Production
512191	Teleproduction and Other Postproduction Services
512199	Other Motion Picture and Video Industries
512210	Record Production
512220	Integrated Record Production/Distribution
512230	Music Publishers
512240	Sound Recording Studios
512290	Other Sound Recording Industries
515111	Radio Networks
515112	Radio Stations
515120	Television Broadcasting
519110	News Syndicates
519120	Libraries and Archives
519190	All Other Information Services

6 Digit NAICS	Description (2012)
Specialized Innovation Services	
541110	Offices of Lawyers
541191	Title Abstract and Settlement Offices
541199	All Other Legal Services
541211	Offices of Certified Public Accountants
541213	Tax Preparation Services
541214	Payroll Services
541219	Other Accounting Services
541310	Architectural Services
541330	Engineering Services
541340	Drafting Services
541380	Testing Laboratories
541420	Industrial Design Services
541430	Graphic Design Services
541611	Administrative Management and General Management Consulting Services
541612	Human Resource Consulting Services
541613	Marketing Consulting Services
541614	Process, Physical Distribution, and Logistics Consulting Services
541618	Other Management Consulting Services
541620	Environmental Consulting Services
541690	Other Scientific and Technical Consulting Services
541711	Research and Development in Biotechnology
541712	Research and Development in the Physical, Engineering, and Life Sciences (except Biotechnology)
541720	Research and Development in the Social Sciences and Humanities
541990	All Other Professional, Scientific, and Technical Services
523910	Miscellaneous Intermediation
523110	Investment Banking and Securities Dealing

6 Digit NAICS	Description (2012)
ICT Product & Component Manufacturing	
327211	Flat Glass Manufacturing
333242	Semiconductor Machinery Manufacturing
334111	Electronic Computer Manufacturing
334112	Computer Storage Device Manufacturing
334118	Computer Terminal Manufacturing
334210	Telephone Apparatus Manufacturing
334220	Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing
334290	Other Communications Equipment Manufacturing
334419	Electron Tube Manufacturing
334412	Bare Printed Circuit Board Manufacturing
334413	Semiconductor and Related Device Manufacturing
334416	Electronic Capacitor Manufacturing
334417	Electronic Connector Manufacturing
334418	Printed Circuit Assembly (Electronic Assembly) Manufacturing
334613	Magnetic and Optical Recording Media Manufacturing
335311	Power, Distribution, and Specialty Transformer Manufacturing
335312	Motor and Generator Manufacturing
335313	Switchgear and Switchboard Apparatus Manufacturing
335314	Relay and Industrial Control Manufacturing
335912	Primary Battery Manufacturing
335991	Carbon and Graphite Product Manufacturing
335921	Fiber Optic Cable Manufacturing
335929	Other Communication and Energy Wire Manufacturing
Aerospace	
336411	Aircraft Manufacturing
336412	Aircraft Engine and Engine Parts Manufacturing
336413	Other Aircraft Parts and Auxiliary Equipment Manufacturing
336414	Guided Missile and Space Vehicle Manufacturing
336415	Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
336419	Other Guided Missile and Space Vehicle Parts and Auxiliary Equipment Manufacturing

