



# Silicon Valley Competitiveness and Innovation Project - 2018 Update

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



[svcip.com](http://svcip.com)

## About the SVCIP partners

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. The Leadership Group focuses on key issues of importance including energy, transportation, education, housing, health care, taxation, economic vitality and the environment. Leadership Group members collectively provide nearly one of every three private sector jobs in Silicon Valley and have more than \$3 trillion in annual revenue.

**Silicon Valley Community Foundation** advances innovative philanthropic solutions to challenging problems. As the largest community foundation in the world, we engage donors and corporations from Silicon Valley, across the country and around the globe to make our region and world better for all. Our passion for helping people and organizations achieve their philanthropic dreams has created a global philanthropic enterprise committed to the belief that possibilities start here.

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## A Letter from the SVCIP Partners

February 2018

Dear Friends,

The past year has reminded us both of the serious challenges we face in Silicon Valley, and of our power to address them working together.

It was to understand and confront these regional challenges that the Silicon Valley Leadership Group and Silicon Valley Community Foundation joined forces in 2014 to create the Silicon Valley Competitiveness and Innovation Project (SVCIP), a multi-year effort to monitor the region's climate for innovation and advance a policy agenda for broadly shared regional prosperity.

This year's report reminds us that Silicon Valley remains the nation's leading innovation region. Again in 2016, we had the highest innovation industry growth rate. More importantly, we have sustained this advantage over a long period of time: between 2006 and 2016, our innovation industries grew 53% in employment, well ahead of Austin and Seattle's 41%. Recently, we have also made substantial strides in increasing the number of students receiving STEM degrees and increasing our levels of university-based research and development.

Yet the report also reveals that two critical components of livability and broader regional competitiveness in our region -- housing and transportation -- have continued to worsen. For the first time since the recession, Silicon Valley began experiencing a net loss of residents in 2016. While we are an innovation leader, our business costs are also among the highest in the country. While many are benefiting from the Valley's booming innovation economy, many are struggling with less than a livable wage. While we are making progress in educational achievement, it is incremental, and large disparities continue to persist across ethnic groups. Uncertainty surrounding federal immigration policy could have serious consequences for a region where outstanding people from all over the globe are integral to our culture and economy.

There are no magic bullets. Yet the history of Silicon Valley teaches us that our region is resilient, that leaders come forward to drive change. Last year, Silicon Valley helped champion bold, statewide action to increase the housing supply, with special attention to the way housing costs affect our low-income residents. Leaders in the Valley were also a driving force behind both the dramatic passage of a traffic relief package that will fortify our state's roadways and transit options, and legislation that will allow voters in our region to decide on new regional solutions to traffic congestion in the Bay Area.

We know that innovation regions like ours play a special role in sustaining U.S. economic growth and competitiveness. As uncertainty rises, it is even more important that we work together to ensure that innovation remains a regional, state, and national imperative. We invite you to visit our website at [svcip.com](http://svcip.com) for important updates on our data and progress.

Sincerely,



**Carl Guardino**  
President and CEO  
Silicon Valley Leadership Group



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

## SVCIP Indicator Dashboard 2018 Update

			Strong and Gaining Ground	Trending positively, but still a critical area for improvement	Critical need for attention, and/or trending down	Change from SVCIP 2017
INNOVATION ASSETS	Talent	STEM Degrees Conferred	●			■
		Talent Migration			●	×
	Research and Development	Universities' R&D Expenditures	●			■
OUTCOMES & PROSPERITY	Business Competitiveness	Cost of Doing Business			●	×
		Home and Rent Values			●	×
	Quality of Life	Traffic Congestion			●	×
		Preschool Enrollment		●		○
		Third Grade English and Eighth Grade Math Proficiency			●	■
	Access to Opportunity	Eleventh Grade English and Math Proficiency			●	■
		Jobs in Innovation Industries	●			×
	Jobs					

■	Some improvement
○	Remained the same
×	Conditions worsened

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## Executive Summary

In 2015, the 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 the Silicon Valley region's competitive advantages in innovation, and ensure that Silicon Valley residents have access to the job opportunities and prosperity linked to growth in key industries. Guided by an advisory council and a series of discussions with legislators and business and civic leaders, the SVCIP team developed an Indicator Dashboard and public policy agenda to evaluate and promote the health of Silicon Valley's innovation ecosystem.

The 2018 report provides updates of selected indicators, and introduces or revisits indicators focused on talent (migration of millennials), business competitiveness (cost of doing business), and quality of life (costs of traffic congestion and the income required to constitute a living wage). It provides a partial update of the Indicator Dashboard (a tool we use to track work) and summarizes progress on the public policy agenda. As in previous years, to the extent available, data from Silicon Valley is juxtaposed with comparable data for key innovation regions, including the New York City metro area, Boston, Southern California, Seattle, and Austin. This year, rather than include discussion of international comparison regions, we examine the growth of innovation industries in five 'regions on the move' which are generally smaller than our primary comparison regions but have shown marked gains in specific innovation industries. The Silicon Valley region is defined as Santa Clara, San Mateo, and San Francisco Counties.

### Key findings:

Silicon Valley's innovation industries continued to create jobs at a faster rate than any other U.S. innovation region, though the pace of growth slowed in the Valley and several other innovation hubs.

**Silicon Valley's innovation industries continue to set the pace of job growth nationally, though the Valley's rate of growth slowed from 8% in 2015 to 5% in 2016.** Seattle (growing 2% in 2015 and 4% in 2016) and Southern California (2% and 3%, respectively) both gained ground but remained behind Silicon Valley, while Austin (1% growth in 2016) and New York City (2%) joined Silicon Valley in experiencing slower growth in 2016. Slowing job growth in Internet and Information Services (from 17% in 2015 to 11% in 2016) and Software (10% to 5%) were the main reasons for Silicon Valley's 2016 performance.

More people left Silicon Valley in 2016 than moved in.

**An average of 42 people moved out of the region each month in 2016 compared to 2015, when an average of 1,962 moved into the region.** The reason for the shift was largely a net increase in people moving to other parts of the United States: in 2015, Silicon Valley was losing on average 832 people per month to other U.S. destinations, but in 2016 that figure jumped to 2,548. Net foreign in-migration remained relatively stable during this period, averaging 2,793 new residents per month in 2015, and 2,506 in 2016.

The median home value in Silicon Valley grew faster than in other innovation regions, topping \$1 million for the first time in 2017.

**Silicon Valley's median home value rose 10%, while Seattle's grew 9%, and the other innovation regions experienced gains of 3-6%.** Silicon Valley's median home value of \$1,026,090 is more than double that of the Seattle, Boston, and New York City regions, and almost four times that of Austin metro area.

The gap between job and housing growth is large and widening.

**From 2010 to 2016, employment in Silicon Valley grew by 29%, while population expanded 8%, and housing units increased by 4%.** The gap between job and housing growth rates grew from 17 to 25 points between 2014 and 2016.

Moreover, as the SVCIP 2017 report showed, less than 30% of the estimated housing need for moderate- and low-income households was met in recent years (2007-2014).

Silicon Valley's cost of doing business is among the highest in the nation, and its labor productivity is higher than in other innovation regions.

**Across all U.S. metro areas, San Francisco and San José have the fourth and sixth highest business costs, respectively.**

Among innovation regions, only the New York City region has higher business costs, while some regions like Seattle (ranked 45th) and Austin (ranked 72nd) have much lower costs. Labor is a major driver of overall costs, and Silicon Valley's value added per employee, as the 2017 SVCIP Report showed, was 1.7 times the U.S. average, topping all innovation regions.

Silicon Valley experienced the largest growth rate in STEM degrees conferred per capita of any of the innovation regions.

**The region's STEM growth rate rose from 4.2% in 2015 to 16% in 2016.** Other innovation regions experienced modest increases or a decline during this period.

Silicon Valley still ranks behind Boston and Austin in STEM degrees conferred per capita, but cut the gap with second place Austin in half during 2016.

Silicon Valley third, eighth, and eleventh graders continue to improve in English Language Arts and Mathematics proficiency, but ethnic disparities in test results suggest that inconsistent access to a good education remains, leaving thousands of students ill-prepared for college or careers in STEM fields.

**In 2017, the share of students meeting or exceeding state standards grew less than 0.5% for third-grade English Language Arts and eighth-grade Mathematics.**

Sixty-nine percent of the region's eleventh graders met or exceeded the state standard in English Language Arts, up from 67% in 2015, with 48% meeting or exceeding the state standard in Mathematics, up from 47%. However, only 19% of Hispanic and Latino eleventh graders met or exceeded the state standard in Mathematics, compared to 78% of Asian and 61% of White eleventh graders.

Last year, we speculated that our region's ability to sustain its post-recession growth may be eroding. This year's update of selected indicators strengthen the case for concern. The region's innovation industries experienced strong growth in 2016, but substantially lower than that of 2015. More people are now moving out than moving into our prosperous but expensive and congested region. We are making better progress compared to other innovation regions in some areas critical to future innovation, such as STEM degrees conferred per capita and university R&D expenditures. But, on indicators related to housing, transportation, and English and Math proficiency, the region has either shown little improvement or worsened.

