



The Technology Sector in New York City

Highlights

- New York State had the third-largest tech sector in the nation in 2016. Of the 10 states with the largest tech industries, New York was among the three where growth exceeded 25 percent between 2010 and 2016.
- Employment in New York City's tech sector increased by 57 percent between 2010 and 2016 (46,900 jobs), growing more than three times faster than the rest of the private sector.
- Almost half of the job gains were concentrated in companies engaged in activities related to the internet.
- The number of tech firms reached 7,600 in 2016, an increase of 23 percent since 2010.
- Most tech workers were 45 years or younger, and most had at least a bachelor's degree. More than one-third were immigrants. One-quarter were women.
- Total wages paid to workers in the City's tech sector doubled since 2010 to reach a record \$18.9 billion in 2016.
- The average salary increased three times faster than the rest of the City's private sector to reach a record \$147,300 by 2016.
- The number of tech jobs in nontech industries increased by 31 percent between 2010 and 2016, nearly twice as fast as other jobs.
- The New York City metropolitan area ranked third in 2015 for technology-related patents, behind San Jose and San Francisco.
- The In-State Private Equity Program, managed by the State Comptroller, has invested heavily in tech companies. Since the initial investment, employment at these companies has more than doubled.

The technology sector in New York State has grown rapidly since the end of the Great Recession, adding more than 57,000 jobs. More than 80 percent of these were located in New York City, which has become one of the nation's most important tech hubs.

The technology sector has grown faster than any other sector in New York City since 2010, helping to reduce the City's reliance on the securities industry. By 2014, the number of jobs in the tech sector had surpassed the peak in 2000 during the dot-com expansion. In 2016, the tech sector set a new employment record of 128,600 jobs.

The sector attracts high-skilled workers to New York City and is a source of high-paying jobs. It is also creating job opportunities for workers with nontech skills. About half of the jobs in the tech sector are in nontech occupations, such as managers and sales representatives.

Other employment sectors in New York City are making greater use of technology. As a result, the number and share of tech jobs in these industries (e.g., finance) are growing. Nontech sectors are responsible for an estimated 111,500 tech jobs. Thus, in total, the larger tech community accounted for a total of 240,100 jobs in 2016.

The public and private sectors are working to expand the tech sector in New York State and New York City. The City's support for technology-related programs in the public schools is creating opportunities for City residents. The opening of the Cornell Tech Campus on Roosevelt Island is an example of its efforts.

The tech sector is actively engaged with many of the City's traditional businesses, such as media, finance and higher education. These synergies are creating new opportunities for economic growth and helping to further diversify the City's economy.

The Tech Sector

Unlike traditional employment sectors (such as construction), there is no official definition of the “technology sector.” The growing importance of this sector in the economy has led researchers across the nation to develop their own definitions in order to measure changes in employment.

In 2014, the Office of the State Comptroller (OSC) issued a report on the high-tech industry in New York City, which focused on computer-related business activities, such as system design, programming and software development. Businesses like these comprise the core of the technology sector. This report focuses on the broader tech sector, which also includes tech manufacturing and biotechnology.

In this report, the tech sector consists of firms that principally research, design, manufacture or maintain technologies related to computer systems, software, computer and communication equipment, the internet and biotechnology.¹ This definition counts everyone employed at these companies, which is the same approach used by the U.S. Bureau of Labor Statistics when measuring jobs in traditional sectors.

OSC’s definition of the tech sector is very similar to those used by most researchers, including the City’s Economic Development Corporation, the Computing Technology Industry Association and the Association for a Better New York.

Some researchers have estimated the size of the tech sector by focusing on industries with a relatively high share of science, technology, engineering and math (STEM) occupations. This approach includes businesses, such as electric power generation, which are not primarily engaged in technology-related activities.

The Center for an Urban Future includes online shopping in its definition of the tech sector, but OSC chose not to include these businesses since their primary activity is selling goods.² OSC, like most researchers, includes the telecommunications industry, which provides the infrastructure that supports the tech sector.³

New York State Employment Trends

Employment in the tech sector in New York State surpassed 280,000 jobs in 2016, which ranked New York third in the nation after California and Texas (see Figure 1). Since the start of the job recovery in 2010, the sector has grown by nearly 26 percent in New York State, much faster than the tech growth in the rest of the nation (16 percent). Of the 10 states with the largest tech industries, New York was among the three states where growth exceeded 25 percent (see Figure 1).

