

Ana Ariño Gutiérrez\*  
Fred Olayele\*\*

# URBAN INNOVATION AND REINVENTION: THE CASE OF NEW YORK

*The growth of New York City's innovation economy is the result of an economic development strategy focused on talent as a growth-engine. This paper presents a case study of how innovation ecosystem-building initiatives, strategic urban investments, and industrial policy have powered the growth of the city's technology ecosystem, providing a framework for understanding urban innovation and industrial diversification.*

## Innovación y reinversión urbana: el caso de Nueva York

*El crecimiento de la economía de la innovación en la ciudad de Nueva York es el resultado de una estrategia de desarrollo económico basado en el talento como promotor del crecimiento. Este trabajo presenta un caso de estudio sobre cómo iniciativas de construcción de ecosistemas innovadores, inversiones urbanas estratégicas y la política industrial han promovido el crecimiento del ecosistema tecnológico de la ciudad, proporcionando así un marco para la comprensión de la innovación urbana y la diversificación industrial.*

**Keywords:** economic development, startups, urban innovation, industrial policy, innovation, industry diversification, public-private partnerships.

**Palabras clave:** desarrollo económico, startups, innovación urbana, política industrial, innovación, diversificación industrial, asociación público-privada.

**JEL:** L25, L32, M31, O18, O25, O31.

## 1. Introduction

New York is a city of reinvention. Since its founding as New Amsterdam, it has undergone various political, demographic, cultural, and industrial shocks

that have shaped its emergence as a global leader in finance and innovation. The city began as a trading outpost, evolved into a commercial and maritime center of activity, then an industrial and manufacturing hub, before emerging as the global capital of finance, innovation, real estate, and media. This ability to innovate has always contributed to the city's economic resilience.<sup>1</sup> In the aftermath of the fiscal crisis of the 1970s, the 9/11 terrorist attacks, the Global Financial Crisis (GFC), and Superstorm Sandy, the

---

\* Corporate Strategy Director at Acciona; former Executive Vice President and Chief Strategy Officer at the New York City Economic Development Corporation.

Mail: [aarinog@icloud.com](mailto:aarinog@icloud.com)

\*\* PhD, Chief Economist at the New York City Economic Development Corporation; Visiting Professor of Trade and Development at the University of Las Palmas de Gran Canaria.

Mail: [fred.olayele@carleton.ca](mailto:fred.olayele@carleton.ca)

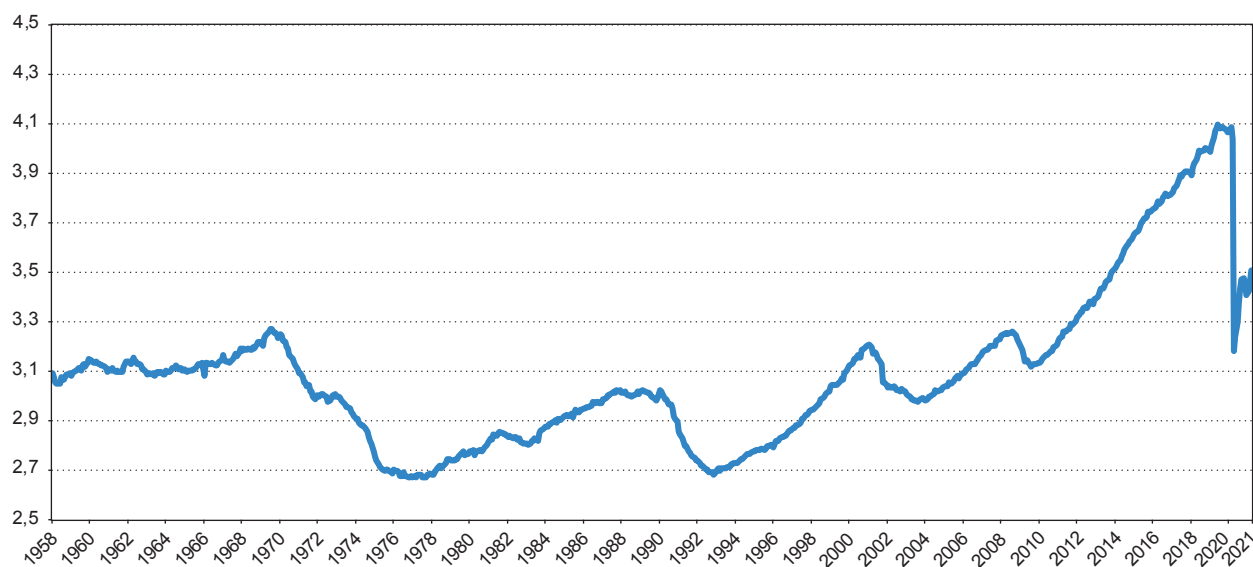
Final version April 2021.

<https://doi.org/10.32796/ice.2021.920.7211>

---

<sup>1</sup> Economic resilience is the ability of an economic system to return to a new, better, and higher growth trajectory, compared to its initial state, after experiencing a shock or a structural change (Martin, 2012).

FIGURE 1  
PRIVATE-SECTOR JOBS IN NYC  
(Millions)



SOURCE: New York State Department of Labor.

city persevered and bounced back. The New York City (NYC) economy has evolved significantly in the last few decades, with technological innovation reshaping its industrial structure and bringing about wide-ranging effects across its five boroughs, occupations, and demographics. COVID-19 is an unprecedented crisis and poses unique challenges the city will need to resolve to recover.

## 2. A history of reinvention

NYC employment grew from 3.1 million in 1958 to a peak of 4.1 million in 2019. In that period, the city experienced a number of economic shocks, from which it has always recovered. In 2020, employment fell to 3.2 million due to COVID-19 and it is currently hovering at 3.5 million, 14 percent below the 2019 peak (Figure 1).

## Past crises: a 50-year snapshot

**Fiscal crisis of the 1970s.** NYC faced significant economic, social, and political shocks in the late 1970s, leading to economic stagnation, industrial decline, and a fiscal crisis which triggered shrinking tax bases and declining revenues and led to the laying-off of city employees and cuts in municipal services. The cuts in social services caused an increase in crime. In addition to the huge declines in wholesale, retail, and public sector jobs, the manufacturing sector was hit particularly hard, resulting in a loss of over 600,000 industrial jobs over eight years —Figure 1— (David, 2020). Private-sector employment witnessed a 16 percent decline during this period, further exacerbating the city's already high unemployment rate. As a result, over 800,000 residents —predominantly from middle-income households— left

the city for the suburbs, resulting in “white flight” in the 1970s.

**Late 1980s/Early 1990s.** In the aftermath of the fiscal crisis, the city’s economy slowly returned to its pre-crisis growth path, with a wide range of gains in key sectors. Crime rates increased in this era, while city-funded debt and social services grew substantially. Despite the robust job growth witnessed, employment levels did not return to the previous peak seen in 1969. Overall, the city recorded a 10 percent decline in private-sector employment (Figure 1), but major gains were recorded in the financial services sector, leading to Wall Street’s dominance by the late 1980s. On October 19, 1987, the stock market crashed, resulting in a single-day 22 percent decline in the Dow, the biggest one-day percentage loss in history (Yahoo! Finance, 2020). The stock market collapse on Black Monday brought the economic expansion of the previous decade to an abrupt halt.

**Late 1990s/Early 2000s.** This period’s technological advances led to a surge in productivity gains (Bram, 2003), along with an economic boom and job growth, with significant declines in crime rates. The new wave of growth resulting from high-tech industries and the wide availability of venture capital led to a Wall Street renaissance, with the financial services industry powering investment and output growth in other sectors of the NYC economy. Household incomes grew across all quintiles, albeit with large disparities (Gould, 2019). Immigration increased substantially during this period, compared only to the high levels seen in the 1890s and 1910s.<sup>2</sup> The economic boom and job growth witnessed in this era came to an end with the 2001 dot-com bubble, which was further exacerbated by the 9/11 terrorist attacks. The city’s emerging tech sector crashed, and overall, about 227,000 jobs were lost over the 2001–2003 period in the immediate aftermath of the tech bubble (David, 2021).

