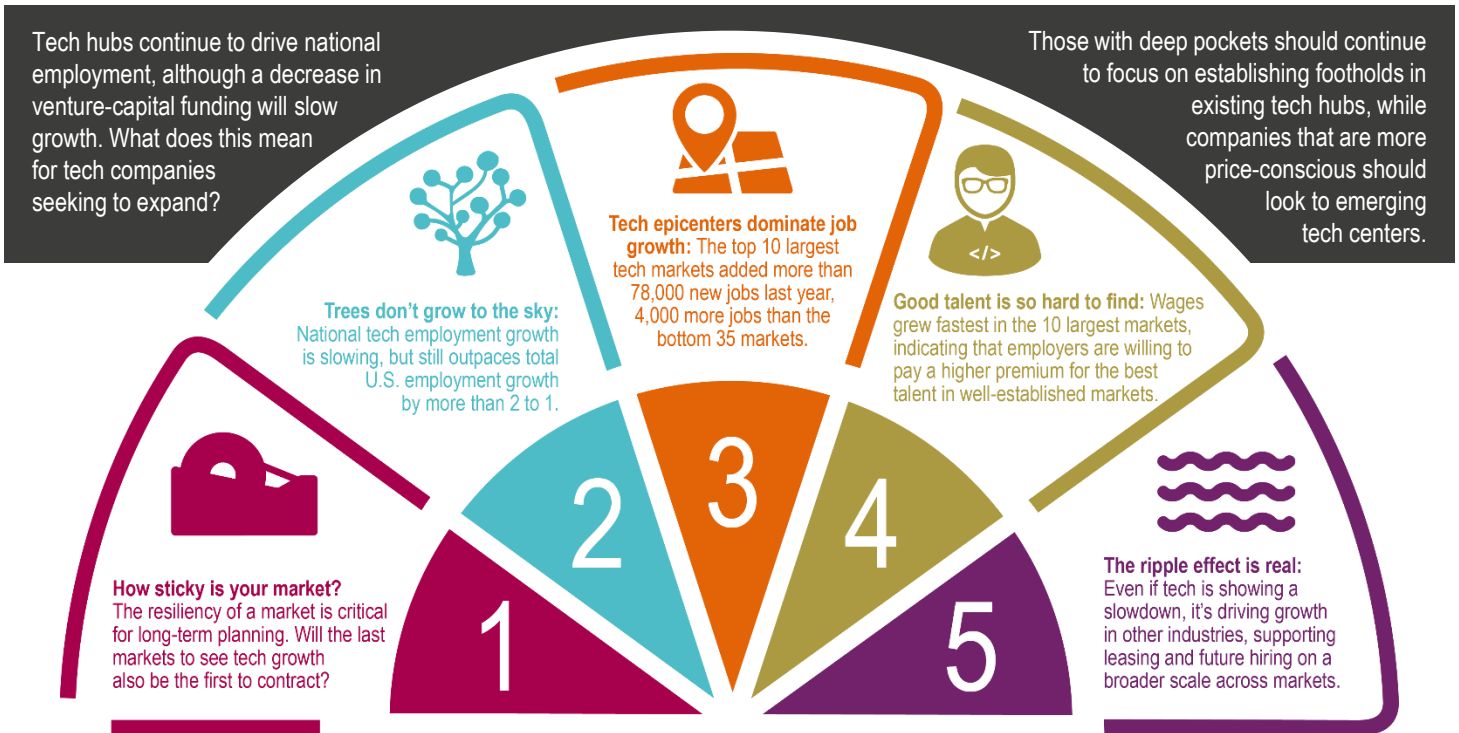


Tech employment trends: Continuing to lead the pack

United States | 2016



Tech hubs continue to drive national employment, although a decrease in venture-capital funding will slow growth. What does this mean for tech companies seeking to expand?

Those with deep pockets should continue to focus on establishing footholds in existing tech hubs, while companies that are more price-conscious should look to emerging tech centers.

