THE POWER OF ENTREPRENEUR NETWORKS
How New York City Became the Role Model for Other Urban Tech Hubs
OVER THE LAST YEAR, our team at Endeavor Insight studied the rapid growth of New York City’s information technology industry. We define tech companies as those developing an information technology or those whose businesses are Internet-enabled, excluding financial tech, green tech, and life sciences companies. Our goal was to identify lessons that leaders in other cities can use to support the growth of their own tech sectors. In the process, we created one of the largest datasets on a single entrepreneurship ecosystem in the world. It combines data from AngelList, Crunchbase, and LinkedIn with nearly 700 interviews with local tech entrepreneurs. In total, these founders dedicated more than a month of their time to this project. Our analysis reveals three key findings:

NEW YORK CITY IS THE BEST ROLE MODEL FOR OTHER URBAN TECH HUBS.

New York City has become the largest truly urban center for tech companies and the second-largest tech hub in the world. Tech companies led by local entrepreneurs directly employ 53,000 people, over 1% of New York City’s workforce. Between 2003 and 2013, the New York City tech sector grew twice as fast as Silicon Valley’s in terms of dollars invested, with its companies raising more than $3.1 billion in funding in 2013. Unlike many other urban tech hubs, most of the growth of the New York City tech sector has come in the last decade. Venture funding for tech companies in New York City increased by 240% from 2003 to 2013, and more than 85% of the sector’s current companies and 86% of its current jobs were created during this time.
Many people believe that tech founders are young, technical experts who studied at a prominent local university. We analyzed data on the age and educational history of New York City tech founders, and found that these myths do not tell the full story of the city’s founders or the sector’s success. The average New York City tech founder is thirty one years old when she founds her company and founders are just as likely to have studied a non-technical subject in university as a technical one. Founders also tend to be highly mobile, with nearly 90% graduating from universities outside of New York City.

Connections between successful founders and new entrepreneurs are a critical driver of the sector’s growth. Data from over 2,500 companies shows that top-performing tech entrepreneurs are more likely than their peers to start new companies, encourage their employees to do the same, mentor, angel invest, and inspire new entrepreneurs. In turn, new founders who are connected to or influenced by these top-performing founders are more likely to be successful than other local tech entrepreneurs. The development of this network of top-performing New York City tech founders has initiated a virtuous cycle of reinvestment that continues to fuel the sector’s growth.

The development of this research and content would not have been possible without the expertise and assistance of the Partnership for New York City. The staff of the Partnership provided critical feedback and connections that greatly enhance the reach and quality of this study.
New York City is the best role model for other urban tech hubs.

At $1.1 billion, the sale of DoubleClick in 2005 kicked off a decade of rapid growth for the New York City tech sector. Since then, companies like Buddy Media and Right Media have followed closely in DoubleClick’s footsteps, selling for hundreds of millions of dollars.

The Fastest Growing Urban Tech Hub. New York City’s tech sector creates hundreds of new startups annually. These aren’t just small businesses, but ones that are scaling rapidly in preparation for IPOs and acquisitions, with at least 27 companies exiting for more than $500 million in the last decade. The sector has expanded so rapidly that the growth of invested venture capital dollars, at 13.3% annually between 2003 and 2013, is twice as large as that of Silicon Valley, at 6.4%, and dwarfs that of Massachusetts, at negative 1.7%. New York City’s tech sector has superseded even Boston’s by many measures to become the largest standalone urban tech hub in the United States.

Poised for Greater Growth. Between 2010 and 2013, the number of New York City tech employees grew by more than 26% annually. At this rate, based on 2013 tax rates and a $100,000 average salary, the city could add nearly $160 million annually in new tech employee income tax receipts by 2019 and over $500 million by 2024. Assuming each of these new employees uses 100 square feet of office space, tech companies would need almost 450,000 square feet of additional office space annually by 2019 and 1.4 million square feet by 2024 to accommodate them, providing real benefit to industries beyond the tech sector.

Look to New York City, Not the Valley. Silicon Valley may seem like an attractive template for creating urban tech sectors, but it is unlikely that cities will be able to replicate it. Silicon Valley commercialized the fundamental technologies of the last half century: the silicon computer chip, personal computer, and consumer Internet. These companies and technologies emerged in a farming region in the 1950s, which, over the course of five decades, became a robust suburban tech hub. Its tech companies may have expanded into San Francisco, but the majority of the region’s funding and startup activity continues to be located in suburban areas like Palo Alto, an hour south of the city.

Cities don’t have 50 years to create a tech sector or the revolutionary technologies underpinning the Valley’s rise. Most importantly, the strategies San Francisco used to attract neighboring suburban firms are only useful to other cities that have world-class innovation hubs next door.