**The 2008 GFC.** With the collapse of Lehman Brothers came the economic meltdown that triggered the GFC. Although NYC was the epicenter of the 2007–09 crisis, the duration was short and the impact was mild compared to other regions and the US in general. Favorable monetary policy and timely federal intervention targeted at propping up Wall Street contributed to the city’s quick rebound. The crisis triggered a 4 percent decline in private-sector employment. However, the city has been on a consistent recovery trajectory since then, with an average annual GDP growth rate of 3.3 percent and nearly 678,000 jobs generated over the 2008–2018 period (Olayele & Goel, 2020).

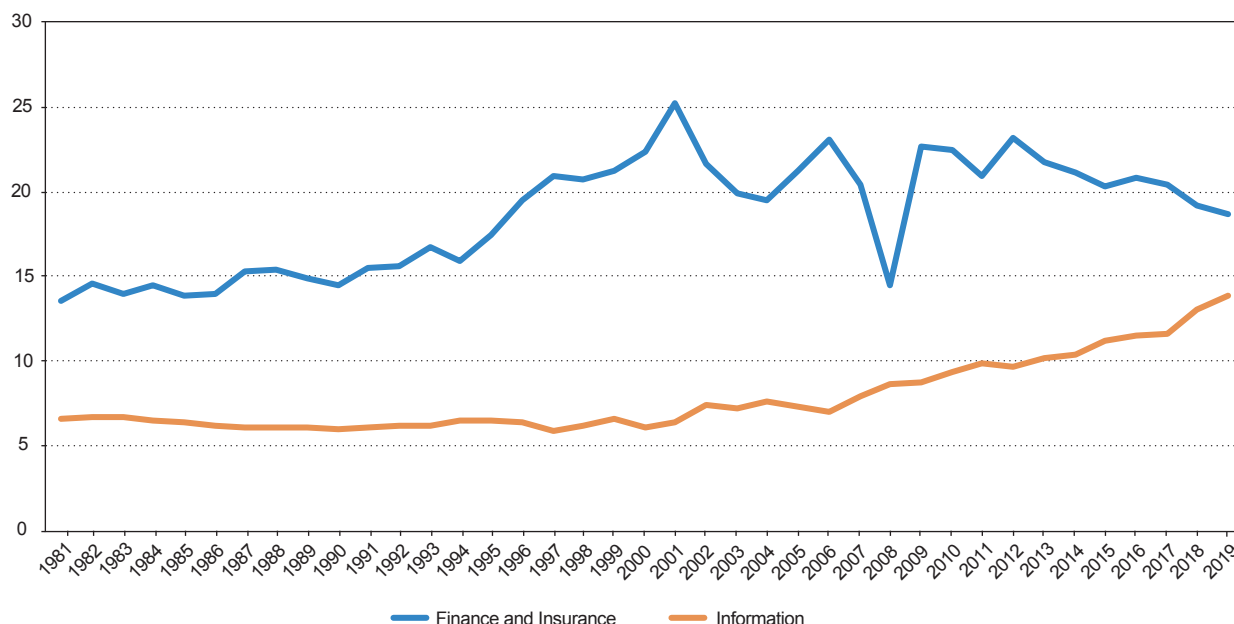
**Recovering from the GFC: industrial diversification.** In the fallout from the GFC, NYC’s economy became more diversified, resistant, and adaptable to shocks (Olayele & Goel, 2020). Prior to the 2008 recession job growth and output expansion were concentrated in the financial services industry and Manhattan, respectively, but more recently, other sectors and boroughs have been leading the way. Finance remains the mainstay of NYC’s economy — one out of every five dollars earned in the city comes from this sector alone (Partnership for New York City, 2015). In addition to driving investment and output growth in other key sectors, the securities industry remains vital to the city’s overall economy. However, while this sector remains the backbone of the city economy, other sectors continue to grow in importance, due to the rise in digital technologies. From 2001 to 2019, the share of finance in NYC’s output fell from 25 percent to 19 percent, while the share of information services grew from 6 percent to 14 percent (Figure 2).

Today we see the synergies resulting from interactions between the high-tech sector<sup>3</sup> and traditional industries like finance, real estate, media, and higher education generating new opportunities for economic growth and diversification in the city’s economy. These

<sup>2</sup> Library of Congress: <https://www.loc.gov/classroom-materials/united-states-history-primary-source-timeline/progressive-era-to-new-era-1900-1929/immigrants-in-progressive-era/>

<sup>3</sup> The high-tech sector is defined as computer hardware, software, component equipment, consumer electronics, semiconductor and contract manufacturers, IT services and distributors, and transaction processors.

FIGURE 2  
FINANCE AND INFORMATION SHARES OF TOTAL NYC OUTPUT  
(Percent)



SOURCE: Bureau of Economic Analysis.

interactions have implications for the “hyphen-tech” economy and emerging sectors like Fintech (finance), PropTech (property and real estate), Healthtech (health care), and Edtech (education).

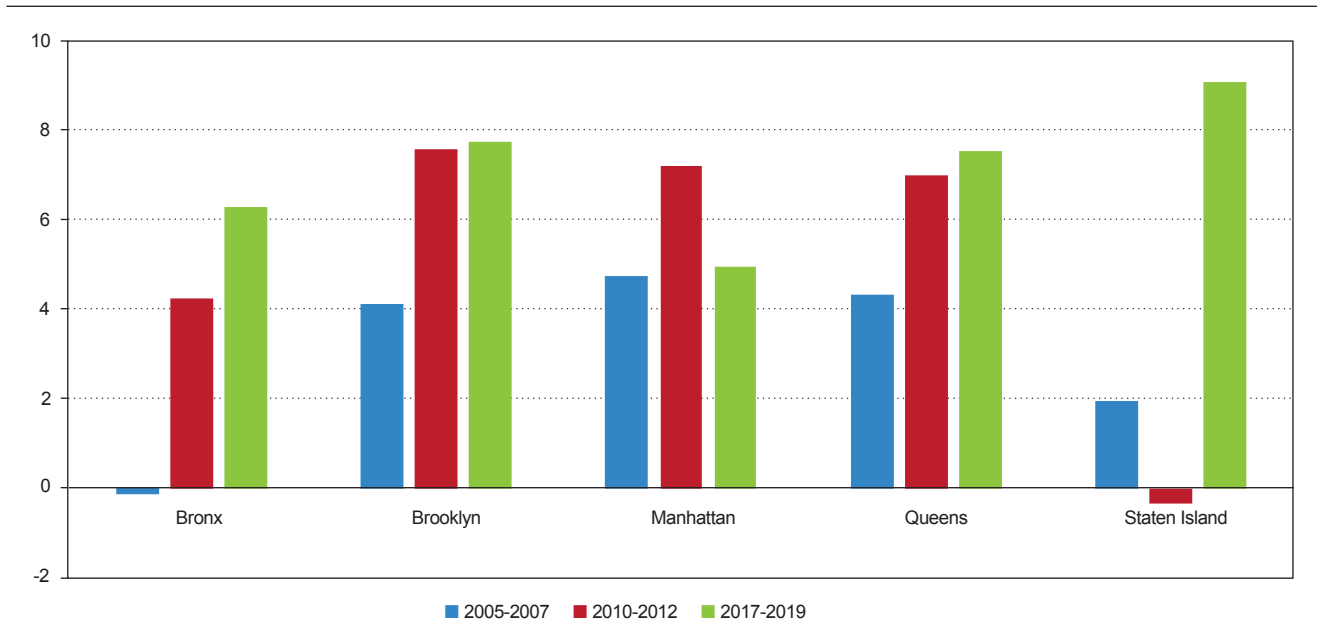
In 2000, high-tech industries represented roughly 5 percent of private-sector GDP, but by 2019, this share had risen to over 8 percent based on data from Moody’s Analytics.

**Recovering from the GFC: neighborhood revitalization.** A recent study (Olayele & Goel, 2020) by the NYC Economic Development Corporation (NYCEDC) found that all five boroughs have become more industrially diverse in the last two decades, while citywide revitalization efforts of neighborhoods, especially outside Manhattan, have contributed to strong growth (Figure 3). All boroughs experienced industrial diversification; output growth and job gains were particularly strong in the Bronx (Figure 3).