6 Digit NAICS	Description (2012)
Other High-Tech Production/Manufacturing	
325120	Industrial Gas Manufacturing
325130	Inorganic Dye and Pigment Manufacturing
325180	Alkalies and Chlorine Manufacturing
325194	Gum and Wood Chemical Manufacturing
325193	Ethyl Alcohol Manufacturing
325199	All Other Basic Organic Chemical Manufacturing
325211	Plastics Material and Resin Manufacturing
325212	Synthetic Rubber Manufacturing
325220	Cellulosic Organic Fiber Manufacturing
333314	Optical Instrument and Lens Manufacturing
333316	Photographic and Photocopying Equipment Manufacturing
334310	Audio and Video Equipment Manufacturing
334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing
334512	Automatic Environmental Control Manufacturing for Residential, Commercial, and Appliance Use
334513	Instruments and Related Products Manufacturing for Measuring, Displaying, and Controlling Industrial Process Variables
334514	Totalizing Fluid Meter and Counting Device Manufacturing
334515	Instrument Manufacturing for Measuring and Testing Electricity and Electrical Signals
334516	Analytical Laboratory Instrument Manufacturing
334519	Watch, Clock, and Part Manufacturing
336992	Military Armored Vehicle, Tank, and Tank Component Manufacturing
333999	All Other Miscellaneous General Purpose Machinery Manufacturing
Medical Devices	
334510	Electromedical and Electrotherapeutic Apparatus Manufacturing
334517	Irradiation Apparatus Manufacturing
333997	Scale and Balance Manufacturing
339112	Surgical and Medical Instrument Manufacturing
339113	Surgical Appliance and Supplies Manufacturing
339114	Dental Equipment and Supplies Manufacturing
339115	Ophthalmic Goods Manufacturing
339116	Dental Laboratories

Employment in Innovation Industries

Employment in Innovation Industries indicators derive from two sources:
Institute for Exceptional Growth Companies (IEGC); and,
Bureau of Labor Statistics, Quarterly Census of Employment and Wages (BLS-QCEW).

IEGC's (http://youreconomy.org/index.ye) employment data are sourced from the National Establishment Time-Series database and the Dun & Bradstreet business-unit census, and represent reported job counts at business establishments as of January of each year for 2000-2012, and March of 2013 and 2014. Data is available at the 6-digit NAICS level. IEGC is the basis for innovation industries' share and composition of total regional employment, given its highly granular industry view. Regions are defined by county.

BLS-QCEW employment data are survey-based employment estimates, available to the 3-4-digit NAICS level. In this report, BLS-QCEW employment levels are annual averages. This source is the basis for industry growth estimates across innovation regions. Regions are defined by county.

Regional Output in Innovation Industries

Regional Output in Innovation Industries is estimated using Moody's Analytics (www.economy.com) nominal GDP levels for Santa Clara, San Mateo and San Francisco counties, adjusted for inflation using the Bureau of Economic Analysis personal consumption expenditures (PCE) price index. Due to data constraints, innovation industries include the following sectors: Computer and Electronic Product Manufacturing, Electrical Equipment; Appliance; and Component Manufacturing, and Information. A share of Professional; Scientific; and Technical Services GDP was added as well, in the same proportion as the Computer System Design Services and Custom Computer Programming Services employment share of Professional; scientific; and technical services employment from BLS-QCEW.

Talent

Talent Pool in Innovation Industries: High-Technology STEM Occupations

High-Technology STEM Occupation data are from Bureau of Labor Statistics, Occupational Employment Statistics, from May 2003 and May 2013. Due to data constraints, regions are defined by MSAs, rather than county. High Technology STEM Occupations are scientific, engineering, and technician occupations, defined by the Bureau of Labor Statistics (Hecker, 2005), including computer and mathematical scientists, engineers, drafters, engineering, and mapping technicians, life scientists, physical scientists, life and physical science technicians, computer and information systems managers, engineering managers, and natural sciences managers. Science and engineering industries are based on U.S. Census Bureau Standard Occupational Classification system, and include comparable codes in the 2002 and 2010 classifications.

International Talent

Data for international talent is provided by the United States Census Bureau, 2013 American Community Survey Public Use Microdata Samples (PUMS). The Science & Engineering (S&E) category is comprised of workers in the following occupations: computer, physical engineers, design, biological, mathematics, and aerospace engineers & scientists. Design includes designers and artists & related workers. Both were added to the S&E occupations to try to capture the employment in graphic designers and multi-media artists & animators. Data includes all employed, at work individuals with a Bachelor's degree or higher. Foreign-born does not include individuals from U.S. territories. In-state-born share of workers for New York City only incorporates NY state, and for Boston, both MA and NH. Science and engineering industries are based on U.S. Census Bureau Standard Occupational Classification system. This classification system was updated in 2010. Regions are defined by county.