New York City’s tech sector is a much better role model for other cities. The city’s tech sector has emerged in just two decades, with many of its new companies using existing infrastructure and industries like advertising, media, and fashion as platforms for growth. This approach has allowed the city to set aside the unlikely chance that it will birth the next computer chip, and instead focus on making its media companies social and its advertising companies digital. By looking at its own strengths, New York City has overcome the constraints facing post-industrial cities worldwide to accumulate the talent and capital at the core of its thriving urban tech sector.
The economic impact of New York City’s tech sector

2003–2013

2,206 Companies founded
336 IPOs & Acquisitions
53,000+ Jobs
$14.2Bn Investment
$18.1Bn Exit amount
IT IS NOT EASY to build a tech sector, and myths regarding what causes one to grow are common. Many of these assumptions rightfully focus on the entrepreneurs themselves; after all, without them, businesses never start and a sector never grows. We analyzed New York City’s tech founders to understand several of these common assumptions and find that, contrary to popular belief, neither youth, nor technical skills, nor even homegrown talent have been central to the growth of New York City’s tech sector.

➤ EXPERIENCE TRUMPS YOUTH. Entrepreneurship is oftentimes portrayed as a vocation of youth: tech-savvy young people, it seems, can disrupt whole industries without ever having worked in them. New York City’s tech founders, rather than recent graduates, tend to be mid-career specialists with substantial industry experience who use their perspective to help existing industries innovate.

A group of seasoned executives, for example, founded Gilt Groupe, a successful e-commerce company. One of the founders, Alexandra Wilkis Wilson, had an MBA and several years of corporate experience at retailers like Bulgari and Louis Vuitton before starting Gilt. Like Alexandra, Neil Blumenthal, founder of online eyeglass company Warby Parker, spent five years as Director of Vision Spring, honing his industry knowledge and managerial skills before becoming an entrepreneur. These are not isolated cases: New York City tech founders were, on average, 31 years old before starting companies.13

New York City tech founders’ age at founding

Data from New York City’s tech sector debunks several common startup myths.
TECH TALENT ISN’T NECESSARILY HOMEGROWN. Cities don’t have to source entrepreneurial talent from within their borders in order to create a successful tech sector. Great tech sectors are instead built in one city by people from around the world. New York City’s tech sector is no exception, with 82% of its founders graduating from high school outside of the city.14

New York City is home to several world-class higher education institutions, including the recently inaugurated Cornell Tech campus. Despite the renown and success of these institutions, New York City’s tech sector is not strictly a product of talent coming out of these universities, either. In fact, it has succeeded in attracting the vast majority of its tech founders not from local universities, but rather from colleges throughout the United States and even worldwide. In aggregate, nearly 90% of New York City’s tech founders graduated from an undergraduate institution outside of the city, while 70% of those who attended graduate school did so elsewhere.15 Surprisingly, the University of Pennsylvania is by far the number one college destination for future New York City tech founders.
New York City tech founders’ undergraduate majors by STEM and non-STEM fields of study

Note: 1,681 founders studied 2,499 majors in undergraduate.
**FOUNDERS ARE POETS AND QUANTS.**
For many, mention of tech entrepreneurship brings to mind a programmer hunched over a computer developing groundbreaking new technologies. This image doesn’t tell the full story, however, of New York City tech founders, who are as likely to write marketing copy as a new compression algorithm. Combining these skill sets, these founders have found a way to grow both their businesses and the sector.

This dynamic begins as far back as college, where more New York City tech founders study non-technical subjects than technical ones. We divide these founders’ undergraduate majors into two categories: STEM (science, technology, engineering, and mathematics) and non-STEM. This breakdown reveals that New York City tech founders study everything from economics, to computer science, to philosophy, and more often pursue the arts than the sciences. 65% of New York City tech founders studied non-STEM fields, while just 35% studied STEM ones during college.\(^{16}\)

It’s not that New York City’s tech founders are transitioning into more technical fields of study after they finish their undergraduate degrees, either. Among the 42% of New York City tech founders who attended graduate school, nearly two-thirds received non-technical graduate degrees like MBAs, MAs, and JDs.\(^{17}\)

The story of New York City’s rise is about much more than the background of its founders, the degrees they hold, or even the university they attended. We dig deeper, and find that the founders themselves, by contributing to one another’s success, are causing the New York City tech sector to grow.

### Percent of New York City tech founders by graduate degree studied

- MBA: 43%
- MS: 23%
- PhD: 5%
- JD: 7%
- MA: 14%
- Other: 8%

Note: 798 of 1,723 founders attended graduate school.
Founders who reinvest their success into others have greatly accelerated the tech sector’s growth.