Over the last decade, growth in the retail, hospitality, and health care sectors has contributed to a drastic improvement in the industrial diversification patterns in the Bronx. In addition to the Bronx, Staten Island has also diversified its economy over the same period.

**Recovering from the GFC: the rise of inequality.** While much progress has been made since the GFC, the recovery from the crisis was not equitable and the widening income gap and labor market polarization have remained a drag. The recession negatively affected all demographic groups, but marginalized populations such as low-income earners, youth, minorities, and the less-educated experienced relatively greater declines in income (Olayele & Goel, 2020). And while real median household income increased 21 percent from \$57,000 in 2010 to \$69,000 in 2019, there were major

FIGURE 3

OUTPUT GROWTH ACROSS NYC BOROUGHES  
(Percent)

SOURCE: Bureau of Economic Analysis (Note: Boroughs are sorted by increasing 2017–19 growth rates).

disparities across race, ethnicity, gender, and neighborhoods (Olayele & Goel, 2020). For instance, while Brooklyn saw more than 3 percent in annual growth, the Bronx witnessed less than 2 percent. In terms of race and ethnicity, 2019 median incomes for White families are roughly double that of Hispanic and Black families. Since 2005, real household median incomes have increased 30 percent for White families — about 50 percent faster than Hispanic and Asian families and three times the growth rate of Black families. Because of these disparities, the city's post-GFC economic development strategy has focused on an “inclusive growth”<sup>4</sup> approach, as discussed below.

<sup>4</sup> Economic growth focused not just on job creation but also on the quality of those jobs and their accessibility by people from diverse backgrounds and educational attainment levels.

### 3. NYC's approach to economic development

The GFC revealed some structural weaknesses in the city's economy, most notably its overreliance on FIRE (finance, insurance, and real estate) industries. The death of industry titans like Lehman Brothers and Bear Sterns — both of which employed thousands of people and were thought to be indestructible — showed that NYC needed a new economic strategy that met the moment. At this time, when New York was recovering from its second major existential crisis in a decade, moving beyond traditional economic development initiatives like tax incentives and subsidies to attract companies made sense. New York leaders understood that human capital had become the main criterion for where companies chose to locate and decided that an economic development strategy to grow its

knowledge-based economy should lean into the city's greatest asset: its talent pool.

A talent-based strategy built on NYC's **strengths**: a diverse talent pool and the cluster advantages of a dense urban environment. Few cities in the world offer companies what New York can in terms of talent. Today, the city is home to 3 million immigrants, representing 36 percent of the city's population (The City of New York, 2020b); this is double the number of immigrants that live in Los Angeles, the American city with the second-highest total. New York is also an epicenter of education with over 100 colleges and universities<sup>5</sup>, from academic institutions like Columbia and New York Universities to smaller community colleges that educate first-generation immigrants looking to kickstart their own American Dream. There are 2.3 million people with bachelor's degrees — more than Boston, Philadelphia, Washington, D.C., San Francisco, and Los Angeles combined.<sup>6</sup> Considering these advantages, it is perhaps no wonder that New York is home to more Fortune 500 headquarters and small and medium-sized enterprises (SMEs) than any other US city.

NYC also has some significant **challenges** it needs to address to retain its talent advantage. First, New York's infrastructure (from roads and bridges to public transit and airports to water mains and power lines vital to a working economy) is old and in desperate need of upgrades. A 2014 report by the Center for an Urban Future, a local think tank, found that many of the city's roads, bridges, subways, and buildings were more than 50 years old and needed \$47 billion in repairs to meet basic needs (Center for an Urban Future, 2014). New York needed to make these critical investments to keep up. Second, the cost of living in New York is higher than in most other metropolitan areas in the country. Due to the widening gap between housing cost and income, housing affordability remains a pervasive challenge. In the last five years, the cost of living in NYC has outpaced the entire metro region. Over 70 percent of those with annual incomes below \$15,000 paid

more than 50 percent of their income toward rent (a relatively high level of rent burden). Furthermore, over 60 percent of those earning between \$15,000 and \$30,000 and over 25 percent of those earning between \$30,000 and \$50,000 are severely rent burdened, with a high likelihood of housing instability.<sup>7</sup> <sup>8</sup> Finally, pronounced income disparities have shrunk the city's middle class due to a decline of good-paying jobs accessible to a low-skilled workforce. Over the past 10 years, the percentage of New Yorkers earning middle-class wages dropped from 46 percent to 43 percent, impacting a quarter million people (The City of New York, 2017). In contrast, more than 60 percent of city residents were considered middle class in the early 1970s (Byrne, 2018).

## Strategy

Considering these factors, NYC leaders developed an economic development strategy to attract, retain, and train talent. The strategy was twofold: making transformative physical investments to ensure the city remained a unique but also viable place to live and do business, and incentivizing private-sector investment in strategic industries through innovative public-private partnerships to create good-paying jobs and pathways to those jobs for residents from all backgrounds.

### *Physical investments to improve quality of life and affordability*

The NYC government has made physical investments over the last decade to address ongoing challenges regarding infrastructure and affordability. Moreover, the city has undertaken a number of impactful urban projects that continue to differentiate it from other cities, both in the US and abroad, and to help preserve what

<sup>5</sup> NYCEDC: <https://edc.nyc/industry/emerging-tech>

<sup>6</sup> 2016 American Community Survey, 1-year estimate.

<sup>7</sup> Streteasy rent index suggests that median rents in NYC have increased from \$2100 in 2010 to \$2900 at the end of 2019: <https://streteasy.com/blog/data-dashboard/>

<sup>8</sup> Housing instability is the result of a combination of severe rent burden, lost wages, and little or no emergency savings.



makes New York one of the world's most dynamic and attractive cities for talent. There are numerous examples of these transformative projects. For example, the city converted abandoned industrial stretches of land or railway into flagship public parks such as The High Line, Hunters Point South, or Brooklyn Bridge Park. It rolled out new transit infrastructure to make it easy and affordable to move around the city while enjoying incredible views, including the bike sharing system Citibike and NYC Ferry. It redeveloped former industrial parks into modern manufacturing districts with thousands of jobs at the Brooklyn Navy Yard and the Brooklyn Army Terminal, and it is working toward a goal to build and preserve 300,000 units of affordable housing by 2026 for low-to-moderate income families.

We examine three of these examples in more detail below.

**The High Line**, one of the key projects that opened in the aftermath of the 2008 financial crisis, transformed the way city planners and urban designers reimagine public space. Once an elevated rail line that transported millions of tons of meat, dairy, and produce to the city's Meatpacking District, the High Line was saved from demolition during the Bloomberg administration and was rezoned to become a public park. Today, the High Line is an anchor for the West Chelsea neighborhood and stretches for 1.45 miles above the west side of Manhattan.<sup>9</sup> In 2019, an estimated 8 million visitors came to experience its public art, gardens, and public programs (Matthews, 2019).

The **NYC Ferry**, a new transit service that connects all five boroughs by boat, was launched in 2017. Until the rise of the automobile, ferries were a key mode of transit around NYC, which has more than 500 miles of coastline.<sup>10</sup> However, in the 20<sup>th</sup> century, the perceived need for ferries declined and virtually all services were discontinued.

Yet, by the 2010s, it became increasingly clear that a citywide ferry service would benefit all New Yorkers. Traffic patterns had become increasingly worse as more people were moving to waterfront neighborhoods — these places had historically been for industrial use and had poor transportation access. The NYC Ferry transit system was built from scratch over the course of 2016 and began with four ferry routes connecting the Bronx, Manhattan, Brooklyn, and Queens by boat. The city plans to expand the ferry service to Staten Island, Coney Island, the West Side of Manhattan, and the East Bronx this year.<sup>11</sup> New Yorkers, who can be slow to adapt to change, quickly embraced NYC Ferry. A 2017 study (Rosenberg, 2017) found that 93 percent of riders gave the service a rating of seven or higher on a ten-point scale.