Population Change by Educational Attainment

Population Change by Educational Attainment uses data from the United States Census Bureau, American Community Survey (ACS), 1-year estimates, for 2011 and 2013. Due to data constraints, regions are defined by MSAs, rather than county. This indicator illustrates change in number of residents by education level among adults 25 years and above, divided by total residents 25 years and above (from the same dataset), by 10,000.

STEM Degrees Conferred

STEM Degrees Conferred refers to data from the National Center for Educational Statistics, Integrated Post-secondary Education Data System (IPEDS). Data are based on first major and include Bachelor's, Master's and Doctorate degrees in Biological & Biomedical Sciences, Physical Sciences, Engineering, Computer & Information Sciences, Mathematics & Statistics, Engineering Technologies and Related, Science Technologies/Technicians. To obtain degrees conferred, balanced by population, total degrees conferred is divided by population (U.S. Census) per 10,000 residents. Regions are defined by county, based on college/university city.

Migration

Migration estimates reflect net change in number of migrants, based on origin, from U.S. Census Bureau Population Estimates.

To obtain monthly averages, yearly migration numbers are divided by 12. In the case of Southern California and New York, the net change in domestic migrants was negative, meaning that more people left those regions than arrived from the rest of the U.S., hence all positive change in population was from abroad. Regions are defined by county.

Risk Capital, Research and Development

Venture Capital & Early Stage Funding

Investment data are provided by CB InsightsTM (www.cbinsights.com) and include disclosed investment deals in private companies. Data are through November 10, 2014, unless explicitly noted to be through Q3 2014. All figures were adjusted for inflation, as described above. VC data includes Angel, Seed, Series A-E+, Growth Equity, Bridge, and Incubator series types. Regions are defined by county, based on startups' HQ city.

R&D Expenditures at Universities

Research & Development Expenditures at Universities are from the National Science Foundation (NSF), National Center for Science and Engineering Statistics, Higher Education Research and Development Survey. From FY 2004 through FY 2009, some institution totals for all R&D expenditures may be lower-bound estimates because NSF did not attempt to estimate for non-response on non-science and engineering R&D expenditures item. Regions are defined by county, based on college/university city.

Total R&D Expenditure estimates were not available for Seattle from 2004 to 2009; to construct the indexed time series, growth rates for Federal R&D Expenditures for the University of Washington, Seattle were substituted (sourced from NSF, Statistical Abstract of the United States, 2007 and U.S. Census Federal R&D Obligations in 2008). In 2012, University of Washington accounted for 99% of Seattle's total reported research funding and federal funding was 86% of University of Washington's total R&D expenditure (NSF).

Innovation Processes

Patents

Patent data are provided by the U.S. Patent Trademark Office, Custom Data Extracts, and reflect utility patents granted by location of the first inventor on the patent application. Regions are defined by county, based on first inventors' city. Patent Registrations in Computers, Data Processing & Information Storage reflect USPC Classes 116, 235, 346-7, 360, 365, 369, 377, 700-20, 726, and 902.

Progression of Early-Stage Investment

Progression of Early-Stage Investment by Series data are from CB InsightsTM (www.cbinsights.com) and include disclosed investment deals in private companies through November 10, 2014. This indicator tracks venture-backed startup companies that launched in the selected year through subsequent rounds of funding. While companies may have received multiple rounds of funding within the series (e.g. several rounds of Series A funding), this indicator counts the first investment in the series only, and then that company's subsequent, higher-level series. Pre-A investments include angel, seed and seed VC investments. This indicator reflects 2012 as the most recent cohort because companies that launched in 2013 and 2014 have had less time to secure subsequent funding rounds, and historical comparisons would be inappropriate. Regions are defined by county, based on startups' HQ city.