THE CITY’S TECH ENTREPRENEURS look quite different from the stereotypes. They are older, less technical, and more likely to have attended undergraduate and graduate school elsewhere. It is not New York City’s mix of founder characteristics, however, that other cities should attempt to recreate. Policymakers who focus only on certain types of entrepreneurs risk orienting urban entrepreneurship policy towards yesterday’s challenges, as opposed to tomorrow’s opportunities. Instead, cities can focus on supporting the dynamic unfolding in New York City: few entrepreneurs who give rise to many generations of spinouts. Through five types of influence—inspiration, mentorship, investment, serial entrepreneurship, and former employee spinouts—New York City’s tech sector is benefitting from a virtuous cycle in which entrepreneurs grow their businesses, become successful, and reinvest their human, financial, and social capital in the next generation.

**SUCCESSFUL COMPANIES ARE INFLUENTIAL COMPANIES.** Over the past decade, companies like DoubleClick, Buddy Media, and AppNexus have received hundreds of millions of dollars in investment and exited for several billion more. These resources have found their way back into the sector, with the founders of these companies influencing 75 other New York City tech companies, using their success to mentor, invest, inspire, found new companies, and encourage former employees to do the same. Over time, the companies they have influenced have become successful in their own right, and continue to accelerate this cycle’s momentum. The 75 companies influenced by DoubleClick, Buddy Media, and AppNexus have gone on to influence 177 other companies themselves, which in turn have influenced 227 companies. Within just three degrees of influence, these three companies alone touch over 400 New York City tech firms.

As New York City tech companies become more successful, their founders are more likely to connect to and influence other entrepreneurs. Although the vast majority of New York City tech companies are still private, it is possible to look at over 300 companies with recorded exits between 2003 and 2013 to determine how influential their entrepreneurs became after being acquired. For every 100% increase in the dollar value of an exit, that company and its founders become 25% more influential. After selling their companies, founders and employees combine new wealth with the experience of having built a fast-growing company. With this expertise, capital, and visibility, these entrepreneurs found new companies, accelerate the growth of existing ones, and contribute to the ongoing expansion of the sector.

**SUCCESS PASSES FROM ONE GENERATION TO THE NEXT.** The most successful companies have an important impact on the performance of the entrepreneurs they influence. To explore this, we look at companies that are top performers, as defined by being in the top 10 percent of all companies founded in the same year by number of employees, total investment, or exit amount between 2003 and 2013. Companies that have been influenced by these top-performers become top-performers themselves 22% of the time, more than twice as often as those that do not have
Influenced by a top-performing company  
Not influenced by a top-performing company

Note: 85 companies are top-performers of 386 companies influenced by top-performers; 101 companies are top-performers of 1,052 total companies not influenced by top-performers.

We look at these same results in a regression framework and find that companies that have been influenced by top-performers are 14% more likely to become top-performing companies themselves. Put another way: being connected to a successful business makes it more likely that a business will receive a lot of investment, employ many people, or exit for a large amount of money.

**CONNECTIONS AS IMPORTANT AS INSTITUTIONS.** The prevailing wisdom has often been that institutions drive the success of an entrepreneurship ecosystem. We look at New York City’s top three investment firms, incubators, accelerators, co-working spaces, and undergraduate universities based on the percent of top-performing companies coming out of each. We compare the percentage of successful companies founded between 2003 and 2013 affiliated with these top institutions to the percentage of successful companies influenced by other successful companies. The results are surprising: 22% of companies influenced by another successful company are themselves successful, compared to 22% with connections to the top three universities, and just 11% from the top three incubators, accelerators, and co-working spaces. Only the top three New York City investment firms have a higher portfolio company success rate, at 44%, and almost half of these top-performing companies are themselves connected to other top-performers.

Companies and founders that connect to other top-performing companies are significantly more likely to be successful than those that tap into existing support organizations alone. New York City tech is not wasting its success; a small handful of companies are instead multiplying it. Highly connected companies do better and, in turn, successful companies give rise to more connections.
Five types of connections are accelerating the New York City tech sector’s growth.

**GIVING BACK** has become the norm for New York City tech founders. They inspire, mentor, invest, found new companies, and support their former employees to do the same. These five connection types bridge the gap between the experienced and the novice, the successful and the striving. In a city where so many are transplants, the entrepreneurs included, they are creating a reservoir of talent and capital for new entrepreneurs to tap.

**MENTORSHIP.** High-quality mentorship—relationships among founders to solve critical business issues—represents a unique opportunity to transfer knowledge from one generation of entrepreneurs to the next. No one is better positioned to guide an entrepreneur through the challenges of scaling a business, growing a sales pipeline, or sourcing talent than someone who is a bit further along in her journey as a New York City tech entrepreneur.