Critical investments in recent years have also been made in **affordable housing**. At the start of Mayor Bill de Blasio's term in 2014, he unveiled "Housing New York," an ambitious plan to create and preserve 200,000 affordable housing units by 2024. This plan was a direct response to the city's increasing cost of rent in virtually every neighborhood and a need to ensure the middle class could still afford to call New York home. To achieve this goal, the city took a number of creative actions, including dedicating underused public lots for new units, helping non-profits onprofits purchase traditional rent-stabilized apartment buildings, and capitalizing on advances in technology and innovative design to expand modular buildings and microunits. In 2017, Mayor de Blasio increased the goal to create and preserve 300,000 total units by 2026. To put this figure into perspective, this is enough housing for the entire population of San Francisco.

### *Incentivizing private-sector investment to drive industry growth*

The physical investments made by New York during the Bloomberg and de Blasio years have supported

<sup>9</sup> <https://www.thehighline.org/faq/#:~:text=The%20percent20High%20percent20Line%20is%20percent20a,on%20percent20Manhattan%E2%80%99s%20percent20West%20percent20Side>

<sup>10</sup> <https://www1.nyc.gov/site/planning/planning-level/waterfront/nyc-city-of-water/nyc-city-of-water.page>

<sup>11</sup> <https://www.ferry.nyc/nycferry-2020-2021-service-route-expansion/>

the city's growth and increased livability. In parallel, NYC's government made seed investments to catalyze private-sector investments in strategic industries and NYC's talent base. During this period, the city used traditional economic development tools, including providing land use, city-owned properties, tax incentives, and direct financial support to incentivize public-private partnerships and private investments. The goal was to leverage the power of the private sector to meet the needs of the economy by investing catalytic capital into a multitude of city-led initiatives. The city's capital is able to de-risk projects, allowing it to leverage private investment, leading to more capital and greater social outcomes. Additionally, the government instills enforcement mechanisms to ensure outcomes are met.

**Cornell Tech**, the applied sciences campus located on Roosevelt Island, is a prime example of how the city creatively leveraged its assets to meet its needs. The idea for an applied tech campus on Roosevelt Island — an underutilized spit of land in the East River — came from the Bloomberg administration. Mayor Bloomberg, an entrepreneur himself, believed that having a graduate engineering school in the five boroughs, similar to Palo Alto's Stanford or Boston's MIT, would produce enterprising tech leaders interested in founding companies of their own. This in turn would bolster New York's tech sector and further diversify its economy. The administration created a competition between leading universities across the globe, offering them \$100 million and free land to build an applied sciences campus. Ultimately, the joint bid submitted by Cornell University, an Ivy League institution based in upstate New York, and the Technion-Israel Institute of Technology was chosen to build a twelve-acre, \$2 billion state-of-the-art campus on the island. To date, Cornell Tech alumni have founded more than 60 startups.<sup>12</sup> When construction is fully complete, the campus will have capacity for more than

2,000 graduate students and hundreds of faculty members.

NYC's investment in the **cybersecurity industry** is another example of successfully incentivizing the private sector to attract businesses and talent by providing catalytic capital to help grow an industry that is projected to have 3.5 million unfilled jobs in 2021 (Morgan, 2019), and where entry-level jobs in New York pay roughly \$85,000<sup>13</sup> a year. Through "**CyberNYC**," an initiative started in 2017, the city offered \$30 million and its sponsorship and connections to invest in new educational models for life-long learning and vocational training, and to form new partnerships with private-sector players in order to support startups and expose major companies with the best cybersecurity solutions and talent in the market. The goal was to create 10,000 good-paying cybersecurity jobs, connect residents from all backgrounds to those jobs (no matter their income, gender, or ethnicity), and catalyze a \$70 million investment from the private sector. Through a competitive bidding process, the city established a number of partnerships. The first is with Israeli venture capital firm Jerusalem Venture Partners, which has moved to NYC and opened a six-story, 165,000-square foot innovation center in Soho. The second is with Israeli company SOSA, which has also expanded to NYC as a result of the initiative to build a cybersecurity center in Chelsea to connect investors, entrepreneurs, talent, and corporate innovation teams through structured programming and events. The third partnership involves three major academic institutions (Columbia University, New York University, and City University of New York (CUNY)), which have launched new continuing education programs for adults to upskill the current workforce. Lastly, the city partnered with Fullstack, a coding bootcamp, which has launched a new three-month accelerated training program to prepare high school graduates, particularly those from underserved communities, for local jobs in cybersecurity.

<sup>12</sup> <https://tech.cornell.edu/studio/real-world-outcomes/#:~:text=Since%20percent202014%20percent2C%20percent20Cornell%20percent20Tech%20percent20alumni,%20employing%20percent20more%20percent20than%20percent20370%20percent20employees>

<sup>13</sup> <https://www.ziprecruiter.com/Salaries/Entry-Level-Cyber-Security-Analyst-Salary-in-New-York-City>



Together with these investments to shore up New York's strategic industries and open pathways to the middle class for residents, the city was also incentivizing private-sector investment in state-of-the-art office space. Through the **Midtown East rezoning**, the city could address its growing problem of aging building stock and ensure this important business district could continue to host the jobs of the future. The rezoning of Midtown East, one of the largest central business districts in the world, involved reimagining 78 blocks to create nearly 7 million square feet of new office space and modernize over 6 million square feet of existing office space to meet Class A standards. Already, the city has seen the payoff of the rezoning. SL Green, New York's largest office landlord, recently opened a 1.7 million-square-foot skyscraper in the heart of Midtown East. As part of the public-private partnership, the corporation made a \$220 million investment in public open space and transit infrastructure to help dramatically improve the area. These improvements include a 4,000-square-foot transit hall, new subway entrances, and enhanced public space.

#### 4. Becoming a capital of innovation

As discussed above, the 2008 GFC highlighted the need for NYC to reduce its dependency on the financial services industry and increase its reliance on other high-growth sectors that could become a significant source of well-paid jobs. Although at the time it was difficult to predict what these jobs of the future would look like, it was clear innovation and entrepreneurship were critical ingredients to create them.

The **innovation economy** cuts across all segments of the economy, in both mature and emerging industries, such as life sciences, advanced manufacturing, design, software, financial services, and health care, and shares a number of common traits across different industries. It derives its primary value from intellectual capital and creativity and places a premium on top talent. It invests heavily in research and development

(R&D) to develop new business models, harness new technologies, and leverage old technologies in new ways. And it disrupts<sup>14</sup> the status quo to create new markets, often by collaborating across disciplines or with public or academic partners. Companies in the innovation economy create the good-paying jobs with growth potential that NYC sought and continues to seek — and are all particularly well-positioned to benefit from the cluster advantages that being located in the city offers. By supporting the innovation economy, instead of picking winners and losers in specific industries, New York has been able to support emerging sectors, bolster existing ones, create significantly more employment opportunities as new businesses sprout, and generate new tax revenue for its coffers.

#### An ecosystem-building strategy

Having watched Silicon Valley's growth from 3,000 miles away, the Bloomberg administration understood the importance of a well-functioning innovation ecosystem that fostered New York's startup community and provided support for companies looking to grow from pre-seed startups to multinational organizations. With this in mind, the city's industrial policy focused on fostering an innovation ecosystem in which entrepreneurs, engineers, investors, academia, government, and the diverse industries already thriving in the city would be able to connect nimbly to support business growth and technology adoption. The private sector was incentivized with infrastructure spending, space, and financing to make investments in corridors of innovation throughout its boroughs, often anchored by a physical space to create cluster advantages and coordinated by a private, non-profit,

<sup>14</sup> Schumpeter's innovation theory explains industry growth through three channels: creative accumulation, creative destruction, and the rejection of competitive market equilibria. These channels underscore evolutionary growth and endogenous innovation, with the vital force behind capitalism being the innovation and the entrepreneur willing to make things happen through market dynamics, profit expectations, and long-run growth expectations (Sweezy, 1943).

or public-sector organization through structured programming and events. These corridors allowed entrepreneurs, academics, investors, corporate leaders, and government officials to easily connect and share resources, including talent, infrastructure, financing, and a curated community. Together, these resources helped companies amplify their research, pilot and scale new technologies, hire talent, and continue to grow. New York has enjoyed much success having implemented this strategy. To help illustrate this growth, we analyze below a case study: the growth of the tech ecosystem.

