



United States | 2021

Research

Tech Office Trends and Outlook for 2022

Tech dominated office leasing activity through the pandemic



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The disruption realized at the start of the pandemic accelerated technological adoption and resulted in the technology sector leading the economic rebound in 2021.

While private fixed investment declined by 1.8 percent from 2019 to 2020, intellectual property increased by 4.2 percent, with software investment increasing by 6.0 percent over the same period. The products and services created through the last two decades of innovation made work-from-home possible, and the sector itself continues to outperform traditional industries thanks to the unmitigated demand for tools that keep businesses operational.

While office demand has been tepid since the onset of the COVID-19 pandemic, **large technology companies doubled down on their space needs**, often contradicting their public statements about return-to-office timelines and flexible work arrangements. In 2021, the largest office commitments came from technology companies both in existing office buildings and in new developments yet to be completed. However, we continue to see a wide spectrum of work-from-home policies that have yet to settle, creating confusion

and volatility in the commercial real estate market, further challenged by the volatile nature of the pandemic.

Sunbelt markets appear more attractive than ever, but scale still matters, **and the top tech geographies will continue to be prime targets for start-ups and blue-chip tech companies alike.** But the pursuit of talent is no longer confined to a few gateway markets and has reached many North American cities. These cities generally have strong educational institutions, provide a high quality of life and creative environment and attract young talent both domestically and internationally. The industry has matured, and so has its workforce, lending itself to greater diversification across geographies.

As we emerge from the worst of the pandemic, several trends are taking shape for tech companies across the U.S. The opportunity for investors targeting innovation- and talent-rich geographies is as attractive as ever.

Key takeaways:

1. Technology companies plan to return to the office, leasing a record 15.3 million square feet since the onset of the pandemic, more than any other industry.
2. Venture capital flows are breaking records, with \$121 billion in funding YTD through September and IPO activity at all-time highs and still growing.
3. Major markets remain centers of gravity for talent, while smaller markets are capturing a more remote-first workforce, expanding talent and growth opportunities for companies of all sizes.

A black and white portrait of Amber Schiada, a woman with long, wavy hair, smiling. She is wearing a dark, sleeveless top.

Amber Schiada
Senior Director of
U.S. Industry Research



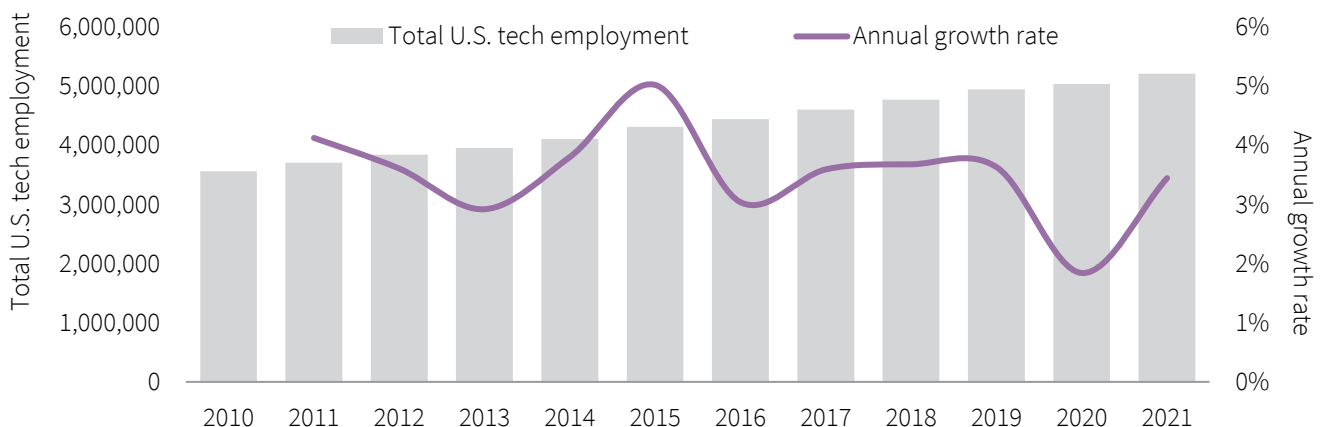
1.

Underlying fundamentals remain strong

The pandemic buoyed the technology sector as workers, consumers and students turned to technology to maintain daily life. Like all sectors, technology employment saw a decline in job levels immediately following the pandemic, but the losses were minimal in comparison to overall employment declines. Already the sector has seen solid gains even if not all those workers are fully back in the office.

Technology adoption accelerated during the pandemic. Total e-commerce sales in the U.S. jumped by 39.3 percent from Q1 2020 to Q1 2021. The NASDAQ index outperformed all major indices, gaining 88.9 percent from Q1 2020 to Q3 2021. Clearly, the momentum and confidence in this sector continue.

After falling to 1.8% growth in 2020, national tech employment is up 3.4% year-over-year in September

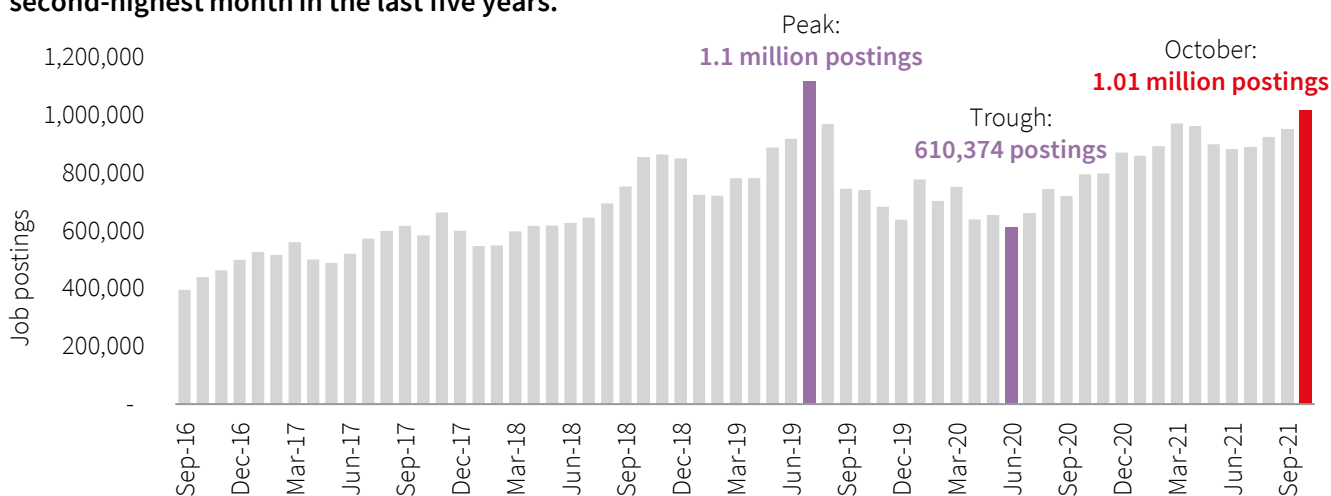


Sources: JLL Research, BLS, EMSI

Technology adoption increased the sector's overall capacity to invest further in talent and intellectual property. National job posting data shows available technology jobs stood at 1.0 million job postings in October. Those numbers were only reached during the 2019 peak when national unemployment dipped under 4 percent. Big technology companies, especially, have grown, with the top 25 technology companies by market capitalization adding more than 600,000 workers from 2020 to 2021.

