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Growing and Diversifying Brooklyn's Innovation Economy

Brooklyn is now a national leader in the innovation economy—tech start-ups, creative companies, and innovative manufacturers—but it still has a ways to go. This report outlines the key obstacles to continued growth and considers how the borough can realize its immense potential to develop a larger and more inclusive innovation economy.

by Eli Dvorkin and Cara Eisenpress

- The following is an excerpt from *Growing and Diversifying Brooklyn's Innovation Economy*
- Read the full policy brief (PDF)
- View the recommendations

In little more than a decade, Brooklyn has emerged as a national leader in the innovation economy. The borough's recent growth in tech start-ups, creative companies, and innovative manufacturers is outpacing the rest of New York City and many other leading cities nationwide. This runaway success in the innovation industries has been a boon to both Brooklyn and New York City, adding thousands of new, well-paying jobs across Brooklyn, diversifying the borough's economy, and giving Brooklyn an important competitive advantage in a part of the economy that is expected to grow significantly in the years ahead.

But despite its success, Brooklyn still has a ways to go to fully realize its vast potential in the innovation economy. For instance, although a disproportionate share of people working in tech and creative fields in New York City live in Brooklyn, surprisingly few large innovation companies have relocated to the borough. And though Brooklyn is teeming with small and mid-sized start-ups, many of them have struggled to scale up while remaining in the borough.

As this report details, a handful of challenges—from a lack of good intra-borough transit options to an insufficient amount of affordable office space for growing companies—are threatening to constrain Brooklyn's future growth in the innovation economy.

At the same time, Brooklyn has work to do to make sure that the growth occurring in its innovation industries is more inclusive. While our research finds that the share of black and Hispanic workers in Brooklyn's tech workforce is notably higher than in many other major tech hubs such as Boston, San Francisco, and Seattle, significantly more progress is needed in expanding access to the good jobs being created in Brooklyn's innovation economy.

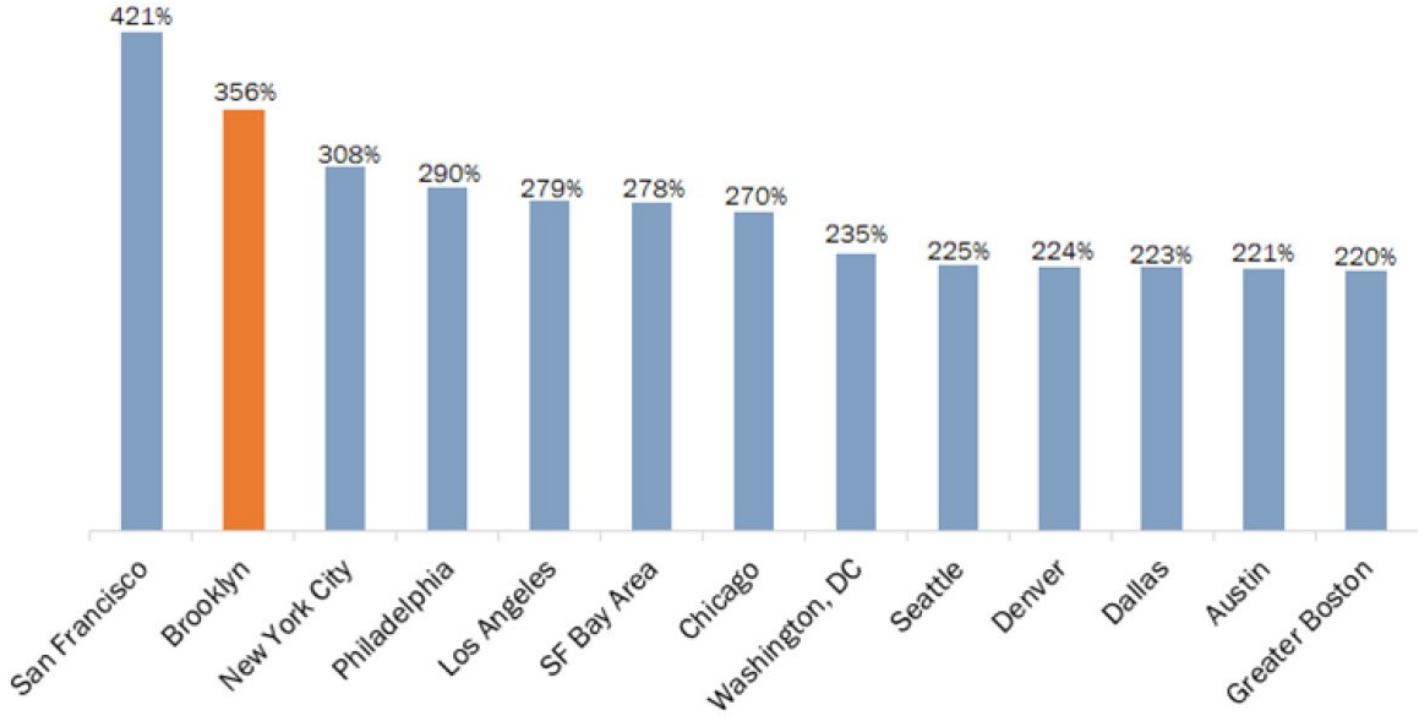
Although the borough boasts some of the city's best schools, colleges, and workforce development organizations, our research finds that Brooklyn is still lacking in education and training programs that help expose Brooklyn residents to career pathways in the innovation economy and prepare Brooklynites for these jobs.