### Case study: the growth of the tech ecosystem

As discussed above, New York has long understood that attracting and retaining talent is crucial for keeping companies within the five boroughs. When New York set out to build its tech economy from the ground up, it aspired to become a capital for founders and entrepreneurial talent by launching a series of initiatives that would create the foundations for a well-functioning innovation ecosystem. These included:

- **Infrastructure:** *starting incubators and accelerator spaces to provide needed infrastructure and to foster community around key growth areas.*

The Varick Street Incubator —affiliated with New York University— opened in 2009 to help startups access space and basic business services. In the years that followed its opening, the city invested in additional specialized spaces for industries that needed support, including urban tech, cybersecurity, blockchain, and advanced manufacturing. Operators of these spaces and programs were selected through competitive bidding processes. They included arms of academia, venture capitalists, real estate firms, and new for-profit and non-profit innovation organizations. For example, in 2016 the city invested \$7.2 million to create Grand Central Tech in Manhattan (operated by a venture of the Milstein real estate family) and a technology center at the Brooklyn Navy Yard (operated by New Lab). The

spaces offer 100,000 square feet of flexible space and resources for prototyping and testing for urban tech companies expanding in NYC, such as Honeybee Robotics, Nanotronics Imaging, and Farmshelf.

- **International talent:** *doubling down on the city's openness to immigration.*

New York, already a welcoming home for immigrants, took additional action to underscore its commitment to diversity and inclusion. This included celebrating the successes of immigrant entrepreneurs in public events with government officials, and continuing to welcome those on H1-B visas, the nation's largest temporary employment visa program; the New York metro area is home to 29 percent of total H1B applications approved in the US, compared to 4 percent in San Francisco (Ruiz & Krogstad, 2018). It also started programs to make immigrants feel safer in the city, including the IDNYC program, which provided a free city identification card for all New Yorkers over the age of 10, regardless of their immigration status. The program has had beneficial impacts on NYC residents, especially vulnerable communities and immigrants. A comprehensive evaluation of the initiative reveals that more than half of the 863,464 unique cardholders use the card as their primary form of identification, while over three-quarters of immigrants surveyed reported that the card increases their sense of belonging to the city (Daley *et al.*, 2016). The success of the program has further reinforced NYC as a city of immigrants, while recognizing their importance as job creators and key drivers of economic growth throughout the city's history.

- **Local talent:** *creating its own pipeline of engineering talent to ensure the city could compete with Boston and San Francisco, as well as other cities with top engineering talent.*

Cornell Tech, referenced above, is a commitment to building a pipeline of local engineering talent. But New York is still making key investments to become the largest and, most importantly, inclusive tech hub in the country. Computer Science for All (CS4All) is an initiative that brings computer science education (including

hard skills and computational thinking, as well as problem solving skills) to 100 percent of the city's public schools, which serve 1.1 million students. At the university level, the city's goal is to double the number of graduates with tech bachelor's degrees from the public university system (CUNY). Today, 40 percent of CUNY undergraduates were born outside the US, 77 percent of students are persons of color, and 59 percent come from families with incomes of less than \$30,000 a year.

- **Curated community:** *launching a series of programs and events to further build the tech community and connect entrepreneurial talent to industry and civic leaders.*

These programs and events—such as NYC BigApps, a civic innovation challenge for designers, developers, academics, entrepreneurs, and other New Yorkers to help improve the city through innovation tech—were particularly important in the early 2010s, when the tech ecosystem was just beginning to grow. New York Tech Meetup, the world's largest tech meetup group, went from fewer than 30 people in its first meeting to its current membership base of over 60,000 people.<sup>15</sup>

The Grid, a citywide network for the urban tech community, is another example of an industry-specific community-building program. It was launched in 2019 as a network of over 70 members—from startups, to academia, to not-for-profits, neighborhood organizations, and corporations—representing a diverse network of organizations on the forefront of their respective industries when it comes to urban technology development, testing, and adoption. The initiative was designed to achieve three objectives through structured programming and events. The first was to help startups grow and establish connections between peers, mentors, and potential customers, all to help facilitate innovation and help advance commercial applications. The second, to bring together those who need, and those who have, space to pilot urban tech ideas in order to promote the adoption of technologies that make NYC a better place

to live. And the third, to provide new pathways to jobs and business opportunities to New Yorkers of all backgrounds who are interested in urban tech.

Overall, the city's innovation programs included public-private partnerships across a number of industries: biotech, AR/VR, cybersecurity, blockchain, urban tech, health care, advanced manufacturing, and more. The most successful programs, from incubators to funds, competitions or accelerators, shared a common ingredient as a key driver of success: the community and informal networks that were created around them. And for these informal networks and connections to occur, particularly in a place with the scale and diversity of NYC, it was critical to have dedicated teams working to curate and organize them through structured programming and events.

The aforementioned strategy worked: the tech sector is now a driving force of New York's economy. In just 10 years, the city has become the second-largest global startup ecosystem with more than 9,000 startups and 372,000 people employed.<sup>16</sup> And venture capital going to NYC startups has increased from around \$2 billion in 2010 to over \$18 billion in 2020 (Figure 4).

*Over time, the city saw the growth of tech companies across its five boroughs.*

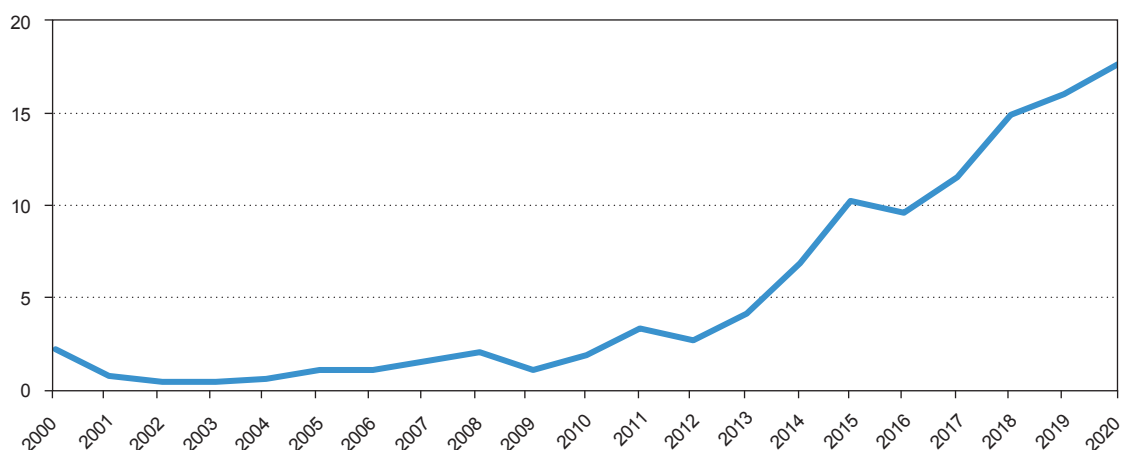
Today, NYC is home to 17 unicorns (startups valued at \$1 billion or more) (McCormick, 2021). Many of these startups are household names in the US, such as Rent the Runway, an online service that allows you to rent designer dresses and accessories; BuzzFeed, a social news and entertainment company; Compass, an internet-first real estate brokerage; and Flatiron Health, a big data company to improve cancer research and care. Most of the city's unicorns built on the city's existing industries (fashion, health care, media, real estate, financial services, etc.) to launch their businesses and help them thrive.

The growth of tech companies led to major real estate investments in search of even more talent and being able

<sup>15</sup> <https://www.nytech.org/nytm>

<sup>16</sup> <https://www.technyc.org/nyc-tech-snapshot>

FIGURE 4  
TOTAL VENTURE CAPITAL INVESTMENT IN NYC  
(\$ Billions)



SOURCE: PitchBook.

to capitalize on the synergy happening on the ground. Google is a prime example of this trend. In 2010, the Mountain View, a California-based company, purchased 111 Eighth Avenue for \$1.9 billion, showing its commitment to growing in New York. The building it purchased is in the heart of Manhattan's Chelsea neighborhood and is 2.9 million square feet, making it one of the city's largest office buildings by floor area and one of the largest technology-owned office buildings in the world. In 2018, the company bought the Chelsea Market building, which sits across from 111 Eighth Avenue, for \$2.4 billion. On top of this, Google is in the process of creating a new campus in Hudson Square, just south of the Chelsea neighborhood, which will include an additional 1.7 million square feet.