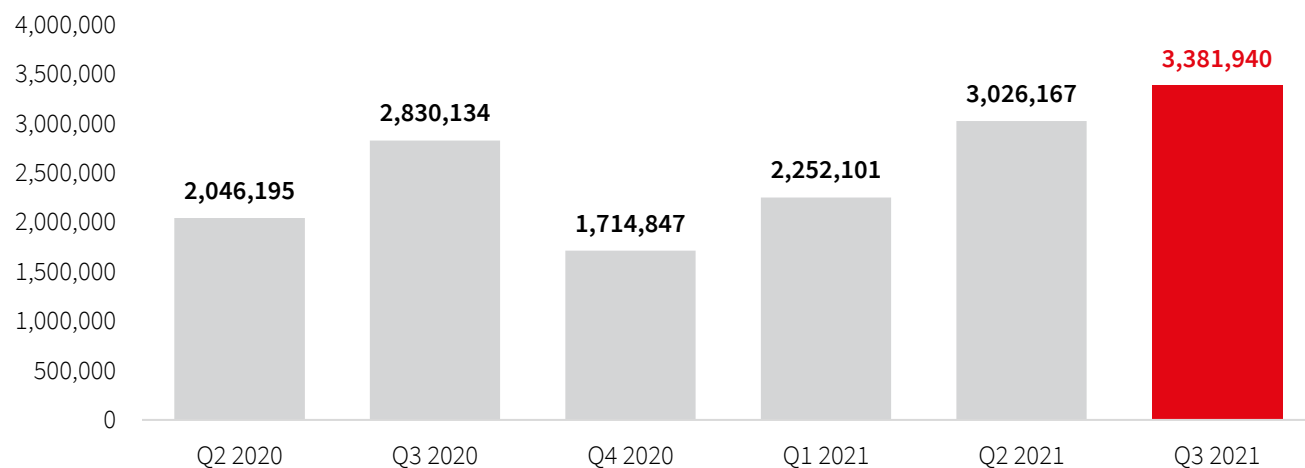
As a result, **technology companies have leased more office space than any other industry through the pandemic**, amounting to more than 15.3 million square feet. More than half of all leases signed since Q1 2020 have been expansion or new-to-market transactions. Large leases have occurred more often in offices with higher-quality amenities and modern, efficient and sustainable workplaces that big technology companies are hoping will woo workers back into the office.

Technology job postings have continued to grow since their trough in June 2020. October was the second-highest month in the last five years.



Sources: JLL Research, EMSI. Data is country-wide.

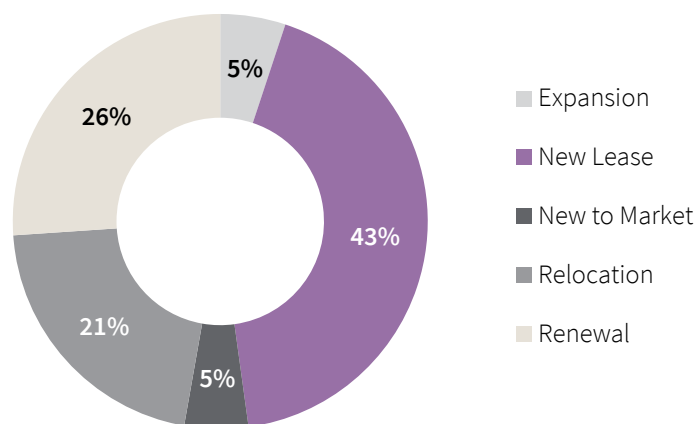
Technology companies have leased 15.3 million office square feet since the pandemic, with Q3 reaching its highest activity. Technology leasing remains the most active industry among new leases.



Source: JLL Research. Only leases > 20,000 s.f. included.

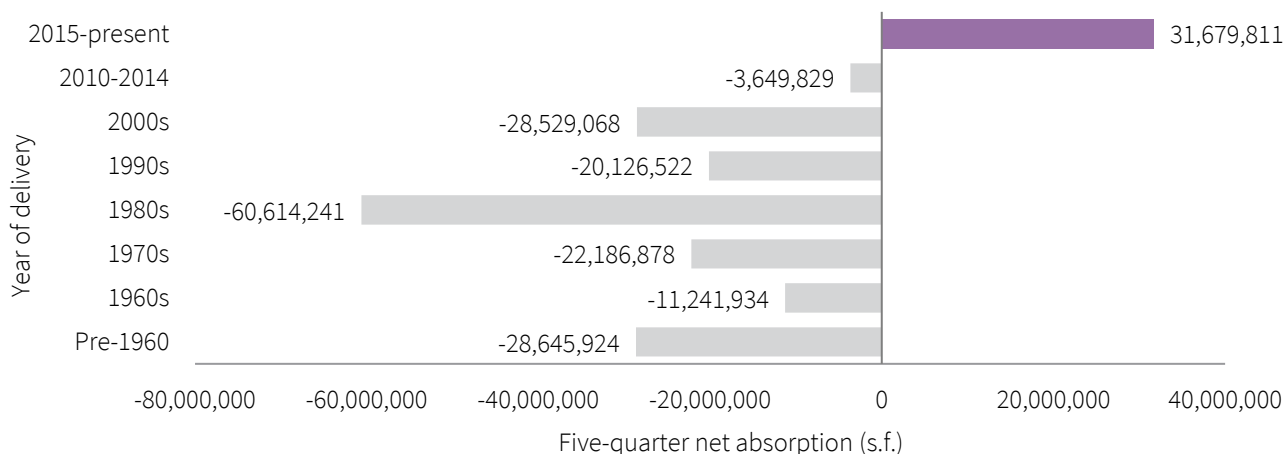
Since Q1 2020, only buildings constructed after 2015 have realized positive net absorption, whereas 1980s-era office spaces realized the largest occupancy losses. The flight from commodity to quality space will remain a major leasing trend among larger tech firms. While some of the net absorption can be attributed to preleased deliveries, several new-to-market deals were executed in San Diego, Silicon Valley, Nashville, Atlanta, Seattle and New York during the pandemic.

Most tech lease transactions since the pandemic are composed of new leases and relocations, reflecting the continued growth in this sector.



Source: JLL Research. Only leases > 20,000 s.f. included. Recorded leases from Q2 2020 to Q3 2021.

A flight-to-quality is driving office leasing activity in the U.S., and tech tenants are a key driver



Source: JLL Research. Only leases > 20,000 s.f. included.

Building age is the primary determinant of occupancy growth

- Since the onset of the pandemic, occupancy losses have been more acute in commodity product than newer assets. In 2021, large-scale anchor-led projects will further contribute to this trend.
- This is likely to continue given the availability of generous concession packages and accelerated flight-to-quality by tenants seeking best-in-class air filtration, ventilation and purification and other building features focused on employee well-being.



Farley Building
New York | Facebook
740,000 s.f.



Nashville Yards (Phase 1)
Nashville | Amazon
500,000 s.f.



Uber HQ
San Francisco | Uber
422,980 s.f.



Office investment activity has been heavily impacted by the pandemic, but as the recovery progresses there have been outperforming subsets of the market that saw a lesser impact from the disruption and have recovered more quickly. Technology tenancy has proven to be one of the factors driving outperformance: technology-led markets have seen more resilient investment volume throughout the past year, and assets with significant technology tenancy have traded at higher pricing than peers.