FIGURE 1
States with the Largest Tech Sectors

Rank	State	Jobs in 2016	Growth from 2010 to 2016
1	California	882,470	26.4%
2	Texas	404,750	21.1%
3	New York	280,870	25.5%
4	Massachusetts	235,900	16.4%
5	Florida	216,800	10.3%
6	Virginia	216,090	5.8%
7	Washington	178,710	27.0%
8	Illinois	174,710	16.7%
9	Pennsylvania	161,420	10.1%
10	New Jersey	157,840	8.2%

Sources: U.S. Bureau of Labor Statistics; OSC analysis

New York City accounted for more than one-third (37 percent) of the tech jobs in New York State in 2010, but it was responsible for 82 percent of the jobs gained in the State’s tech sector by 2016. Employment in New York City’s tech sector grew by 57 percent (46,900 jobs) during this period, while tech employment in the rest of the State increased by only 7 percent (10,200 jobs).

The tech sector in New York City is different from this sector in the rest of New York State. In the City, firms primarily engaged in activities related to computer systems design and the internet made up 70 percent of the jobs in 2016. These activities accounted for one-third of the jobs in the tech sector in the rest of the State. Manufacturing jobs made up only 3 percent (3,900) of the tech sector in New York City, while they accounted for 36 percent (55,300) in the rest of the State.

New York City Employment Trends

The number of jobs in the tech sector in New York City grew rapidly during the 1990s, but declined sharply (by 34 percent) after the dot-com bubble burst in 2001 (see Figure 2). In subsequent years, jobs grew slowly but steadily, falling only slightly during the Great Recession (a time when many parts of the economy experienced steep losses). By 2014, employment in the tech sector surpassed the peak reached in 2000 during the dot-com expansion.

The City is currently undergoing the strongest job expansion on record, and the tech sector has contributed to this growth. It added 46,900 jobs between 2010 and 2016 to reach 128,600 jobs. Employment increased by 57 percent between 2010 and 2016, more than three times faster than the rest of the private sector. The rapid expansion occurred while the City's traditional economic engine, the securities industry, was still struggling to fully recover from the 2008 financial crisis.

The number of tech firms increased by 23 percent during this period to reach 7,600. According to Built in NYC, a growing number of tech companies with more than 400 employees are located in New York City. These include AOL,

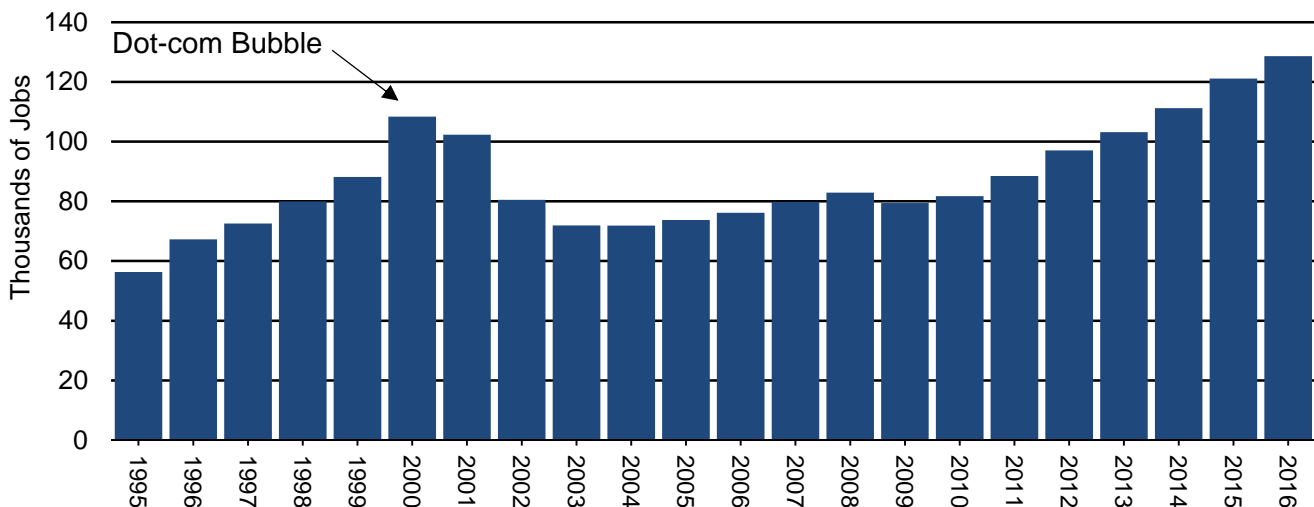
BuzzFeed, Google, LinkedIn, Spotify, Twitter and Yelp. In addition, a number of tech companies are headquartered in New York City, including About.com, DoubleClick and Tumblr.