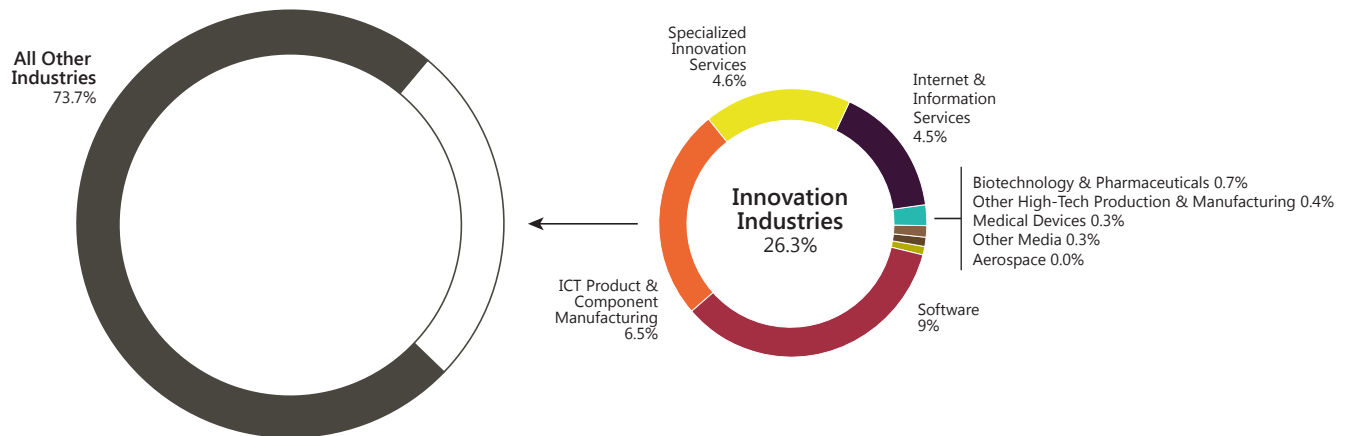
We in Silicon Valley have proven remarkably adept at walking a tight rope between high productivity and the high costs of living and doing business. We have also made remarkable progress in finding policy solutions to the challenges highlighted in this report. Yet, challenges remain, and pose a serious threat. Our housing crisis shows no signs of abating. Silicon Valley is absorbing billions of dollars in lost productivity due to traffic congestion and is failing to prepare many of our young people to share in the region's prosperity. These challenges combined with the continuing political volatility at the national level require an even stronger focus and level of collaboration within our region, and with our state. In the face of an uncertain regional situation and an unsettling national climate, now is the time for more—not less—leadership from Silicon Valley.

Much is at stake. Silicon Valley remains a major contributor to U.S. innovation and prosperity. Its continuing success—and those of other innovation regions—is not only a local, but a national imperative. In fact, the effects of innovation ripple across the global economy, providing communities worldwide with technologies and products that enable the growth of their industries and improve the quality of life of their people. While this rising tide of prosperity begins in innovation regions, it can recede with far-reaching effects beyond these regions.

# Innovation Industries Overview

## Silicon Valley Employment

Detailed Innovation Industries and All Other Industries, 2016



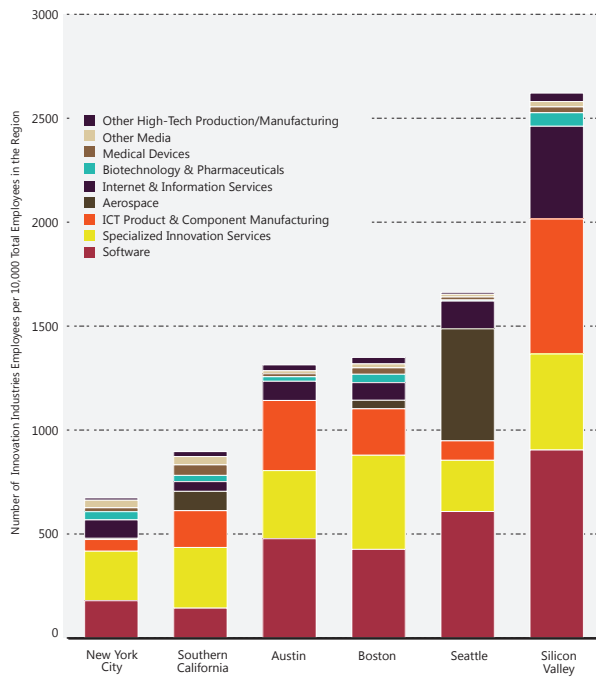
Data Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages  
Analysis: Collaborative Economics

In 2016, just as in 2015, 26% of Silicon Valley jobs were in innovation industries, up from 25% in 2014. Internet and Information Services rose from 4.1% to 4.5% of all jobs. Software, which continues to represent the largest share of innovation industry jobs, rose from 8.9% to 9.0%. Biotechnology and Pharmaceuticals also increased its share from 0.6% to 0.7%. All others retained the same share of total jobs as reported previously, except for ICT Product and Component manufacturing which edged down from 6.6% to 6.5%.



**Employment in Innovation Industries by Region**

Per 10,000 Workers in Overall Economy  
Innovation Regions, 2016



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

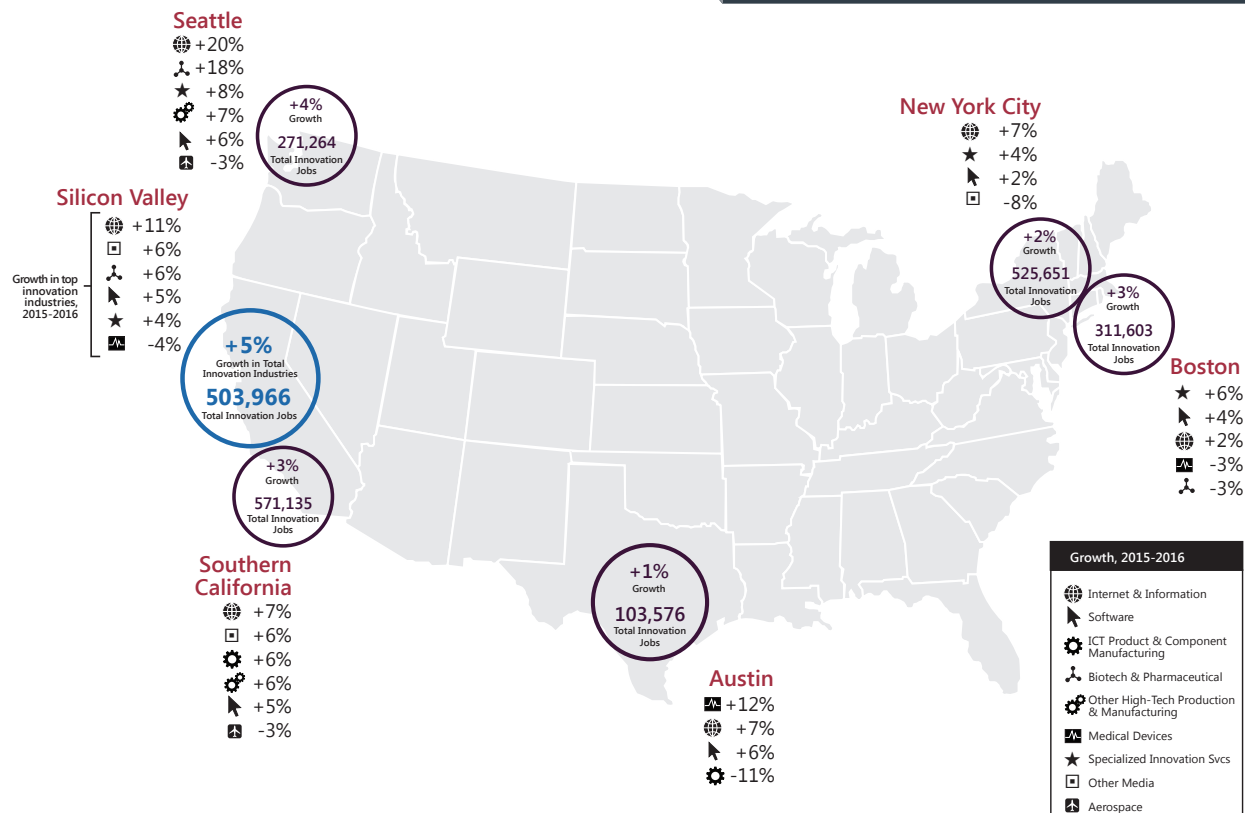
Keeping with past years' trends, Silicon Valley continues to have the highest proportion of workers in innovation industries compared to other innovation regions. Over the past decade (2006-2016), innovation industry jobs grew 53% in the Valley, outpacing the 41% increase for both Austin and Seattle. Boston (22%), New York City (17%), and Southern California (9%) grew much more slowly. In 2016, Silicon Valley continued to be the leader, having the highest growth rate (5%) for innovation industry jobs among these regions.

At the same time, the Valley's growth rate for innovation industry jobs slowed considerably from 8% in 2015 to 5% in 2016. So too did Austin's (from 7% to 1%) and New York City's (4% to 2%). In contrast, Seattle's growth rate doubled (2% to 4%), Southern California's increased by half (2% to 3%), and Boston's remained the same (3%).

What changed? In Silicon Valley, slower growth in Internet and Information Services (from 17% in 2015 to 11% in 2016) and Software (10% to 5%) was the main reason. Other regions experienced a similar trend. For example, Austin also recorded much slower growth in these industries, as Internet and Information Services dropped from 25% growth in 2015 to 7% in 2016, and Software slipped from 11% to 6% during this period. However, Seattle actually sustained a rapid growth rate in Internet and Information Services (20% in 2016 vs. 22% in 2015), while diversifying its innovation economy as Biotechnology and Pharmaceuticals boomed (from 4% growth in 2015 to 18% growth in 2016) and Specialized Innovation Services' growth rate more than doubled (from 3% to 8%).