With over 400 entrepreneur-to-entrepreneur mentoring relationships, collaboration across generations of entrepreneurs has become the norm in the New York City tech sector. Successful entrepreneur mentors like Stephen and Heidi Messer of LinkShare (acquired by Rakuten for $425 million in 2005) and Scott Belsky of Behance (acquired by Adobe for a reported $150 million in 2012) are just two of hundreds investing their time and expertise in new tech companies. The New York City tech sector is increasingly collaborative, and successful entrepreneurs are helping the next generation as a way to pay it forward, stay tapped into new innovations, and cultivate future business relationships.

**ANGEL INVESTMENT.** Angel investments, typically from $25,000 to $500,000, play a critical role in providing the early capital and expertise necessary to get a business off the ground. Angel investors are not just sources of capital, but also mentors in their own right, as well as important sources of credibility as new entrepreneurs seek outside funding. In New York City’s tech sector alone, there have been over 3,500 New York City tech angel investments made by more than 2,000 angels.

Over 860 of these investments have been made by New York City tech entrepreneurs themselves, and more than a quarter of New York City tech companies have at least one co-founder who is also an angel investor. Large numbers of New York City tech founders are spurning the opportunity to retire to a tropical beach and are instead staying committed to the growth of the sector and propelling its growth with the smartest capital: entrepreneur angel investment.

**INSPIRATION.** Entrepreneurship is not an obvious career choice, and there are easier ways for talented people to make money, particularly in New York City. Despite these challenges, as New York City tech entrepreneurs become successful, they are also attracting attention. Increased visibility in turn allows these entrepreneurs to become role models for the next generation of founders. In fact, successful entrepreneurs like Alexis Maybank and Alexandra Wiliks Wilson from Gilt Groupe, Jonah Peretti from Buzzfeed, and Dennis Crowley from FourSquare, have inspired over 180 future New York City tech entrepreneurs.
Successful companies and entrepreneurs have two more ways that they can impact an ecosystem: serial entrepreneurship and former employee spinouts. More than 400 serial entrepreneurs have founded over 650 New York City tech companies.³²

It’s not just the entrepreneurs who go on to found new companies, either. Many New York City tech founders promote entrepreneurship among employees, inspiring them to venture out on their own and oftentimes supporting them financially when they take the plunge. In total, more than 500 companies have been founded by former employees of New York City tech companies.³³ The multiplicative effect of these two types of connections alone is impressive: on average, every two New York City tech companies connected to this network give rise to one more through serial entrepreneurship and former employee spinouts.³⁴
Connections among New York City tech companies grew rapidly between 2003 and 2013.

► REINVESTMENT IS ACCELERATING. The combined effects of the five connection types cannot be overstated. New York City tech has become a successful urban tech sector in large part because its best entrepreneurs and companies are accumulating not just employees, investments, and exits, but also influence. Over time, a network of 2,340 New York City tech entrepreneurs from 1,297 companies has emerged. Between these people and companies, a dense network of at least 2,000 connections has developed.35

Growing at an annualized rate of nearly 25% between 2003 and 2013, entrepreneur and company connections are the pathway through which New York City tech entrepreneurs are accumulating the human, social, and financial capital necessary to drive the formation of new companies. Without these relationships, people, knowledge, and money would leave the city’s tech sector: the iconic never inspire, the knowledgeable never mentor, and the successful never invest. Rather than standing on the shoulders of successful founders, young entrepreneurs of each subsequent generation would instead start on the ground floor. In a global economy with tempered growth and intense competition for nascent entrepreneurs, supporting this cycle is the only way for cities to capitalize on their success stories and create successful urban entrepreneurship ecosystems of their own.

► FROM FEW ENTREPRENEURS, MANY. New York City is now home to several groups of founders and former employees—sometimes referred to as “mafias”—who have left a single successful company and founded many more. These mafias demonstrate that over time, the strongest companies have an impact that spills across an entire city, generating jobs, revenue, and new companies. The three firms we have profiled, DoubleClick, Buddy Media, and AppNexus, are all important financial successes, but their founders have exceeded this success by mentoring, investing in, and inspiring the next generation.
Cummulative connections among New York City tech companies