There is much at stake for Brooklyn to address these challenges and build a larger and more inclusive innovation economy. Doing so could mean thousands of additional well-paying jobs for residents across the borough in the years ahead, a welcome prospect at a time when a disproportionate share of the job growth nationally and in New York has been in low-wage industries—and when a new wave of automation will likely cause some good jobs to disappear.

This report outlines the key obstacles to growing Brooklyn's innovation economy and creating new pathways into these jobs—and it puts forth a series of achievable recommendations to overcome these challenges and realize the borough's immense potential to develop a larger and more inclusive innovation economy. Researched and written by the Center for an Urban Future and produced in partnership with Downtown Brooklyn Partnership, Dumbo Improvement District, Brooklyn Navy Yard Development Corporation, and Industry City, it is informed by interviews with more than 50 company founders, investors, educators, workforce development organizations, real estate developers, and economic development officials in Brooklyn, as well as more than a dozen experts working in relevant fields outside of the city. It builds on the Center's June 2019 data brief, *Brooklyn's Growing Innovation Economy*, which provided a new level of detail on the diverse mix of tech startups, creative companies, and entrepreneurial makers and manufacturers that are flourishing in Brooklyn today.

Our research shows that Brooklyn is one of just a handful of regions across the country to capture a significant share of the growth occurring in the innovation economy—a set of industries fueled by technology, creativity, and invention that is driving much of the nation's high-wage job gains. In 2018, forinstance, Brooklyn was home to 1,205 tech-powered start-ups—a remarkable increase from 264 start-ups a decade ago. Additionally, employment in Brooklyn's creative industries surged by 155 percent over the past decade, nearly ten times the growth rate of Manhattan. And Brooklyn's manufacturing sector has significantly outperformed the city's, with much of the growth coming from a new generation of companies at the intersection of manufacturing, technology, and design.

Start-up Growth Rate Since 2008 in Major U.S. Tech Hubs



Source: CUF analysis of data from Crunchbase

Nearly everyone we interviewed said that Brooklyn is well positioned for even more growth in the core industries of the innovation economy. Today, Brooklyn has a strong foundation of tech start-ups, creative companies, advanced manufacturers, and entrepreneurial makers that either started in the borough or have been planting roots here for several years. The borough is home to an unmatched pool of tech and creative talent. It also has a more diverse innovation economy workforce than most other cities, a point of strength at a time when many employers are understandably feeling pressure to diversify their workforces. And Brooklyn benefits from a robust innovation infrastructure—with vital R&D centers like NYU Tandon School of Engineering and New Lab, and roughly 60 incubators and co-working spaces.

- **Transit Gaps** – With more subway stations than any other borough, Brooklyn's expansive transit network is one of the borough's greatest assets. Yet in our interviews with innovation economy leaders, transit was also one of the most frequently cited obstacles to the growth of the borough's innovation economy. In particular, our research found growing concerns about two types of transit gaps:

- *Limited intra-borough transit connections.* Although there is a large tech and creative workforce living in Williamsburg, Greenpoint, and Bushwick, interviews suggest that many opt to commute to jobs in Manhattan because of the lack of efficient transit options connecting North Brooklyn to innovation economy job centers in Dumbo, Downtown Brooklyn, and Sunset Park.
- *Long commutes from the surrounding region.* Large innovation companies are often deterred from moving to Brooklyn because they need to draw talent from all over the region but find Brooklyn lacking in easy transit commutes from New Jersey, Westchester, and even Long Island. Several company founders cited the lack of a direct ferry connection between New Jersey and Brooklyn, while others noted that employees commuting from Westchester are turned off by the additional 20- to 45-minute commute time to Brooklyn after arriving at Grand Central Terminal. And at a time when companies face fierce competition for top talent, these commuting challenges become a major factor in siting decisions.

- **Space Constraints** – A second key challenge raised in the majority of our interviews is the limited supply of affordable commercial space in neighborhoods across the borough that are most attractive for innovation companies. Although innovation companies are certainly not the only ones facing real estate obstacles in Brooklyn today, we heard about two specific space-related challenges that have become a major barrier to the borough's growth in the innovation economy:
  - *Next-stage space for start-ups to grow.* Brooklyn has no shortage of incubators, but start-ups outgrowing those facilities often find it difficult to locate other affordable spaces within the borough—especially in the neighborhoods that are seen as most attractive by innovation companies. "I have seen companies start in Brooklyn or consider Brooklyn, but they couldn't get the right size space for around 25 to 40 people," says Charlie O'Donnell, founder of Brooklyn Bridge Ventures, a seed stage investment fund. "We have to make sure these emerging companies stay and grow here," adds Sayar Lonial, the associate dean for communications and public affairs at NYU Tandon, who says that companies coming out of NYU's incubators often struggle to find the 500 to 5,000 square foot space with flexible leases they need as they grow.
  - *New commercial space in high-demand neighborhoods.* Despite extremely low commercial vacancy rates, relatively few new office spaces are being built in Brooklyn. This is likely the result of zoning rules that give preference to residential development and create few incentives for developers to build commercial projects. At the same time, several of the most in-demand neighborhoods are home to commercial buildings that have clear potential to house innovation companies but are being used instead for municipal uses—from the tow pound at the Brooklyn Navy Yard to the Board of Election storage facility in Downtown Brooklyn—and for self-storage.