**Employment Growth in Top Innovation Industries**

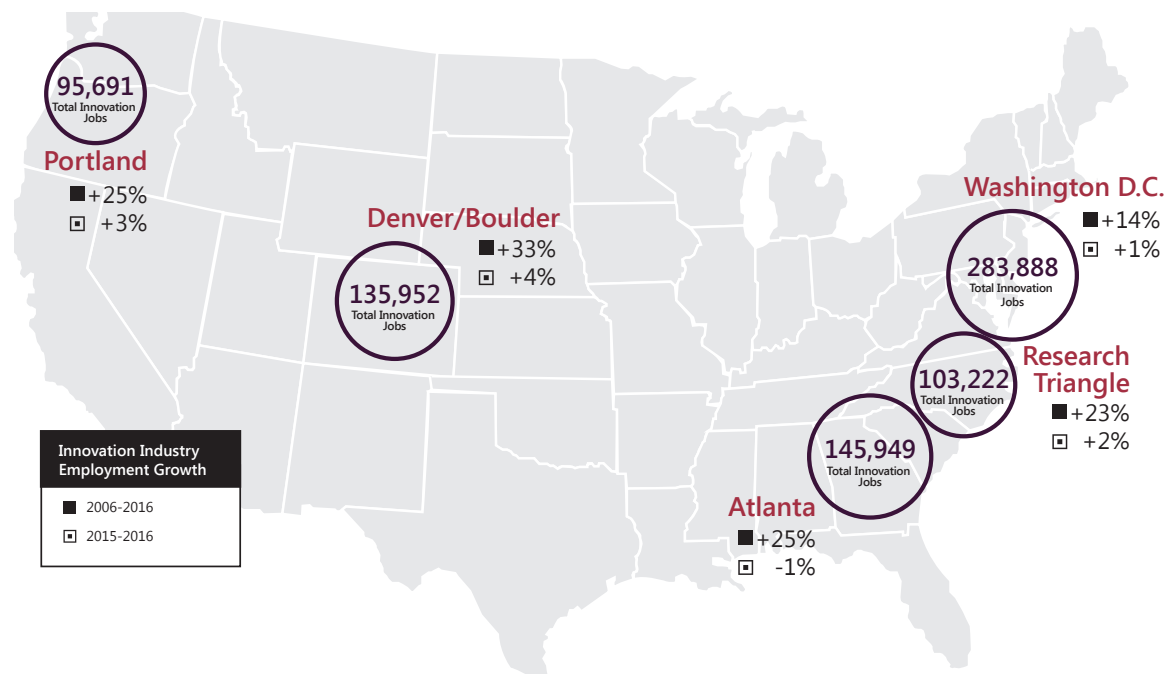
2015-2016



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

**Employment in Innovation Industries in Five Regions to Watch**

2016



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

This year's SVCIP Update also looks at a second group of regions that have experienced substantial innovation industry growth over the past decade. While generally not as large and fast-growing as the innovation regions that have served as comparisons for Silicon Valley in this and earlier reports, these regions are important to monitor in anticipation of their future potential. Between 2006 and 2016, innovation industries in four of these regions—Denver/Boulder, Atlanta, Portland, and North Carolina's Research Triangle—have grown faster than those in more established innovation regions of Boston (22%), New York City (17%), and Southern California (9%). In 2016, most of these regions continued to grow, but at a slower rate than Silicon Valley and most of the other innovation regions this report evaluates each year.

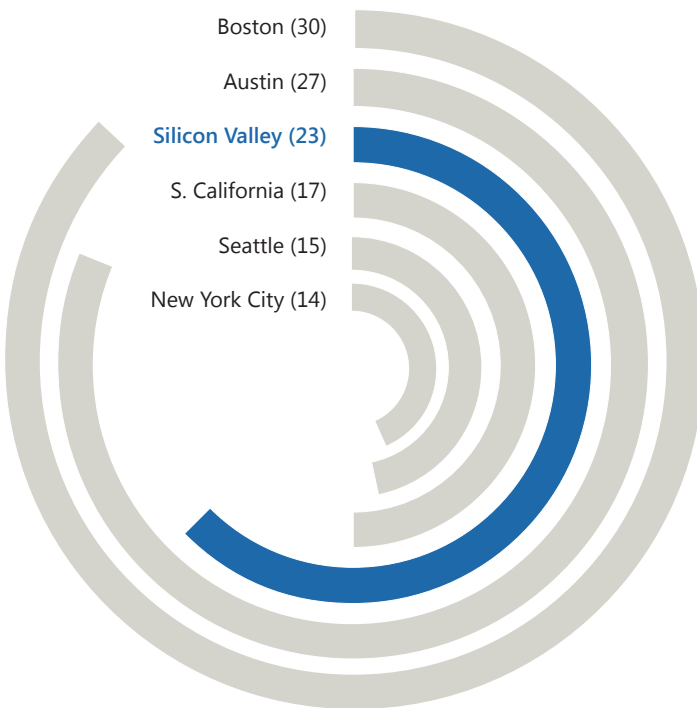
Looking more closely at activity in these thriving regions, we see that specific innovation industries have helped drive growth over the past decade. Software and Innovation Services have been strong contributors, growing between 15% and 80% in these regions. Internet and Information Services has also been strong drivers in most of these regions (except for Atlanta), growing between 12% and 118%. In Atlanta, Portland, and Washington D.C., Biotechnology and Pharmaceuticals was a strong source of growth, while in Denver/Boulder, Portland, and the Research Triangle Medical Devices was a strong growth contributor.

These regions all have much smaller employment in innovation industries than Silicon Valley, New York City, and Southern California. However, several of these "up and coming" innovation regions maintain indicators that are comparable to the communities this report evaluates each year. For example, Washington D.C. has more jobs in innovation industries (283,888) than two of the innovation regions we consistently compare to Silicon Valley: Seattle (271,264) and Austin (103,576). Similarly, compared to Austin, newcomers Atlanta (145,949) and the Denver/Boulder region (135,952) have more innovation industry jobs; the Research Triangle (103,222) has about the same number.

What does this all say about these "regions on the move"? It is clear that innovation industries are not limited to just a few regions. However, Silicon Valley's base of innovation industries remains much larger and is growing faster than any region in the group. Seattle's base is also much bigger (except for Washington D.C.) and growing faster than regions in this group. However, employment in innovation industries in the Denver/Boulder region and the Research Triangle are comparable or bigger than Austin's base, and both grew faster than Austin in 2016.

# Innovation Assets: Talent

## STEM Degrees Conferred Per 10,000 Residents Innovation Regions, 2016



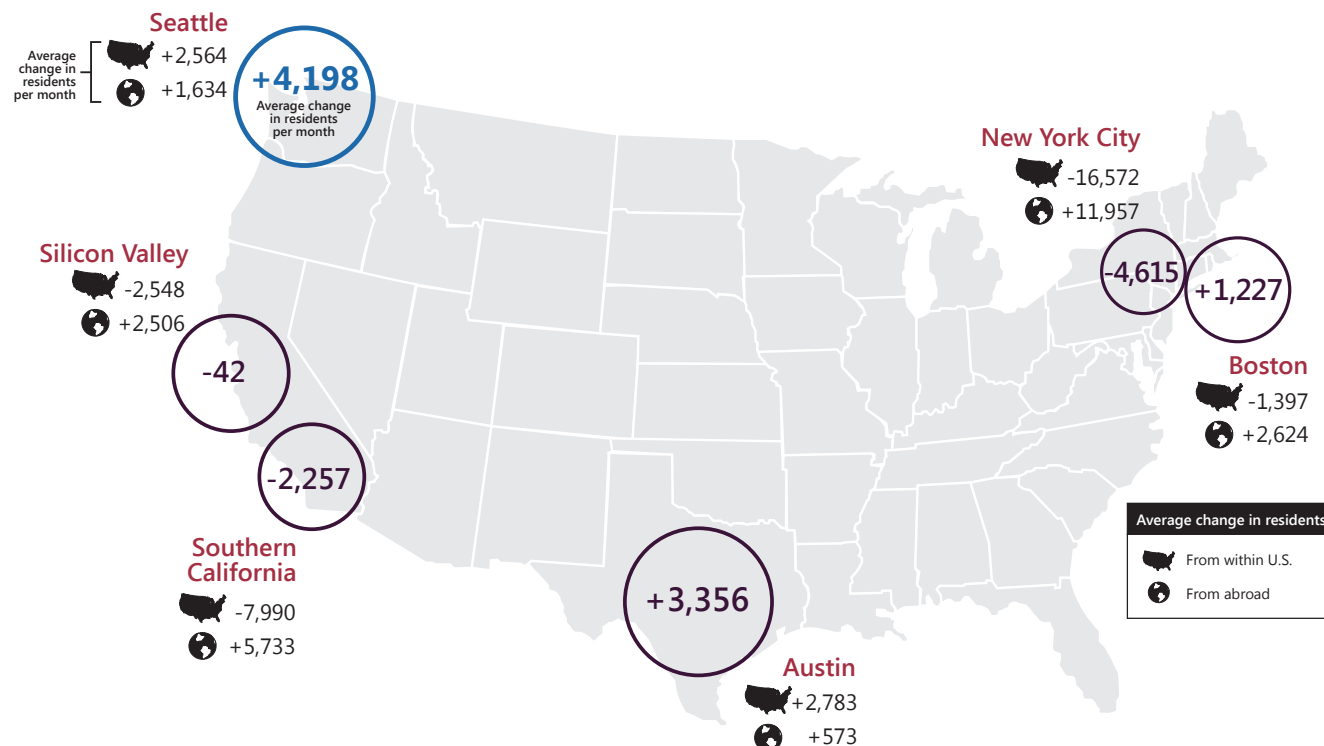
Note: Data are based on first major and include bachelor's, master's and doctorate degrees.  
Data Source: National Center for Educational Statistics, IPEDS  
Analysis: Collaborative Economics

STEM degrees conferred indicates the availability of homegrown, highly-skilled talent. Although Silicon Valley still ranks behind Boston and Austin in terms of the number of STEM degrees conferred per capita, the region experienced the highest growth rate in STEM degrees conferred of any of the innovation regions (16%). As a result, Silicon Valley cut in half the gap in per capita STEM degrees conferred with second place Austin.