WHEN HOUSEHOLDS in the U.S. were just getting their first dial-up Internet connections, Kevin O’Connor, Dwight Merriman, and Kevin Ryan mixed technology and advertising to monetize the consumer Internet. DoubleClick became a leading Internet ad-server and rode the expanding Internet bubble to an IPO in 1998. When the bubble burst and decimated the tech industry, DoubleClick managed to survive, losing 70% of its clients but 80% of its competitors. As the industry slowly regained its footing, DoubleClick and its founding team managed to resize the company and achieve profitability before selling it to private equity firm Hellman & Friedman in 2005. At $1.1 billion, this acquisition was one of the biggest of a New York City tech company at the time. The new owners would go on to sell the company to Google for $3.1 billion, and today DoubleClick is at the center of Google’s $50 billion advertising business. The financial success of this business has been superseded by its ongoing impact, with Dwight and Kevin Ryan going on to found seven more New York City tech companies and its former employees starting 26. Yahoo! acquired one of these firms—Right Media—in 2007 for $850 million.
Seeing an Opportunity: to link social media with traditional advertising, Mike and Kass Lazerow, Aryeh Goldsmith, and Jeff Ragovin started Buddy Media in 2007. Mike and Kass, having recently sold Golf.com for $24 million to Time Warner, were ready for a new challenge. Even as the financial crisis began to strike down traditional companies, Buddy Media thrived by offering companies a Software as a Service (SaaS) platform on which they could easily engage their own customers through social media. Buddy Media continued its rise through 2010, scaling to add several hundred employees and attracting $90 million in investments from blue chip investors including Greycroft, Softbank, and British advertising giant WPP. In 2012, Salesforce.com, seeing the strength of Buddy Media’s managing team and the staying power of its product, acquired the company for more than $800 million. The story doesn’t stop there. The four founders have become influential investors and mentors to younger entrepreneurs. They have made at least 11 angel investments in New York City tech companies and have continued to mentor and inspire several other entrepreneurs.
WHEN RIGHT MEDIA, which was founded by a former DoubleClick employee, sold to Yahoo! for $850 million, two of its former employees had an idea for a new kind of digital advertising company. Brian O’Kelley and Mike Nolet founded AppNexus to transform digital advertising by offering real time bidding to compete with some of the biggest names in the business: Google, Yahoo!, and Facebook. In just five years, the company has grown to be one of the largest ad exchanges in the world, second only to its homegrown competitor, Google’s DoubleClick. AppNexus’ $130 million in revenues and 500 employees at the end of 2013 helped it to raise $140 million at a valuation in the billions. Brian and Mike have already begun to multiply their impact by investing in at least ten other New York City tech companies, with a strong focus on ad-tech startups, and six former employees have gone on to found new companies themselves. There are rumors of an IPO on the horizon that may ultimately create new liquidity for founders, early employees, and investors, but AppNexus is already demonstrating that success breeds success.
The growth of New York City’s tech sector from 2003-2013

2003
45 total connections

2004
87 total connections

2005
148 total connections

2006
236 total connections

2007
359 total connections

2008
535 total connections

2009
719 total connections

2010
1,070 total connections

2011
1,503 total connections

2012
1,813 total connections

2013
2,070 total connections

Total connections among New York City tech entrepreneurs in 2013

121 inspiration connections
320 mentorship connections
865 angel investments
428 serial entrepreneurs
336 former employee spinouts
CITIES AROUND THE WORLD can recreate the success of the New York City tech sector, and they don’t need to seed new industries or create tech parks to do it. In fact, the public effort necessary to recreate the dynamic of reinvestment now happening in the New York City tech sector may be much smaller than many policymakers think. Most cities already have many of the components necessary to accelerate the growth of a tech sector, including aspiring founders, new startups, and successful entrepreneurs. By connecting startups, scale-ups, and top-performing companies to one another, cities can catalyze the growth of an entrepreneurship ecosystem on top of existing local companies, capital, talent, and industries.

**INSPIRE ENTREPRENEURS TO START HIGH-GROWTH BUSINESSES IN YOUR CITY.** Successful entrepreneurs are powerful ambassadors and role models for your city’s tech sector, and celebrating them and their businesses can raise the visibility of the entire sector. Promoting these figures can change the trajectory of people who had not previously considered entrepreneurship as a good career path, and local stories make the possibility of launching a successful company much more tangible.

Several New York City campaigns have highlighted the growth of the sector at large, as well as the success of specific companies and entrepreneurs. **Made in New York City** is an ongoing advertising campaign promoting, among other things, the city’s digital industries. A citywide advertising campaign put local companies like LearnVest, Etsy, Songza, Kickstarter, and AppNexus on city buses and subways. A separate program, now called **digital.nyc**, is a platform for all things tech in the city. Its news stories promote local companies and emerging technologies and celebrate the growth of the sector with a map of local tech companies, investors, jobs, and events.

Cities can promote their success stories without building a dedicated online platform or launching a large-scale advertising campaign. In Texas, **The Dallas 100** is an annual list of the fastest-growing companies in the city. Over 1,100 executives, investors, university leaders, government officials, and journalists celebrate and promote the companies on the list during an annual award celebration, creating examples of inspirational high-growth entrepreneurs in the process.