In addition, our research identified a range of other challenges that could inhibit the growth of theinnovation economy in Brooklyn, if left unaddressed.
These include:

- Talent shortages, particularly for engineers, software and hardware developers, UX designers,data scientists, cybersecurity specialists, and other highly specialized workers.
- Rising housing costs, which could make it difficult for the borough to hold onto its greatest competitive advantage in the innovation economy: its highly educated and entrepreneurial workforce.
- Concerns about Brooklyn's ability to maintain its creative edge amid rising costs and the proliferation of national chains.
- Questions about the future of the Relocation and Employment Assistance Program (REAP), which will terminate next year if it is not reauthorized in Albany. REAP provides income tax credits of up to $3,000 per employee for companies relocating jobs to Brooklyn (and the other three boroughs outside of Manhattan) from outside the city or below 96th Street in Manhattan. According to our research, many of the innovation companies based in Brooklyn today would not have relocated to the borough without the REAP incentives.

Diversity of Workforce in Tech Occupation, Leading U.S. Tech Hubs, 2017

	Black	Hispanic	White	Asian
Brooklyn	14%	8.8%	54%	20.4%
NYC	8.7%	10.9%	46.9%	30.9%
SF Bay Area	2.2%	5.3%	38.9%	50.3%
Boston	3.7%	5.5%	68%	19.1%
Seattle	2%	4.3%	60.2%	30.1%
Los Angeles	5.4%	17%	40.4%	33.9%
Dallas	12.4%	8.5%	50.5%	26.1%
Houston	13%	13.1%	47.5%	24.1%
Austin	4.7%	14.1%	61.7%	17.5%
Chicago	8.7%	8.8%	58.6%	21.9%
Washington, DC	25.6%	6.3%	48.1%	16.9%
Philadelphia	13%	6%	61%	16.6%
Portland	1.7%	5.2%	80.9%	9.5%

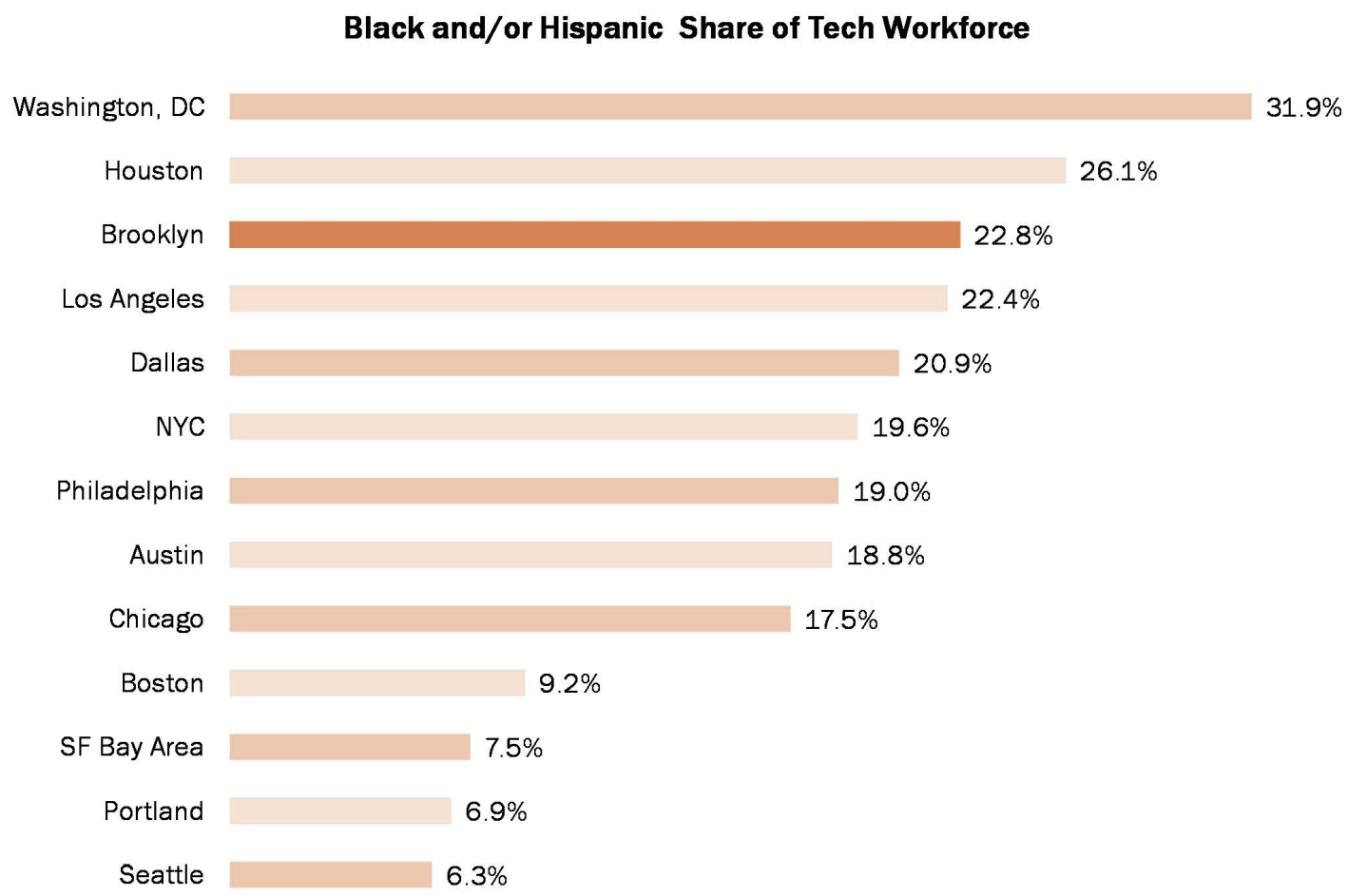
Source: Center for an Urban Future analysis of 17 tech-specific occupations, using data from the 2017 American Community Survey. Our analysis employs similar methodology to a 2018 Brookings Institution study and a 2016 U.S. Census Bureau report.