While Google's New York footprint may be the largest of its peers, other tech companies have also been making sizable investments in the city. Today, Amazon, Facebook, IBM, Slack, Snapchat, Spotify, and Twitter all have a significant presence in New York. Many of these companies are drawn to Midtown

South, a neighborhood directly south of Midtown Manhattan known for its loft-like buildings and proximity to trendy neighborhoods with good restaurants and culture. Over time, Midtown South overtook Midtown Manhattan for having the highest commercial real estate rents in the city (albeit, that distinction now belongs to Hudson Yards, the new neighborhood on Manhattan's Far West Side).

Brooklyn and Queens, boroughs that historically were home to a few corporations, have also seen an influx of tech companies over the past 8 years as both startups and older companies looked for less established commercial neighborhoods that were authentic to their company cultures. These businesses include VICE (Williamsburg), Kickstarter (Greenpoint), and Gimlet Media (Gowanus). Moreover, had Amazon fulfilled its commitment to bring its second headquarters to New York, its 8 million-square-foot campus would have been located in Long Island City, Queens.

Even throughout the COVID-19 pandemic, tech companies have continued to expand their New York footprint.

Last May, TikTok signed a lease for over 230,000 square feet in Times Square, and in August Facebook signed a lease for 730,000 square feet in Midtown West in the historic James A. Farley Building. While the future of work will evolve, it is clear tech in New York is here to stay.

### **Inclusive growth: a significant challenge**

While the growth of the tech industry has contributed to the city's unprecedented economic expansion over the last decade, it has also magnified how the benefits from growth have been unequally distributed. In a polarized labor market environment, New Yorkers with little access to opportunity haven't been able to secure employment in well-paid technology jobs. This was at the heart of the debate that accompanied Amazon's announcement that it would build a second headquarters (HQ2) in Long Island City, Queens. Three months after it was announced—and after an intense and heated public dialogue—Amazon decided not to build its headquarters in the city. Amazon's HQ2 would have been the largest job creation opportunity in the city's history, creating up to 40,000 good-paying jobs and generating more than an estimated \$27 billion in tax revenue.<sup>17</sup> The city and the state worked hard to pursue it; however, when the deal was announced, it faced strong political headwinds from a small but vocal minority that adamantly opposed the project. To exacerbate the problem, public dialogue wasn't always factual. While NYC's winning bid for Amazon's HQ2 is a testament to the strength of the city's growing tech economy, it also highlighted how important it is for the city to work with companies and communities to close the opportunity gap—both real and perceived.

The city recognizes this problem and is working to build pathways to the jobs that are being created in high-paying industries like technology. One solution is making foundational investments in education at every grade level to prepare more students for computer science careers.

As discussed, the city is investing \$20 million to double the number of graduates with tech degrees by 2022 at CUNY, the city's public college system, where 44 percent of students are first-generation college students. CS4All, a 10-year, \$81 million investment is another program that will ensure that every student in the city's public school system has an opportunity to study computer science throughout their primary education.

The city is also working with non-profit partners, philanthropies, and the innovation community to create new models of tech education for underserved residents. An example is the new Union Square Tech Training Center, located on top of one of the city's major transit hubs in Manhattan. It is a new digital skills training space where New Yorkers can gain short-term, job-focused education to access a specific role in the technology sector (e.g. coding), and is co-located with 250,000 square feet of flexible and modern workspace for startups and established companies that have outgrown co-working space but are not yet ready (or do not qualify) for traditional leasing, and will have the added benefit of being able to hire within the building. Training will be provided by multiple, experienced local organizations like General Assembly and Per Scholas that are currently training people with diverse backgrounds, including immigrants, teachers, people with disabilities, and others. There is also money set aside to provide scholarships and secure a workforce development fund for low-income residents. City officials envision that Civic Hall will program the event space to create an ecosystem of jobs, training, and creative retail under the same roof with discounted rates to non-profit and community groups.

Finally, the city is working to bring inclusive innovation to underserved neighborhoods through the NYCx Co-Labs program. These neighborhood-based partnerships are designed to co-create with communities and residents to address local community needs through technology pilots and capacity building. One example of this is in Brownsville, Brooklyn, a high-need neighborhood where close to 40 percent of residents live

<sup>17</sup> [https://www1.nyc.gov/office-of-the-mayor/news/552-18/mayor-de-blasio-governor-cuomo-amazon-selects-long-island-city-new-corporate#/0](https://www1.nyc.gov/office-of-the-mayor/news/552-18/mayor-de-blasio-governor-cuomo-amazon-selects-long-island-city-new-corporate#/)



in poverty. Here, NYCx Co-Labs created a program to reduce trash and litter in shared spaces and increase resident participation in recycling. The program is testing an onsite organics processing system that turns food scraps into compost in 24 hours, coupled with a door-to-door recycling pickup service and a peer-to-peer education program in a large public housing residential complex.<sup>18</sup>

## 5. The impact of COVID-19

Before the pandemic, NYC enjoyed robust economic growth with an economy close to full employment and 4 percent unemployment rate. The city's tourism had hit a record high at the end of 2019, with 66.6 million individual trips and \$47.4 billion in direct spending.<sup>19</sup> As discussed above, growth had been unequal, with job opportunities increasingly polarized and concentrated in high- and low-paying occupations. To combat inequality, policymakers introduced a number of measures such as increasing NYC's minimum wage to \$15 an hour, implementing universal pre-K for all 4-year-olds, building affordable housing, and expanding health care. In 2018, the poverty rate had decreased by 1.1 percentage points relative to 2014, but remained high at 19.1 percent.<sup>20</sup>

**Economic inequality.** COVID-19 quickly laid bare the deep flaws in NYC's economic and social structures. Unlike in previous recessions, job losses during this crisis have been more significant for workers with low wages, due to, among other factors, poor labor market conditions, low worker bargaining power, and lackluster growth in nominal wages. One of the most significant impacts of the COVID-19 crisis has been job loss. The city lost 894,000 jobs (Olayele & Marks, 2021) within the first two months of the pandemic

and almost half of city workers lost employment income from the pandemic (Collyer *et al.*, 2020) —the March 2021 unemployment rate<sup>21</sup> stands at 11.7 percent. Inequality has become very pronounced under COVID-19. About 95 percent of all businesses in NYC are small businesses and typically labor-intensive. Unlike in previous crises, COVID-19 has disproportionately affected a wide array of small businesses and marginalized New Yorkers, especially low-wage workers, who are overrepresented in occupations highly vulnerable to pandemic-related job and income losses. This has deepened existing inequalities.

**Health.** The pandemic has highlighted the disparities in health outcomes due to unequal access to, among other things, key infrastructure. Transportation mobility and housing are key issues in NYC, particularly for low-income earners. About 68 percent of the over 2.2 million city resident workers (56 percent) who rely on public transit for their daily commute are people of color. Throughout the pandemic, wealthier residents have been more likely to stay at home, work remotely, and limit their exposure to the virus, while low-income residents have been more likely to be essential on-site workers. New Yorkers who lost employment income or were unable to work from home were twice as likely to be low-income or living in poverty.<sup>22</sup> In terms of housing, 885,000 households in NYC (27 percent of total households) were severely rent burdened prior to COVID-19 and a larger number of households will experience challenges and housing instability because of the pandemic.<sup>23</sup>

**Population.** There have been a number of articles reporting that NYC residents moved elsewhere in 2020. Time will tell whether this is a permanent or temporary dislocation, but the ability to continue to attract and retain talent will be critical for the city's

<sup>18</sup> <https://www1.nyc.gov/assets/cto/#/project/brownsville-co-lab>

<sup>19</sup> <https://www.nycgo.com/company-information/about-us/tourism-advocacy>

<sup>20</sup> New York City Government Poverty Measure 2018. <https://www1.nyc.gov/site/opportunity/poverty-in-nyc/poverty-measure.page>