**MENTOR BUSINESSES AND THEIR ENTREPRENEURS AS THEY SCALE UP.** Successful local entrepreneurs have a great deal of expertise when it comes to creating a business model, raising capital, and scaling a business once it has product market fit. These entrepreneurs tend to be busy, so creating opportunities for high-quality, structured mentorship is particularly important and oftentimes difficult to achieve.

Accelerators like **Techstars** and **Entrepreneurs Roundtable Accelerator (ERA)** provide targeted mentorship to help young New York City tech entrepreneurs address critical business issues, but both organizations also take an equity stake in their companies. Recently launched public programs like **NYC Generation Tech** work directly with high school students, while **NYC SEED** works with very early stage companies. New York City may lack formal programs to promote later stage mentorship, but its successful entrepreneurs...
have filled that gap and created a robust expert network in their absence. Not all cities already have the scale or resources to support programs like ERA and Tech Stars. However, examples from outside New York City can help cities to create a culture of mentorship. In Boston, MIT’s Adolf F. Monosson Prize for Entrepreneurial Mentoring promotes individuals and organizations that have mentored young entrepreneurs. Recipients tend to include the award in their biographies. By elevating the status of mentorship, cities can encourage the successful to contribute back to the ecosystem.

► INVEST INTO THE MOST PROMISING COMPANIES. Encouraging more entrepreneur angel investment not only facilitates the transfer of knowledge and money into new ventures, but also keeps successful entrepreneurs engaged in the ecosystem’s success. This is particularly important for entrepreneurs who have exited companies and have enough liquidity to retire and leave the local ecosystem.

New York City has robust networks of angel investors, as well as the resources and financial infrastructure to train recently successful entrepreneurs in the finer arts of seed investing. The city has dozens of angel groups dedicated to investing in early stage startups, including New York Angels (a top 10 most active angel group in the world with over $95 million invested), The Angel Investor Forum, and 37 Angels. Comprised of both entrepreneurs and investors, these groups lower the barriers to becoming an angel, reduce risk, and professionalize the practice.

Cities lacking angel investment networks can still help to spur the practice locally. The Angel Resources Institute (ARI) is just one such organization that conducts training programs on the investment process, valuation, term sheets, the post-investment relationship, and due diligence. Tax credits that enable recently liquid entrepreneurs to allocate stock options to angel investment vehicles can also increase the quantity of local entrepreneur seed capital.

► ENCOURAGE SERIAL ENTREPRENEURS AND FORMER EMPLOYEE SPINOUTS. Successful entrepreneurs and their employees have experience starting, working in, and scaling fast-growing businesses. Cities must not only retain these entrepreneurs and employees, but also enable them to spin out new businesses.

The Partnership for New York City runs an Entrepreneurs Council to give successful entrepreneurs a platform to engage with each other as well as local civic organizations and government. These interactions facilitate future business relationships and wed entrepreneurs and their future ventures to the city.

Former employees of New York City tech companies are tapping into a similar network to create new businesses. New York Tech Meetup, an organization dedicated to supporting the New York City tech sector, has more than 40,000 members, many of them working at tech companies. Its monthly gatherings enable these employees to share and demo product ideas with one another, and it is not uncommon for attendees to meet their future co-founders, formulate business plans, and launch new companies at these events.

Even without a robust network of thousands of people interested in tech entrepreneurship, cities can implement policies to facilitate serial and former employee entrepreneurship. According to a study by the Kauffman Foundation, non-compete agreements inhibit the formation of new local companies.42 In New York, non-competes are only narrowly enforceable, and in other domestic tech hubs like California, non-compete agreements are not enforced at all, freeing employees to become entrepreneurs themselves.43
METHODOLOGY

WE COLLECTED THE DATA for this report between March 2013 and March 2014 using primary interviews with entrepreneurs and publicly available data from Crunchbase, AngelList, and LinkedIn.

Tech companies are defined as those that are either actively developing a new information technology or those whose businesses are Internet-enabled. We excluded financial technology, green technology, and life sciences companies from this analysis. Our rationale for excluding these three industries was 1) the overlap between finance and technology has increased, and it is difficult to disaggregate the two; 2) manufacturing drives large portions of green technology; 3) expertise and founders in life sciences firms are largely distinct from those in information technology businesses.

All companies included in this study met three criteria: 1) information about them was publicly available; 2) they were founded in one of the five boroughs (Manhattan, Brooklyn, Bronx, Queens, and Staten Island) of New York City; and 3) they had received investment and/or had revenues at the time of data collection. Using these definitions, we created a list of New York City tech companies using Crunchbase, AngelList, the Made in NY Digital Map, and the portfolio companies of all major venture capitalists, incubators, accelerators, and co-working spaces active in New York City. We added to this list additional companies mentioned by entrepreneurs, who we define as company founders, in the course of interviews.