While Brooklyn has more to do to keep its innovation economy growing, it also will need to take steps to ensure that a lot more residents from Brooklyn's lowerincome communities are able to access the well-paying innovation industry jobs being created in the borough.

Jobs in the borough's innovation economy have the potential to become the middle-income career paths of the future, transforming the lives of New Yorkers from lower-income backgrounds. But to realize this potential, city and local leaders needs to make significant strides in equipping Brooklynites with the skills and experience necessary to succeed in the innovation economy. Indeed, it was abundantly clearfrom our site visits and interviews that Brooklyn's innovation economy workforce does not adequately reflect the borough's diversity.

Brooklyn is far from the only city with a troubling opportunity gap in the innovation economy. In fact, an analysis we conducted for this report shows that Brooklyn's tech workforce is notably more diverse than several other leading tech hubs. According to our analysis of 17 tech-specific occupations, Black and Hispanic workers account for 22.8 percent of Brooklyn's tech workforce (14 percent Black and 8.8 percent Hispanic).[1] This is significantly higher than Boston (9 percent Black and Hispanic combined), the San Francisco Bay Area (7 percent), and Seattle (6 percent).

The comparatively diverse workforce is a clear strength for Brooklyn's innovation economy. But there is still much more progress to be made in a borough where the overall workforce is 27 percent Black and 21 percent Hispanic.[2]



Source: Center for an Urban Future analysis of 17 tech-specific occupations, using data from the 2017 American Community Survey.

Our research took a close look at how to expand access to the jobs in Brooklyn's innovation economy. We conclude that the borough's leading stakeholders—including policymakers, leaders of academic institutions, heads of workforce development organizations, philanthropic foundations, and innovation economy employers—will need to make meaningful new investments to expand and improve the borough's education and workforce training infrastructure. In particular, Brooklyn's stakeholders will need to address the following specific challenges that were surfaced in our research:

- **Greatly expand the number of Brooklyn residents with a college credential –** A large share of the well-paying jobs in the innovation economy typically require at least a bachelor's degree, but just 35 percent of adults in Brooklyn hold a BA or higher, compared to 61 percent in Manhattan—and many of Brooklyn's college graduates are more recent arrivals from other cities. College attainment rates are considerably lower in many neighborhoods, including Brownsville (where 13.6 percent of adults have a BA or higher), East New York (14 percent), Canarsie (18.6 percent), Sunset Park (19 percent) and East Flatbush (22.5 percent).
- **Scale up the borough's tech training programs –** Although there are some notable exceptions, Brooklyn is home to relatively few training organizations with specific, in-depth programs tailored to careers in technology, creative industries, and innovative manufacturing, and most programs are serving just a few dozen participants annually. Moreover, the vast majority of the borough's tech training programs only offer basic digital literacy and computer skills. Though there are a handful of more in-depth tech training programs that can lead directly to a well-paying tech job, these programs are also small, collectively serving no more than a few hundred people each year.
- **Increase the number of employers that recruit and hire local residents –** Too few of the borough's employers in the innovation industries have established efforts to hire locally, recruit from CUNY, partner with the borough's workforce development organizations, and offer hands-on career-exploration opportunities and paid internships to

Brooklyn residents. There are a number of important exceptions, including dozens of companies that work with the place-based employment centers at the Brooklyn Navy Yard, Industry City, and Brooklyn Army Terminal. But there's no question that a lot more Brooklyn-based innovation companies will need to take affirmative steps to recruit, hire, and train local residents.

- **Expand work-based learning –** There are hardly any apprenticeship programs so far in Brooklyn's tech or creative sectors, although a new apprenticeship program for CNC technicians is connecting Brooklynites to jobs in advanced manufacturing. And while Brooklyn has a number of new Career and Technical Education (CTE) programs in public high schools, just one is in computer science and too few programs have meaningful partnerships with Brooklyn employers or are embedded among the borough's job clusters.
- **Strengthen Brooklyn's CUNY campuses and foster partnerships between these colleges and local employers –** Brooklyn's four CUNY colleges have an important role to play in expanding access to careers in the innovation economy. As one example, graduates of Downtown Brooklyn–based New York City College of Technology (City Tech)—where 61 percent of students come from households earning under $30,000 annually—have the highest median earnings one year after graduation of all CUNY colleges citywide ($41,564), serving as a testament to the power of a postsecondary credential aligned with STEM careers. But all four Brooklyn-based CUNY institutions could benefit from additional resources and from investments to more closely align with the needs of employers in the innovation economy. For example:
    - None of the Brooklyn-based CUNY campuses offers a bachelor's degree program in engineering.[3]
    - In 2016-17, the four Brooklyn CUNY campuses produced just 2,275 STEM graduates, with roughly half (1,203) coming from City Tech. Although the number has increased in recent years, there's an opportunity to further boost these numbers.
    - Only 15.4 percent of undergraduates at Medgar Evers College and 19.4 percent of students at City Tech participated in an internship, according to the 2018 CUNY Student Experience Survey. Of the borough's three senior colleges, only Brooklyn College (where 23 percent of undergrads participated in an internship) surpassed the citywide senior college average (21.7 percent). Meanwhile, just 10.2 percent of students at Kingsborough Community College participated in an internship, which is roughly on par with the citywide community college average (10.3 percent).
- **Expand bridge programs** – Brooklyn has veryfew bridge programs designed to connect people with the greatest barriers to employment—like limited English and math skills and no high school diploma—to job training and further education.