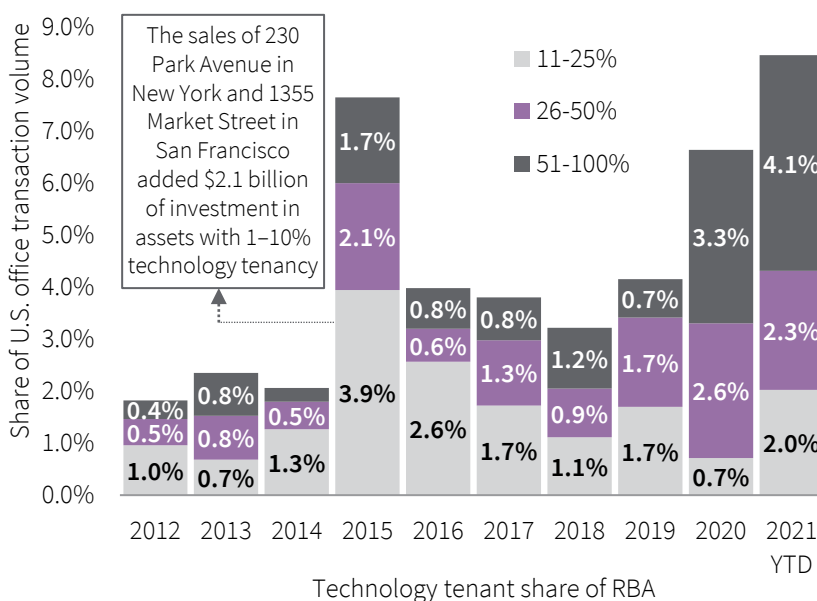
Among gateway markets, Seattle and the San Francisco Bay Area have seen a considerably smaller

decline in investment volume than peers, while Austin, Denver, San Diego and Raleigh-Durham have outperformed among secondary markets, driven by a greater concentration of technology and biotech tenancy.

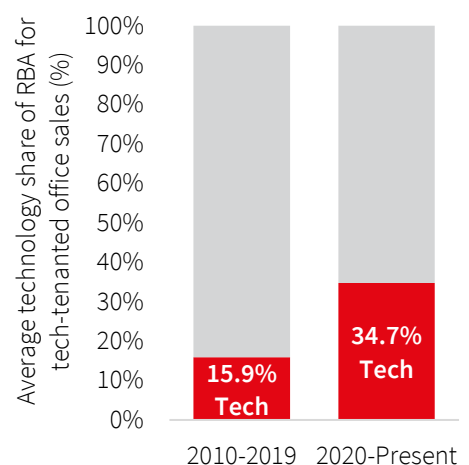
Nationally, this has driven a considerably greater share of investment into technology-tenanted assets, with a historical high of 8.5 percent of year-to-date investment volume coming from assets that are at least 10.0 percent leased to technology tenants. Clearly, investors are betting on innovation.

Tech-anchored assets are making up their greatest share of office investment on record since the pandemic

U.S. office investment volume with technology tenancy



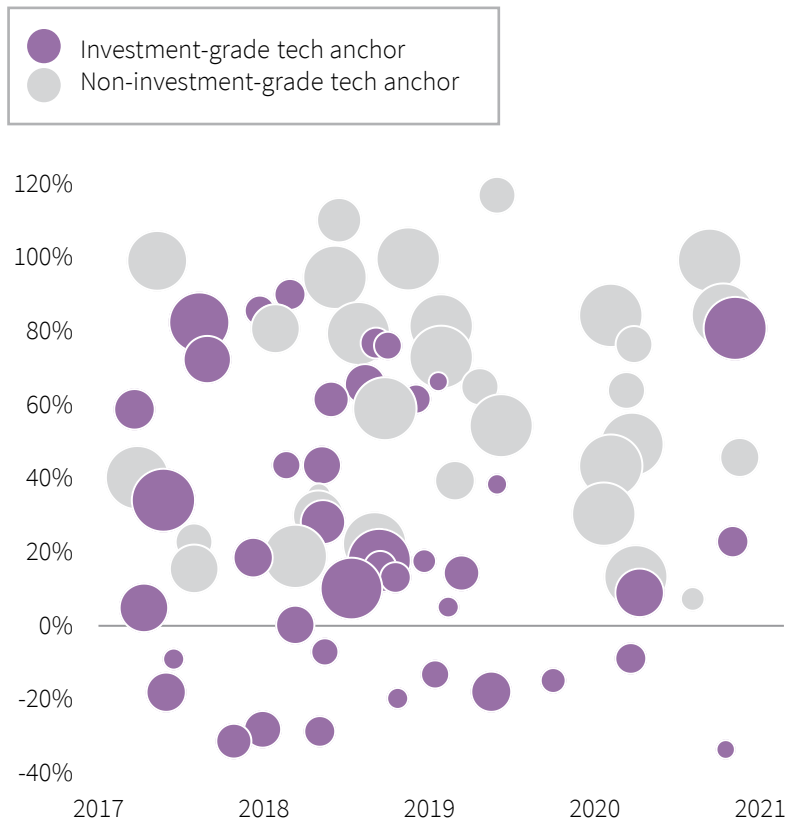
Post-COVID tech-tenanted sales have had considerably greater tech exposure



Sources: JLL Research, YTD through June; Real Capital Analytics (single-asset transactions larger than \$5.0 million)

Tech-anchored assets generate premium pricing; creditworthiness carries greater importance post-pandemic

Price PSF premium/discount to market average (%)
Size of bubble correlates with deal size



Technology-anchored pricing premium by anchor tenant credit rating:

Credit rating	Pre-pandemic	Post-pandemic
Investment grade	+52.5%	+59.5%
Non-investment grade	+26.1%	+8.5%

Sources: JLL Research, Real Capital Analytics (single-asset transactions larger than \$5.0 million)



Big tech continues to flourish

While technology companies overall have realized significant gains over the past six quarters, the top 25 publicly traded technology companies by market capitalization have flourished even more. **From Q1 2020 to Q3 2021, Big Tech in the U.S. realized a 109.1% gain in market capitalization, or approximately \$7.0 trillion.**

Big Tech has responded by adding nearly 600,000 more workers from Q1 2020 to Q1 2021, a year-over-year increase of 27 percent. Twenty-two of the top 25 technology companies added workers from Q1 2020 to Q1 2021, whereas overall employment remained below pre-pandemic levels.

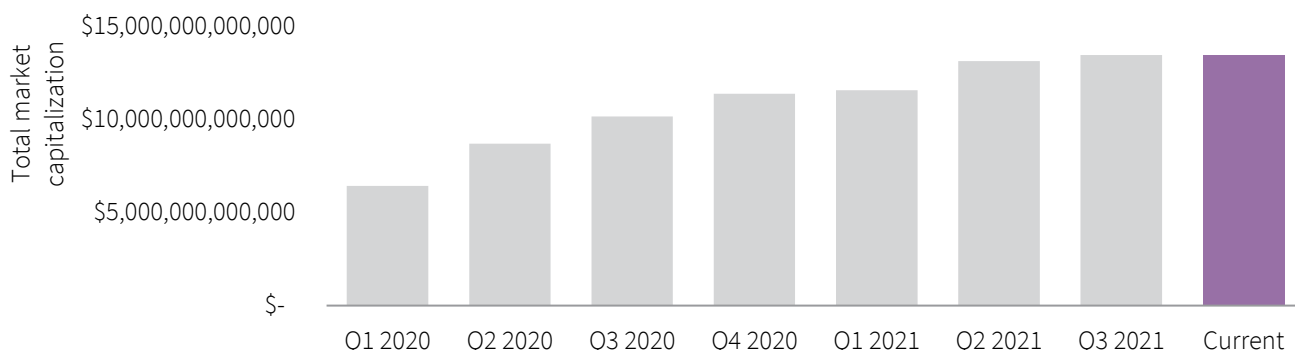
This increase in headcount will ultimately manifest in additional office demand as Big Tech has made slower but meaningful expansions in space. FAANG+ (FAANG+ is defined as Facebook, Amazon, Apple,

Netflix, Google and Microsoft) companies alone accounted for approximately 26 percent of total technology leasing activity (office only). While the Bay Area, New York and Seattle remain the dominant office and R&D markets in the U.S., FAANG+ has expanded outside their headquartered regions to reach additional talent. Large FAANG+ leases that have been executed in San Diego, Atlanta, Washington, DC and Los Angeles and represent a growing share of FAANG+'s footprint in these markets.