Trees don't grow to the sky: National tech employment growth is slowing, but still outpaces total U.S. employment growth by more than 2 to 1.

Tech epicenters dominate job growth: The top 10 largest tech markets added more than 78,000 new jobs last year, 4,000 more jobs than the bottom 35 markets.

Good talent is so hard to find: Wages grew fastest in the 10 largest markets, indicating that employers are willing to pay a higher premium for the best talent in well-established markets.

How sticky is your market? The resiliency of a market is critical for long-term planning. Will the last markets to see tech growth also be the first to contract?

The ripple effect is real: Even if tech is showing a slowdown, it's driving growth in other industries, supporting leasing and future hiring on a broader scale across markets.

<How sticky is your market?>

Tight labor market conditions are driving tech industry expansion into secondary markets where the demographics and cost factors are highly attractive for both firms and talent alike. The largest tech clusters, like the Bay Area, Boston and New York, will remain the centers of innovation for the foreseeable future; but as the

job data shows, companies are growing rapidly in lower-cost markets like Cincinnati, Charlotte and Madison.

For occupiers, selecting a new location for growth is a critical decision, especially when deciding on a market for expansion outside of the main hub. Many of the largest tech companies have expanded outside of their main headquarters during this cycle, including Google, Uber and LinkedIn, highlighting the trend of geographic diversification. But how will these new tech markets fare if there is a significant contraction within the industry? How well will this new growth stick?

Market stickiness in three tranches:

THE TECH HUBS: These markets are at the center of industry innovation with the highest concentration of companies, ideas and talent. Markets that are home to prominent universities, a highly educated workforce and a culture of innovation bred by coding schools, incubators and major tech anchors will be the stickiest, or most resilient, of tech markets throughout cycles.

THE EMERGING TECH CENTERS: These are markets where job growth has been strong enough for the last 10 years to have a lasting impact on the industry and talent composition of a market. The presence of good universities and coding schools provide learning opportunities, and these markets will likely weather tech cycles of growth and contraction better than most.

THE TECH SATELLITES: These markets have only just begun to see more rapid job growth, perhaps due to nonessential tech-job growth (administrative functions), and could see a quicker correction if there is a significant pullback in the industry and a push to have most job functions return to the HUBS. These markets will be the least sticky if there's a significant correction.

There are only a few similarities between the largest tech markets of today versus those that dominated during the dot-com boom. New entrants have emerged, and those with the greatest increase in tech employment will likely maintain their position as an innovative market through the next cycle and beyond. Those where little change has occurred may suffer from job losses first if there is a substantial correction in this sector in the next 24 months.

<Trees don't grow to the sky>

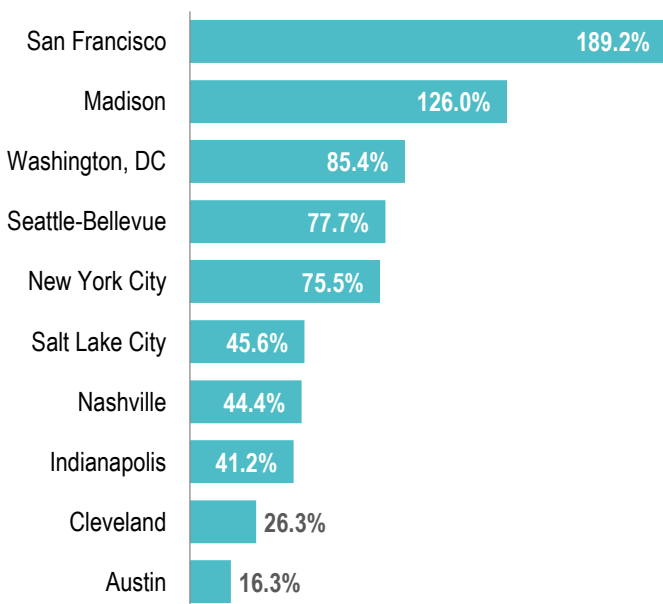
National tech employment is slowing, but remains the leading industry, driving employment growth in the United States overall. With annual growth of 4.3 percent in May versus 1.9 percent for the United States, tech is still growing at more than twice the national rate.