Most of the jobs (86 percent) are located in Manhattan, with concentrations in Midtown, Midtown South and Downtown. Other clusters are located in Long Island City in Queens and Downtown Brooklyn.

The number of jobs in the tech sector in Queens (6,000) has grown by 11 percent since the end of the recession. However, the number of jobs in Brooklyn (9,200) increased by 2,900, or nearly half, over the six-year period ending in 2016.

As employment in tech-related industries has increased, the demand for office space has grown. According to Jones Lang LaSalle Inc., between 2012 and 2016 the tech sector accounted for 11.5 percent of office leasing activity in Manhattan (more than double the share in the prior five-year period). To meet its office space demands, the sector has adopted an office model where companies share a work space to reduce costs and improve collaborative efforts.

FIGURE 2
Jobs in New York City's Tech Sector



Sources: U.S. Bureau of Labor Statistics; NYS Department of Labor; OSC analysis

Composition of the Tech Sector

Almost half of the jobs (62,400) in the tech sector in New York City were located in businesses engaged in computer systems design (see Figure 3). These companies added 19,000 jobs since 2010, increasing by 44 percent.

Companies engaged in activities related to the internet, such as Google, were responsible for more than one-fifth of the jobs (27,800). Since 2010, these companies have added the most jobs (20,000) and had the fastest rate of job growth (255 percent).

Employment at telecommunications firms (e.g., internet service providers such as Spectrum/Time Warner Cable and Verizon) accounted for 15 percent of the sector's jobs in 2016 (19,500). Employment in this subsector has been slowly declining as technology has changed the way these companies operate.

In 2016, only 3 percent of the jobs were located in companies engaged in tech manufacturing. Nonetheless, jobs at these companies have increased by 36 percent (1,000 jobs) since 2010.

Within the "other" category, the strongest growth occurred in software publishers, including app developers and gaming, and biotech researchers. Employment in both these subsectors more than doubled between 2010 and 2016.

Work Force Characteristics

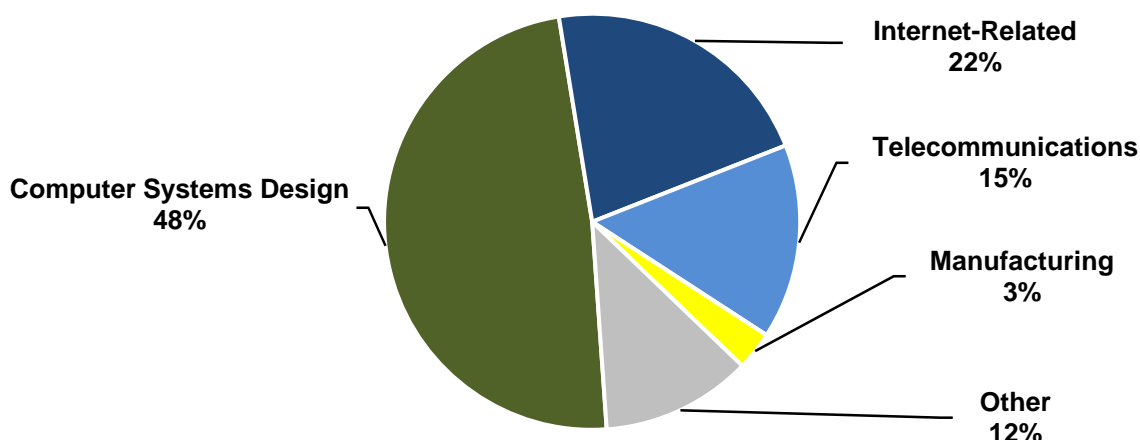
In 2015, three-quarters of the workers in the City's tech sector were 45 years old or younger (compared to 63 percent in the overall work force), and more than three-quarters had earned at least a bachelor's degree (compared with 48 percent in the overall work force).⁴ One-quarter of the workers were women, compared with almost half in the overall work force.