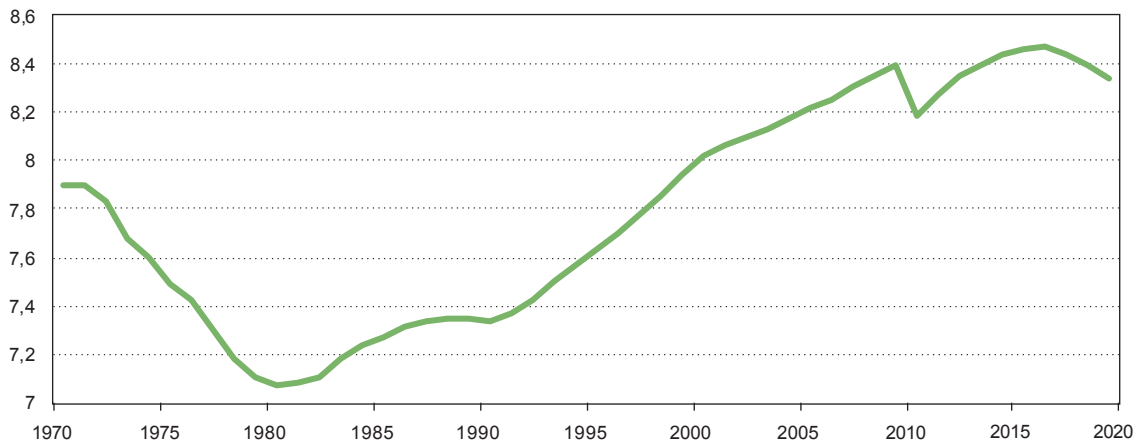
<sup>21</sup> The seasonally adjusted unemployment rate was 11.7 percent in March 2021, compared to 3.8 percent in March 2020.

<sup>22</sup> The Robin Hood Foundation.

<sup>23</sup> <https://furmancenter.org/thestoop/entry/nyc-housing-insecurity-by-the-numbers>



FIGURE 5  
NYC POPULATION  
(Millions)



SOURCE: United States Census Bureau.

recovery. For a long time, the city's talent pool showed no signs of shrinking. In 1990, the population throughout the five boroughs was 7.3 million, and by 2010 the population had grown to 8.1 million and was continuing its upward trajectory.<sup>24</sup> Yet, even before COVID-19, NYC's population was starting to decline. From 2016 to 2019, the city's population fell by roughly 132,000, due to a combination of domestic out-migration<sup>25</sup> and falling immigration from foreign countries (Figure 5).

### The city's COVID-19 response

In response to this unprecedented crisis, the city reprioritized its work to focus on immediate response and long-term rebuilding initiatives.

### *Activating sites and the local innovation ecosystem to overcome space and equipment shortages*

In the immediate aftermath of the pandemic, the city created a new lab for test processing, while its cruise terminals morphed into hospitals and armories into food distribution centers. When global personal protective equipment (PPE) supply chains witnessed major disruptions, causing a severe shortage in PPE for health care workers, NYCEDC devised a creative public-private partnership<sup>26</sup> that enabled the city's advanced manufacturing, life sciences, and fashion industries to work together to make the quick transition to creating face shields, gowns, testing kits, and bridge ventilators. This led to the production of 8.4 million face shields and 4.2 million isolation gowns in four months, thereby insulating NYC from PPE shortages,

<sup>24</sup> [https://www1.nyc.gov/assets/planning/download/pdf/planning-level/nyc-population/historical-population/nyc\\_total\\_pop\\_1900-2010.pdf](https://www1.nyc.gov/assets/planning/download/pdf/planning-level/nyc-population/historical-population/nyc_total_pop_1900-2010.pdf)

<sup>25</sup> Residents leaving one US state for another.

<sup>26</sup> <https://edc.nyc/article/five-ways-nycedc-is-supporting-new-york-city-covid-19-response>

while encouraging local job creation and reducing the carbon footprint of production.

### *Supporting small businesses*

COVID-19 disproportionately affected NYC small businesses, a core<sup>27</sup> part of the city's economy (The City of New York, 2015). In response to the crisis, the city created the NYC Small Business Resource Network<sup>28</sup>, a collaboration between different arms of government and non-profit organizations. It is a one-stop-shop mechanism for the 230,000-plus small businesses in the city offering personalized guidance on small business resilience, as well as advice and resources for opening or reopening (including grants and loans, digital marketing, getting online, lease negotiations, and business planning). The Network is structured as a public-private partnership funded by a \$2.8 million grant from the NYC-based Peter G. Peterson Foundation, with in-kind contributions from other key players in the city's corporate, financial, professional services, academic, and philanthropic sectors.

### *Expanding access to broadband*

The early months of the pandemic highlighted the importance of high-quality broadband infrastructure in providing faster emergency response times. As part of the efforts to close the digital divide in the aftermath of COVID-19, NYC committed \$157 million<sup>29</sup> in capital investment to broadband and 5G infrastructure. In addition to connecting about 1.5 million residents that lacked<sup>30</sup> broadband access, the investment was also targeted at unlocking private capital to help

minority- and women-owned businesses through new digital infrastructure.

### *Establishing the city's Pandemic Response Institute to become the public health capital of the world*

Following a drastic reduction in infection rates and hospitalizations, the city bolstered its strategy of widespread testing and tracing with the establishment of the Pandemic Response Lab<sup>31</sup> in the Alexandria Center for Life Science in Manhattan — a facility dedicated to processing COVID-19 tests within 24–48 hours to help scale up its capacity to process several thousands of tests per day. As a long-term strategy to harness and make permanent the best aspects of NYC's response to the pandemic, the city has committed \$20 million and released a public request for proposals to establish the Pandemic Response Institute,<sup>32</sup> a new institution devoted to preparing NYC for future health emergencies and epidemics. In addition to building on the success of the Pandemic Response Lab, the Institute is aimed at positioning the city as a global capital of public health innovation, focusing on three strategies: health solutions and innovations, data and information decision-making, and community and workforce capacity building.

### *Launching a childcare innovation lab*

COVID-19 has exacerbated the precarious issue of the lack of access to affordable childcare in NYC. Twice as many women as men —and predominantly women of color— dropped out of the labor force in the first three months of the pandemic, while 520,000 people in the New York metro area were not working in early 2021 because they were taking care of a child

<sup>27</sup> Of the approximately 220,000 businesses located in the City, 98 percent are small —with fewer than 100 employees— (The City of New York, 2015).

<sup>28</sup> <https://www.nycsmallbusinessresourcenetwork.org/>

<sup>29</sup> <https://www1.nyc.gov/office-of-the-mayor/news/499-20/mayor-de-blasio-taskforce-racial-inclusion-equity-accelerated-internet-master>

<sup>30</sup> <https://statescoop.com/nyc-commits-157-million-internet-master-plan/>

<sup>31</sup> <https://www.nychealthandhospitals.org/pressrelease/mayor-de-blasio-announces-citys-own-dedicated-covid-19-lab/>

<sup>32</sup> <https://www1.nyc.gov/office-of-the-mayor/news/830-20/recovery-agenda-city-invests-20-million-create-pandemic-response-institute-strengthening>

not in school or daycare. This led to the establishment of a policy innovation lab, designed to work with NYC employers and government agencies to catalyze public-private collaboration and innovation that can expand accessible, affordable, and quality childcare solutions and support working women and families.<sup>33</sup>

### *Strengthening the green economy*

To capitalize on the opportunities provided by the pandemic to redesign the economic system and accelerate the transition to a clean energy economy, the city has announced a series of green infrastructure commitments<sup>34 35</sup> in solar, offshore wind, and hydropower. These include, for example, its commitment to purchase clean energy certificates covering 100 percent of the government's energy needs by 2025. These long-term investments are part of the efforts to rebuild a fairer and more sustainable economy through a comprehensive climate mitigation strategy that puts equity, fairness, and confronting the climate crisis at the center of NYC's rebuilding efforts.

### *Making the Open Streets emergency program permanent*

In order to make more outdoor public space available during the pandemic to facilitate social distancing, the city introduced the Open Streets program and restricted car access in certain streets during certain hours in favor of cyclists and pedestrians, outdoor dining, and outdoor education and play. This program has now been made permanent as a way to reimagine city streets, support active transportation (walking and biking), and strengthen neighborhoods' social and economic fabric. The Department of Transportation will operate the program and will

support local community organizations that want to manage temporary closures or limits to vehicle access in designated streets, providing better signage, new barriers, and resources for such purposes.