Silicon Valley's growth in STEM degrees conferred per capita grew from 4.2% (between 2014 and 2015) to 16% (between 2015 and 2016). No other innovation region experienced anything close to this growth rate. Seattle's almost doubled (from 2.8% to 5%), and Austin's increased substantially (from 6.2% to 10%), while others grew modestly (New York City from 8 to 10%, Boston from 8 to 11%) or declined slightly (Southern California from 12% to 11%).

### Growth in STEM Degrees Conferred 2015-2016

Silicon Valley	16%
Southern California	11%
Boston	11%
New York City	10%
Austin	10%
Seattle	5%

**Migration Flows**Average Net New Residents Per Month  
Innovation Regions, 2016Data Source: U.S. Census Bureau Population Estimates  
Analysis: Collaborative Economics

Silicon Valley had a net out-migration of residents in 2016, with an average of 42 people departing the region each month, taking their skills and talent with them. This is a sharp reversal from 2015, when the region was gaining an average of 1,962 residents per month. The reason for the shift was largely an increase in domestic out-migration: in 2015, Silicon Valley was losing on average 832 people per month, but in 2016 that figure jumped to 2,548. Net foreign in-migration remained relatively stable during this period, averaging 2,793 new residents per month in 2015, and 2,506 in 2016.

Unlike Silicon Valley, Seattle and Austin had substantial net in-migration during 2016. Among the innovation regions, Austin had the largest number of new residents relocating from other parts of the United States (an average of 2,783 per month). Seattle experienced high numbers of both domestic and foreign in-migration, and as a result the largest overall net increase in new residents per month (4,198) among the innovation regions.

New York City and Southern California also experienced net out-migration of residents in 2016, reversing net gains in 2015. New York City gained a net of 92 people per month in 2015, but lost a net of 4,615 residents monthly in 2016. Southern California gained 806 per month in 2015, but lost 2,257 in 2016. New York City's net loss was due more to substantial increases in the number of people leaving for other parts of the United States, while Southern California's decline was due more to a drop in foreign in-migration.

**Geographic Mobility of Millennial Residents (Ages 20-29) Living in Innovation Regions  
2016**

Region	Residing in Same Place as a Year Prior	Total Movers	Moved Within the Region	Moved from a Different County, in the Same State	Moved from a Different State	Moved from Abroad
New York City	83%	17%	8%	4%	3%	2%
Southern California	79%	21%	14%	3%	3%	1%
Boston	71%	29%	13%	7%	6%	3%
Silicon Valley	71%	29%	13%	8%	5%	3%
Austin	63%	37%	20%	10%	6%	1%
Seattle	63%	37%	21%	5%	9%	2%

Source: US Census, American Community Survey, Geographic Mobility Statistics  
Analysis: Collaborative Economics

**Tracking the mobility of the millennial workforce (ages 20-29) helps us to anticipate the contours of a region's future workforce and evaluate that community's ability to attract talent.** A closer look at recent millennial mobility reveals that at the end of 2016, only 71% of Silicon Valley millennials (ages 20-29) were residing in the same place as they were in 2015. More than half of the 29% who moved in 2016 came from outside Silicon Valley, either moving from another part of California (8%), another U.S. state (5%), or another country (3%). Another 13% also moved, but just relocated within the Silicon Valley region.

**Compared to other innovation regions,** Silicon Valley's millennials (ages 20-29) are more mobile than their counterparts in New York City and Southern California, but less mobile than those in Austin and Seattle. However, the greater millennial mobility in Austin and Seattle is mostly due to a higher rate of moves within those regions, rather than relocations from outside regions.

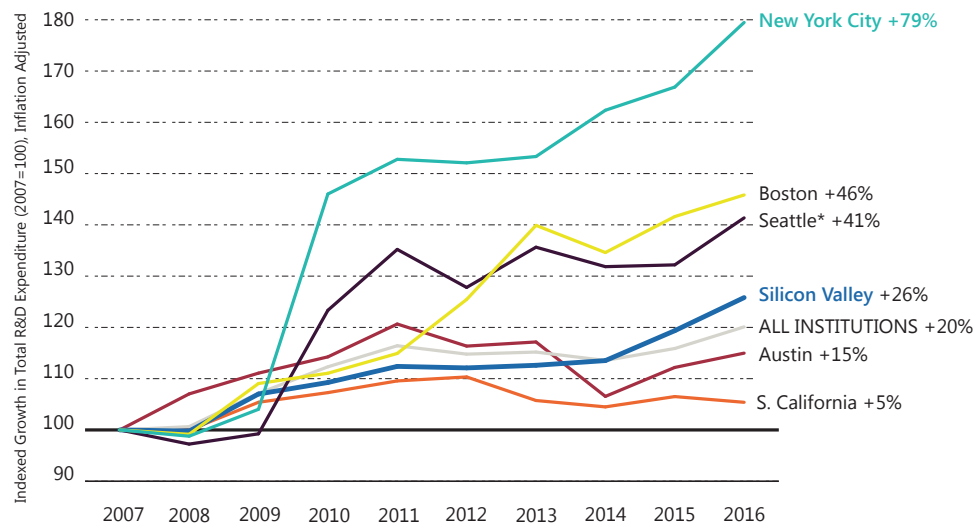
**Among the innovation regions,** Austin and Silicon Valley have the highest percentages of millennials ages 20-29 moving in from other parts of their states, indicating the regions' strong ability to attract millennial workers who may already be familiar with the communities. Meanwhile, Seattle has the highest proportion of millennials moving in from other states, suggesting the desirability of that innovation region to attract talent from greater distances within the US. Silicon Valley and Boston attracted the highest percentages of millennials moving in from other countries compared to the other innovation regions.



# Innovation Assets: R&D Funding

## Growth in Academic R&D Expenditures

Innovation Regions, 2007-2016 (Index 2007=100)



### Total R&D Expenditures 2016

All U.S. Institutions	\$73.6B
S. California	\$4.3B
New York City	\$4.1B
Silicon Valley**	\$3.3B
Boston	\$3.1B
Seattle*	\$1.3B
Austin	\$701M

\*Seattle's index growth path 2005-2010 is proxied by the University of Washington's federal R&D funding growth rate, 2010-2016 indexed growth reverts to Total R&D expenditures within the region.

\*\* Silicon Valley includes East Bay universities

Data Source: National Science Foundation

Analysis: Collaborative Economics

University R&D expenditures are important to the innovation pipeline because they provide opportunities for taking risks and proving ideas. Nationally, university R&D expenditures rose 20% between 2007 and 2016 (the latest data available and adjusted for inflation), but some regions did much better: New York City (+79%), Boston (+46%), and Seattle (+41%).

Silicon Valley's university R&D expenditures grew 26% between 2007 and 2016. While exceeding the national average, the region's growth rate was far less than those of New York City, Boston, and Seattle. It was well ahead of the growth rates of Austin (15%) and Southern California (5%). For the first time, Silicon Valley's university R&D expenditures exceeded \$3 billion.

Recently, Silicon Valley R&D expenditures have made some of their most significant gains relative to the gains of other regions. University R&D expenditures grew 11% between 2014 and 2016, just under double the national average (6%). Silicon Valley's growth rate was parallel to that of New York City (11%), and ahead of Boston (8%), Austin (8%), Seattle (7%), and Southern California (1%). For perspective, between 2011 and 2014, Silicon Valley's growth rate had been only 2%.

## Outcomes and Prosperity: Business Competitiveness

### Costs of Doing Business Compared to the National Average Innovation Regions, 2015

Metro Area	Total Ranking of Business Costs Among All U.S. Metro Areas	Overall Business Costs, % Above National Average
New York City	1	64%
San Francisco	4	39%
San José	6	35%
San Diego	7	32%
Boston	10	30%
Los Angeles	34	13%
Seattle	45	10%
Austin	72	4%

Source: Moody's Cost of Doing Business Index in 2015, May 2017 Report  
Analysis: Collaborative Economics

While Silicon Valley has continued to have the highest worker productivity among innovation regions, it also is a relatively high-cost region for doing business. A 2015 ranking of total business costs by U.S. metropolitan statistical areas (MSAs) finds that the San Francisco and San José MSAs have the fourth and sixth highest costs in the country, respectively. Among innovation regions, only the New York City MSA has higher business costs, while some regions like Seattle (ranked 45th) and Austin (ranked 72nd) have much lower costs. Business costs included in this analysis are labor, energy, state and local taxes, and office rents.

The cost of doing business in the San Francisco and San José MSAs is more than one-third higher than the national average. The New York City MSA is considerably higher than the national average, while Boston and the San Diego portion of the Southern California innovation region are more comparable to Silicon Valley. The Los Angeles portion of the Southern California innovation region, Seattle, and Austin areas are much closer to the national average.