New Companies & Establishment Dynamics

All entrepreneurship indicators use Institute for Exceptional Growth Companies (IEGC) (http://youreconomy.org/index.ye) data for establishments. IEGC's establishment data are sourced from National Establishment Time-Series database and the Dun & Bradstreet business-unit census, and represent reported counts of active business establishments as of January of each year for 2000-2012, and March of 2013 and 2014, at the 6-digit NAICS level. New Companies Launched reflect the number of establishments opening in each year, in which the business units are the first for the company, not connected to an existing headquarters or branch location. In Employment Dynamics in Innovation Industries sources of job growth (Opening, Expanding, Moving In) reflect gross increase in jobs in the region, not net job change. In Establishments Opening, Expanding, Closing, Contracting & Moving, & Total Jobs, "Openings" includes both the number of new companies launching and existing companies opening a branch/division in a new location. Regions are defined by county.

Median Valuations of Startup Companies

Median Valuation of Startup Companies data and analysis are from Pitchbook Data, Inc. (pitchbook.com) as of July 2014. Valuations are evaluated before a subsequent round of investment ("pre-money"). Included are venture-backed companies that have not exited (e.g. through an initial public offering, merger/acquisition, etc). Figures are inflation adjusted using BLS CPI-U data. "Early Stage" startups are companies that have secured seed/seed VC or series A investments, while "Later Stage" startups refer to companies that received Series B investment or later. Regions are defined by county, based on startups' HQ city.

IPO Valuations

IPO Valuation data are from CB InsightsTM (www.cbinsights.com) and include initial public offering exits among private companies through November 10, 2014, adjusted for inflation. Where IPO valuation data were unavailable from CB Insights, valuations from CrunchBase (http://www.crunchbase.com/) were used. Regions are defined by county, based on startups' HQ city.

Business Competitiveness

Cost of Doing Business Index

Cost of Doing Business Index data and analysis are from Moody's Analytics (www.economy.com), U.S. Cost of Doing Business Analysis Update, May 2014, by Eric Tannenbaum. Due to data constraints, regions are organized by principal metropolitan area. Silicon Valley is proxied by San Jose, New York City by New York metro, and Southern California by Los Angeles. As an index, costs are relative to the U.S. average, where U.S. overall=100. The 2012 relative business cost index reflects a three-year average of underlying components of the index, covering 2010 to 2012. Index components include relative unit labor, energy, office rent and state & local tax costs. Components are adjusted to account for variation in industry mix across geographies.

Productivity – Annual Output per Worker

Worker productivity is roughly proxied by annual regional output (GDP) in the private sector per private sector worker, in 2013. Regional GDP data are from Bureau of Economic Analysis, and employment data are from BLS-QCEW. Due to data constraints, regions are organized by principal metropolitan area. Silicon Valley is proxied by San Jose, New York City by New York metro, Southern California by Los Angeles. BLS-QCEW county-level data were matched to the MSA county definitions. To correct for regional differences in industry mix, and those industries' differences in productivity, regions' output per worker rates for each GDP sector (matched to 2-3-digit NAICS sector in BLS-QCEW) were applied to the overall U.S. proportion of employment by sector. Figures exclude output per worker in real estate.

Quality of Life and Opportunity

Median Home Sale Price

Median Home Sale Price data are from Zillow (www.zillow.com), and are inflation adjusted. Due to data constraints, regions are organized by principal city. Austin data is not available. Silicon Valley is proxied by San Jose, New York City by New York metro and Southern California by Los Angeles. Monthly data are averaged to estimate annuals. Data include new construction, first-time re-sale, and re-sales, though do not include foreclosure sales.

Commute Times

Average Commute Times data are from the U.S. Census Bureau, American Community Survey 1 year estimates from 2010 through 2013. Regions are defined by county.

Preschool Participation

Preschool participation data are from the U.S. Census Bureau, American Community Survey 1-year estimates from 2008 through 2013, and reflect percent share of total 3 and 4 year-olds in school. Regions are defined by county.