While the top tech companies represented a large share of leases over 100,000 square feet, unprecedented investment in venture-backed companies has enabled further expansion among early- and mid-stage technology companies. Examples include Figma in San Francisco and TikTok in New York and Los Angeles.

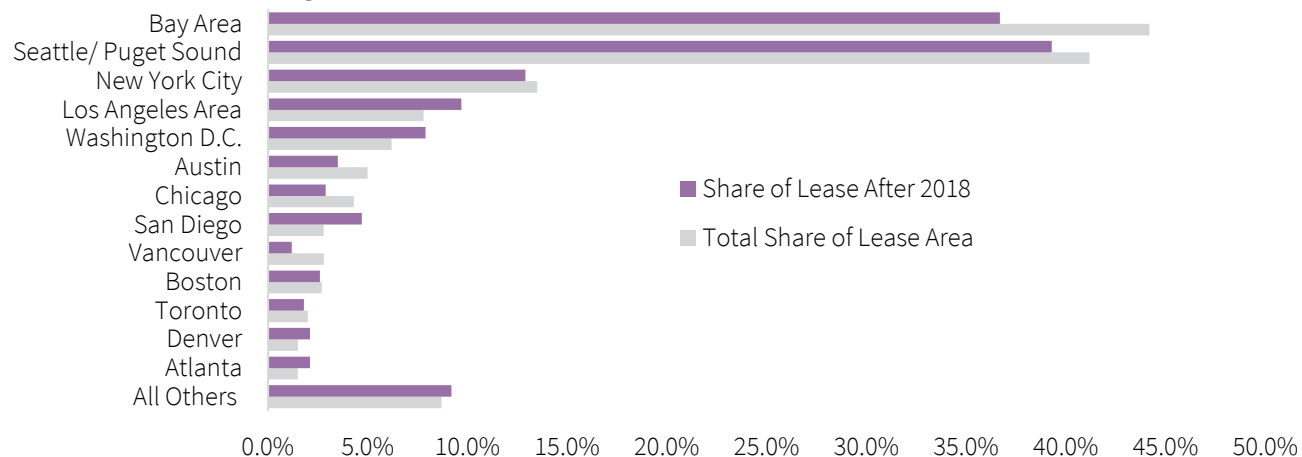
The top 25 technology (i.e., Big Tech) firms by market capitalization have realized a 109.1% gain in value from Q1 2020 to Q3 2021, or approximately \$7.0 trillion.

Top 25 technology companies market capitalization by quarter (Q1 2020–Q3 2021)



Source: JLL Research, 2021. Big Tech is defined as the U.S. top 25 technology companies in market capitalization at the end of Q3 2021.

Share of FAANG+ leasing by market

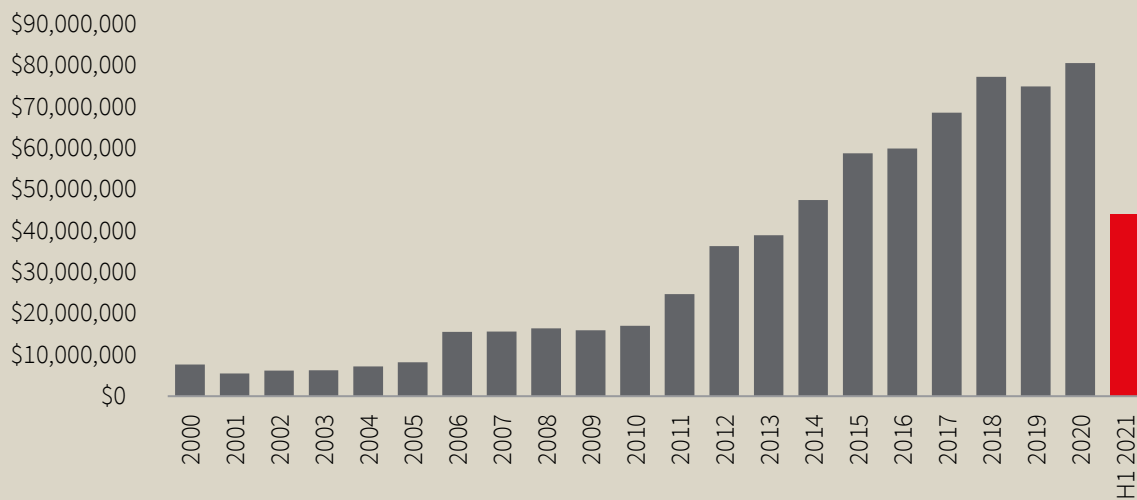


Source: JLL Research. Only leases > 20,000 s.f. included.

As Big Tech grows in importance and revenue, so does government oversight

Big Tech has continued to advocate on its behalf to drive state and federal policy due in part to increased pressure and concerns. The result is concentrated investment in Washington, DC to influence future policy on technology.

In tandem with their growing importance and scrutiny, technology companies have increased their federal lobbying efforts, which are on pace to reach record levels in 2021



Sources: JLL Research, OpenSecrets



2. *VC funding and IPOs are at record highs and driving diversification within tech*

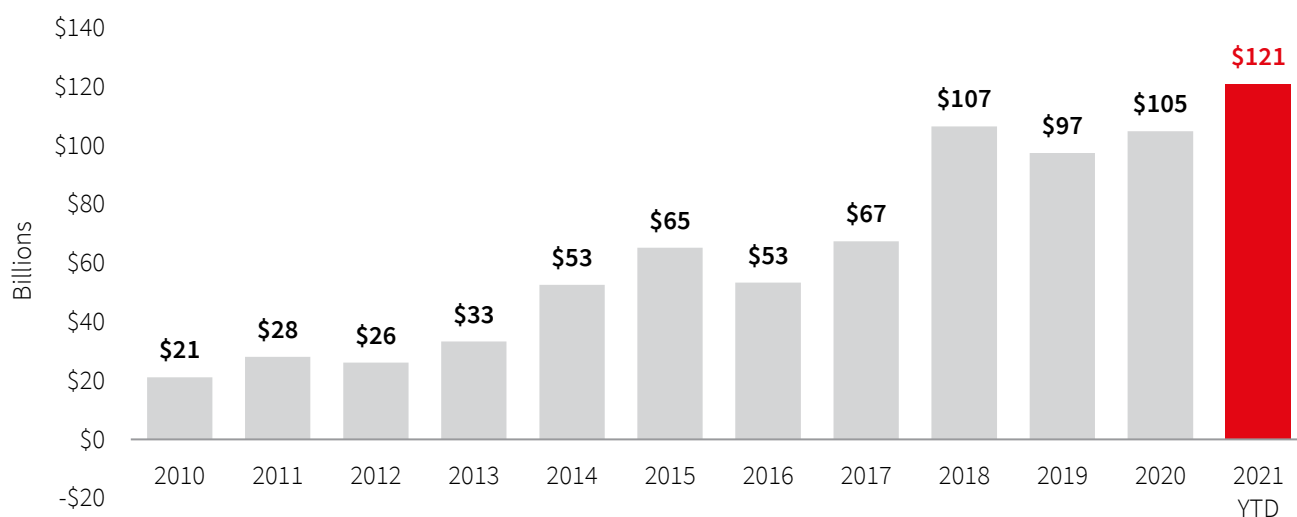
Venture capital and IPO trends

The optimism in technology adoption and its long-term economic prospects over other investments is clearly demonstrated by the explosion in venture capital investment. Year-to-date through September 2021, technology companies had received \$121 billion in total investment. That's higher than the last

annual record reached in 2018 (\$107 billion). In 2010, total venture capital investment in technology companies reached just over \$21 billion. That total is less than the City of San Francisco technology companies received in the first three quarters of 2021.