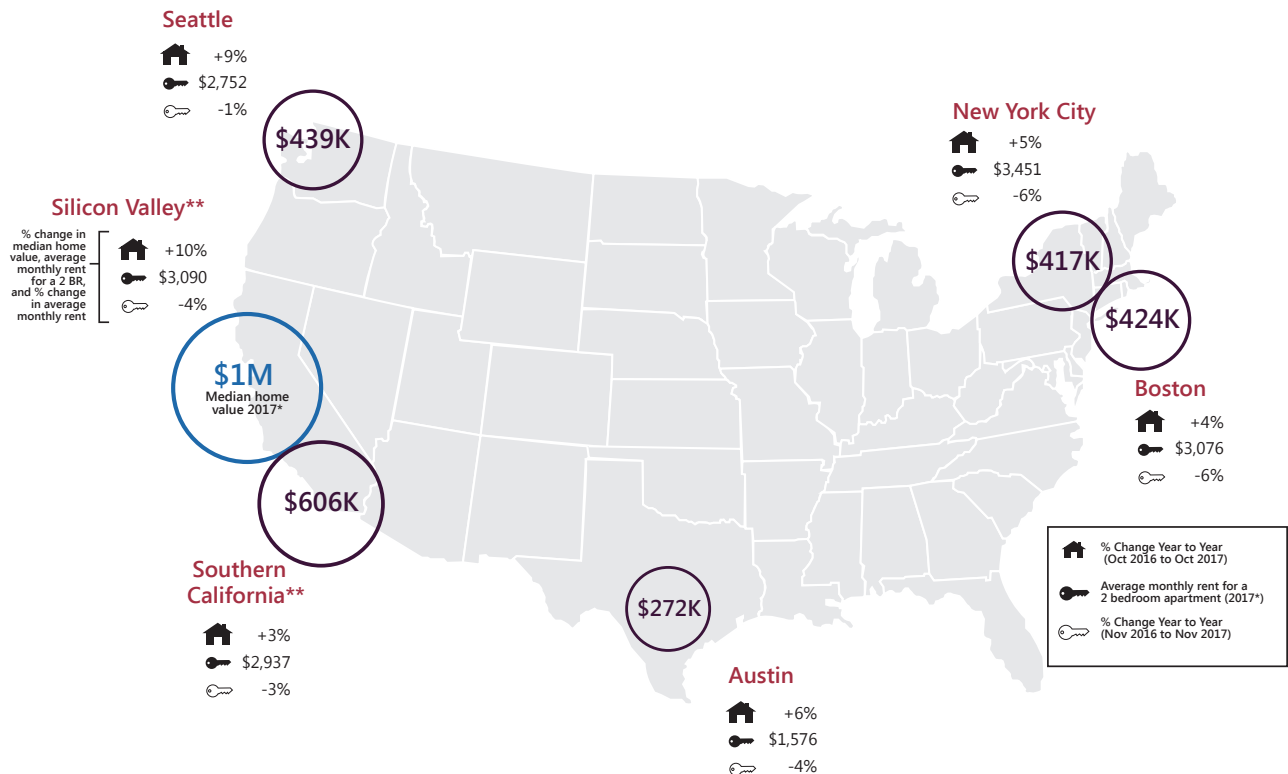
Looking further into what affects the overall cost of doing business, we see that specific elements play out differently in each region. While overall business costs in innovation regions are consistently higher than the national average, business costs attributed to state and local taxes are typically lower than the national average. Only the New York City MSA is above the national average. Business costs due to state and local taxes in the San Francisco (-7%) and San José MSAs (-8%) are lower, while other innovation regions like Boston (-14%), Seattle (-18%), and Austin (-40%) are significantly lower. Much higher costs in other categories—especially costs associated with highly-skilled labor—are the reason innovation regions exceed the national average in overall business costs.

## Outcomes and Prosperity: Quality of Life

*Housing costs and commutes are key factors influencing residents' quality of life, which affect innovation regions' ability to attract and retain talent.*

### Housing Costs in Innovation Regions

Median Home Values and Average Monthly Rent, 2017\*

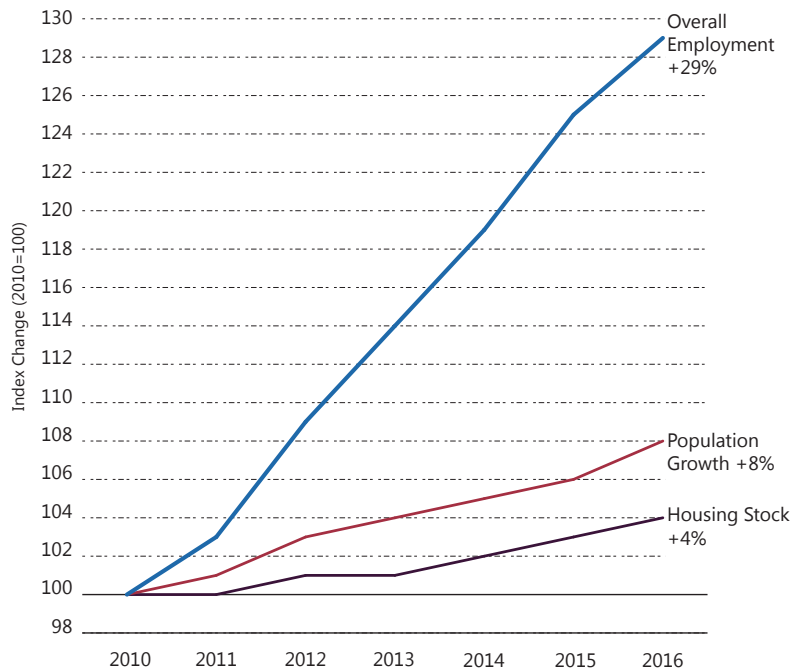


Using the San José Metropolitan Statistical Area (MSA) to represent Silicon Valley home and apartment prices, the median home value exceeded \$1 million for the first time in 2017. Looking at MSAs for both San José and San Francisco, we see the median home value remained substantially higher in both (\$1,026,090 for San José) and (\$856,740 for San Francisco) than in Southern California (\$606,240). These averages are more than double that in the Seattle, Boston, and New York City MSAs; and almost four times that in the Austin MSA. The region's median home value is also increasing faster than in other innovation regions, up 10% from October 2016 to October 2017. Seattle's median home values also increased substantially (9%), while other innovation regions absorbed smaller increases of 3-6% during this period.

Breaking a multi-year trend, rent prices in Silicon Valley dropped in 2017. Average monthly rent for a two-bedroom apartment declined 4% in both the San José and San Francisco MSAs between 2016 and November 2017. In fact, rents dropped in every one of the innovation regions, ranging from 1% in Seattle, 3% in Southern California, 4% in Austin, and 6% in the New York City and Boston MSAs. Thus, in terms of comparable rental affordability with other innovation regions, little changed for Silicon Valley in 2017. Rents remain among the highest of the innovation regions.

**Growth in Employment, Population and Housing Stock**

Silicon Valley (Index 2010=100)



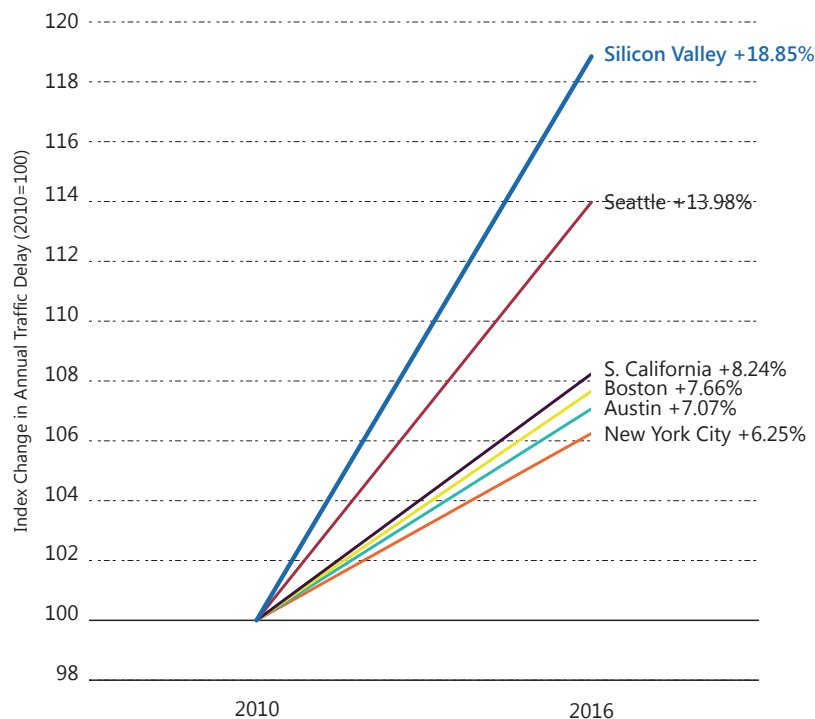
Source: US Census, American Community Survey; California Department of Finance, Bureau of Labor Statistics  
 Analysis: Collaborative Economics

Since the end of the national recession in 2010, Silicon Valley's employment has boomed and population has grown considerably. However, increases in housing stock have not kept pace—especially options for households at or below the region's average median income.