In total, we reviewed 3,609 companies to determine if they met the aforementioned criteria and identified 2,593 New York City tech companies. These companies were founded between 1980 and 2013, although 96.58% of companies in the dataset were founded after 1996 due to survivorship bias. We then identified and vetted 4,542 entrepreneurs and found that 4,161 had founded one or more of these New York City tech companies.

We interviewed 643 New York City tech founders representing 664 New York City tech companies and asked them five core questions:

- Who inspired you to become an entrepreneur?
- Who invested in your company?
- Who was your mentor during the growth and development of your company?
- Have you founded other New York City tech companies?
- Which of your former employees have gone on to found New York City tech companies?

We use the responses to these questions to create an edgelist of connections among companies, along with a corresponding set of five outbound connection types, each of which is represented by a different colored arrow.

Where an entrepreneur has founded multiple companies, his or her most prominent company based on an index of founding date, number of employees, total investment, and exit sizes represents his or her influence on the map. Companies are oftentimes connected by more than one type of connection. Where a purple “founder” arrow connects any two companies, the only other arrow that can appear is the blue “former employee” arrow. Likewise, where mentorship and investment occur simultaneously between two companies and their entrepreneurs, we only include the green investment arrow. In the former case, we assume that inspiration, mentorship, and investment are encompassed within the act of serial entrepreneurship represented by the purple arrow. In the latter, we assume that angel investment comes with a degree of mentorship. Otherwise, multiple arrows can connect two companies.

We calculate the size of a company’s circle
based on directed closeness centrality for unconnected graphs. In layman’s terms, the size of a company is a function of the number of first-, second-, third-, etc. degree connections the company and its entrepreneurs have to others in the network.

Each ring represents a time period and companies are located on a ring according to the year they were founded. Connections accrue to a company based on the time period in which the connections occurred. Where we do not know the year a connection occurred, we take one of two different approaches.

Where we do not have year information for an inspiration, former employee, investment, or founder connection, we assume that the year of the connection between the source and the target companies is equal to the year the target company was founded. To estimate when a mentorship relationship started where we are lacking a start year, we reviewed mentorship relationships where we do have start year information. For the 273 mentorship relationships where this information is available, we find that the mean elapsed time between company founding and mentorship is .5 years. We then set the mentorship year equal to the year the target company was founded, and add .5 years to it, rounding to the nearest year.

In this model, a company’s circle and influence grow over time as it and its entrepreneurs become more connected to other New York City tech companies.

For other analyses, all percentages are calculated using a 95% confidence interval.
APPENDIX 1

LISTED BELOW are all 643 entrepreneurs who participated in interviews. Entrepreneurs are affiliated with their most influential company. Companies are listed in alphabetical order.

AdSheretech: Michael Moreno
Admelt: Ben Barokas, Brian Adams
Adstar: John Larraine, Josh Wurman
Advtuitive: Isaac Oates
Advizr: Mustapha Baasri
Adwise: Kif Shafir
Agelo: Mohamed Altantawy
Alienative: Matt Johnson
Aliaswatch: Raja Choudhury
Alluring Logic: Dane Arpino
Altah Net: Elizabeth Collusio
Amicus: Seth Bannon
Amie Street: Joshua Bolttuch
Amplience: Tony Denis
Amplify: Joel Klein
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Doubleverify: Oren Netzer
Drop.io: Darden Somashker
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Groupon: Michael Waxman
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Harvest: Danny Wen
Hatch: Anastasia Leng
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Heybuddy: David Amasilem
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APPENDIX 2
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APPENDIX 3
Participants

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ENDNOTES

1. See Methodology section for additional information on the definition of New York City's information technology sector.

2. 3.8 million people were employed in New York City in July 2014. “New York City Local Area Unemployment Statistics Program.” New York State Department of Labor. Accessed 15 September 2014 <http://labor.ny.gov/stats/laus.asp>. We assume that companies for which we do not have employment data (1,627 of 2,593) have the median number of employees (10), with 53,430 estimated net employees working at these New York City tech companies as of December 2013.


4. CB Insights.

5. 2,206 companies were founded between 2003 and 2013 of 2,593 companies, all time, or 85.11%. 53,430 jobs were created between 2003 and 2013 of 62,291 gross jobs, all time, or 85.77%.


7. Ibid.


9. In 2010, the New York City tech sector had 26,577 employees and in 2013, 53,430 employees, a 3-year compound annual growth rate (CAGR) of 26.21%.