?Brooklyn has a golden opportunity to make progress on both areas that are the focus of this report: keeping its innovation economy growing and expanding access to the well-paying jobs in this sector. But it will requirepublic sector leaders—in Brooklyn and at City Hall— working closely with leaders from industry, academic institutions, and nonprofit workforce organizations to make new investments and institute new policies to help the borough overcome some key challenges.

This report outlines the key obstacles to growing Brooklyn's innovation economy and creating new pathways into these jobs—and it puts forth a series of achievable recommendations to overcome these challenges and realize the borough's immense potential to develop a larger and more inclusive innovation economy.

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1. To examine the racial and ethnic composition of Brooklyn's tech sector, we analyzed 17 tech-specific occupations, such as database administrators, web developers, and computer network architects, using data from the 2017 American Community Survey and employing similar methodology to a 2018 Brookings Institution study and a 2016 U.S. Census Bureau report.

2. Center for an Urban Future analysis of data from the 2013-2017 American Community Survey.

3. CUNY Office of Institutional Research and Assessment. Of the 594 engineering grads at CUNY senior colleges in 2016-2017, zero were at Brooklyn schools. All of the 594 were at City College, Baruch & CSI (and one at CUNY J School).

- The following are recommendations from *Growing and Diversifying Brooklyn's Innovation Economy*
- Read the full policy brief (PDF)

Strengthen Brooklyn's unique position as a driver of New York City's innovation economy

- **Launch a growth plan for Brooklyn's innovation economy.** To build on Brooklyn'scompetitive edge in the innovation industries and head off looming challenges, policymakers and local leaders should launch a comprehensive growth plan with specific funding to tackle five key needs: closing Brooklyn's borough-wide and regional transit gaps; unlocking space for jobs through land use changes; aligning incentives and tax policy to spur job creation; investing in public space improvements and cultural infrastructure; and expanding Brooklyn's workforce training and education systems to develop more local talent and create opportunities for far more residents from low-income communities.
- **Launch a major campaign to prepare 25,000 Brooklyn residents for careers in the innovation economy by 2025.** Brooklyn's growing advantage in tech, the creative industries, and advanced manufacturing is poised to generate thousands of well-paying jobs in the years ahead. But to ensure that these jobs are accessible to far more Brooklyn residents from lower-income communities, New York City and borough leaders will need to launch a major new effort to provide Brooklynites with the education, skills training, and connections needed to succeed. Brooklyn should take multiple approaches to meet this ambitious goal, including by boosting the number of students at Brooklyn's CUNY colleges who graduate with degrees in STEM fields; vastly expanding the number of Brooklyn residents who complete in-depth job training programs in innovation economy industries; increasing the number of high school vocational programs in tech, creative industries, and advanced manufacturing; growing the number of employers in innovative industries who offer paid internships and on-the-job training; and launching new apprenticeship programs in Brooklyn's tech and creative industries.

Boost the borough's transit infrastructure

- **Improve transit service for people commuting within the borough.** Brooklyn's greatest competitive advantage in the innovation economy is its highly educated workforce, but currently many of the borough's residents find it far easier to commute to jobs in Manhattan. City economic development officials—as well as leaders in Brooklyn—should push for new investments that greatly improve transit service between the North Brooklyn neighborhoods that are home to so many people working in the tech and creative industries nd the communities further south where a disproportionate share of the innovation economy jobs are being created—including the Navy Yard, Dumbo, Downtown Brooklyn and Sunset Park. This means supporting the Brooklyn-Queens Connector streetcar (BQX), but it should also include improvements that increase the frequency and speed of bus service in the borough.
- **Upgrade Brooklyn subway stations serving major job hubs.** Dumbo has become one of the city's most appealing destinations for innovation economy companies, but the neighborhood could greatly benefit from improvements to its main subway station at York Street. There is a mounting need to add capacity and address congestion issues at the station, where weekday ridership has more than doubled in the past decade. The station currently has just one exit, so adding a new one closer to its southern end would provide much needed relief. In addition, several other stations that serve the borough's growing job centers are badly in need of repair and face serious capacity issues, including Borough Hall,Jay Street, and Hoyt Street stations.
- **Add ferry service connecting Brooklyn and New Jersey.** To continue growing its innovation economy and attract larger innovation companies, Brooklyn will need to make it easier for workers living in Jersey City, Hoboken, and other communities outside of the city to commute to jobs in the borough. This is because larger companies draw its workforce from throughout the region. One solution is to add a direct ferry connection between Brooklyn and New Jersey, something that does not exist today. Brooklyn policymakers should push NYCEDC, DOT and private ferry

operators to launch ferry service connecting New Jersey with Dumbo, Sunset Park, and Williamsburg.