More than one-third (39 percent) of the workers were immigrants. The share of immigrants is even higher (47 percent) for occupations requiring technical skills, such as software developers and computer programmers.

The average salary was \$147,300 in 2016, much higher than the citywide average in the private sector (\$89,100).⁵ Since 2010, salaries in the tech sector increased by 29 percent, more than three times faster than in the rest of the private sector. Total wages paid in the tech sector doubled between 2010 and 2016, reaching a record \$18.9 billion.

The growth of the tech sector creates opportunities for workers with nontech skills, such as managers, sales representatives, accountants and lawyers. OSC estimates that half of the jobs in New York City's tech sector were in nontech occupations in 2015.⁶

FIGURE 3
Composition of the Tech Sector in New York City



Sources: NYS Department of Labor; OSC analysis

The Larger Tech Community

Other employment sectors in New York City are making greater use of technology. As a result, the number and share of tech jobs in these sectors are growing. For example, the retail sector now has companies that are primarily online, such as Amazon and Etsy. In addition, traditional retailers, such as Macy's, have increased their online presence.

The finance sector is also making greater use of technology, and some companies are exclusively online, such as E*TRADE. OSC estimates that tech jobs comprise about 11 percent of the securities industry.⁷

OSC estimates that all nontech sectors are responsible for 111,500 tech jobs (see Figure 4). Thus, in total, the larger tech community accounted for a total of 240,100 jobs in 2016, an increase of 44 percent since 2010.

The number of tech jobs in nontech sectors increased by 31 percent between 2010 and 2016, nearly twice as fast as other jobs (18 percent). In some sectors the growth in tech jobs was even faster, such as in retail (78 percent).

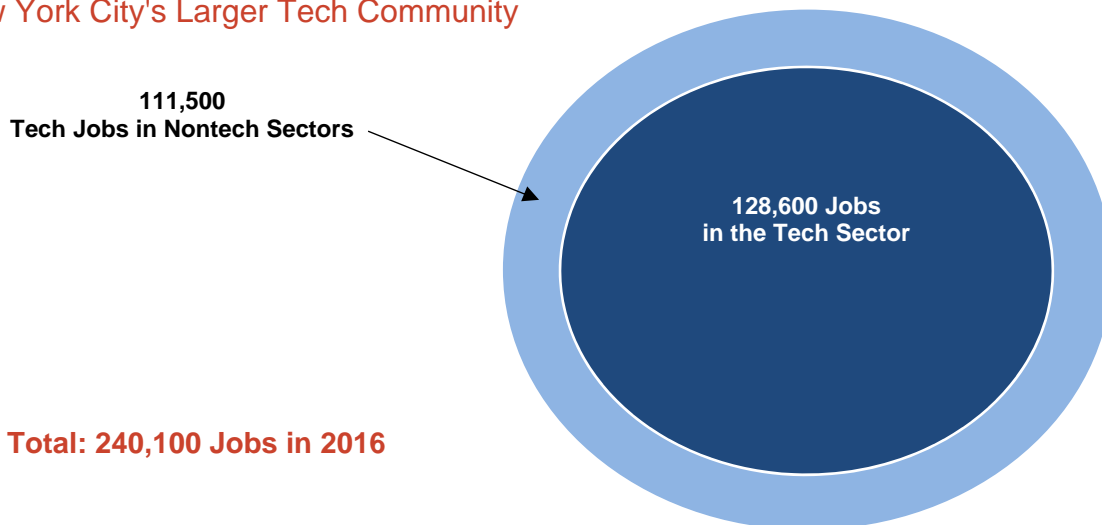
Venture Capital Investment

Raising capital has always been a challenge for entrepreneurs and companies in the early stages of development. In New York City, these innovators have access to a diverse set of investors, including those on Wall Street and in the growing venture capital community.⁸

The In-State Private Equity Program of the New York State Common Retirement Fund (CRF) provides much-needed early-stage funding to New York companies through venture capital partners, including Contour Venture Partners, Primary Venture Partners, Tribeca Venture Partners and SoftBank Capital NY.⁹ Since 2011, the CRF has allocated an additional \$155 million to target early-stage investment opportunities.