Reading and Algebra Proficiency

Proficiency data are from the California Department of Education, STAR Results in 2008 and 2013. Reading proficiency reflects 3rd grade students that took the CST English Language Arts exam (Exam 7) and scored proficient or higher. Algebra proficiency reflects 8th grade students that were enrolled in Algebra and took the CST Algebra I exam (Exam 9) and scored proficient or higher. Regions are defined by county.

Economic Mobility

Income gap data are from Bureau of Labor Statistics, Occupational Employment Statistics and reflect differences in annual wages between the 25th and 75th percentiles from May 2013. Due to data constraints, regions are defined by principal MSA. Silicon Valley is proxied by San Jose, New York City by New York metro, and Southern California by Los Angeles.
Odds of Reaching Top Fifth of the Income Distribution when Starting from the Bottom Fifth data and analysis are from Chetty, Raj et al, The Equality of Opportunity Project. (http://www.equality-of-opportunity.org/). Due to data constraints, innovation regions are defined by their commuting zones (CZ): Silicon Valley is proxied by San Jose CZ (Santa Clara, San Benito, Santa Cruz and Monterey counties), and San Francisco CZ (San Francisco, San Mateo, Alameda, Contra Costa, Marin, Napa, Solano counties), Boston CZ (Norfolk, Middlesex, Plymouth, Essex, Worcester, Barnstable, Suffolk counties), Austin CZ (Mower, Lee, Freeborn, Williamson, Milam, Blanco, Bastrop, Travis, Hays, Caldwell counties), New York CZ (Nassau, Putnam, Richmond, Westchester, Suffolk, Queens, New York, Kings, Bronx counties), Southern California proxied by Los Angeles CZ (Los Angeles, Orange, Ventura, San Bernardino, Riverside counties), Seattle CZ(King, Snohomish, Kitsap, Island, Skagit, Lewis, Pierce, Thurston, Mason counties).

Methods Citations

Chetty, Raj, Nathaniel Hendren, Patrick Kline, Emmaneul Saez, Nicholas Turner. "The Equality of Opportunity Project." 2013. (http://www.equality-of-opportunity.org/).

"Definition of the Tech Industry." TechAmerica Foundation, 2013. http://www.techamericafoundation.org/content/wp-content/uploads/2013/06/TechAmerica-Foundation-Cyberstates-2013-NAICS-Tech-Definition.pdf

Hecker, David. "High-technology employment: a NAICS-based update." Bureau of Labor Statistics, 2005. http://www.bls.gov/opub/mlr/2005/07/art6full.pdf

Helper, Susan. Timothy Krueger, and Howard Wial. "Locating American Manufacturing." Brookings Institution, 2012. http://www.brookings.edu/~/media/research/files/reports/2012/5/09%20locating%20american%20manufacturing%20wialh/0509_locating_american_manufacturing_report.pdf

Henton, Doug. "A Profile of the Valley's Evolving Structure." The Silicon Valley Edge: A Habitat for Innovation and Entrepreneurship. Stanford, California: Stanford University Press, 2000.

"Identifying & Defining: Life Science, Biotech, High Tech, Knowledge Industries and Information Technology Industries." Massachusetts Department of Workforce Development, 2007. http://lmi2.detma.org/lmi/pdf/Definitions.pdf

The Silicon Valley Leadership Group, founded in 1978 by David Packard of Hewlett-Packard, represents nearly 400 of Silicon Valley's most respected employers on issues, programs and campaigns that affect the economic health and quality of life in Silicon Valley. For more information, visit **svlg.org**.

Silicon Valley Community Foundation makes all forms of philanthropy more powerful. We serve as a catalyst and leader for innovative solutions to our region's most challenging problems, and through our donors we award more money to charities than any other community foundation in the United States. SVCF has more than $6 billion in assets under management. As Silicon Valley's center of philanthropy, we provide thousands of individuals, families and corporations with simple and effective ways to give locally and around the world. Find out more at **siliconvalleycf.org**.

Silicon Valley Competitiveness and Innovation Project - 2015
svcip.com