## **6. Conclusion**

The story is still being written on how NYC will recover from COVID-19. But there is no question that —like in previous crises— the government will have to make strategic decisions and take decisive action to help it return to what will be a new normal. This effort will likely include continuing to build on NYC's strengths —including its density and the cluster advantages density provides, such as allowing employers and high-skilled workers to co-locate in tight geographic areas to help fuel innovation and increase productivity. The government's response will also likely include deliberate steps to attract and retain talent; both US talent and foreign talent, which has long been a differentiator for NYC relative to competing geographies like California. This will be harder to do than in the past; at a time when more people than ever are working from home, smaller cities like Philadelphia, Baltimore, and Nashville can offer more space for less money. To do this, it will be vital for NYC to address what has long been its Achilles' heel: affordability. It will have to continue to drive down the cost of rent to ensure living in the city makes economic sense for more prospective New Yorkers. This goes hand-in-hand with continuing to make investments that improve residents' quality of life, from shoring up infrastructure to improving the public education system and the urban amenities that have long attracted workers to NYC. Closing the opportunity gap will be key to ensuring the recovery doesn't leave behind the communities that were most deeply impacted, and while the city has already begun making many of these investments, more is needed to reassure residents from all backgrounds that the city is still the best place to build a future. NYC's track

<sup>33</sup> <https://women.nyc/childcare-lab/>

<sup>34</sup> <https://www1.nyc.gov/site/cpp/our-programs/covid19-green-recovery.page>

<sup>35</sup> <https://www1.nyc.gov/office-of-the-mayor/news/281-21/recovery-all-mayor-de-blasio-major-step-forward-towards-purchase-large-scale>

record of reinventing itself is a key advantage as it begins writing its next chapter. It may not look quite the same as it did before — and that is okay. Part of NYC's DNA is that it is always evolving. With the right plan in place, the city's economy can come back in a way that makes it a fairer and more resilient place to live and do business.

## Bibliographic references

- Bram, J. (2003). New York City's economy before and after September 11. *Federal Reserve Bank of New York*, 9(2). <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.195.2342&rep=rep1&type=pdf>
- Byrne, J. A. (2018). The exodus of New York City's endangered middle class. *New York Post*. <https://nypost.com/2018/12/22/the-exodus-of-new-york-citys-endangered-middle-class/>
- Center for an Urban Future (2014). *Caution ahead: Overdue investments for New York's aging infrastructure*. <https://nycfuture.org/pdf/Caution-Ahead.pdf>
- Collyer, S., Hug, S., Washington, K., & Wimer, C. (2020). Monitoring poverty and well-being in NYC. *Poverty Tracker, Robin Hood, Center on Poverty and Social Policy and CPR, Columbia Population Research Center*. [https://www.robinhood.org/wp-content/themes/robinhood/images/poverty-tracker/poverty\\_tracker.pdf](https://www.robinhood.org/wp-content/themes/robinhood/images/poverty-tracker/poverty_tracker.pdf)
- Daley, T. C., Lunn, L., Hamilton, J., Bergman, A., & Tapper, D. (2016). *IdNYC: A tool of empowerment. A mixed-methods evaluation of the New York municipal ID Program*. Westat, Inc. [https://www1.nyc.gov/assets/idnyc/downloads/pdf/id-nyc\\_report\\_full.pdf](https://www1.nyc.gov/assets/idnyc/downloads/pdf/id-nyc_report_full.pdf)
- David, G. (2020). Bad times are nothing new to the city, but this might be the worst. *Crain's New York Business*. <https://www.crainsnewyork.com/greg-david-new-york/bad-times-are-nothing-new-city-might-be-worst>
- David, G. (2021). NYC lost a record 631,000 jobs to the pandemic in 2020. So what's next? *The City*. <https://www.thecity.nyc/economy/2021/3/14/22326414/nyc-lost-record-jobs-to-pandemic-unemployment>
- Gould, E. (2019). Decades of rising economic inequality in the U.S. *Economic Policy Institute*. <https://www.epi.org/publication/decades-of-rising-economic-inequality-in-the-u-s-testimony-before-the-u-s-house-of-representatives-ways-and-means-committee/>
- Martin, R. (2012). Regional economic resilience, hysteresis, and recessionary shocks. *Journal of Economic Geography*, 12(1), 1-32. <https://doi.org/10.1093/jeg/lbr019>
- Matthews, K. (2019). New York's High Line park marks 10 years of transformation. *Abc news*. <https://abcnews.go.com/Lifestyle/wireStory/yorks-high-line-park-marks-10-years-transformation-63587235>
- McCormick, J. (2021). New York tech startups see jump in funding activity. *The Wall Street Journal*. <https://www.wsj.com/articles/new-york-tech-startups-see-jump-in-funding-activity-11611793722>
- Morgan, S. (2019). Cybersecurity talent crunch to create 3.5 million unfilled jobs globally by 2021. *Cybercrime Magazine*. <https://cybersecurityventures.com/jobs/>
- Olayele, F., & Goel, P. (2020). Economic diversification, resilience, and the path to inclusive growth. *NYCEDC Economic Development Quarterly*. <https://edc.nyc/sites/default/files/2020-11/NYCEDC-Economic-Diversification-Resilience-and-the-Path-to-Inclusive-Growth.pdf>
- Olayele, F., & Marks, K. (2021). COVID-19 and the New York City economy. *NYCEDC Economic Development Quarterly*. <https://edc.nyc/sites/default/files/2021-03/NYCEDC-ERP-EDQ3-COVID-19-New-York-City-Economy.pdf>
- Partnership for New York City (2015). *At risk: New York's future as the world financial capital*. <https://pfny.org/wp-content/uploads/2015/06/2015-06-world-financial-capital.pdf>
- Partnership Fund for New York City (2016). *New York's next big industry: commercial life sciences*. <https://pfny.org/wp-content/uploads/2020/02/New-Yorks-Next-Big-Industry-Commercial-Life-Sciences-Partnership-Fund-for-New-York-City.pdf>
- Rosenberg, Z. (2017). More than 90 % of NYC Ferry riders satisfied with their experience. *Curbed*. <https://ny.curbed.com/2017/8/25/16202092/nyc-ferry-customer-satisfaction-survey>
- Ruiz, N. G., & Krogstad, J. M. (2018). East Coast and Texas metros had the most H-1B visas for skilled workers from 2010 to 2016. *Pew Research Center*. <https://www.pewresearch.org/fact-tank/2018/03/29/h-1b-visa-approvals-by-us-metro-area/>
- Sweezy, P. M. (1943). Professor Schumpeter's theory of innovation. *The Review of Economics and Statistics*, 25(1), 93-96. <https://www.jstor.org/stable/1924551?seq=1>
- The City of New York (2015). *Small business first*. <https://www1.nyc.gov/assets/smallbizfirst/downloads/pdf/small-business-first-report.pdf>
- The City of New York (2017). *New York Works*. <https://newyorkworks.cityofnewyork.us/wp-content/uploads/2020/06/NewYorkWorks-1.pdf>
- The City of New York (2020a). New York City government poverty measure 2018. *New York City Mayor's Office for*

*Economic Opportunity*. [https://www1.nyc.gov/assets/opportunity/pdf/20\\_poverty\\_measure\\_report](https://www1.nyc.gov/assets/opportunity/pdf/20_poverty_measure_report)

The City of New York (2020b). State of our immigrant city. *New York City Mayor's Office of Immigrant Affairs*. Annual Report. <https://www1.nyc.gov/assets/immigrants/downloads/pdf/MOIA-Annual-Report-for-2020.pdf>

United States Census Bureau (2016). *American Community Survey 2005–2009 5-year estimates* [Data file]. <https://www.census.gov/data.html>

Yahoo! Finance (2020). *The Dow's biggest single-day gains and losses in history*. <https://finance.yahoo.com/news/dow-apos-biggest-single-day-181600238.html>



## Últimos números publicados