12. 2003-2013 economic impact calculated using two methodologies. For companies founded, acquisitions, and exit amounts, we count the actual number of companies founded and acquired and the actual dollar amount of exits between January 2003 and December 2013 based on survey and publicly available data. For employees and investment, we assume straight line growth from the founded year until the close year, acquisition year, or 2013, recording only employees and investments generated between 2003 and 2013. We assume that companies for which we do not have employment data (1,319 of 2,206) have the median number of employees (10). All other figures are actuals.

13. 30.64 (+/- 34 years) on average when New York City tech founders found their companies. Assumes that founders are 18 at undergraduate university matriculation.

14. 81.87% (+/-2.52%) of New York City tech founders attended high school in the five boroughs of New York City.

15. 11.67% (+/-1.44%) of New York City tech founders attended undergraduate school in the five boroughs of New York City.

16. 27.84% (+/-2.91%) of New York City tech founders attended graduate school in the five boroughs of New York City.

17. 11.67% (+/-1.92%) of New York City tech founders studied at least one non-STEM subject in undergrad while 35.46% (+/-1.92%) studied at least one STEM subject.

18. 41.98% (+/-2.21%) of New York City tech founders have a graduate degree, 64.40% of founders have non-technical graduate degrees. 42.97% (+/-3.26%) have an MBA, 22.73% (+/-2.76%) have an MS, 14.29% (+/-2.30%) have an MA, 7.14% have JDs (+/-1.69%), 5.30% (+/-1.47%) have PhDs.

19. DoubleClick has 44 first degree connections; AppNexus has 20 first degree connections; Buddy Media has 16 first degree connections. Five of these connections overlap.

20. DoubleClick, AppNexus, and Buddy Media have 177 second degree connections and 227 third degree connections. DoubleClick, AppNexus, and Buddy Media have 401 unique connections within three degrees.
21. R-squared = .1905, n=48, p=0.002.
22. We group companies in cohorts and calculate percentiles based on the year the company was founded.
23. 22.02% (+/-4.22%) of companies with a top-performing inbound connection are successful, 9.60% (+/-1.82%) of companies with no top-performing inbound connections are successful. Analysis includes companies with no inbound connections.
24. R-squared = .0404, n=730, p=0.000.
25. 22.02% (+/-4.22%) of companies with a top-performing inbound connection are successful, 9.60% (+/-1.82%) of companies with no top-performing inbound connections are successful. Analysis includes companies with no inbound connections.
26. There have been 413 mentorship relationships among New York City tech founders, all time.
29. 3,583 total angel investments made in New York City tech companies by 2,157 total angels, all time.
30. There are 865 company to company investment connections. 665 New York City tech companies have at least one founder who is also an angel investor, 25.65% of the 2,593 total New York City tech companies, all time.
31. 183 inspiration connections among New York City tech founders, all time.
32. 420 New York City tech serial entrepreneurs founded 656 New York City tech companies, all time.
33. 527 New York City tech companies have been founded by former employees of other New York City tech companies, all time.
34. 627 unique serial entrepreneurship and former employee connections (mutually exclusive) divided by 1,297 companies in network equals .4834 new companies per company through these connection types, all time.
35. 2,340 unique entrepreneurs have founded these 1,297 companies. Since 2003, we record 1,963 company to company connections with 2,070 connections among them where any pair can have more than one connection type between them.
38. DoubleClick’s founders founded 8 New York City tech companies, its former employees 29, with 3 companies overlapping.
44. Survivorship bias in this case is the tendency of our dataset to contain companies that still exist, and not ones that have closed.
45. An edgelist is a data structure for storing connections between nodes, in this case companies.
ABOUT US

ENDEAVOR is leading the global high-impact entrepreneurship movement to catalyze long-term economic growth. Over the past fifteen years, Endeavor has selected, mentored, and accelerated the best high-impact entrepreneurs around the world. To date, Endeavor has screened more than 30,000 entrepreneurs and selected 900+ individuals leading 600+ high-impact companies. These entrepreneurs represent over 400,000 jobs and over $6.8 billion in revenues in 2013 and inspired future generations to innovate and become entrepreneurs too.

ENDEAVOR INSIGHT, Endeavor’s research arm, studies high-impact entrepreneurs and their contribution to job creation and economic growth. Its research educates policy makers and practitioners on how to accelerate entrepreneurs’ success and support the development of strong entrepreneurship ecosystems. In 2013, Endeavor Insight joined with the Kauffman Foundation and the World Bank to co-found the Global Entrepreneurship Research Network (GERN).

THE PARTNERSHIP FOR NEW YORK CITY’S mission is to engage the business community in efforts to advance the economy of New York City and maintain the city’s position as the center of world commerce, finance and innovation. Through the Partnership Fund for New York City, the Partnership contributes directly to projects that create jobs, improve economically distressed communities and stimulate new business creation.