The In-State Program is designed to generate a market rate of return consistent with the risks associated with private equity, and has contributed to economic growth in New York. The program invested in 226 companies in New York City between 2007 and 2016, including 210 that were tech-related. These investments totaled \$204.7 million and helped these companies expand. By 2016, employment had more than doubled (to 6,822 jobs) since the initial investment.

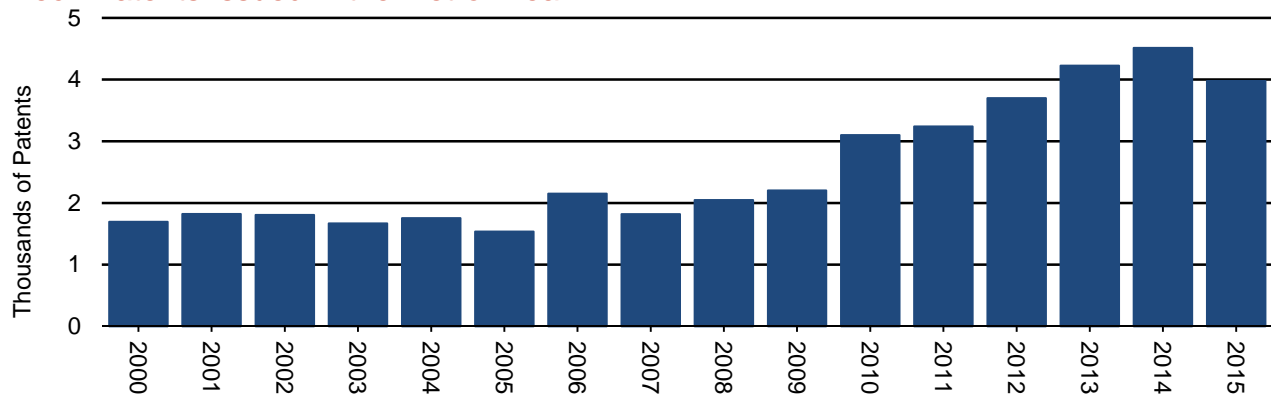
FIGURE 4
New York City's Larger Tech Community



Sources: NYS Department of Labor; U.S. Census Bureau; OSC analysis

FIGURE 5

Tech Patents Issued in the Metro Area



Sources: U.S. Patent and Trademark Office; OSC analysis

Innovation

According to data from the U.S. Patent and Trademark Office, the number of tech patents granted in the New York City metropolitan area reached a peak of 4,515 in 2014 (see Figure 5). The number declined to 3,978 in 2015, which was reflective of a nationwide trend. Nonetheless, the level of activity remained elevated.

The New York City metropolitan area ranked third in the nation in tech patents in 2015 behind San Jose and San Francisco, which make up Silicon Valley. After New York City, the San Diego and Seattle metropolitan areas ranked fourth and fifth.

New York State ranked second after California in the number of start-ups (15) that have reached \$1 billion in valuation in 2016, according to CB Insights, a tech-focused data analytics firm. Massachusetts, Illinois, and Utah rounded out the top five.

Higher Education Partnerships

In 2010, the City launched the Applied Sciences Initiative, which was designed to build or expand world-class applied sciences and engineering campuses in New York City. The initiative is already cultivating new tech businesses and talent, helping to grow the City's tech sector.

The largest and most ambitious project under this initiative is the Cornell Tech campus (a partnership between Cornell University and the Technion-Israel Institute of Technology), opening

on Roosevelt Island in September 2017 (see the architectural visualization in Figure 6 on the next page). The engineering graduate school has been operating in a temporary space at Google's Chelsea headquarters since 2013. When the new campus opens, building space will exceed 700,000 square feet. When fully completed in 2043, the project is expected to total 2 million square feet on 12 acres.

Columbia University, New York University (NYU) and other prominent institutions are also involved in the initiative. In Morningside Heights, Columbia opened the Institute for Data Sciences and Engineering in 2014. In Downtown Brooklyn, NYU opened a \$345 million Center for Urban Science and Progress. In addition, NYU is currently expanding its Tandon School of Engineering to focus on tech and engineering.