Venture capital funding continues to level off,

resulting in a slowdown of growth from early-stage tech companies and subsequent demand for office space and new jobs. But well-established tech firms continue to fill tenant-demand pipelines in many markets, and are expected to support industry growth despite a slowdown in the startup segment. Unless startups begin to burn through cash and fail on a large scale, employment levels will remain elevated and growth will be supported by expanding tech giants.

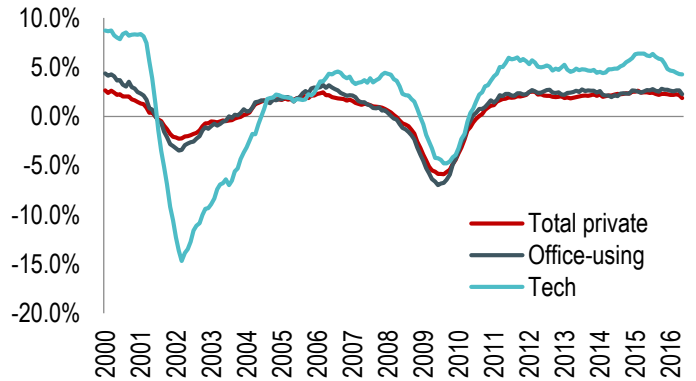
There are now 13.1 percent more tech jobs today than there were at the height of the dot-com boom in 2001. With a shift toward an economy centered on consumer-based applications, enterprise cloud software and social media platforms, the tech industry has evolved into a services-based industry on a large scale, having a greater impact on office demand than ever before. Since the previous peak in 2001, tech manufacturing has failed to recover 50.0 percent of peak-level jobs, while tech-services jobs are 48.8 percent higher than the 2001 peak. This shift has allowed the industry to diversify geographically as well, because innovation and development can be done from nearly anywhere with a good internet connection.

// Top markets for tech employment growth, 2001 vs. 2015 //



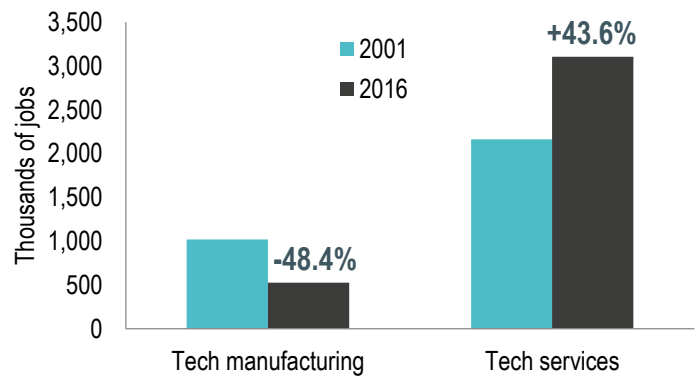
Source: JLL Research, BLS

// Employment growth by sector //



Source: JLL Research, BLS

// Tech-services jobs drive overall tech industry growth //



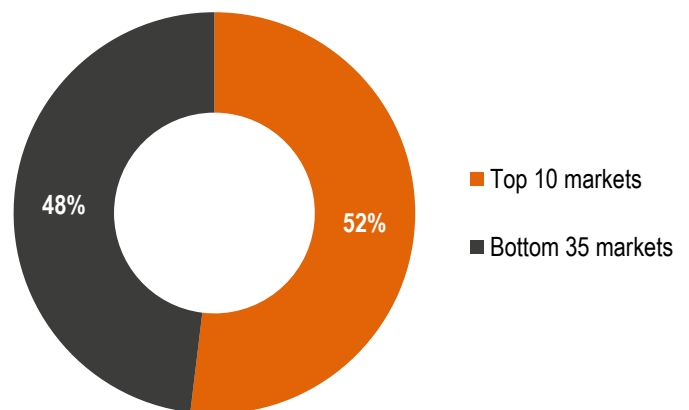
Source: JLL Research, BLS

<Tech epicenters dominate job growth>

The top 10 tech markets make up 30.4 percent of U.S. tech employment, and job growth in these places accounted for 36.8 percent of U.S. tech-job growth last year. While several smaller markets showed substantial increases in employment, the top 10 markets still dominate employment growth, adding more than 78,000