Between 2010 and 2016, employment in Silicon Valley grew by 29%, while population grew by 8%. However, housing units lagged behind, growing by only 4% during this job boom. In recent years the gap between new jobs and housing units has grown: over the 2010-2014 period, there was a 17 point difference in growth rates between employment and housing, but over the 2010-2016 period the gap had widened to 25 points. The gap between population and housing growth also continued to widen from 3 to 4 points during this period.

### Change in Average Commute Time

Innovation Regions, 2010 and 2016 (Index 2010=100)



Reflects commute times for workers employed in the innovation regions  
Source: US Census, American Community Survey  
Analysis: Collaborative Economics

Commute time can be an important factor in worker productivity and quality of life. Commute times continued to increase in 2016 across all of the innovation regions, with Silicon Valley's total increasing the most between 2010 and 2016—almost 19%.

An average Silicon Valley commuter now spends 72 minutes commuting per day (round trip). This figure has grown marginally since last year and remains second only to the commute time of New York City workers, who spend 74 minutes commuting. Other innovation regions have shorter average round-trip commute times: Boston (66 minutes), Seattle (64 minutes), Southern California (62 minutes), and Austin (54 minutes).

An analysis of major cities finds that innovation regions are having to absorb enormous economic costs from traffic congestion. Estimated costs include both direct costs of the value of fuel and time wasted by drivers, and indirect costs such as freight and business fees from company vehicles idling in traffic, which are passed on to customers through higher prices. While substantial, these costs are only a portion of total costs, which would include harder-to-estimate impacts on workplace productivity, for example. Moreover, figures from major cities in innovation regions (San Francisco is included, while San José is not in this analysis) are just a portion of total costs experienced by commuters throughout these larger metropolitan areas.

**Nonetheless**, even a partial measure finds that drivers in these cities spend between 46 and 104 hours per year in traffic congestion, costing between \$1,345 and \$2,533 per driver. The costs of traffic congestion for innovation regions numbers in the billions of dollars. For San Francisco alone, the total cost of congestion was more than \$2.5 billion in 2016.

#### Time & Cost Impacts of Traffic Congestion Innovation Regions, 2016

City	Annual Hours Spent in Congestion for a Typical Commuter*	Total Annual Cost of Congestion Per Driver	Total Annual Cost of Congestion to the City
Los Angeles	104	\$2,408	\$9,680M
New York City	89	\$2,533	\$16,949M
San Francisco	83	\$1,996	\$2,535M
Boston	58	\$1,759	\$2,864M
Seattle	55	\$1,590	\$1,995M
Austin	47	\$1,453	\$810M
San Diego	46	\$1,345	\$1,412M

\*Technically known as Peak Hours Spent in Congestion  
Source: INRIX Global Traffic Scorecard, INRIX Research  
Graham Cookson & Bob Pishue, February 2017  
Analysis: Collaborative Economics



### Estimated Annual Livable Wages By Innovation Region, 2016

Region	1 Adult, No Children Households	2 Adults, 2 Children Households
Silicon Valley	\$33,109	\$82,492
New York City	\$30,056	\$82,784
Southern California	\$27,893	\$74,214
Boston	\$27,082	\$71,843
Seattle	\$26,728	\$ 71,136
Austin	\$23,754	\$ 63,024

Notes: Annual Living Wage estimated by multiplying hourly rate by 2080 hrs, full time equivalent. Southern California Reflects Los Angeles Metro Area, New York City reflects New York Metro Area; Silicon Valley's Living Wage figures estimated based on weighted average of San Mateo, Santa Clara and San Francisco Counties based on number of households  
Sources: Dr. Amy K. Glasmeier and the Massachusetts Institute of Technology Living Wage Calculator  
Analysis: Collaborative Economics

**Living wage thresholds are calculated for different household sizes and compositions.** For example, a Silicon Valley household of one adult and no children has the highest requirement for a living wage among the innovation regions. For a household of two adults and two children, only the New York City metropolitan area has a higher living wage requirement. The level required for a living wage is substantially lower in Austin (24% less than Silicon Valley), as well as Seattle and Boston (13-14% less) for a household of two adults and two children.

**When living wage thresholds are compared to household income distribution in Silicon Valley,** it is clear that many residents are under economic stress. More than one-third (39.2%) of Silicon Valley households with two adults and two children have annual incomes below \$82,492 and are trying to get by on less than a livable wage in our high cost region.

**Living wage is another important metric for understanding regional competitiveness.** It measures community affordability, which has impacts on both businesses' costs of labor and residents' ability to survive and thrive. Researchers at the Massachusetts Institute of Technology (MIT) define living wage as "a market-based approach that draws upon geographically specific expenditure data related to a family's likely minimum food, childcare, health insurance, housing, transportation, and other basic necessities (e.g. clothing, personal care items, etc.) costs. The living wage draws on these cost elements and the rough effects of income and payroll taxes to determine the minimum employment earnings necessary to meet a family's basic needs while also maintaining self-sufficiency."

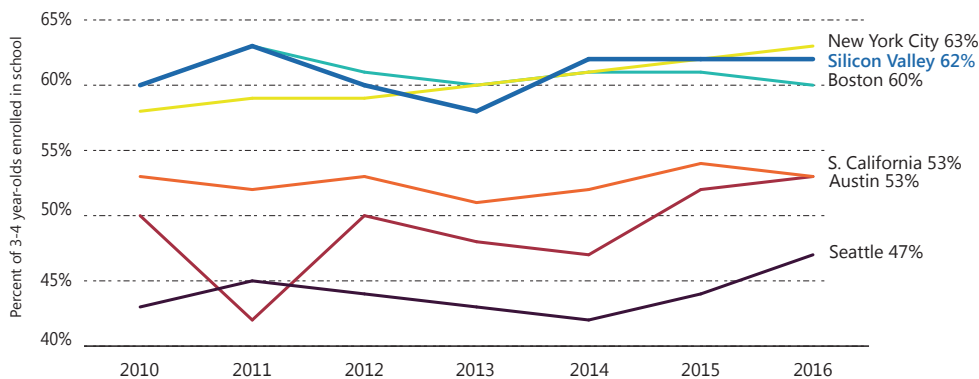
**The relationship between a region's living wage and economic opportunity is complex,** and often looks very different depending on where one sits on the socioeconomic spectrum. High living wages are often found in regions with the most job growth, where economic opportunity outweighs high costs for those with skills that are in demand. Even in high growth areas, however, high living costs can effectively constrain opportunity for those whose skills do not command high wages, but are yet critical for a region's success. Residents are more vulnerable to economic hardship, and experience great difficulties getting ahead, in communities with a higher living wage.

# Outcomes and Prosperity: Access to Opportunity

Education enables access to well-paying jobs and facilitates income mobility. Jobs in innovation industries have strong earning potential; high quality education is therefore particularly important to promote access to opportunity across the full population.

## Preschool Enrollment

Share of 3-4 Year-Olds Enrolled in School  
Innovation Regions, 2010-2016

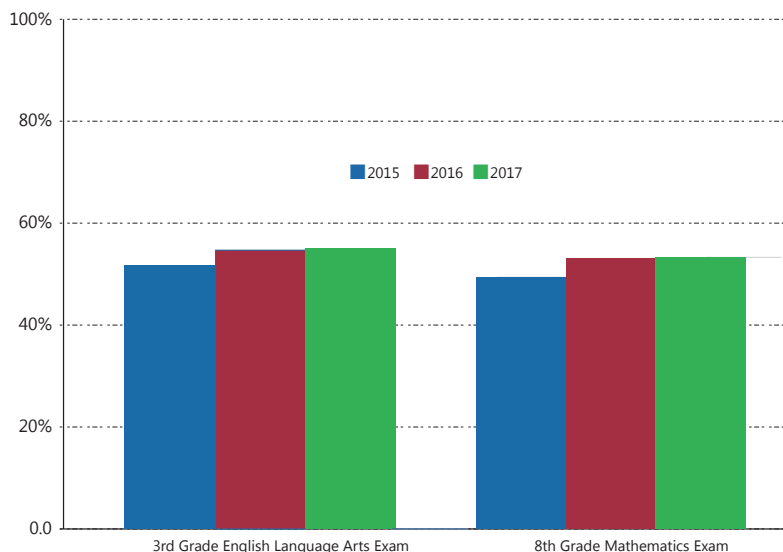


Data Source: American Community Survey  
Analysis: Collaborative Economics

Attending preschool can provide youth with foundational skills critical to later educational success. In 2016, 62% of Silicon Valley's 3-4 year-olds were enrolled in a preschool program, the same percentage as the previous year and a level that remains comparable to that of New York City and Boston. Silicon Valley maintained, but did not increase, preschool access in 2016. However, what distinguishes New York City from the other innovation regions is just how much it increased children's access to preschool over the last several years. Since 2010, New York City increased preschool enrollment from 58% to 63%, while Silicon Valley's enrollment only grew from 60% to 62% and Boston's remained at 60%. Seattle and Austin have also experienced faster enrollment growth than Silicon Valley since 2010, although both continue to have an overall lower percentage of their 3-4 year-olds in a preschool program than other innovation regions, including Silicon Valley.