In December 2016, the City launched the LifeSci NYC initiative, to encourage research and innovation in the growing life sciences industry. As part of this plan, the City will invest \$100 million to create a new Applied Life Sciences Campus (located either on Manhattan's East Side or in Long Island City).

Existing programs at higher education institutions throughout the State also help support the sector. These include engineering and/or computer science programs at the State University of New York, the City University of New York and 20 private institutions.

FIGURE 6
Cornell Tech on Roosevelt Island



Sources: New York City Economic Development Corporation; Kilograph

Sector Support

In September 2015, the Mayor announced a strategic technology plan to increase access to science, technology, engineering and math (STEM) programs and computer science education for all public school students. Efforts are also underway to increase access to broadband service in underserved and high poverty areas.

In February 2017, the City released design plans for the Union Square Tech Hub, a \$250 million project that would provide worker training and modern work spaces for early-stage start-ups. The center is expected to generate 600 tech jobs and 800 construction jobs. The project is subject to review under the City's land-use process.

The City has also recently announced plans to create the nation's first publicly funded virtual reality and augmented reality lab. The space is expected to receive \$6 million in public and private funding.

In 2014, the City launched the NYC Technology Talent Pipeline, a \$10 million public-private initiative designed to train New Yorkers with the skills to compete in 21st century jobs.

New York City also hosts a number of independent and funded incubators and accelerators for cultivating new businesses.¹⁰ The New York City Economic Development Corporation (EDC) fosters an incubator and a co-working network, with 18 work space locations scattered throughout the City. Many of these spaces are located outside of Manhattan's business districts, including a new biotech incubator in Harlem, a community workspace in Staten Island and a business incubator in Long Island City, Queens.

The State and the City have each announced separate initiatives to support and expand the life-sciences industry, including the biotechnology subsector. Together, the two programs would commit nearly \$1.2 billion in tax credits, capital grants and public-private partnerships.

Endnotes

- ¹ OSC's definition includes the following North American Industry Classification System (NAICS) codes: 333242 Semiconductor Machine Manufacturing; 334 Computer and Electronic Manufacturing; 335911 Storage Battery Manufacturing; 335921 Fiber Optic Cable Manufacturing; 5112 Software Publishers; 517 Telecommunications; 518 Data Processing, Hosting and Related Services; 51913 Internet Publishing and Broadcasting and Web Search Portals; 5415 Computer Systems Design and Related Services; 541711 Research and Development in Biotechnology; and 61142 Computer Training.
- ² Businesses engaged in electronic retail were responsible for 15,700 jobs in New York State in 2016, including 10,700 jobs in New York City.
- ³ Telecommunications companies were responsible for 48,300 jobs in New York State in 2016, including 19,500 jobs in New York City.
- ⁴ U.S. Census Bureau, 2015 American Community Survey 1-year estimates.
- ⁵ NYS Department of Labor, Quarterly Census of Employment and Wages.
- ⁶ Occupation data from the U.S. Census Bureau's American Community Survey was used to determine the share of tech occupations in nontech sectors. (Tech workers include the following occupations: biomedical and agricultural engineers, computer hardware engineers, computer and information research scientists, computer and information systems managers, computer network architects, computer programmers, computer support specialists, computer systems analysts, database administrators, electrical engineers, information security analysts, network and computer systems administrators, software developers, telecommunications installers/repairers, web developers, and other computer occupations.) The share was then applied to data from the Quarterly Census of Employment and Wages to calculate tech jobs in nontech sectors.
- ⁷ Ibid.
- ⁸ Tech-related venture capital investments in the New York City metropolitan area have risen significantly over the past six years, from \$1.5 billion in 2010 to \$6 billion in 2016, according to OSC analysis of the PwC/CB Insights MoneyTree™ Report.
- ⁹ The State Comptroller is the sole trustee and manager of the Common Retirement Fund, which had an estimated value of \$192 billion as of March 31, 2017.
- ¹⁰ Incubators provide mentorship and logistics, and take a long-term approach (i.e., longer than a year). They do not provide capital, they take no equity, and they are largely funded through grants. Accelerators typically work with start-ups for less than a year, and provide capital and give guidance.

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