jobs in the last year, an increase of 6.6 percent relative to U.S. tech-job growth of 5.4 percent. The remaining 35 markets accounted for just 72,000 of new jobs growth of 5.6 percent.

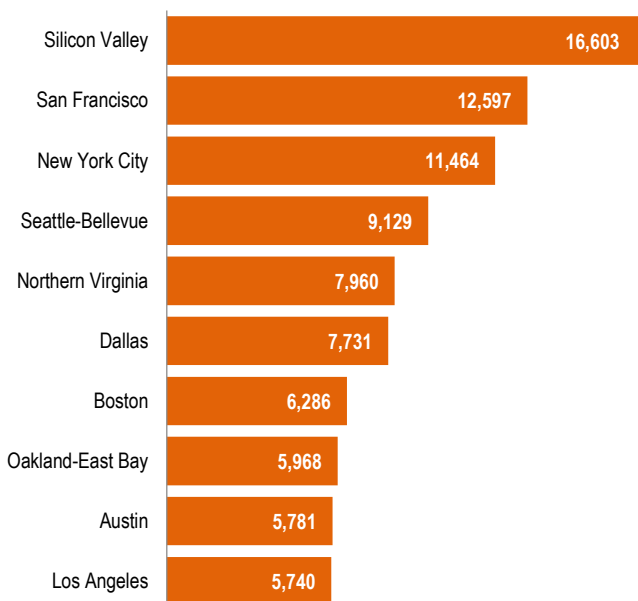
// Top 10 of 45 tech markets make up more than 50% of job gains in 2015 //



Source: JLL Research, BLS

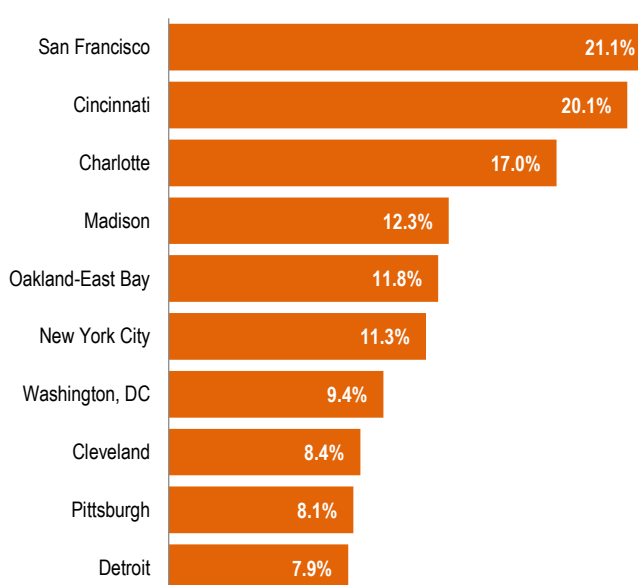
The Bay Area maintains its position as a top growth region for tech firms, with employment growth indicating that significant leasing volume by tech firms in the last 18 months is filling up with new employees. San Francisco led tech-job growth for markets of all sizes, growing by 21.1 percent, taking the honor of fastest growing tech employment market for the sixth year in a row. On an absolute basis, this amounts to 12,600 jobs, second only to Silicon Valley where 16,600 jobs were added, an increase of 7.2 percent. Oakland-East Bay moved up in the ranks of employment growth, coming in fifth among all markets, or 11.8 percent growth, with the addition of nearly 6,000 jobs. This, combined with the San Francisco Peninsula's growth rate of 5.0 percent, underscores the Bay Area's dominant place in the tech ecosystem, but growth is increasingly more difficult there as a result of high prices and a very tight labor market.