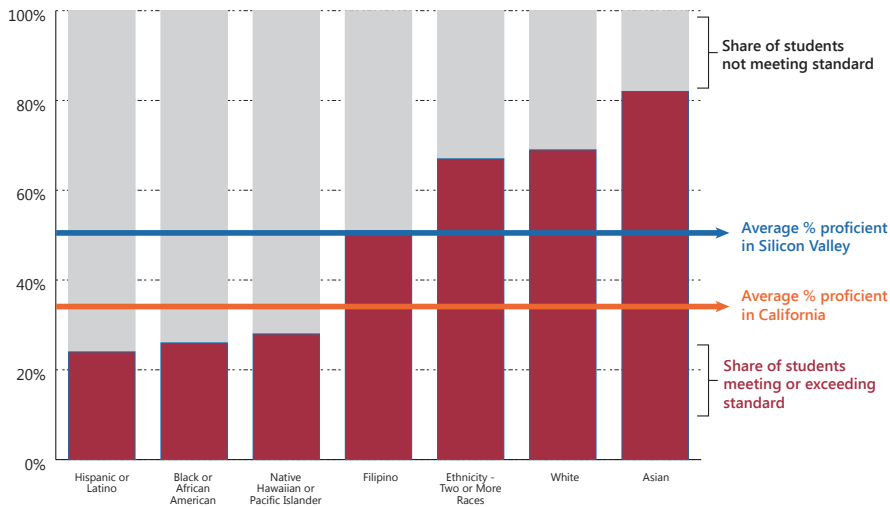
## Share of Students Meeting or Exceeding State Learning Standards in Third Grade Language Arts and Eighth Grade Mathematics

Silicon Valley, 2015-2017



Data Source: California Department of Education, CAASPP 2017  
Analysis: Collaborative Economics

Third grade proficiency in English Language Arts and Eighth Grade Mathematics proficiency are important indicators of students' future academic success and STEM workforce readiness. The percentage of local third grade students meeting or exceeding the state standard for English Language Arts was slightly higher in 2017 (55.1%) compared to 2016 (54.7%), after rising from 51.7% in 2015. The percentage of eighth grade students meeting or exceeding the state standard for Mathematics was also slightly higher in 2017 (53.3%) compared to 2016 (53.0%), after rising from 49.4% in 2015. Although it is too early to conclude if diminishing growth indicates schools are losing ground, these statistics show that just over one out of two local students is meeting proficiency levels. While Silicon Valley students are out-performing the statewide average, clearly much more can be done.

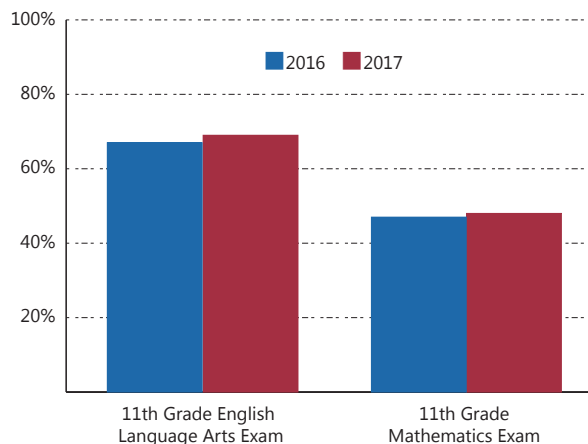
**Mathematics Proficiency Among Eighth Grade Students**Share of Students Meeting or Exceeding Standards, by Race and Ethnicity  
Silicon Valley, 2017Data Source: California Department of Education, CAASPP 2017  
Analysis: Collaborative Economics

A closer look at the performance of local eighth graders underscores the fact that close to half are not meeting the state standard in Mathematics, with much higher percentages for some ethnic groups falling behind in their preparation for college and/or career.

In addition, the mathematics performance of Hispanic and Latino students (who comprise 36% of all the test-takers, representing the largest ethnic group in Silicon Valley) declined in 2017, as only 24% met or exceeded the state standard compared to 25% in 2016. The performance of next two largest groups of test-takers (Asians at 28% and Whites at 22%) either remained the same (82% of Asian eighth graders met or exceeded the state standard in 2016 and 2017) or improved (69% of White eighth graders met or exceeded the state standard in 2017, up from 68% in 2016).

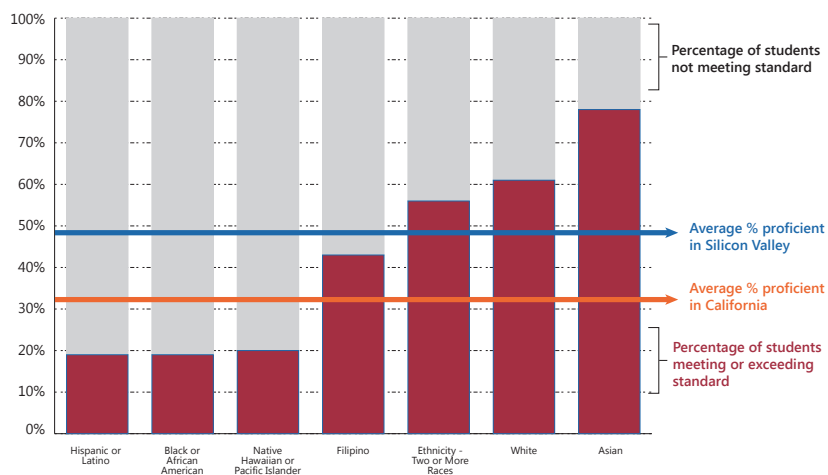
**Share of Students Meeting or Exceeding State Learning Standards in Eleventh Grade Mathematics and English Language Arts**

Silicon Valley, 2016 &amp; 2017

Source: California Department of Education, CAASPP 2016, 2017  
Analysis: Collaborative Economics

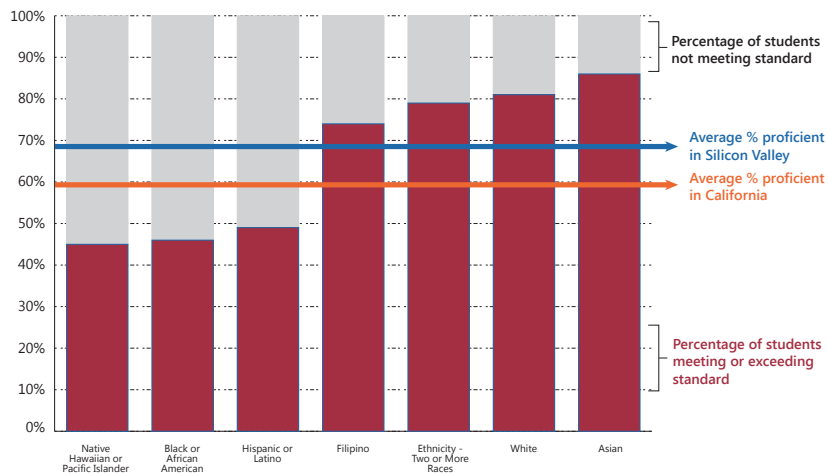
Since eleventh grade students are close to entering either college or the workforce, test results are an important indicator of how well we are preparing our young people for success. In 2017, the overall performance of Silicon Valley eleventh graders continued to improve in both English Language Arts and Mathematics. Sixty-nine percent of local eleventh graders met or exceeded the state standard in English Language Arts, up from 67% in 2016 and 65% in 2015. Forty-eight percent of local eleventh graders met or exceeded the state standard in Mathematics, up from 47% in 2016 and 2015. While scores are improving, the fact remains that more than half of Silicon Valley eleventh graders are close to leaving high school without being proficient in Mathematics, a key determinant of STEM education and career readiness.

### Mathematics Proficiency Levels Among Eleventh Grade Students by Race/Ethnicity Silicon Valley, 2017



Note: Data for American Indian or Alaska Native students not available, due to small number of test takers  
Source: California Department of Education, CAASPP 2017  
Analysis: Collaborative Economics

### English Language Arts Proficiency Levels Among Eleventh Grade Students by Race/Ethnicity Silicon Valley, 2017




Note: Data for American Indian or Alaska Native students not available, due to small number of test takers  
Source: California Department of Education, CAASPP 2017  
Analysis: Collaborative Economics




**As in previous years, large disparities in Eleventh Grade Mathematics proficiency by ethnicity plagued Silicon Valley again in 2017.** Hispanic and Latino students make up the largest group of Eleventh Grade students, but only 19% of Hispanic and Latino eleventh graders met or exceeded the state standard in Mathematics, down from 20% in 2016. In contrast, 78% of Asian and 61% of White eleventh graders did so. The achievement gap in Language Arts is smaller, but still substantial. Less than half of Hispanic and Latino eleventh graders (49%) were proficient in Language Arts, compared to 86% of Asian and 81% of White students.

**What do these percentages mean in human terms? In 2017, just over 10,000 Silicon Valley Hispanic or Latino eleventh graders took the Smarter Balanced Mathematics exam, and more than 8,000 fell short of the state standard. About 5,400 Hispanic or Latino eleventh graders didn't meet the state standard in Language Arts. Although Silicon Valley innovation companies are hungry to hire home-grown talent, the largest group of test-takers in our region are neither STEM-workforce ready nor, if going to college, prepared to major in STEM fields. It is clear that students of color in particular are being left behind in one of the most prosperous regions in the world.**

## Policy Scorecard

In 2015, the Silicon Valley Leadership Group and Silicon Valley Community Foundation hosted a series of public policy strategy sessions with federal, state and local officials, CEOs, education administrators, and community leaders. The following public policy recommendations emerged as priorities to enhance the health of Silicon Valley's economy.