Total U.S. venture capital investment in technology companies is at record levels at \$121 billion

Total VC funding (USD)



Sources: JLL Research, OpenSecrets

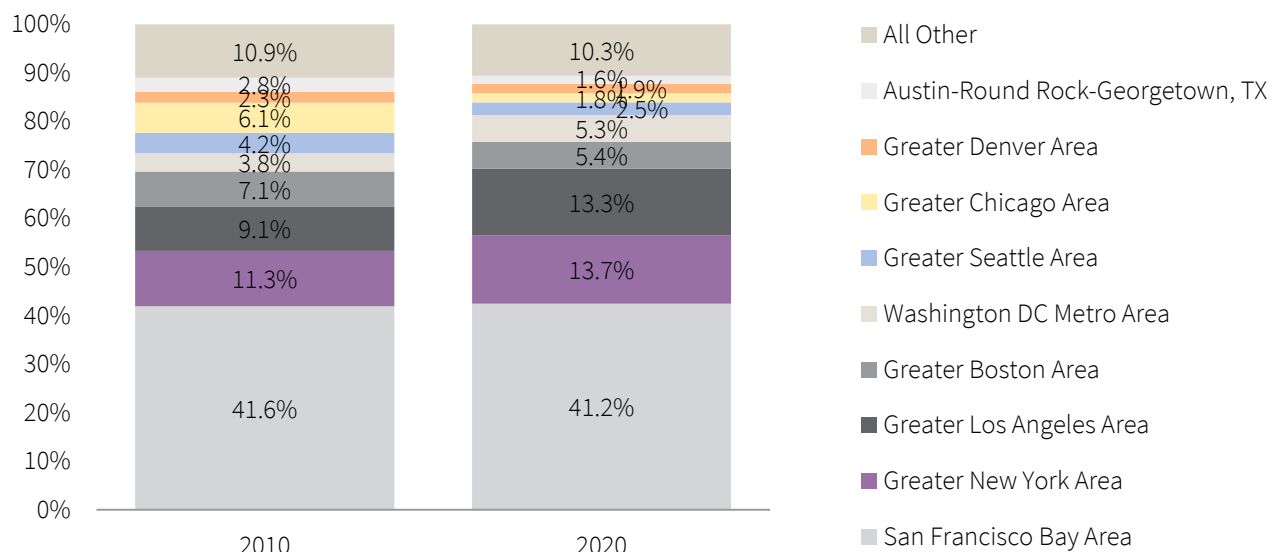
2020–21 IPOs are mostly concentrated in New York, Boston, Los Angeles and the San Francisco Bay Area



The distribution of venture capital investment has grown across multiple markets but remains highly concentrated in the major gateway markets of the San Francisco Bay Area, New York and Los Angeles. Those three markets account for more than two-thirds of total VC investment in 2020. However, Raleigh-Durham, Vancouver, Canada and Washington, DC have accelerated their technology start-up ecosystem.

While VC funding has increased across markets, it remains highly concentrated in four major gateway markets, accounting for over 73% of total funding and growing

Share of technology VC investment by market (2010 vs. 2020)



Sources: JLL Research, Crunchbase. Accessed August 2021.

Markets that can attract top talent from around the world will remain at the forefront of the creative economy. The primary elements for a healthy venture capital ecosystem include a robust university system to farm top talent, an open and livable community that enables free thought, a savvy finance sector willing to take on significant risk and an existing labor/company base to grow and acquire intellectual property.

While the Bay Area remains the epicenter of VC investment, there are nascent ecosystems forming in Raleigh-Durham, Montreal, Vancouver and Washington, DC

Market	2010–2020 average annual growth rate	Share of 2021 investment	H1 2021 Technology investment
San Francisco Bay Area	17%	44%	\$43,095,759,359
Greater New York Area	20%	16%	\$15,379,498,065
Greater Los Angeles Area	22%	9%	\$8,467,398,810
Greater Boston Area	14%	7%	\$6,417,820,525
Greater Chicago Area	4%	2%	\$2,413,046,250
Greater Seattle Area	12%	2%	\$2,284,061,900
Toronto, Canada	11%	2%	\$2,034,991,666
Greater Philadelphia Area	21%	2%	\$2,012,381,117
Greater Atlanta Area	20%	2%	\$1,878,843,656
Greater Denver Area	15%	2%	\$1,841,750,828
Washington, DC Metro Area	22%	2%	\$1,816,700,582
Vancouver, Canada	24%	2%	\$1,683,781,493
Austin-Round Rock-Georgetown, TX	11%	2%	\$1,533,200,202
Raleigh-Durham	33%	2%	\$1,526,002,945
Greater Miami Area	21%	1%	\$986,243,476
Montreal, Canada	25%	1%	\$985,443,138
Tampa Bay Area	4%	1%	\$933,701,107
Greater San Diego Area	19%	1%	\$923,785,137
Greater Houston Area	17%	1%	\$740,510,929
Dallas/Fort Worth Metroplex	8%	1%	\$513,722,363
Greater Detroit Area	14%	0%	\$330,839,219
Greater Phoenix Area	27%	0%	\$165,400,724
Greater Minneapolis-St. Paul Area	19%	0%	\$100,535,871
Greater Baltimore-Maryland Area	11%	0%	\$85,407,644

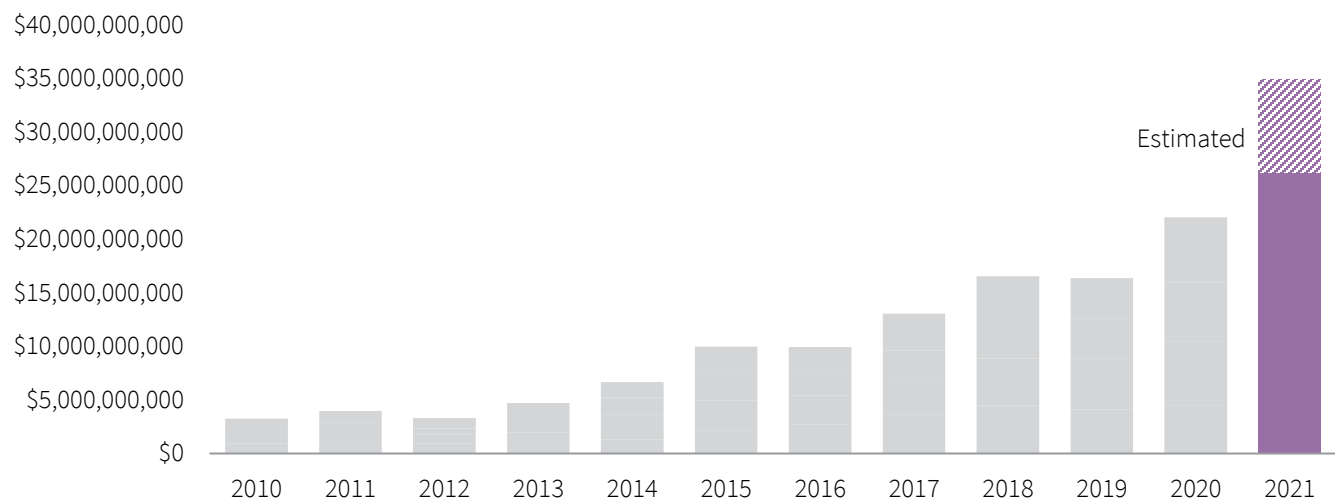


While the late company exits have been strong, with significant interest for late-stage investing, so has an investment appetite for early-stage start-ups. Early-stage investment is on pace to reach a record \$50 billion by the end of year, or over \$20 billion higher than the previous total for early-stage investment. (Early-stage funding is defined as Angel, Pre-Seed, Seed, Series A and Series B funding. These are

typically lower sums of funding and are often pre-revenue.) Early-stage funding informs the size and capacity of nascent companies poised to grow over the next year. Series A and Series B funded companies (i.e., early-stage) were most likely to execute on a lease five to six months after their announcement. This bodes well for offices in Q1 and Q2 in 2022.