- **Maintain expanded G train capacity to meet growing demand.** To help alleviate crowding during repairs to the L train tunnel, New York City Transit has expanded the capacity and frequency of the G train. This includes both additional roundtrips on weekdays and longer trains to accommodate more passengers. Given the growing demand for G train service, which is helping connect Brooklyn residents to major job centers within the borough, New York City Transit should maintain this expanded service permanently to help meet the demand. G train ridership has seen strong growth since 2013, increasing more than 20 percent across several stations served only by the G train.
- **Prioritize connections to current and emerging job hubs through the Brooklyn Bus Network Redesign.** Over the next year, New York City Transit is developing a plan to redesign the Brooklyn bus network, with the goal of improving speed, reliability, and capacity; closing coverage gaps; bolstering offpeak service; and eliminating redundancy. To ensure that this process results in substantial improvements to bus service across the borough, the redesign should prioritize better connections to Brooklyn's existing and emerging job clusters along the corridor from Sunset Park to Williamsburg and faster transit times fromthe neighborhoods where Brooklyn's workforce lives—many of which are in north Brooklyn—to the neighborhoods where jobs are growing.
- **Permanently adopt the MTA's Atlantic Ticket pilot program to foster connections between Brooklyn and Queens.** The MTA's highly successful Atlantic Ticket pilot program allows riders to travel from seven Long Island Rail Road stations in Queens to Atlantic Terminal in Brooklyn for a discounted $5 fare—less than half the current peak cost. During the first year of the pilot, customers took more than 1.3 million trips using the Atlantic Ticket, which significantly improves commute times for Queens residents with jobs in Brooklyn. The MTA should make this successful pilot program permanent and maintain better connections between Queens and Brooklyn.

Expand the supply of spaces needed to grow Brooklyn's innovation economy

- **Promote new office development by increasing commercial FAR in Dumbo, Downtown Brooklyn, and other areas where it is appropriate.** Dumbo has become one of the city's most attractive centers for the innovation economy and Downtown Brooklyn has enormous potential as a central hub for companies from across the region. But despite record demand and extremely low vacancy rates, relatively few new office developments have moved forward. This would likely change if the city increased the permitted Floor Area Ratio (FAR) in the district to allow greater densities—not for housing or retail, but for commercial and industrial uses.
- **Preserve the borough's Class B & C office spaces.** Many of the city's tech start-ups and creative firms today rent space in these older office buildings, which tend to command sharply lower rents than Class A office towers. Unfortunately, many of the borough's B and C buildings have been converted for other uses in recent years. Borough leaders should take steps to hold onto remaining B & C buildings. This might include supporting new tax exemptions or low-cost financing for tenant improvements that would make it financially attractive for Class B and C owners to preserve their buildings as office spaces.
- **Relocate municipal uses with low job-generating benefits out of innovation districts.** Commercial vacancy rates are hovering near zero in many of the borough's most desirable innovation hubs, but some of these districts are home to government uses that take up large amounts of space. By relocating some of these uses, policymakers could free up more space for high-wage innovation jobs. This might include the Brooklyn Tow Pound that is located inside the Navy Yard; 345 Adams Street in Downtown Brooklyn, which includes storage facilities for the Board of Elections; the Metropolitan Detention Center in Sunset Park; Department of Education buildings at 65 Court Street and 131 ivingston Street; and the Department of Health facility at 295 Flatbush Avenue Extension.
- **Preserve Wallabout as a home for innovation economy companies.** Wallabout, the neighborhood adjacent to the Brooklyn Navy Yard, is home to a number of industrial buildings that are ideal for growing innovation companies—including manufacturing, tech and creative businesses working at the Navy Yard that require more space to grow. But many of the buildings in Wallabout are facing mounting pressure to be converted to housing. The Department of City Planning should consider Wallabout for a rezoning that requires manufacturing but also allows for additional overbuild density for office and residential.

Continue incentives that help attract innovation companies to Brooklyn

- **Reauthorize REAP.** Many of the innovation companies located in Brooklyn today told us that they may not have moved to the borough if not for REAP, an incentive program that provides a $3,000 business income tax credit for companies relocating jobs from outside of New York City or below 96th Street in Manhattan to designated locations above 96th Street in Manhattan or in one of the other four boroughs. Failure to renew this program will make it difficult for Brooklyn to build on its competitive advantage in the innovation economy and attract new companies from Manhattan and other cities. Leaders from the borough and City Hall should advocate for the reauthorization of the REAP incentive program—and the state legislators based in the borough should support reauthorization.