High-Skill Immigration	
Streamline the visa process for permanent residents and non-immigration visas.	
Broaden eligibility criteria for EB-5, to better reflect start-up company growth.	
Maximize O-1 visas, especially for high-talent entrepreneurs.	
Education: STEM Education and High-Quality Pre-K	
Increase funding for public preschool education programs, particularly targeting at-risk populations	 
Increase student opportunities to engage with STEM in pre-K and K-12	 
Accept more STEM courses as A-G requirements (e.g., engineering, science courses) for UC/CSU admission	
Increase student proficiency in third grade reading and eighth grade Algebra	 
Transportation and Housing	
Increase funding for BART and Caltrain, leveraging New Starts, Cap & Trade funds, local ballot initiatives and infrastructure financing districts	  
Develop a permanent funding source for affordable housing	 
Engage corporate leaders to encourage connectivity to transit	
Research and Development	
Develop R&D funding matching program for areas such as biotechnology, clean energy and DARPA	 
Implement permanent R&D (and R&D equipment) tax credits	 
Emphasize return on investment in funding formula, tax credits	 
Cost of Doing Business and Regulation	
Modernize CEQA	
Augment tax credits, incentives to encourage business expansion locally	 
Automate local permitting system	

Key	
Federal Action	
State Action	
Local Action	



## Policy Scorecard Progress

Since 2015, the Silicon Valley Leadership Group and Silicon Valley Community Foundation have tracked progress on a series of public policy recommendations related to the indicators in this report. Those recommendations, which emerged from a series of strategy sessions with federal, state and local officials, CEOs, education administrators, and community leaders, are as follows:

### Housing Policy

Many years of work by the Silicon Valley Leadership Group and many others to secure a permanent source of funding for affordable housing came to fruition in 2017 with the passage of Senate Bill 2 championed by then-Senator and soon to be Senate Pro Tem Toni Atkins. This legislation will provide more than \$250 million annually to address the impact of California's housing crisis on low income residents.

Governor Brown signed Senate Bill 35, Senator Scott Wiener's bold and successful effort to streamline the construction of much needed housing where project proposals have satisfied local zoning requirements, in jurisdictions that have not met their housing construction obligations. Both Silicon Valley Community Foundation and the Silicon Valley Leadership Group were early backers of the legislation.

The passage of Senator Jim Beall's Senate Bill 3 in 2017 opened the door for voters to approve a \$4 billion veterans and affordable housing bond in 2018, to complement the funding that will come through the passage of Senate Bill 2. That measure will appear on the November 2018 ballot.

The Legislature also passed and the Governor signed Assemblymember Richard Bloom's Assembly Bill 1505 that allows for jurisdictions to once again require a percentage of affordable housing rental units from new market-rate rental housing projects, an essential tool cities utilize to build new affordable housing in their communities.

### Research & Development Policy

The federal R&D tax credit, which had been threatened as part of the 2017 federal tax overhaul, was preserved in the final legislation. The R&D tax credit is among the best policy tools for encouraging investments in research and development and the positive externalities that come with them.

### Transportation Policy

The Silicon Valley Leadership Group worked with Governor Jerry Brown and Senator Jim Beall to move the massive transportation funding bill through the California State Legislature. SB 1 will provide \$52 billion over the next 10 years to address both the aging and growing pains of California's transportation system.

In the face of threats to federal funding that would imperil electrification of Caltrain, Senator Dianne Feinstein and the Bay Area Congressional delegation, together with the Silicon Valley Leadership Group and regional leaders, rallied to secure a full funding grant agreement from the federal government for the project. Caltrain electrification will result in an 80% increase in capacity, growing to roughly 110,000 daily trips, reducing traffic on the heavily congested Highway 101 corridor between San Jose and San Francisco.

The Silicon Valley Leadership Group co-sponsored Senate Bill 595, authored by Senator Jim Beall, which the governor signed into law. This legislation allows for a consolidated election across the nine Bay Area counties to approve \$4.45 billion in regional traffic relief projects as part of the Regional Measure 3 (RM3), which will appear on the June 2018 ballot. The Leadership Group has also partnered with the Bay Area Council and SPUR to lead a successful Bay Area campaign for RM3.

SVLG partnered with Senator Jerry Hill to sponsor and successfully pass Senate Bill 797. SB 797 was signed into law by Governor Brown in 2017, allowing for a consolidated election across Santa Clara, San Mateo, and San Francisco counties in order to establish a dedicated source of revenue for Caltrain operations, maintenance and capacity improvements.

## Appendix

**Employment in Innovation Industries** - BLS-QCEW employment data are county-level survey-based employment estimates, available to the 4-Digit NAICS level. In this report, BLS-QCEW employment levels are annual averages. As a consistent methodology over time, this source is the basis for industry growth estimates.

**STEM Degrees Conferred** - Data on the number of STEM Degrees conferred comes from the National Center for Education Statistics' Integrated Postsecondary Education Data System (IPEDS). Data are based on first major and include bachelor's, master's, and doctoral degrees in Biological & Biomedical Sciences, Physical Sciences, Engineering, Computer & Information Sciences, Mathematics & Statistics, Engineering Technologies and Related, Science Technologies/Technicians. To obtain STEM degrees conferred per 10,000 residents, Collaborative Economics divides the number of STEM degrees in each region by the region's population.

**Migration/Millennial Geographic Mobility** - 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 months. In Silicon Valley, Boston, Southern California and New York City, 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. Geographic mobility by age data is drawn from the US Census' American Community Survey (ACS) (Table B07001) and reflects 1-Year estimates by place of residence. Innovation regions are defined by county. Millennials are defined as residents ages 20-29.

**Research and Development Expenditures at Universities** - Data on university R&D Expenditures come from the Higher Education Research and Development Survey produced by the National Science Foundation's National Center for Science and Engineering Statistics. Universities were classified into their respective regions by county. Some institution totals for all R&D expenditure for FY 2004 through FY 2009 may be lower-bound estimates because the National Science Foundation did not attempt to correct for non-response on non-science and engineering R&D expenditure items. Total R&D expenditure estimates were not available for Seattle from 2004 to 2009: Collaborative Economics estimated Seattle's growth trajectory based on growth in the University of Washington's Federal R&D expenditure over time. The Federal R&D data were from the Statistical Abstract of the United States for 2007, and the U.S. Census Federal R&D Obligations in 2008. In 2012, the University of Washington accounted for 99% of Seattle's total reported research funding and Federal funding was 86% of the University of Washington's total R&D expenditure.

**Costs of Doing Business** - Costs of doing business data is sourced from Moody's Cost of Doing Business Index, and includes business costs for labor, energy, state and local taxes, and office rents.

**Median Home Value and Average Rents** - Median Home Value data are from Zillow ([www.zillow.com](http://www.zillow.com)), and are inflation adjusted. Rents are sourced from Rent Jungle. Due to data constraints, regions are organized by principal city. Silicon Valley is proxied by San José, New York City by New York metro and Southern California by Los Angeles. Monthly data are averaged to estimate annuals.

**Population, Housing, and Jobs** - Data for this indicator is sourced from the U.S. Census American Community Survey, California Department of Finance, California Department of Housing and Community Development, U.S. Bureau of Labor Statistics, and Association of Bay Area Governments.

**Average Commute Times/Economic Costs of Traffic Congestion** - Change in average commute time for workers in innovation regions is sourced through the U.S. Census, American Community Survey. Economic costs of traffic congestion is sourced from the INRIX Global Traffic Scorecard.

**Livable Wage** - Livable Wage threshold estimates for the innovation regions are extracted from the Living Wage Calculator, which is produced by Dr. Amy K. Glasmeier and the Massachusetts Institute of Technology, based on metro area and county definitions. Living Wage reflects, "geographically specific expenditure data related to a family's likely minimum food, childcare, health insurance, housing, transportation, and other basic necessities (e.g. clothing, personal care items, etc.) costs. The living wage draws on these cost elements and the rough effects of income and payroll taxes to determine the minimum employment earnings necessary to meet a family's basic needs while also maintaining self-sufficiency." (source: <http://livingwage.mit.edu/pages/about>) Living wage is typically lower than the "sustainable wage", and higher than the federal poverty guidelines.

Living Wage estimates are annualized by multiplying the hourly rate by 2080 hours (full time equivalent). For Silicon Valley's Living Wage threshold figures, these are estimated based on the weighted average of San Mateo, Santa Clara and San Francisco counties based on number of households. All other innovation regions reflect metro area definitions, without transformation. Silicon Valley household income distribution information is gathered from the US Census' American Community Survey (ACS), and combines San Mateo, Santa Clara and San Francisco counties. The share of households in the region below the livable wage threshold is estimated based on the relative position of the threshold wage within the ACS's income categories, and assumes an even distribution of households within the income categories.

**Preschool Enrollment** - Preschool participation data are from the U.S. Census Bureau American Community Survey 1-year estimates from 2010 through 2016, and reflect the percent share of total three- and four-year-old children enrolled in school. Regions are defined by county.

**English and Mathematics Proficiency** - Exam performance data are from the California Department of Education, CAASPP Results in 2017, and "proficiency" reflect students meeting or exceeding state standards in third grade English Arts, eighth grade Mathematics, and eleventh grade English Arts and Mathematics. Regions are defined by county.



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. The Leadership Group focuses on key issues of importance including energy, transportation, education, housing, health care, taxation, economic vitality and the environment. Leadership Group members collectively provide nearly one of every three private sector jobs in Silicon Valley and have more than \$3 trillion in annual revenue. For more information, visit [svlg.org](http://svlg.org).



**Silicon Valley Community Foundation** advances innovative philanthropic solutions to challenging problems. As the largest community foundation in the world, we engage donors and corporations from Silicon Valley, across the country and around the globe to make our region and world better for all. Our passion for helping people and organizations achieve their philanthropic dreams has created a global philanthropic enterprise committed to the belief that possibilities start here.

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