Early-stage funding is on pace to have its best year ever at \$53 billion. That's an 82.7% increase from the previous year.

Early-stage VC investment by market (2010–2021)

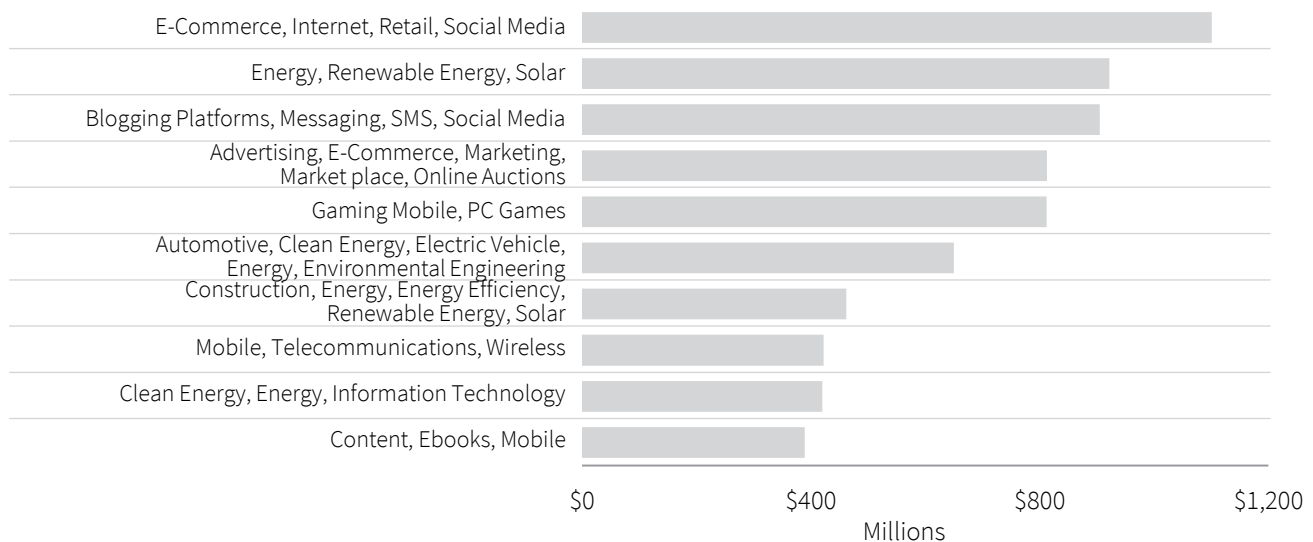


Sources: JLL Research, Crunchbase. Accessed August 2021. Early-stage funding is defined as angel, pre-seed, seed, Series A and Series B funding. 2021 estimates are based on doubling the H1 totals.

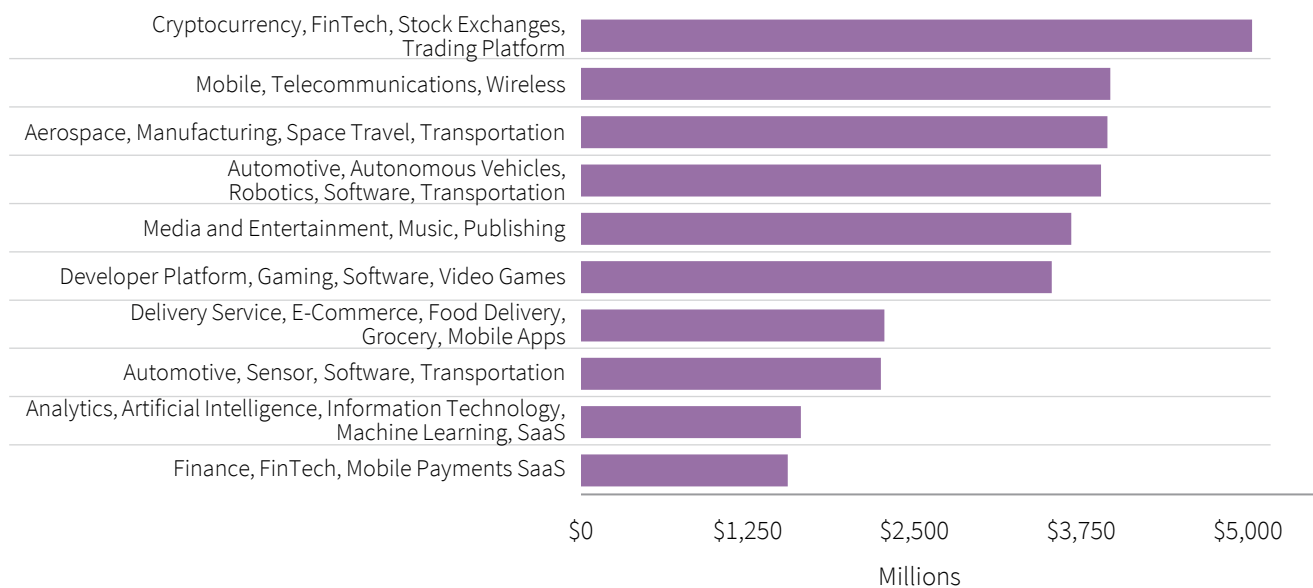
Those metropolitan areas amenable to attract and retain talent in artificial intelligence (A.I.), blockchain, autonomous vehicles, game theory, cybersecurity, and quantum computing will continue to attract VC investment. VC houses have turned more toward cryptocurrency, aerospace, autonomous vehicles, robotics and financial tech in the last two years, recognizing the disruptive opportunities to the automotive, financial, data management and manufacturing sectors. A.I. specifically has considerable upside as McKinsey Global Institute reports A.I. has the opportunity to add 16 percent to global economic output by 2030, or around \$13 trillion.

VC houses have turned favor toward cryptocurrency, aerospace, autonomous vehicles, robotics and financial tech in the last two years

Top 10 investment sectors (2010–2012)



Top 10 investment sectors (2019–2021 H1)



Source: Crunchbase

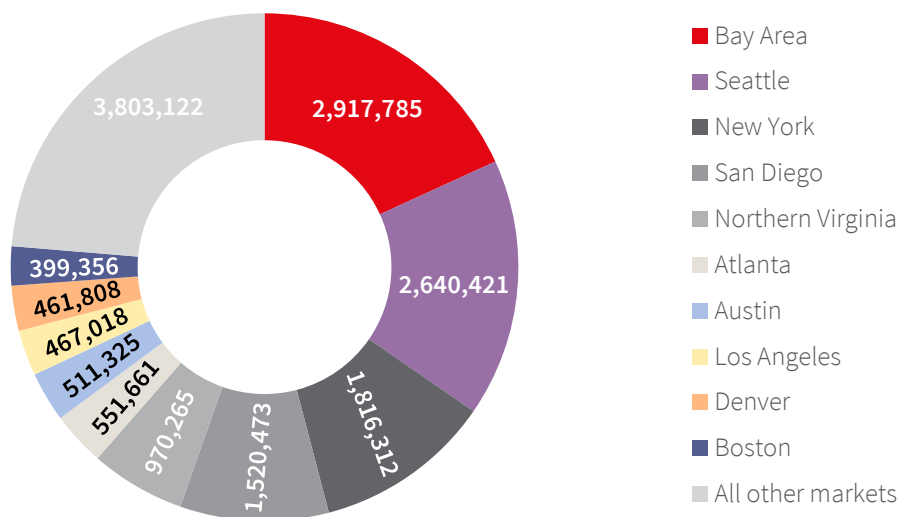
*Note: Investment sectors are grouped according to Crunchbase company tags and descriptions. The subgroups that are repeated are specific to the overall sector; i.e. - energy general, energy related to the automotive industry and energy related to the construction industry.