Maintain Brooklyn's creative edge

- **Launch a Cultural Infrastructure Plan for Brooklyn.** Brooklyn's unparalleled concentration of working artists, musicians, and creative venues has been vital to the rise of the borough's innovation economy. But today, many of the borough's artists are struggling to survive amid rapidly rising real estate costs. To address the challenges threatening Brooklyn's artists and venues, New York City should consider taking a page from London, where Mayor Sadiq Khan recently unveiled an ambitious blueprint to sustain and grow the city's cultural infrastructure. City officials should do the same for Brooklyn, which has become the heart of New York's emerging creative ecosystem. Such a plan might include establishing Creative Enterprise Zones, which in London are funding the creation of affordable workspaces for artists and creative businesses while also developing training programs that help local residents access jobs in the creative economy.
- **Expand Spaceworks NYC across Brooklyn's innovation clusters.** The nonprofit Spaceworks NYC has proved effective at creating affordable spaces for visual and performing arts. It has built arts spaces in Williamsburg,

Gowanus and Park Slope, but Brooklyn stakeholders should explorepartnerships that bring Spaceworks NYC to innovation centers like Dumbo, Downtown Brooklyn, and Sunset Park.

Build community around Brooklyn's innovation economy

- **Establish a Brooklyn Innovation Industry Council.** Brooklyn has emerged as one of the nation's leading hubs of the innovation economy, but the borough's more than 1,000 innovation companies don't always speak with a strong voice. Brooklyn would benefit from an innovation industry council that would regularly pull together leaders from the borough's innovation industries to discuss, strategize, and advocate on critical issues affecting the sector's sustainability and growth—from improving transit to expanding internships. The council Growing and Diversifying Brooklyn's Innovation Economy 27 should be led by founders and executives from Brooklyn-based innovation companies, withrepresentation from tech, creative and advanced manufacturing businesses located across the borough. Brooklyn Borough President Eric Adams and the borough's City Council delegation should consider providing seed funding to launch the council.
- **Develop an annual Brooklyn Innovation Awards competition.** Establishing an awards competition for companies and products in tech, creative industries, and advanced manufacturing would help raise the visibility of Brooklyn's high-flying innovation economy and showcase some of the innovative companies in the sector.
- **Launch an accelerator in Brooklyn focused on one of the borough's emerging competitive strengths.** Although Brooklyn is home to dozens of incubators and co-working spaces, our research found that the borough could use more step-up offices with flexible and affordable leasing terms. To address this need, Brooklyn policymakers should work with NYCEDC to establish an accelerator space focused around one of the growing industries where the borough holds a competitive advantage, such as fintech, property tech, digital health, consumer electronics, or gaming.

Expand access to jobs in Brooklyn's innovation economy

- **Boost the number of low-income Brooklyn residents with a college degree.** Low levels of formal educational attainment are preventing thousands of Brooklyn residents from accessing the borough's growing number of well-paying jobs in innovative industries. While 61 percent of adults in Manhattan have at least a bachelor's degree, the same is true for just 35 percent of Brooklyn residents—with significantly lower levels in most of the borough's lower-income communities. To ensure that more Brooklynites can access the borough's growing supply of well-paying jobs, the city and state, along with CUNY's leadership, should double down on efforts to boost graduation rates. Programs like CUNY ASAP that are proven to increase completion rates at community colleges should be expanded to reach every community college student, and similar programs should be developed and launched at the borough's senior colleges—particularly at Medgar Evers, which has the lowest six-year graduation rates of any senior college. The New York City Department of Education should set a goal of boosting college readiness rates for Brooklyn's high school students from 50 percent to 75 percent by 2025, while ensuring that the borough's lowest-performing schools are making gains.
- **Increase the number of black and Hispanic STEM graduates in Brooklyn.** Brooklyn has benefited from a strong push by CUNY in recent years to increase the number of programs offered in STEM fields. But to ensure that more Brooklyn residents from low-income communities are able to access the best-paying jobs in the borough's innovation economy, far more Brooklynites should be earning STEM degrees. Brooklyn's City Tech produced 1,203 STEM graduates in 2017—more than any other CUNY campus. But Medgar Evers, Brooklyn College, and Kingsborough Community College are collectively producing just 1,072 STEM graduates each year. In addition, students who are black and/or Hispanic, and/or who are women, remain seriously underrepresented among STEM graduates. Working with partners at CUNY and the DOE, at community-based organizations, and at other educational institutions, Brooklyn should set a goal to increase the number of STEM graduates at Brooklyn's public colleges by 50 percent and launch new mentorship and early-exposure programs to help grow the share of Brooklyn STEM graduates who are black and/or Hispanic, and/or who are women.
- **Build community job training and employment hubs in neighborhoods where Brooklyn's innovation industries are growing.**

Job opportunities in Brooklyn's innovation economy are growing rapidly, but relatively fewphysical spaces exist to connect local residents with area employers and industry-guided training. The city should provide seed funding for the development of new Innovation Job Centers in neighborhoods like Dumbo, Downtown Brooklyn, Williamsburg, and Bushwick—developed in partnership withe local nonprofits and commercial landlords—to embed local recruitment and training programs amid clusters of innovative businesses.