// Top markets by absolute jobs added, 2015 //



Source: JLL Research, BLS

// Top markets by job growth, 2015 //



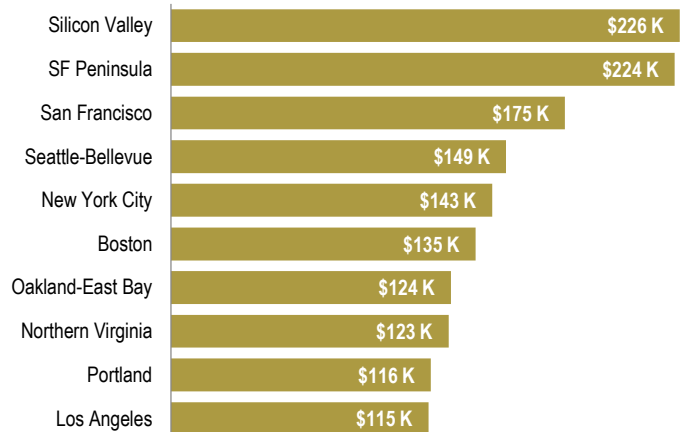
Source: JLL Research, BLS

<Good talent is so hard to find>

Most markets are still recording strong wage growth, reflecting a tight labor market. Wage growth averaged 3.6 percent in the 10 largest markets, versus 2.6 percent on average for the remaining 35 markets, suggesting that the top tech markets are having the greatest difficulties sourcing talent, and firms are willing to pay a premium for it. It could also suggest that many of the firms in growth mode focused on hiring more support personnel in the last year, which typically earn lower wages than early team members who have stock options, or engineers whose salaries start in the six-figure range.

The top tech markets are also those that pay the greatest premium on talent. Silicon Valley leads with an annual wage of \$226,236, a figure that includes benefits and stock options. Despite having the top tech wages, two of the five had flat wage growth, while one showed a slight decline (but remained in second place nonetheless). This indicates that many of the new hires last year were those in support functions to help businesses mature and grow.

// Markets with the highest tech wage //



Source: JLL Research, BLS

<The ripple effect is real>

Venture capital investment is a key indicator to predict future leasing and job growth. Investment in seed- and early-stage rounds has slowed, and we expect leasing will follow that trend in key tech markets where costs are greatest. In San Francisco, Silicon Valley and New York, tech leasing has slowed by a combined 30.7 percent in the last 12 months compared with the previous 12-month period. This will lead to slower employment growth in U.S. tech overall, compounded by a very tight labor market, where unemployment is just 2.5 percent for white-collar workers.

There will be a slowdown in tech-job growth compared to the levels achieved during the last five years, which averaged 5.2 percent from 2011, compared to the U.S. overall job growth rate of just 2.1 percent. The good news is that tech makes up only one-third of all U.S. employment, and the residual impact of strong tech growth over the last five years has led to expansion in other industries such as private banking, intellectual property law, marketing and advertising, leisure, and demand for other services driven by tech households where incomes are mostly higher on average.