3. *Major markets continue to drive the bulk of activity, but recent corporate and talent shifts will create a diversified landscape*

Major STEM labor markets remain dominant leaders in attracting technology industries. The Bay Area, Seattle, New York, and San Diego accounted for nearly half of all technology sector office leasing in the U.S. since the onset of the pandemic, a testament to their depth of talent that ensure long-term growth.

Three markets—Bay Area, Seattle, New York—accounted for 55% of tech leasing activity since COVID
COVID-19 tech leasing by market



Source: JLL Research. Only leases > 20,000 s.f. included.

Recent corporate site selection and demographic shifts have benefited emerging markets

Over the past decade, many Sun Belt and Mountain West markets have emerged as drivers of population growth and tenant demand. The COVID-19 pandemic has influenced migration trends, with new “work-from-anywhere” policies spurring a rapid reshuffling of the U.S. population.

Drivers of population migration are mixed, but roughly 90% of post-pandemic migration has involved savings on taxes and housing costs. As population growth, corporate site selection and investment trends maintain momentum, some growth markets are being validated in a way that make them formidable competitors to gateway cities. But scale still matters for firms looking to

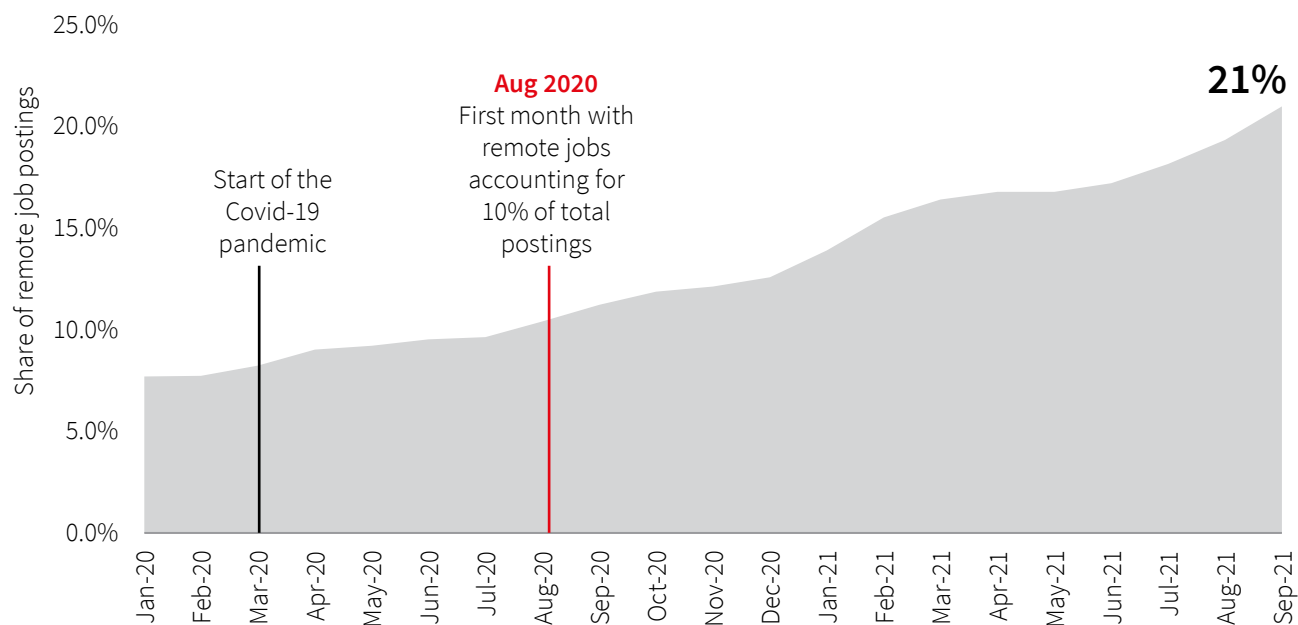
grow, and many of these recent migrations have targeted emerging markets that also have the right talent mix.

Coinciding with shifts in population and tenant demand, employment growth year-over-year spread to smaller markets around the U.S. but also continued to center around established STEM hubs such as San Francisco, Austin and Seattle, reinforcing their dominance.

As employment and job postings grew, so did the share of remote work options, driven by the shifting population. At the start of the pandemic, remote postings accounted for less than 10% of openings, but quickly grew to 21% as of September, a trend expected to continue moving into 2022.

The share of remote employment options at tech companies has more than tripled since the start of Covid

Share of remote job postings for computer/math occupations

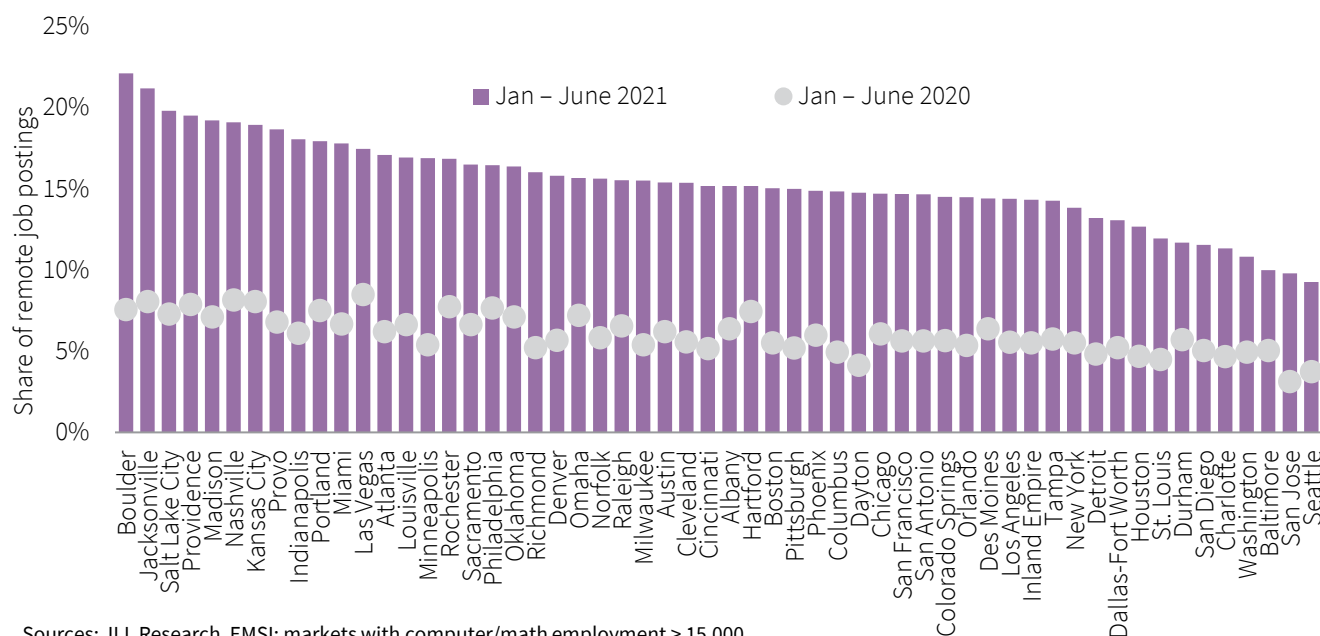


Sources: JLL Research, EMSI; markets with computer/math employment > 15,000

Secondary markets saw the largest increases in the share of remote postings, while the trend was less robust in major primary markets that already offer deep talent pools. Companies are casting a wider net for talent and leveraging flexible work arrangements to entice talent.

From 2020 to 2021, technology employment has grown faster in existing technology markets such as the Bay Area, New York and Seattle. However, Dallas, Austin and Denver are rapidly growing their share of technology workers, with San Diego, Atlanta, Kansas City and Baltimore showing increasing importance in the tech economy.