- **Expand the city's ApprenticeNYC initiative to include apprenticeship programs in Brooklyn's tech and creative sectors.** New York City's recently launched ApprenticeNYC program aims to create 450 apprenticeships in the industrial, health, and tech sectors by 2021. For New Yorkers with limited formal education, this program can provide a powerful economic boost, while offering employers a way to develop talent with the exact skills they need. But so far the initiative is operating at a very small scale. While this is an important start, the city should move quickly to launch new apprenticeship programs in other parts of the innovation economy, including in tech and creative occupations. Apprenticeships in data science and marketing, software development, or cloud computing could create important new pathways into Brooklyn's innovation economy, while helping more companies meet hiring needs and boost retention while diversifying their workforces.
- **Develop new capacity-building grants so Brooklyn's nonprofit job training organizations can launch and scale programs focused on the innovation economy.** Brooklyn benefits from a number of well-regarded job training and skills-building organizations focused on careers in the innovation economy, but there are too few of these programs overall and the scale remains very small. Research conducted for this report found that fewer than 300 Brooklyn residents are graduating from free, in-depth tech training programs annually, and programs aimed at jobs in the creative industries are smaller still. New York City should support capacity-building grants designed to help organizations scale the programs that are working, including by building new training facilities and hiring instructional, administrative, and outreach staff. In addition, this initiative should support the growth and development of nonprofit small-business intermediaries that can help convene local employers with training organizations to identify talent needs and build industry-informed curricula.
- **Fund bridge programs in Brooklyn to provide on-ramps to further education and job training.** Brooklyn has very few bridge programs designed to connect residents with significant barriers to employment—like limited English and math skills and no high school diploma—to in-depth job training and further education. For nearly one million Brooklynites, including 340,000 adults without a high school diploma or equivalent and 565,000 residents who speak English less than very well, training programs for jobs in the innovation economy are often out of reach. To ensure that far more Brooklyn residents can connect with career-oriented training and education, the city should invest at least $70 million annually in bridge programs citywide and greatly expand the number of programs bridging into advanced training programs for the innovation economy.
- **Build the capacity of Brooklyn's CUNY colleges to connect with innovative employers.** CUNY's Brooklyn colleges play a vital role in producing STEM graduates with the skills and credentials needed to access jobs in the borough's innovation industries. But research for this report finds that too few of Brooklyn's CUNY schools are connecting with employers in the borough's innovation economy. In part, this problem stems from a lack of capacity: for instance, City Tech has just three career counselors serving the entire population of 17,000 students. The challenge is exacerbated by the fact that most of the borough's tech start-ups, creative companies, and advanced manufacturers are small, which makes the employer outreach process much more labor-intensive. To help CUNY develop relationships with a much larger pool of local employers in the innovation economy, the city and state should support a significant expansion of CUNY's career services departments and ensure that more counselor and account managers are hired at each college.
- **Relaunch and expand the Brooklyn Tech Triangle Internship program.** The Brooklyn Tech Triangle Internship program, which launched in 2012, offered City Tech studentsa nine-week paid internship with companies in Brooklyn's innovation economy, receiving accolades from both businesses and students. But funding for the program, which was provided by the Department of Small Business Services and the Mayor's Office of Media and Entertainment, along with members of the Brooklyn Tech Triangle, ended in 2017. The program should be relaunched and expanded to include both high school and college summer internships, with additional support from the Department of Education, and grow to include at least 300 internships per year with innovation economy companies located throughout Brooklyn.

- **Expand high school CTE and work-based learning programs aligned with the innovation economy.** Brooklyn's CTE programs provide an important pathway for high school students to access job-specific training and work-based learning opportunities. However, far too few of Brooklyn's current CTE programs are aligned with occupations in the innovation economy. For instance, Brooklyn has just one CTE program in web design, at the Academy of Innovative Technology High School in Cypress Hills, and the new Brooklyn STEAM Center offers the borough's only CTE program in computer science. The Department of Education should launch at least ten new CTE programs in fields such as data science, e-commerce, media production, construction technology, and advanced manufacturing, and ensure that every CTE school has at least one program focused on computer science.
- **Embed more high school programs in innovative workplaces.** For most Brooklyn high school students, their first experience in the workplace is a minimum-wage job in the service sector. While these experiences are valuable on their own, Brooklyn has an enormous opportunity to greatly expand the availability of work-based learning experiences aligned with the borough's fast-growing innovation economy. One highly promising model is the Brooklyn STEAM Center at the Brooklyn Navy Yard, which provides handson exposure to real jobs and workplaces in technology, manufacturing, and the creative industries. The Department of Education should replicate the STEAM Center model in other Brooklyn innovation-economy job clusters, including Industry City and Dumbo, and set a goal of connecting at least 30 high schools to innovative work-based learning opportunities like the STEAM Center over the next three years.
- **Launch new programs designed to recruit more innovation economy employers as partners in developing talent.** Brooklyn's innovation economy companies need to get more involved in hiring locally, helping to develop relevant education and training curricula, creating internship and apprenticeship opportunities, and partnering with schools, colleges, and workforce development organizations. But support is needed to help facilitate relationships between Brooklyn's relatively small innovation economy employers and local training and education organizations. New York City's Economic Development Corporation should launch a new RFP designed to incentivize partnerships focused on employer engagement, which should include business intermediaries like the Brooklyn Chamber of Commerce and local business improvement districts, as well as local training and workforce development organizations. Measurable results would include growing the number of companies participating in existing training programs, like Opportunities for a Better Tomorrow's TechSTART program and BWI's Made in NY program, as well as launching new training initiatives with first-time employer partners.
- **Add a hiring bonus to the REAP tax credit for employers who source talent through local workforce development programs.** REAP provides a $3,000 business income tax credit per employee for companies relocating jobs in one of the other four boroughs. To ensure that more companies that take advantage of REAP are also incentivized to source talent through local workforce development programs, a $2,000 bonus should be added for companies who hire new employees through a nonprofit workforce development program and retain them for at least a year.

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