// Technology market metrics //

Market	Total tech employment (2014)	Total tech employment (2015)	2015 annual job growth (#)	2015 annual job growth (%)	Average tech wage (2015)	Annual wage growth	Wage index (U.S. = 100)
Atlanta	68,403	73,644	5,241	7.7%	\$104,842	3.7%	95.3
Austin	74,402	80,183	5,781	7.8%	\$106,307	4.6%	96.6
Baltimore	34,671	35,064	393	1.1%	\$106,120	-1.1%	96.4
Boise	12,155	12,848	693	5.7%	\$103,440	0.5%	94.0
Boston	149,737	156,023	6,286	4.2%	\$135,454	3.1%	123.1
Boulder	21,786	21,987	201	0.9%	\$113,249	4.9%	102.9
Charlotte	20,184	23,613	3,429	17.0%	\$100,834	1.2%	91.6
Chicago	61,456	65,234	3,778	6.1%	\$89,294	5.9%	81.1
Cincinnati	8,984	10,789	1,805	20.1%	\$83,326	1.3%	75.7
Cleveland	18,838	20,420	1,582	8.4%	\$78,110	3.8%	71.0
Columbus	20,887	20,706	-181	-0.9%	\$76,161	2.7%	69.2
Dallas	113,728	121,459	7,731	6.8%	\$112,244	1.2%	102.0
Denver	50,996	54,370	3,374	6.6%	\$105,830	1.1%	96.2
Detroit	50,280	54,233	3,953	7.9%	\$89,798	6.4%	81.6
Houston	59,424	57,998	-1,426	-2.4%	\$97,796	2.0%	88.9
Indianapolis	29,340	31,378	2,038	6.9%	\$58,321	4.2%	53.0
Los Angeles	98,678	104,418	5,740	5.8%	\$114,540	13.2%	104.1
Madison	14,633	16,428	1,795	12.3%	\$94,412	4.6%	85.8
Milwaukee	15,369	15,557	188	1.2%	\$92,049	2.8%	83.6
Minneapolis	77,630	79,718	2,088	2.7%	\$103,653	3.3%	94.2
Nashville	12,193	12,985	792	6.5%	\$85,483	-0.1%	77.7
New York City	101,791	113,255	11,464	11.3%	\$142,846	5.5%	129.8
Northern New Jersey	89,559	91,537	1,978	2.2%	\$106,183	-0.9%	96.5
Northern Virginia	120,319	128,279	7,960	6.6%	\$123,465	3.0%	112.2
Oakland-East Bay	50,587	56,555	5,968	11.8%	\$124,481	2.8%	113.1
Orange County	64,986	67,268	2,282	3.5%	\$104,061	1.7%	94.6
Orlando	23,165	23,322	157	0.7%	\$79,281	5.0%	72.0
Philadelphia	49,406	49,923	517	1.0%	\$102,798	4.9%	93.4
Phoenix	74,214	79,853	5,639	7.6%	\$91,794	0.5%	83.4
Pittsburgh	19,020	20,558	1,538	8.1%	\$84,298	2.1%	76.6
Portland	60,015	62,760	2,745	4.6%	\$115,504	3.0%	104.9
Raleigh – Durham	53,646	56,071	2,425	4.5%	\$107,774	1.6%	97.9
Richmond, Va.	8,093	8,050	-43	-0.5%	\$87,950	4.5%	79.9
Sacramento	18,589	19,976	1,387	7.5%	\$114,487	-1.3%	104.0
Salt Lake City	52,300	55,155	2,855	5.5%	\$81,153	4.1%	73.7
San Diego	53,005	54,276	1,271	2.4%	\$108,169	1.2%	98.3
San Francisco	59,608	72,205	12,597	21.1%	\$175,196	-0.2%	159.2
Seattle-Bellevue	139,860	148,989	9,129	6.5%	\$149,018	-0.7%	135.4
SF Mid Peninsula	45,603	47,866	2,263	5.0%	\$224,000	-3.5%	203.5
Silicon Valley	229,202	245,805	16,603	7.2%	\$226,236	6.8%	205.6
South Florida (Miami, FTL, WPB)	48,092	50,135	2,043	4.2%	\$75,975	7.2%	69.0
St. Louis	23,088	23,928	840	3.6%	\$98,671	3.7%	89.7
Suburban Maryland	38,458	37,925	-533	-1.4%	\$112,063	3.0%	101.8
Tampa	30,376	32,418	2,042	6.7%	\$85,817	2.8%	78.0
Washington, DC	25,767	28,191	2,424	9.4%	\$106,275	0.4%	96.6

Source: JLL Research, BLS | Note: Wages include bonuses, stock options, severance pay, profit distributions, cash value of meals and lodging, tips and other gratuities, and, in some States, employer contributions to certain deferred compensation plans such as 401(k) plans.

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