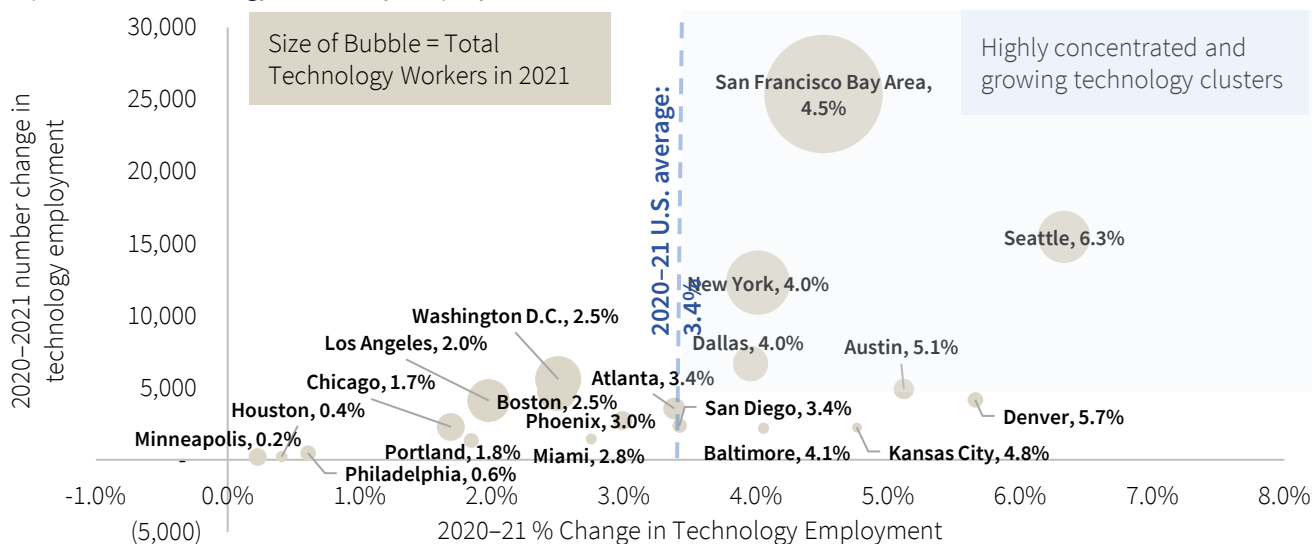
Secondary markets have seen larger increases in the share of remote tech job postings than primary markets



Sources: JLL Research, EMSI; markets with computer/math employment > 15,000

The Bay Area has the highest concentration and number of technology workers, while Seattle, New York and Dallas continue to expand their tech presence. Seattle, Austin and Denver grew rapidly in tech from 2020 to 2021.

Top 15 U.S. technology metros by employment (2020–2021)



Notes: Animation sequenced according to total technology employment in 2021

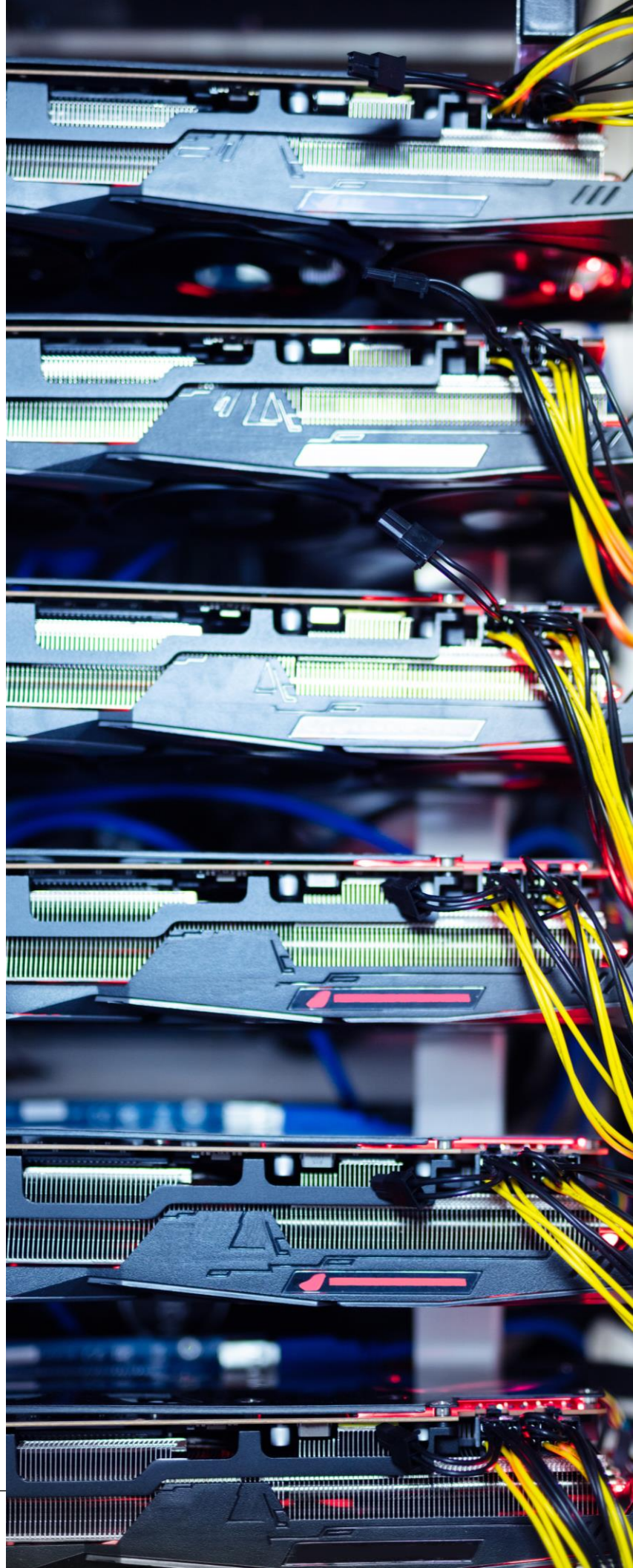
Conclusion

Where does the industry go from here?

Funding shows no signs of slowing, indicating continued momentum in the industry and future expansion. Return-to-office timelines are still ambiguous but leasing activity indicates the office is as critical as ever, especially for Big Tech. The industry continues to scale across geographies, and recent talent migration will only bolster the success of the industry's growth in new markets that weren't even on the radar only 10 years ago.

As technology becomes more ubiquitous, more importance will be placed on specialization, be it autonomous vehicles in Pittsburgh, blockchain and crypto currency in Miami, robotics in Boston, artificial intelligence in San Francisco, customer success in Dallas or cloud solutions in Seattle. The clustering of nascent industries will command a premium and be "stickier" than general technology solutions, which will compete across multiple markets where costs and convenience will play a more important role in site selection.

The industry continues to globalize, offering more opportunities for investors to tap into innovation geographies in more markets than ever before. As industries continue to technify over the next decade, expect the industry's growth to further diversify the economy and the markets of opportunity.





For more information, contact:

Authors:

Amber Schiada

Senior Director of Industry Research
+1 213 239 6141
Amber.Schiada@am.jll.com

Michael Hartnett

Senior Director of Research
+1 202 719 5878
Michael.Hartnett@am.jll.com

Alexander Quinn

Director of Research
+1 415 395 4924
Alexander.Quinn@am.jll.com

Contributors:

Julia Georgules

Senior Research Director
+1 617 316 6453
Julia.Georgules@am.jll.com

Phil Ryan

Research Director
+1 973 224 9225
Phil.Ryan@am.jll.com

Jacob Rowden

Senior Research Analyst
+1 847 691 8756
Jacob.Rowden@am.jll.com

Paulina Torres

Senior Research Analyst
+1 562 277 3036
Paulina.Torres@am.jll.com

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